CAD/CAM/CAE

Source: Dataquest

Dataquest

Dataquest Incorporated
1290 Ridder Park Drive
San Jose, CA 95131-2398
(408) 437-8000
Telex: 171973
Fax: (408) 437-0292

United Kingdom
Dataquest UK Limited
Roussel House,
Broadwater Park
Denham, Nr Uxbridge,
Middx UB9 5HP
England
0895-835050
Telex: 266195
Fax: 0895 835260-1-2

France
Dataquest Europe SA
Tour Galliéni 2
36, avenue du Général-de-Gaulle
93175 Bagnolet Cedex
France
(1)48 97 31 00
Telex: 233 263
Fax: (01)48 97 34 00

Germany
Dataquest GmbH
Kronstadter Strasse 9
8000 Munich 80
West Germany
011 49 89 93 09 09 0
Fax: 011 49 89 930 3277

Japan
Dataquest Japan Limited
Shinkawa Sanko Building 2 Fl
1-3-17 Shinkawa
Chuo-kuTokyo 104
Japan
011-81-3-5566-0411
Telex: 781-32768
Fax: 011-81-3-5566-0425

Korea
Dataquest Korea
Dacheung Building Room 1105
648-23 Yorksam-dong
Kangnam-gu, Seoul 135-80
Korea
011-82-2-552-2332
Fax: 011-82-2-552-2661

Dataquest Incorporated
Ledgeway/Dataquest
The Corporate Center
550 Cochituate Road
Framingham, MA 01701
(508) 370-5555
Fax: (508) 370-6262

The content of this report represents our interpretation and analysis of information generally available to the public or released by responsible individuals in the subject companies, but is not guaranteed as to accuracy or completeness. It does not contain material provided to us in confidence by our clients.

This information is not furnished in connection with a sale or offer to sell securities, or in connection with the solicitation of an offer to buy securities. This firm and its parent and/or their officers, stockholders, or members of the families may, from time to time, have long or short position in the securities mentioned and may sell or buy such securities.

Printed in the United States of America. All rights reserved. No part of this publication may be reproduced, stored in retrieval systems, or transmitted, in any form or by any means—mechanical, electronic, photocopying, duplicating, microfilming, videotape, or otherwise—without the prior permission of the publisher.

©1991 Dataquest Incorporated

Welcome to Dataquest

CAD/CAM/CAE

You are in the *Source: Dataquest* binder

A biannually updated collection of reference and statistical documents about the worldwide CAD/CAM/CAE industry. Worldwide, regional, and industry segment market statistics, *Company Backgrounders*, and several guides such as *How to Use Dataquest, Dataquest Research Methodology*, and *Dataquest High-Technology Guide--Segmentation and Glossary* are contained in this binder.

Other* CAD/CAM/CAE binders are:

Dataquest Perspective
A series of multitopic publications that provide analysis on worldwide CAD/CAM/CAE markets, companies, technologies, exhibitions, and trade shows, as well as news and views from around the industry.

Mechanical Applications
Contains detailed market statistics, including market share and forecasts, of the overall mechanical applications market. It also contains *Dataquest Perspectives* dedicated to the mechanical applications industry segment.

Electronic Design Automation Applications
Contains detailed market statistics, including market share and forecasts, of the overall electronic design automation applications market. It also contains *Dataquest Perspectives* dedicated to the electronic design automation applications industry segment.

AEC and GIS Applications
Contains detailed market statistics, including market share and forecasts, of the overall architecture, engineering, and construction CAD and geographical information systems market. It also contains *Dataquest Perspectives* dedicated to the AEC and GIS Applications industry segment.

CAD/CAM/CAE Europe
Contains detailed market statistics, including market share and forecasts, of the overall European market. It also contains *Dataquest Perspectives* dedicated to the European CAD/CAM/CAE industry.

CAD/CAM/CAE Asia
Contains detailed market statistics, including market share and forecasts, of the overall Asian market. It also contains *Dataquest Perspectives* dedicated to the Asian CAD/CAM/CAE industry.

Personal CAD and Distribution Channels
Contains detailed market statistics, including market share and forecasts, of the overall personal CAD market. It also contains *Dataquest Perspectives* dedicated to the personal CAD industry segment as well as a *Dealer Directory* and analysis of the indirect distribution channel.

*All CAD/CAM/CAE subscribers receive the *Dataquest Perspective* and *Source: Dataquest* binders, inquiry privileges, and access to Dataquest's Information Resource Center. In addition, subscribers to individual product or geographical segments receive the segment-specific binders: Mechanical Applications, Electronic Design Applications, AEC and GIS Applications, Personal CAD and Distribution Channels, Europe, and Asia. Each regional service and segment also provides *Dataquest Perspective* and *Source: Dataquest* coverage unique to that region or segment. For more information, contact your Dataquest marketing representative at (408) 437-8000.

CAD/CAM/CAE

Source: Dataquest

Table of Contents

Guides

How to Use Dataquest
Dataquest Research Methodology
Dataquest High-Technology Guide—Segmentation and Glossary

Market Statistics

Market Share
Forecast
Historical Company Data

Company Backgrounders

A detailed listing is located behind the *Company Backgrounder* tab.



Dataquest

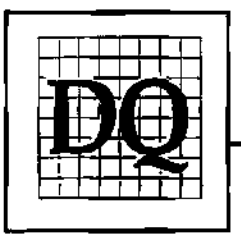
Dataquest Research Methodology



Dataquest®

RSOP-COR-GU-9201
August 31, 1992

Dataquest Research Methodology



Dataquest®

RSOP-COR-GU-9201
August 31, 1992

Published by Dataquest Incorporated

The content of this report represents our interpretation and analysis of information generally available to the public or released by knowledgeable individuals in the subject industry, but is not guaranteed as to accuracy or completeness. It does not contain material provided to us in confidence by our clients.

Printed in the United States of America. All rights reserved. No part of this publication may be reproduced, stored in retrieval systems, or transmitted, in any form or by any means—mechanical, electronic, photocopying, duplicating, microfilming, videotape, or otherwise—without the prior permission of the publisher.

© 1992 Dataquest Incorporated
August 1992
0013537

Table of Contents

Page

1. Introduction 1-1
2. Research Methods 2-1
   - Primary Research 2-1
     - Telephone Interviews 2-2
     - Mail Questionnaires 2-2
     - Personal Interviews 2-3
   - Secondary Research 2-3
3. Vendor-Based Research 3-1
   - Dataquest's Methodology 3-1
     - Market Size 3-1
     - Market Share 3-2
   - Definitions 3-2
   - Shipment Estimates 3-3
   - Data Collection 3-4
   - Quality Control and Validation 3-5
   - Documentation 3-6
   - Quarterly and Semiannual Shipments and Pricing 3-6
4. User-Based Research 4-1
   - Project Design 4-1
     - Questionnaire Development 4-1
     - Sample Design 4-1
     - Data Collection 4-2
     - Data Analysis 4-3
5. Market Forecasting 5-1
   - Theoretical Framework, Variables, and Data 5-1
   - Long-Run Trends versus Short-Run Fluctuations 5-6
   - Empirical Methods 5-7
     - Judgmental Methods 5-8
     - Technological Methods 5-8
     - Time Series Models 5-8
     - Causal Models 5-8
   - Forecast Quality Control 5-8
6. Summary 6-1

Appendix A. Currency Conversion A-1

List of Tables

Table		Page
A-1	Example of an Arithmetic Mean Annual Exchange Rate	A-3
A-2	Japanese Companies' Total Semiconductor Revenue	A-5

List of Figures

Figure		Page
3-1	Dataquest's Research Dimensions	3-3
5-1	Dataquest's Forecasting Methodology	5-2
5-2	The High-Technology Food Chain	5-5
5-3	North America Semiconductor Market	5-6

Chapter 1
Introduction

Fundamental to the way Dataquest conducts its research is the underlying philosophy that the best research and analysis uses appropriate methodology. Such methodology includes a balance between primary and secondary data collection; between supply-side, vendor-based analysis and demand-side, consumer-preference analysis; between focused, industry-specific research and coordinated, "big picture" analysis; and between the informed, insightful perspectives of experienced industry professionals and the rigorous, disciplined techniques of seasoned market researchers. Ultimately, this leads to a balance between data and analysis—the combination of which provides unique insight and maximum tangible value to our clients.

The purpose of the *Dataquest Research Methodology Guide* is to provide a clear and concise overview of Dataquest's research methodologies. This guide discusses research methodology as it pertains to vendor-based research, user-based research, and market forecasting.

Each methodology is discussed separately for explanatory clarity. In no way does this organization imply that one type of research is done in isolation of the other types. For example, vendor-based research, user-based research, and market forecasts all rely on the services provided by both primary and secondary research. Also, results from vendor-based research and user-based research are inputs to market forecasting. Indeed, the free flow of information among the different research specialties creates synergy that is key to Dataquest's research methodology.

Dataquest is committed to a rigorous research methodology. Dataquest applies accepted market research techniques to the dynamic world of changing technology, fluctuating business conditions, and evolving client needs. The methodologies described in this document serve the multiple needs of our clients in a constantly changing marketplace.

©1992 Dataquest Incorporated

Chapter 2
Research Methods

Dataquest recognizes the importance of a variety of information sources and the impact they have on the value of the services we provide. Dataquest conducts primary market research as well as secondary research to produce timely, detailed, and accurate analyses of high-technology marketplaces. The combination of these two research approaches yields a rich pool of data that can be used to answer specific questions, to produce market statistics, and to analyze and forecast industry trends.

Primary research can be distinguished from secondary research in several important ways, as follows:

- Primary information is first-hand data collected by the researcher. Secondary research is information that already has been published and typically is bought for research purposes.
- Primary research is custom research in areas where data or information does not previously exist. On the other hand, much of the secondary information has been compiled and published for some particular purpose other than market research.
- Availability is another key distinction between primary and secondary research. Primary research is proprietary data and available on a selective basis. Secondary research is public information and generally easy to obtain.

Dataquest views primary and secondary research as complementary components in its data gathering, drawing on each to produce vital information for high-tech markets.

Primary Research

Dataquest relies heavily on primary research as a means to collect original data. Primary research is conducted with end users in business, households, government, and schools; and with product vendors, suppliers, manufacturers, and distributors. Primary information is collected by Dataquest's in-house field interviewing groups as well as by industry analysts worldwide.

There are three basic interviewing methods used by Dataquest: telephone interviews, mail interviews, and personal interviews. The choice of which method to use is determined by the objective of the project.

©1992 Dataquest Incorporated

Telephone Interviews

Dataquest uses telephone-based field interviewing for much of its primary research. This method is usually employed when the study design requires a large randomly selected sample from a population, when eligibility is difficult to determine (necessitating many contacts for a completed interview), when the interview is relatively short, or when face-to-face contact is impossible or unnecessary. In some cases, questionnaires are faxed to the respondent prior to the telephone interview.

Telephone interviewing is conducted regularly by Dataquest's in-house field interviewing groups in San Jose and Paris. The charter of Dataquest's field interviewing groups is to collect and ensure quality data in a timely and cost-effective manner. These objectives are possible because of the following competitive advantages unique to Dataquest's interviewing group:

- Dataquest uses interviewers who specialize by industry, ensuring consistent, high-quality information
- Dataquest has complete access to information-gathering resources
- Dataquest experiences increased productivity because of industry contacts and knowledge of technologies

Dataquest's San Jose facility conducts interviews in North America, South America, Japan, and Asia/Pacific. Interviewing in Japan is also conducted from Dataquest's Tokyo office. Dataquest's Primary Research Centre, located in Paris, conducts interviews in 12 languages throughout the European region.

Central location interviewing has many advantages. It allows for central monitoring to ensure that correct interviewing procedures are being followed. Furthermore, if a respondent requests clarification on the meaning or intent of a question, it can be handled on the spot.

Dataquest's field interviewers participate in a briefing on each project prior to implementation. Interviewers are trained specifically in handling open-ended questions and questions that ask for "other" responses.

Mail Questionnaires

Dataquest uses mail questionnaires infrequently for the following three reasons:

- Low response rate—Mail surveys have a lower response rate than do personal or telephone interviews. The danger with low response rates is that those who return the questionnaires may be "different" or not representative of the universe of respondents, thereby introducing bias.

©1992 Dataquest Incorporated

- Accuracy—There is no interviewer in mail surveys who can explain the purpose of the project, clarify the questions, or resolve any problems. Respondent confusion about the questions can adversely affect survey accuracy.
- Time—It takes several weeks to conduct a mail survey, and most clients cannot wait that long.

Mail surveys cannot be used for an unstructured study in which the interviewer formulates the questions as the interview progresses. Personal and telephone interviews are more flexible in that they can be terminated or altered at any point, whereas mail surveys are inflexible.

Paper and pencil questionnaires are used in some specialized situations such as trade conferences and other group meetings.

Personal Interviews

Personal interviews are less structured and more intensive than phone interviews. There is a longer and more flexible relationship with the respondent resulting in data that has more depth and richness.

There are two basic types of personal interviews: nonstructured and semistructured. Nonstructured and semistructured interviews differ in the amount of guidance given by the interviewer. In the nonstructured interview, the respondent is given considerable freedom to respond within the bounds of topics specified by the interviewer. In semistructured interviews, the interviewer have a specific list of topics to cover with the respondent.

Focus groups are another form of personal interviews. Focus groups consist of 8 to 12 people who gather for two to three hours with a trained group facilitator to discuss a product, service, organization, or other marketing entity. The participants are paid an honorarium for attending. The meeting is held in a focus group room equipped with a two-way mirror for filming and observation. The group facilitator encourages remarks from the participants, while at the same time focusing their discussion. The comments are tape recorded and analyzed.

Secondary Research

Dataquest recognizes the importance of secondary research in all its analytical and intelligence functions. Although secondary information alone does not answer complex market research questions, secondary research has major advantages and roles in the market research process. Dataquest uses secondary information for the following:

- Provide basic working knowledge of industries
- Gather facts about the technology, products, and applications
- Monitor developments

©1992 Dataquest Incorporated

- Explore new territory or emerging technologies
- Gain insight for preliminary analysis
- Signal need for primary research
- Gather information quickly and at a lower cost than primary research.

In conducting secondary research, Dataquest employs a methodology to ensure that appropriate information is obtained to meet the diverse needs of its researchers. With a process-oriented approach, Dataquest is not only able to achieve time and cost efficiencies, but also is able to focus on finding the desired data from the pool of secondary information that currently exists. This process can be summarized as follows:

- Define the topic and data points to be collected
- Select secondary sources to search
- Conduct information search through multiple sources, using electronic databases, CD-ROMs and print resources
- Assemble and review information from all sources
- Present results of the information gathered

Because an impressive amount of secondary information exists concerning high-technology industries and the companies within these markets, Dataquest's researchers routinely use secondary research in the following key areas:

- Market sizing
- Validating estimates
- Cross-checking information, such as market share
- Checking trends that influence markets
- Checking company growth rates
- Verifying shipment totals and pricing information
- Supporting assumptions used in forecasting

Because our researchers and analysts are expected to review all types of information to keep abreast of market trends and industry events, Dataquest understands that access to information is a crucial part of the market research process. Dataquest has invested substantial resources to ensure that current information is available and accessible by all research staff.

The secondary research process is managed by professional librarians who understand how and where to get the secondary information necessary to support the needs of analysts and researchers. Dataquest's librarians are not only expert in searching all types of information sources, but also in selecting and obtaining key resources that researchers need on a frequent basis. The librarians work closely with

©1992 Dataquest Incorporated

the research staff to answer the complex questions that arise during the course of our market research.

Each major Dataquest location maintains a library facility that typically offers a comprehensive collection of information sources covering the full range of high-technology companies, markets, and industries tracked by Dataquest. Sources of secondary information typically utilized by Dataquest include the following:

- Articles in the general business and trade press
- Financial information from annual reports and other SEC documents
- Company and product directories
- Company press releases and product literature
- Government reports, statistics and economic data
- Trade association data
- Credit reports

In-house research collections are supplemented by online database services including Dialog, Lexis/Nexis, Dow Jones, Newsnet, Data-Star, and CompuServe. Other specialized databases from such companies as Dun & Bradstreet and Thomson Financial are also available to the research staff.

The benefits of buying secondary information on CD-ROM were recognized a number of years ago, and Dataquest became an early adopter of this information format. Today we have numerous CD-ROMs available for retrieving financial information, trade press articles, product information, and company profiles. Because of the high information content and ease of use of these products, these resources are used heavily by our research staff. In addition, analysts and researchers are able to receive secondary information on their own computer workstations. For instance, Dataquest currently has agreements for real-time information feeds from companies like BusinessWire and PR Newswire that are accessible from the researcher's desktop.

©1992 Dataquest Incorporated

Chapter 3
Vendor-Based Research

Each year, Dataquest tracks the shipments and revenue of thousands of vendors worldwide. This research helps Dataquest maintain a dynamic database of product shipments by company, and product consumption by region of the world.

Dataquest conducts product market share surveys on a quarterly, semiannual, or annual basis. The annual market share actually includes two surveys—a preliminary and a final survey. The preliminary estimates are completed by the end of the calendar year being reported, and the results are summarized in a report which is released early in the new year. Preliminary vendor rankings are featured in a Dataquest press release. Final market share estimates are prepared during the first quarter, and the results are published in a reference report released in the spring.

Dataquest believes that the estimates presented in its market share documents are the most accurate and meaningful statistics available. While Dataquest takes care in gathering, analyzing, and categorizing its data, clients must be aware of the definitions and assumptions that Dataquest uses when they interpret the estimates presented in the market statistics documents. Other companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, thereby reporting different results. These differences should be kept in mind when making comparisons between data provided by Dataquest and those provided by other suppliers.

Dataquest's Methodology

Dataquest's vendor-based research incorporates both market sizing and market share research activities.

Market Size

Market size is defined as the universe of all companies competing in a market. The universe of companies is based on a core list of companies that Dataquest has developed over time. Each year, Dataquest checks the universe to add companies previously not included, and to delete companies no longer competing in the market.

©1992 Dataquest Incorporated

Dataquest uses its proprietary market sizing bibliography as a foundation for market sizing research. The market sizing bibliography describes sources of information that identify companies participating in various markets. These sources include industry associations, business and financial sources, and other secondary sources. Dataquest analysts search these sources to develop a list of companies that is as comprehensive as possible. Special attention is devoted to identifying companies not included in our previous data collection.

Once the universe of companies in an industry is identified, researchers estimate the approximate size of each company. Size is one of the variables used in identifying a company as a leading vendor and as a company that Dataquest will track in greater detail. The largest companies are usually considered to be leading vendors in an industry. In addition to size, identification of a company as a vendor that merits more detailed attention is based on our ongoing relationships with industry contacts and industry events.

Smaller companies in each market are also noted. Shipments and revenue for smaller companies are estimated using the same general procedures applied to larger companies. The data from smaller companies usually are aggregated and reported as "other companies." These estimates are incorporated into overall market size statistics.

Market Share

The purpose of market share is to estimate the presence of a leading vendor in a product market. Market presence may be measured in terms of unit shipments or revenue. Market share is critical for companies to assess their absolute and relative position in a market, and thus develop appropriate competitive strategies.

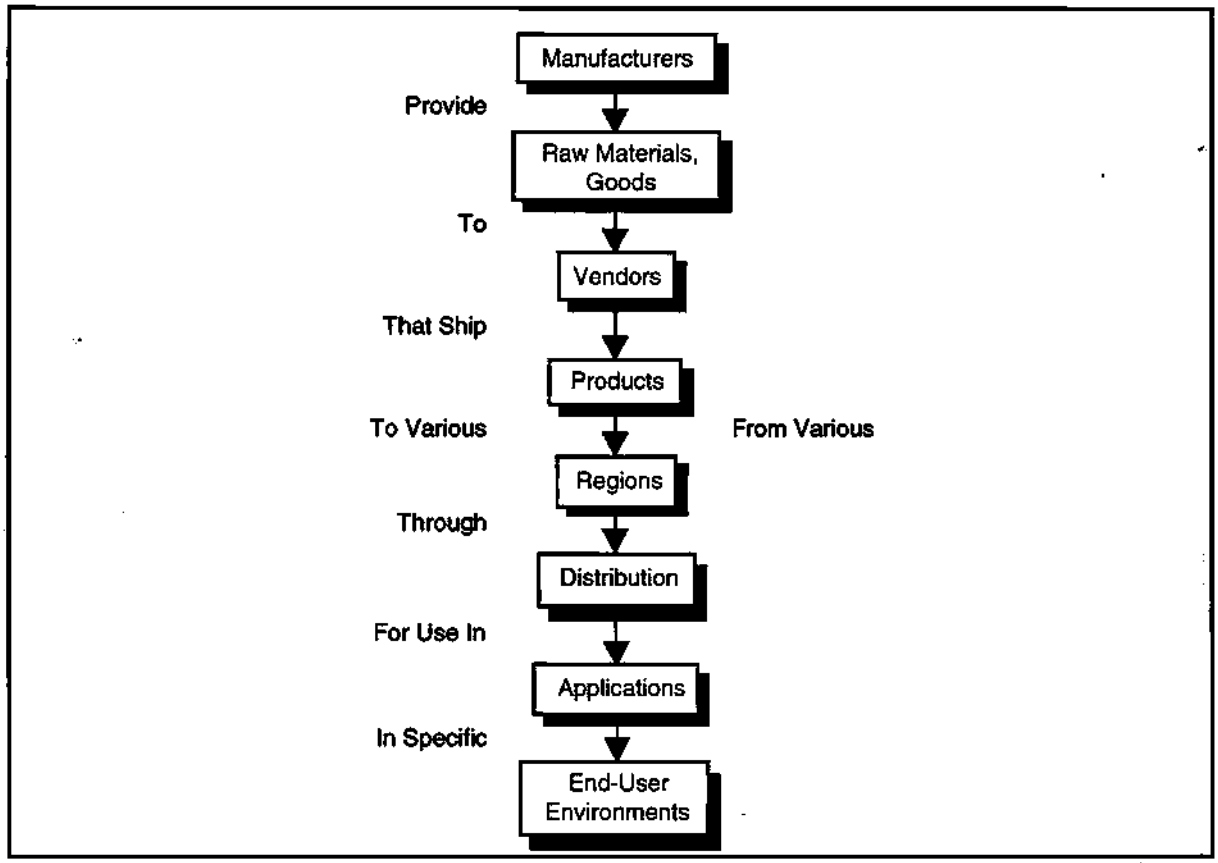
Definitions

The *Dataquest High-Technology Guide* is the corporatewide reference for segmentation and definition of technologies and markets. Definitions explain Dataquest's understanding of technologies. Segmentation refers to the way in which a market is divided into different dimensions including companies, products, regions, distribution, applications, and user environments. These dimensions are illustrated in Figure 3-1. The segments and terms found in the *Dataquest High-Technology Guide* are used consistently throughout Dataquest's products and within all Dataquest's worldwide offices.

Dataquest has defined regions of the world for the purposes of tracking and reporting company production and consumption. Those regions are North America, Europe, Japan, Asia/Pacific, and Rest of World. The country composition of these regions is given in the *Dataquest High-Technology Guide.*

©1992 Dataquest Incorporated

Figure 3-1
Dataquest's Research Dimensions



Source: Dataquest (August 1992)

G2000416

Shipment Estimates

Dataquest prepares estimates of shipments for each product and company prior to market share data collection. Shipments are estimated at the most disaggregate level possible (such as by company, by product, or by region). These initial estimates are based on the following:

- Company year-to-date performance
- Validating information, such as press releases, Wall Street news items, industry contacts, and online sources
- Dataquest forecasts of product revenue and shipments, by product and by regional market

Initial estimates represent Dataquest's best estimate of company performance during the previous year. The estimates are treated as confidential.

©1992 Dataquest Incorporated

Data Collection

Data collected in our vendor surveys are used in a bottom-up analysis defining market revenue, market size, and market share. Market share data collection involves virtually all Dataquest researchers and interviewers. Dataquest estimates of product shipments and revenue for the year are provided to each company. The company is asked to respond to Dataquest with revisions or corrections as appropriate.

The accuracy of information provided to Dataquest varies. Some companies are known for always reporting accurate numbers, whereas other companies are less uniform in their reporting practices. With experience, analysts become familiar with the different and varied reporting styles of the companies involved.

Dataquest analysts cross-check all information with the goal of defining the most accurate estimate possible. This effort requires the ability to integrate information from different sources. It relies on the analyst's ability to perceive and process information provided indirectly. The skill and sensitivity of the individual researcher is a critical element.

Collection of top-level aggregate data (worldwide and regional unit shipments and revenue) from a vendor is the responsibility of the Dataquest office located within the same region of the world as the vendor being surveyed. Collection of bottom-up disaggregate data (regional and country shipments of each vendor) is the responsibility of the Dataquest office located within the region of consumption. The rationale for this division of labor is that the Dataquest office located within a particular region is best suited to perform data collection tasks related to manufacturers located within that region. The local Dataquest office is also most able to comment on facets of consumption within that region, regardless of the location of company headquarters.

For example, Dataquest San Jose is responsible for data estimation and collection for North America-based vendors and their worldwide and regional shipments. Similarly, Dataquest Europe estimates and collects data on worldwide and regional shipments for European-based vendors, and Dataquest Japan is responsible for the estimates and collection of worldwide and regional shipments for Japanese vendors. Dataquest Seoul and Dataquest Taiwan estimate and collect the worldwide shipments data for South Korean and Taiwanese vendors, respectively. Vendors located in the Rest-of-World region are, in most cases, the responsibility of Dataquest San Jose. This assignment forces a reconciliation between Dataquest's analysts and Dataquest's offices, resulting in a single worldwide estimate for any given product.

Once the vendor-based data are collected, they are compiled into a single market-specific database. Subsets of the data based upon the region of consumption are then furnished to Dataquest's regional offices. The regional analysts examine their specific regional consumption data (worldwide vendors' shipments into their regions), and

©1992 Dataquest Incorporated

compare the estimates to the results of their individual regional data collection efforts.

This methodology harnesses the advantage provided by Dataquest's regional analysts. It enables regional analysts, by strength of their location, to collect data from vendors based within their region. Furthermore, it makes allowances for differences in regional pricing, distribution methods, and application usages, and their effects on the market share estimates. At the same time, it allows the regional analysts to examine the shipment data of worldwide vendors into their region in order to account for differences within their region of the marketplace.

An additional advantage of this approach is the assignment of ultimate responsibility for a particular vendor to a particular analyst. This assignment forces a running dialogue and information exchange among offices.

Quality Control and Validation

All market share data are validated through cross-checks to assure quality. The checks include the following:

- Check aggregate data against at least two other data points
- Check large market share changes
- Check large volume changes
- Check current trends against historical trends
- Check against complementary or substitute products
- Check against installed base
- Check against other Dataquest data
- Check company growth rates against competitors

Dataquest utilizes both primary and secondary sources to produce market statistics data. Primary research is supplemented with secondary research to verify market size, shipment totals, and pricing information. Either primary or secondary information is used to validate estimates. Where data cannot be collected from primary sources, estimates are checked against secondary sources. Revenue reported in one market covered by a vendor are also evaluated against that vendor's revenue in other markets covered by Dataquest to make sure that revenue is not double counted. In addition, Dataquest may check with multiple sources at one company to verify data.

The data collected in our vendor surveys are considered public information. The names of respondents are always kept confidential, and all data are published as Dataquest estimates. All respondents are notified of Dataquest policies when market estimates are initially sent.

Companies in the market share survey review Dataquest's initial estimates and respond with their comments or revisions. If a company chooses not to participate in the data collection effort, Dataquest either

©1992 Dataquest Incorporated

uses initial estimates, or adjusts the initial estimates based on responses by other companies.

Documentation

Detailed notes and documentation are maintained on each company surveyed in the market share sample, as well as the supplemental group of companies used to estimate total market size. Documentation includes handwritten notations indicating sources of data and any relevant secondary information.

Quarterly and Semiannual Shipments and Pricing

Dataquest monitors selected companies on a monthly, quarterly, or semiannual basis. Typically, this research and analysis is limited to unit shipments and product pricing of the most important leading companies in a market. Companies selected for this in-depth research have products that meet the following criteria:

- Significantly greater than average growth
- "Bell-weather" indicators of future market activity
- Receive disproportionate market-participant attention.

The purpose of this in-depth monitoring is to assure that Dataquest estimates stay current with important market shifts that occur between market share and data collection cycles. This research serves as valuable input for updating expectations of short-range market activity.

©1992 Dataquest Incorporated

Chapter 4
User-Based Research

User-based research serves as a complement to Dataquest's traditional vendor-based research. By focusing on the consumer, user-based research reflects the demand-side of product markets. Dataquest's user-based research includes studies of market penetration, installed base, technology plans, product configurations, product pricing and positioning, customer satisfaction, and new product testing and concept evaluations.

Project Design

The most important aspect of user-based research is to define the purpose of the research. What is the question that the client wants to answer? If there are multiple questions, what is the main question? Once the project's purpose is identified, a design is prepared to guide research activity. The design covers the entire range of research activity, including definition of research objectives, questionnaire development, sample design, field interviewing, statistical analysis, and the final report. It also includes a timeline and milestones that can be used to assess progress.

Questionnaire Development

Questionnaires are developed in consultation with the project leader or client. Questions are phrased in a form that will facilitate complete and usable responses. Special attention is devoted to minimizing response biases potentially caused by such factors as answer order, question order, generalization, and scaling.

Questionnaires typically contain the following three main sections:

- Introduction and screener page that outlines the purpose of the study and identifies the correct person to participate in the interview
- Specific questions to meet the project's objectives
- Demographic questions that enable the respondents to be grouped together and the data analyzed in subsets

Sample Design

Sample design involves definition of sample parameters, determination of the sample approach, and the most appropriate source for the sample. Sample parameters are determined according to the

©1992 Dataquest Incorporated

population of interest in the study. For example, a survey of corporate computer use would likely include parameters such as the number of employees and annual sales. A study measuring users' interest level in video games would include sample parameters such as household composition and annual household income.

Once the sample parameters have been defined, a sampling approach is developed. Dataquest uses two types of sampling approaches: probability sampling and quota sampling.

Probability sampling is used for data that are to be projected to the population at large, such as market penetration data. In this approach, each potential respondent has an equal probability of being selected. A study that requires 200 completed interviews would begin with names of 1,000 potential respondents, if the anticipated response rate is 20 percent.

Quota sampling is an alternative to probability sampling and is used when simplicity and cost-effectiveness are important considerations. In quota sampling, a profile of the population to be studied is developed and quotas are set so that the final sample is forced to fit the main population profile. An example would be a study of U.S. business establishments with results reported by industry. The 1990 U.S. Census data reveal that government institutions represent approximately 3 percent of U.S. business establishments, services represent 31 percent, manufacturing represents 7 percent, and other businesses represent 59 percent. For a study requiring 500 completed interviews, quotas would be set so that 15 respondents would come from government institutions, 155 respondents would come from services, 35 respondents would be from manufacturing businesses, and 295 respondents represent other businesses.

Dataquest uses a variety of sampling sources depending on the nature of the research. Databases from Dun & Bradstreet, including Dun's Marketing Service databases of nine million U.S. businesses, are frequently used. Other sources include UCC1 filings that identify sites with specific computer and telecommunications equipment, and mailing lists from industry trade publications. Dataquest also has proprietary respondent databases that are used for research in specific high-technology markets.

Data Collection

Data collection in end user research relies heavily on primary research. Dataquest's primary research procedures are described in detail in an earlier section of this document.

Dataquest maintains sizable primary research units in San Jose, California and Paris. In addition, staff responsible for primary research data collection are located in London, Tokyo, Seoul, Taiwan, and Framingham, Massachusetts.

Preparation for the primary research includes in-depth briefings with the interviewers to review details of the project, the questionnaire, and procedures for collecting information. At the beginning of

©1992 Dataquest Incorporated

the project, preliminary interviews are conducted to validate the effectiveness of the questionnaire. Suggested changes can then be discussed and incorporated into the final questionnaire. The actual interviews are conducted online or with hard copy, depending on the format most appropriate for the objective of the study. Considerable time goes into quality control. The interview process is carefully monitored and responses are reviewed for accuracy and completeness at all stages of a project.

Data Analysis

Dataquest uses a full range of practical capabilities to conduct statistical analysis of user-based data. After data collection is completed, the data are cleaned and prepared for analysis. As a quality control check, frequency and percentage data are calculated for each response to every question.

Specific cuts of data are determined jointly by Dataquest and the client. Initial tables are produced according to predetermined specifications. Once the initial tables are reviewed, the need for further cuts of data often becomes apparent. An iterative process then occurs in which questions are formulated, additional analyses are conducted, and new sets of tables are prepared.

A variety of data analysis techniques are used to answer Dataquest's research questions. Techniques commonly used include validity and reliability testing, correlations, regression analysis, factor analysis, analysis of variances, and significance testing. Dataquest also measures customer satisfaction and importance ratings using a matrix gap analysis technique. The statistical analysis packages used to analyze data at Dataquest include SAS, SPSS, Survey System, and ACA/Ci2.

©1992 Dataquest Incorporated

Chapter 5
Market Forecasting

Dataquest's charter includes the task of forecasting high-technology markets. There are two important benefits of forecasting market activity, as follows:

- Forecasting provides a structured and logically rigorous setting in which to clarify expectations about the future. This structured setting maximizes the likelihood of generating forecasts that are internally consistent.
- Forecasts help reduce business risk by aiding executives in planning strategy and tactics based on likely future events and trends.

There are two basic components to Dataquest's forecasting methodology: theory and facts. Theory and facts are complementary—one cannot be substituted for the other. Theory provides a simplified situation with the same logical structure as more complicated reality, and it uses the former to understand the latter. Facts may appear to be self-evident; however, facts do not "speak for themselves." To use facts effectively, they must be interpreted in terms of an underlying structure, embodied in a theory.

Dataquest forecasts begin with facts about real world events. Most generally, facts regarding the real world include level of economic activity, prices, technology characteristics, user demographics, political environment, and other exogenous or outside influences.

Facts lead to data representing observations. Data are broadly classified as either demand-side or supply-side, depending on the side of the market they influence. Empirical methods combine data with economic theory to yield market analysis and forecasts.

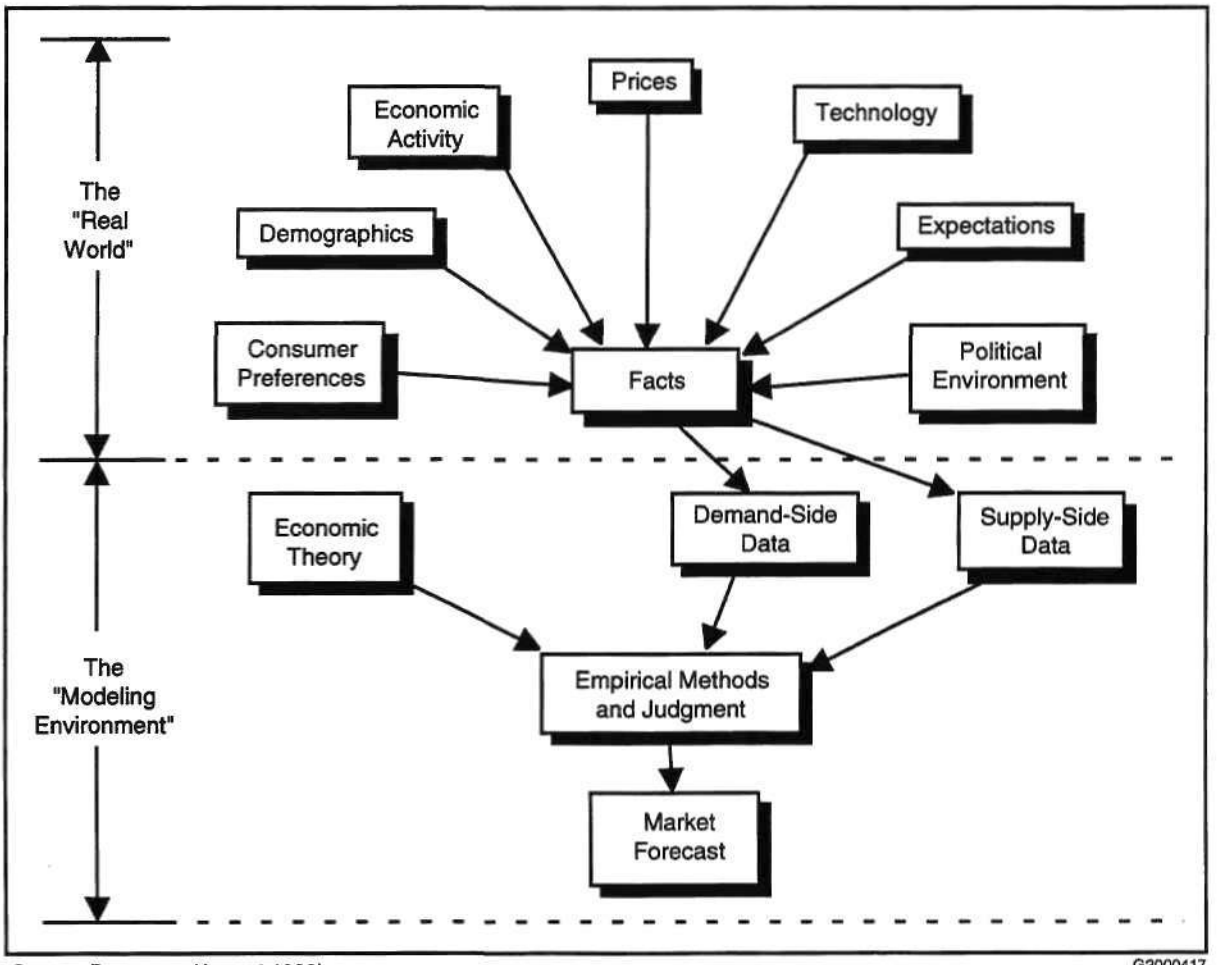
Figure 5-1 outlines the key elements and flow of Dataquest's forecasting methodology.

Theoretical Framework, Variables, and Data

High-technology markets are complex; furthermore, high-technology markets generate an abundance of facts. The volume of high-technology publications and information is evidence of this situation. Therefore, before generating a market forecast, it is necessary to reduce the market's complexity to a manageable level with a simplifying conceptual framework, typically referred to as an analytical model.

©1992 Dataquest Incorporated

Figure 5-1
Dataquest's Forecasting Methodology



Source: Dataquest (August 1992)

Dataquest uses standard microeconomic models as the basic theoretical framework for analyzing high-technology markets. These models include the following:

- Models of consumer behavior to analyze the demand-side of a market
- Models of production, the company, and the industry to analyze the supply-side of a market
- Models of market supply and demand

These models are the accepted paradigms for analyzing economic and market phenomena. They have withstood years of rigorous empirical testing and verification.

©1992 Dataquest Incorporated

High-technology markets also yield an abundant flow of facts about real world events. These facts lead to a set of data, representing observations such as unit shipments, revenue, market share, and average selling prices. Dataquest classifies these data according to broad categories called variables that are grouped as demand-side variables or supply-side variables.

Dataquest includes the following demand-side variables in its product forecasts:

- Overall level of economic and business activity, industry conditions, and related industry conditions
- Prices of substitute products
- Prices of complementary products
- Expected future prices of the product being forecast
- Consumer preferences
- Demographics

Dataquest also includes the following supply-side variables in its product forecasts:

- Prices of resources and inputs used in a product's production
- Technological improvements that allow for decreases in the cost of production
- Outside factors that may alter supply or influence a company's production costs, such as trade barriers

Some variables are more easily quantified than others. For example, a country's overall level of economic activity can be measured directly by estimating its Gross Domestic Product (GDP). Product prices and resource prices also are normally directly observable. Other variables are more elusive and intangible. Information on consumer tastes and preferences may have to be sampled. Likewise, expectations of future products and resource prices are not directly observable, but must be inferred. Thus, a variable's consideration does not necessarily imply collection of the corresponding data.

Examples of specific data used in Dataquest forecasts include the following:

- Unit consumption and production
- Consumption and production revenue
- Average selling price (final user price, list price, and manufacturer price)
- Installed base, saturation, and retirements
- Input/output (I/O) ratios and tie ratios
- Market penetration and total available market (TAM)

©1992 Dataquest Incorporated

Supply and demand market models have the added advantage of maximizing the internal consistency of Dataquest's numerous forecasts. By modeling and forecasting the supply-side and the demand-side of a product, Dataquest analysts are able to check for "market clearing." The principle of market clearing states that whatever quantity of a product is supplied to a market must by necessity find a "home" in the market, either with the final or ultimate user or in inventory, and vice versa. In other words, after the fact, supply equals demand. (This does not imply that *planned* supply necessarily equals *planned* demand.) Whatever inconsistencies arise in the modeling and forecasting process must be eliminated or rationalized by changes in inventory levels or prices, or both.

Another check for internal consistency makes use of the high-technology food chain (see Figure 5-2). The high-technology food chain is the simplified conceptual arrangement of the production of high-technology goods according to the order of utilization. In the food chain approach, each product uses the preceding product as an input to production. For example, integrated circuits (ICs) are produced from silicon wafers, workstations are produced from ICs, and so on. By checking product flows through the food chain, Dataquest is able to monitor the consistency of its various forecasts at different stages of the food chain. In addition, modeling the food chain enables Dataquest to forecast possible production bottlenecks and their implications for other product markets.

At the beginning of each forecast cycle, Dataquest assesses current and expected future international macroeconomic conditions. Dataquest uses the macroeconomic forecasts and analysis developed by the Economic Analysis Department of The Dun & Bradstreet Corporation.

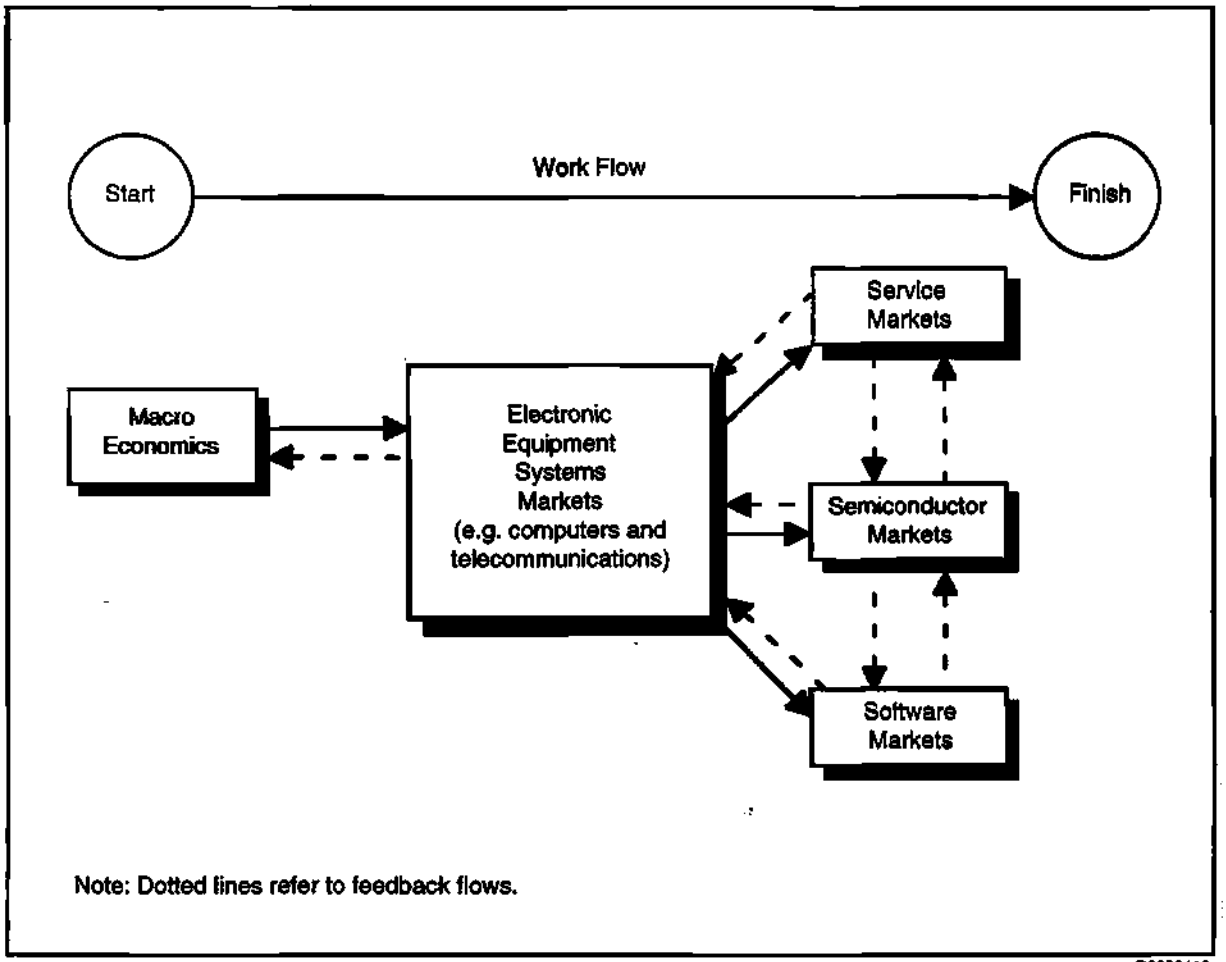
In the next stage, given the macroeconomic outlook, forecasts of the electronic equipment systems markets are developed. At this stage, effort is concentrated on the systems markets and the important variables that influence these markets. All other things are held constant.

In the final stage, given the macroeconomic outlook and the systems outlook, forecasts of the semiconductor, software, and services markets are developed. Again, all other things are held constant; feedback from the semiconductor, software, and services markets to the systems markets, and the economy in general, are ignored.

The serial flow of effort described above should not be construed to imply that there is not a free forward or backward flow of communications between, for example, workstation analysts and semiconductor analysts; or lateral communications between, for example, mainframe analysts and personal computer analysts, or between semiconductor analysts and software analysts. The purpose of Dataquest's forecasting framework is to mirror real-world conditions, and then to use the approach to logically analyze current business conditions and to generate expectations about the future.

©1992 Dataquest Incorporated

Figure 5-2
The High-Technology Food Chain



Source: Dataquest (August 1992) G2000418

The factors or variables that are given or "held constant" are referred to as forecast assumptions. Forecast assumptions are the conditions upon which a forecast is based. A typical set of forecast assumptions includes expectations about macroeconomic conditions, currency exchange rates, technology characteristics, productive capacity, end-user market conditions, and political conditions (such as the reunification of Germany, changes in Central and Eastern Europe, and so forth).

While some assumptions may be universally applied to all market forecasts (macroeconomic expectations and currency exchange rates), assumptions about other markets may themselves forecast markets further up the food chain. For example, a semiconductor market forecast will use the most recent PC market forecast as a given assumption.

©1992 Dataquest Incorporated

Long-Run Trends versus Short-Run Fluctuations

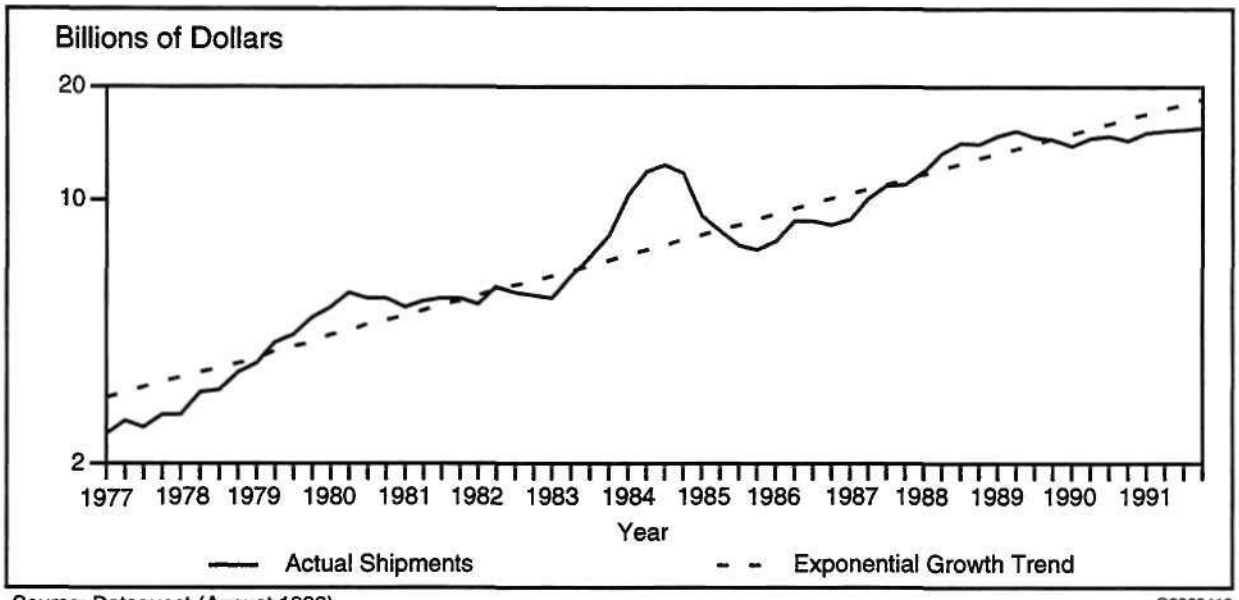
The basic thrust of the Dataquest forecasting models is that high-technology markets show short-term fluctuations around long-term trends.

The long-run equilibrium movements determine the basic trends of the markets as they grow over time. The short-run movements around the long-run equilibrium are referred to as market fluctuations.

Market fluctuations result from unexpected changes in market conditions or from changes in technology. Manufacturers' expectations about future market conditions may differ significantly from actual market conditions. As an example, personal computer manufacturers accumulated huge semiconductor inventories in 1984 and 1985 in anticipation of a boom in PC sales (see Figure 5-3). When actual PC sales fell short of the expected boom, the quantity of chips supplied to the market was greater than the quantity demanded at prevailing prices, and prices fell. Chip producers and consumers revised their plans in light of the new information and market conditions, and the market adjusted accordingly, albeit painfully.

Discontinuous changes in technology may be either anticipated or unanticipated. For example, the emergence of 1Mb DRAM technology (an anticipated technological change) put a discontinuity, or a kink, in what would have been an otherwise relatively smooth revenue growth path of DRAM devices.

Figure 5-3
North America Semiconductor Market



Source: Dataquest (August 1992)

G2000419

©1992 Dataquest Incorporated

Seldom, if ever, does a high-technology market settle down to its long-run equilibrium long enough to grow along its trend growth path. Therefore, what we observe over time is a continuously fluctuating market tracing out its trend or long-run growth envelope. This is demonstrated in Figure 5-3. The solid line represents the actual growth path of North American market semiconductor revenue; the dotted line represents the trend growth path of revenue.

The farther into the future one forecasts, the greater the level of uncertainty about the expected state of a market. We have a clearer idea of events that we expect to disturb the market in the short term—and thus give rise to market fluctuations—than we do in the long term. The significance of the trend value in the final year of the forecast is that it is simply the expected value—or midpoint—of an ever-widening confidence interval or envelope. Of the range of possible future outcomes, it is the most likely or probable outcome.

Although Dataquest is constrained to forecasting under conditions of incomplete information, by no means are we completely unaware of all future events. For example, the analysts that monitor technology markets usually have information regarding manufacturing capacity at some future date. Dataquest includes such information in its forecasts.

In summary, the trend or long-range values of a forecast represent the expected value of a probability distribution of likely future outcomes. In the absence of shocks and other disturbances, high-technology markets tend to converge toward a long-run equilibrium growth path.

Empirical Methods

Microeconomic models provide a general conceptual framework to analyze market behavior. The task of forecasting, however, requires more specific, empirical models. No single empirical model or method is necessarily appropriate for forecasting all the different products and services that Dataquest follows. Furthermore, a strong case can be made for using more than one empirical model to forecast a product as a check of the robustness of a forecast.

All Dataquest empirical models combine prior information with sample data to produce forecast estimates. Prior information includes historical data of an industry, product, or market; knowledge accumulated by Dataquest analysts from industry experience; and the collective body of knowledge resident at Dataquest. Sample data consist of information that Dataquest collects and analyzes describing recent events about an industry, product, or market. Sample data are obtained through primary research, technical discussions with industry and company officials, announcements and articles in the trade press, and judgmental data based on knowledge, experience, and professional intuition.

There are four types of empirical techniques commonly used for forecasting at Dataquest.

©1992 Dataquest Incorporated

Judgmental Methods

Judgmental techniques are useful in situations where past data are scarce, causal relationships have not been identified or quantified, or some other major change has occurred in the forecasting context (such as a war or a trade agreement) that is not accounted for by other techniques. The validity of using these methods by themselves is uncertain, although using them correctly can provide very good forecasts, especially in uncertain environments. The objective of these judgmental methods is to provide logical, unbiased, and systematic quantitative estimates. Examples of judgmental methods include the Jury of Executive Opinion and the Delphi method.

Technological Methods

Technological techniques are particularly appropriate for very new technologies with little or no data, or very long range forecasting. These methods are highly exploratory, and large errors are quite likely. Examples of technological methods include curve fitting, including trend extrapolation, S-shaped curves, and envelope S-curves; and analogous data.

Time Series Models

Time-Series techniques extrapolate past data into the future. The premise is that some underlying pattern exists in the variable being forecast. Examples of time series models include moving averages, exponential smoothing, decomposition models, and Box-Jenkins techniques.

Causal Models

The premise of causal models is that changes in the value of the variable of interest (for example, shipments of Product A) are closely associated with changes in some other variables (for example, the cost of Product B). Consequently, if future values of these other variables (cost of Product B) can be estimated, they can be used to forecast the desired variable (shipments of Product A). Examples of causal models include regression analysis, leading indicator analysis, and input-output models.

Forecast Quality Control

All forecasts must strictly adhere to the following guidelines to ensure internal consistency:

- The same value of a variable must be used throughout Dataquest
- Analysts may vary the relationship between variables, according to their own research findings, but not the values of the variables
- Not all variable relationships hold true for all industries, therefore analysts may specify which sets of data to use
- Data must conform to Dataquest standard segmentation
- Final forecasts must be approved before release

©1992 Dataquest Incorporated

- All preliminary data are clearly stated as such.
- The source of the information and date are always cited

Ultimately, the most important and toughest quality check that Dataquest forecasts must pass before publication is the test of reasonableness. The test of reasonableness is imposed by the team of experienced Dataquest researchers and analysts. Empirical methods are indispensable to economize the task of generating forecast estimates, but they are no substitute for the seasoned intuition of practical experience.

©1992 Dataquest Incorporated

Chapter 6
Summary

When Dataquest clients receive research and analysis with the familiar citation "Source: Dataquest," they receive the end result of a rigorous methodology involving primary and secondary data collection, supply-side and demand-side market analysis, and the cross-industry perspective afforded by Dataquest's uniquely broad and in-depth worldwide coverage of high technology.

Behind the published research is a thorough body of knowledge involving industry professionals and research experts. As a result, Dataquest's clients receive more than simply a single and solitary point of information for planning and decision making. Dataquest provides comprehensive market research to its clients, including the highest-quality vendor-based research, user-based research, and market forecasts.

©1992 Dataquest Incorporated

Appendix A
Currency Conversion

As a worldwide company, Dataquest tracks high-technology markets and companies in five major regions of the world: North America (United States and Canada), Japan, Europe, Asia/Pacific, and Rest of World.

Since most high-technology companies sell their products in more than one country, and since we cannot simply aggregate foreign currencies to estimate worldwide value, we have adopted a common currency, the U.S. dollar, by which we evaluate and compare all markets and all companies. We have chosen the U.S. dollar for the following reasons:

- Since World War II, the U.S. dollar has been the major reserve currency of choice for industrialized nations, although its dominance has diminished in recent years
- Dataquest is a U.S.-headquartered corporation

Although Dataquest tracks data in five regions, we deal with regional currencies and currency conversion issues for three markets—Europe, Japan, and Asia/Pacific. The currencies involved are the Austrian schilling, the Belgian franc, the Chinese renminbi, the Danish krone, the Dutch guilder, the Finnish markka, the French franc, the German mark, the Greek drachma, the Hong Kong dollar, the India rupee, the Irish punt, the Italian lira, the Luxembourg franc, the Malaysia ringgit, the Norwegian krone, the Portuguese escudo, the Singapore dollar, the Spanish peseta, the Swedish krona, the Swiss franc, the Thailand baht, the U.K. pound, the European Currency Unit (ECU), the Japanese yen, and the Korean won. Dataquest deals only in a U.S. dollar base for the North American and Rest of World markets for the following reasons:

- North America: Typically, the Canadian portion of the North American market is quite small (10 percent or less) and the relative values of the U.S. and Canadian dollars do not fluctuate widely.
- Rest of World: This region is made up of hundreds of separate countries, each with its own currency, and accounts for less than 1 percent of most high-technology markets.

©1992 Dataquest Incorporated

Method

Data Collection

Data for Japanese, Asian, and European companies are usually collected in the local currency of the companies being tracked. For example, Dataquest collects Japanese companies' revenue in Japanese yen. If a company wishes to report data in U.S. dollars, we request that it use the most recent year-to-date currency exchange rate supplied by Dataquest.

Average Currency Exchange Rates

Once the data are collected, Dataquest uses the average currency exchange rate for the period of time interest, and converts the foreign currency into U.S. dollars. The average exchange rate for a quarter is calculated by summing the values for the three months of the quarter and dividing the sum by three. Similarly, the average exchange rate for a year is calculated by summing the values for the 12 months of the year and dividing the sum by 12.

The choice of which exchange rate to use is determined by the precise period of time being evaluated. Most of our historical market sizing and market share data are evaluated in calendar-year or calendar-quarter time periods. However, in evaluating the fiscal year or fiscal quarter performance of an individual company, the exchange rate must be calculated for the specific fiscal period under review. For example, NEC Corporation's fiscal year ends March 31. Therefore, when evaluating NEC's financial performance in U.S. dollars, the proper exchange rate would be the average yen per dollar exchange rate for the 12 months beginning April 1 of the previous year and ending March 31 of the current year.

Currency Conversion: Unweighted Exchange Rates

Handling historical data reported in foreign currencies is relatively straightforward when unweighted exchange rates are used. Dataquest maintains a database of average monthly exchange rates for the currencies of major European and Asian countries. These exchange rates are compiled by Dun & Bradstreet.

Conversion of U.S. Dollar to Currency Unit

The formula for converting U.S. dollars to other currencies is as follows:

(U.S. Dollar Value) × (Currency Unit per U.S. Dollar Exchange Rate) = Currency Unit Value

Example:
If U.S.$1 = £0.65, then
$30,000 = £19,500

The formula used is: $30,000 × £0.65 = £19,500.

©1992 Dataquest Incorporated

Conversion of Currency Unit to U.S. Dollar

The formula for converting other currencies to U.S. dollars is as follows:

> (Currency Unit Value) / (Currency Unit per U.S. Dollar Exchange Rate) = U.S. Dollar Value
>
> Example:
> If £0.65 = U.S.$1, then
> £20,000 = $30,769
>
> The formula used is: £20,000 / £0.65 = $30,769.

Exchange rates can be expressed in either of two ways: Currency Unit per U.S. Dollar, or U.S. Dollar per Currency Unit. The two are reciprocals of each other. Traditionally, the former is preferred for ease of use, as shown in the following example:

Currency Unit per U.S. Dollar: One U.S. dollar equals 134.68 Japanese yen.

U.S. Dollar per Currency Unit: One Japanese yen equals .00743026 U.S. dollars.

Currency Conversion: Weighted Exchange Rates

In certain circumstances, it is desirable to weight exchange rates according to the chronological pattern of consumption in a market over a period of time, or according to the relative importance of various regional markets (a "basket of currencies").

Weighting According to a Chronological Pattern of Consumption

Dataquest tracks consumption in certain markets on a calendar-quarter basis. Each quarter the European and Japanese currencies are valued differently against the U.S. dollar. Simply summing the values of the four quarters and dividing by four would yield an arithmetic mean annual exchange rate; however, this exchange rate would not be the true, effective exchange rate for the year for that market. The example outlined in Table A-1 shows why:

Table A-1
Example of an Arithmetic Mean Annual Exchange Rate

	Q1	Q2	Q3	Q4	Year
U.S.$ Size of Market	100	150	200	250	700
Japanese Yen Size of Market	16,270	23,145	26,420	27,625	93,460
Exchange Rate (Yen per U.S.$)	162.7	154.3	132.1	110.5	
Weighted Average Exchange Rate					133.5
Arithmetic Mean					139.9

Source: Dataquest (August 1992)

©1992 Dataquest Incorporated

In the example presented in Table A-1, the arithmetic mean is higher than the weighted average. The weighted average is calculated by the following formula:

93,460/700=133.5

The arithmetic mean is calculated by the following formula:

(162.7+154.3+132.1+110.5)/4 = 139.9

When more than one market is tracked, and when a weighted average exchange rate is used, every market will have a different effective exchange rate because the pattern of consumption over four quarters will not be identical for every market.

Weighting According to a Basket of Currencies

The European Community has a ready-made basket of currencies, known as the European Currency Unit (ECU). The ECU, which was established in March 1979, is a basket of currencies composed of specific amounts of the currencies of the member countries of the EC (excluding Greece prior to September 1984 and including Greece thereafter). Each currency's share in the ECU basket is weighted broadly in line with the respective country's GNP and foreign trade. The ECU is used when forecasting future market trends in Europe.

Normalized Currency Valuation

Although Dataquest rarely uses normalized currency valuation, this is a useful technique for measuring "true" growth for individual companies or groups of companies. It is especially appropriate during times of rapid and dramatic currency exchange rate changes.

Normalization of exchange rates is an attempt to express more accurately how a company's revenue changed in one time period compared with the previous time period.

An example of a situation in which normalized exchange rates are useful occurred in September of 1985. At that time, the Group of Five major economic powers (the United States, United Kingdom, Germany, France, and Japan) met and instituted economic policies that resulted in a rapid devaluation of the dollar against the Japanese yen and other currencies. This devaluation continued throughout 1986. The average yen per dollar exchange rate in 1985 was 238.4. In 1986 it was 168.37, a 29 percent decline in the value of the dollar against the yen (based on how many yen you could buy with one dollar), or a 42 percent rise in the value of the yen against the dollar (because you could now buy 0.0059393 dollars with one yen, compared with only 0.0041945 dollars per yen in 1985).

A normalized view of Japanese company revenue growth in 1986 would remove the currency fluctuations from the non-U.S. dollar revenue the company received. Although the yen-valued revenue of

©1992 Dataquest Incorporated

Table A-2
Japanese Companies' Total Semiconductor Revenue

	1985	1986	Growth Rate (%)	Difference
Using Actual Exchange Rates				
Worldwide ($M)	10,144	14,307	41.0	4,163
In Japan ($M)	7,387	10,691	44.7	3,304
Worldwide (¥M)	2,414.3	2,389.3	-1.0%	
In Japan (¥M)	1,758.1	1,785.4	1.6%	
Exchange Rate (¥/$)	238	167		
Using Constant Exchange Rates				
Worldwide ($M)	10,144	10,039	-1.0	-105
In Japan ($M)	7,387	7,502	1.6	115
Exchange Rate (¥/$)	238	238		

Source: Dataquest (August 1992)

Japanese companies declined in 1986 compared with 1985, Japanese companies experienced a rise in dollar-valued revenue, most of which was due solely to exchange rate fluctuations. The example outlined in Table A-2 illustrates this.

Forecasting

Dataquest does not forecast exchange rates per se; however, we do forecast semiconductor markets in several regions of the world, and we use the U.S. dollar as a common currency for market comparisons. In the forecast period, Dataquest assumes that the most recent actual month's exchange rate will apply throughout all future months of the forecast. For example, the current semiconductor forecast uses actual exchange rates through June 1992, and assumes that the June rate applies throughout all future months. Then the quarterly and annual exchange rates are estimated as described above.

©1992 Dataquest Incorporated

Dataquest®

a company of
The Dun & Bradstreet Corporation

Dataquest Incorporated
1290 Ridder Park Drive
San Jose, California 95131-2398
United States
Phone: 01-408-437-8000
Facsimile: 01-408-437-0292

Dataquest Incorporated
Dataquest/Ledgeway
The Corporate Center
550 Cochituate Road
Framingham, Massachusetts 01701-9324
United States
Phone: 01-508-370-5555
Facsimile: 01-508-370-6262

Dataquest Europe Limited
Roussel House Broadwater Park
Denham, Near Uxbridge
Middlesex UB9 5HP
England
Phone: 44-895-835050
Facsimile: 44-895-835260/1

Dataquest Japan Limited
Shinkawa Sanko Building
1-3-17 Shinkawa Chuo-ku
Tokyo 104
Japan
Phone: 81-3-5566-0411
Facsimile: 81-3-5566-0425

Offices in
Costa Mesa, Munich,
Paris, and Seoul

Representative Agencies in
Bangkok, Hong Kong,
Kronberg, North Sydney,
Singapore, and Taipei

©1992 Dataquest Incorporated
0013537

Lois Petersen CCIS-0832320
Adminstrative Assistant, CCIS
299-1256
Internal Distribution

How to Use Dataquest

Source: Dataquest

Dataquest

How to Use Dataquest



Dataquest

A worldwide network of information-gathering resources

Source: Dataquest

Published by Dataquest Incorporated

The content of this report represents our interpretation and analysis of information generally available to the public or released by knowledgeable individuals in the subject industry, but is not guaranteed as to accuracy or completeness. It does not contain material provided to us in confidence by our clients.

Printed in the United States of America. All rights reserved. No part of this publication may be reproduced, stored in retrieval systems, or transmitted, in any form or by any means—mechanical, electronic, photocopying, duplicating, microfilming, videotape, or otherwise—without the prior written permission of the publisher.

© 1991 Dataquest Incorporated
April 1991

Table of Contents

Page

1. A Guide to Help You Get the Most Out of Your Dataquest Information Resources
   - Introduction 1-1

2. Your Industry Service: What's in It for You?
   - Source: Dataquest 2-1
     - Guides 2-1
     - Market Statistics 2-1
     - Company Backgrounders 2-1
   - Dataquest Perspective 2-1
   - Inquiry Support 2-2
     - Call Your Industry Analyst 2-2
     - Call the Client Inquiry Center 2-2
   - Information Resource Center 2-4
     - Policies and Procedures 2-4
     - Non-Dataquest Consultants 2-4

3. How to Use Your Industry Service
   - What Written Materials Will You Receive? 3-1
     - Source: Dataquest 3-1
     - Dataquest Perspectives 3-2
   - How Do You File Your Written Materials? 3-2
   - How Do You Find the Written Material? 3-2

4. Customizing Your Industry Service
   - Custom Consulting 4-1
   - Multiclient Studies 4-1
   - Retainer Consulting 4-1
   - Primary Research 4-1
   - End-User-Based Services 4-2
     - Score Reports 4-2
     - CPE Market Dynamics 4-2

5. Whom Do You Call at Dataquest?

6. About Dataquest...
   - The Technology Information Division 6-1
     - Semiconductor Group 6-1
     - Systems Group 6-2
     - Telecommunications Group 6-2
     - Peripherals Group 6-3
     - Ledgeway/Dataquest 6-3
     - The Executive and Financial Group 6-4
   - Other Dataquest Services 6-5
     - Conferences 6-5
     - Technology Products 6-5

7. Subscription Terms
Basic Terms of Syndicated Industry Services 7-1
Add-On Subscriptions 7-1
Payment Terms 7-1
Base Price 7-1
A Reminder 7-1
We Thank You for Choosing Dataquest as Your Marketing Research Partner 7-1

Appendix A. Dataquest Information Resource Center CD–ROMS and Computer Databases A-1

Appendix B. Dataquest 1991 Conference Schedule B-1

Appendix C. Technology Products C-1

List of Tables

Table Page

5-1 Who to Contact at Dataquest 5-1

List of Figures

Figure Page

2-1 Client Inquiry Center Flow 2-3
2-2 Whom to Call for Your Inquiry 2-3
3-1 Contents of Your Binder 3-3
3-2 Standalone European Country Binder Contents 3-3

Chapter 1

A Guide to Help You Get the Most Out of Your Dataquest Information Resources

Introduction

As a Dataquest client, we want you to obtain the greatest possible value from your subscription. This guide will acquaint you with the available information resources and will help you establish a "user strategy" that ensures that Dataquest's products and services contribute to your success.

This guide is divided into the following sections:

- Your Industry Service: What's in It for You?
- How to Use Your Industry Service
- Customizing Your Industry Service
- Whom Do You Call at Dataquest?
- About Dataquest
- Subscription Terms
- Appendixes
  - Appendix A: Dataquest Information Resource Center CD-ROMS and Computer Databases
  - Appendix B: Dataquest 1991 Conference Schedule
  - Appendix C: Technology Products

Chapter 2

Your Industry Service: What's in It for You?

Clients can tap into Dataquest's extensive knowledge base to support their decision-making process in the industries and markets that we track. The information and analysis that you receive from Dataquest can help you to better:

- Evaluate markets
- Position new products
- Develop marketing strategies
- Perform competitive analysis
- Understand end-user trends
- Verify critical market assumptions
- Assess emerging technologies
- Implement and execute tactical plans
- Support your ongoing research activities

As a Dataquest client you will receive much of this information automatically through the regular publication of database documents and industry analysis. Your industry service also provides information, available at your initiation, that is specific to your company's needs. You will receive Dataquest information through a variety of forms, including:

- *Source: Dataquest*
- *Dataquest Perspectives*
- Inquiry support
  - Industry Analysts
  - Client Inquiry Centers
- Dataquest Information Resource Center

Source: Dataquest

The *Source: Dataquest* binder is an annually updated collection of reference documents. The binder contains worldwide and regional market statistics, *Company Backgrounders,* and several guides.

Guides

- *How to Use Dataquest:* Describes your industry service subscription, publications, inquiry privileges, phone contacts, library use, and other services.
- *High-Technology Guide—Segmentation and Glossary:* Lists key terms and defines the market segments, products, applications, regions, distribution channels, and environments tracked by Dataquest.
- *Dataquest Research Methodology:* Details the research methodology used by Dataquest to gather data and information and provides the general assumptions used to generate industry forecasts.

Market Statistics

Market Statistics documents provide clients with detailed tables consisting of product shipments, average selling prices, industry revenue, forecasts, and market share data.

Company Backgrounders

Each service provides its clients with a set of *Company Backgrounders by Dataquest,* made up of companies that represent 80 percent of the revenue of that industry. *Company Backgrounders* are produced by the Strategic Company Analysis group in Research Operations. The documents contain useful information on a company's finances, product lines, sales and manufacturing locations, and joint ventures, mergers, and acquisitions.

Dataquest Perspective

This multitopic publication, delivered on average twice a month, contains timely analysis of markets, products, technologies, companies, and industry events, and provides detailed discussions of our market projections and market share statistics. These publications are filed

chronologically, and include a quarterly index that cross-references articles by company name and major topic. They may be supplemented as needed by the timely delivery of faxes that provide information and analysis of current significant events.

Please note that all of Dataquest's written material is copyrighted and therefore may not be copied without our permission.

Inquiry Support

Inquiry—via phone, fax or letter—is an integral part of the service Dataquest provides. Through inquiry you can:

- Clarify or interpret information.
- Explore Dataquest information in more depth.
- Discuss the application of this information to a particular situation.
- Access information that is not available in Dataquest publications, but is available in Dataquest's extensive files.

Each Dataquest client has a designated binderholder. In addition to receiving all the Dataquest published materials, the binderholder serves as the liaison between Dataquest and your company.

The binderholder has access to Dataquest's inquiry privilege and may designate up to two people to serve as alternates for inquiry privileges. Dataquest account managers need to be aware of any designated alternates.

If someone calls who is not a binderholder or alternate, Dataquest will refer that person to the account manager for your company. We have a commitment to our clients to provide them with timely, high-value information. In order to do that, services must be restricted to authorized contacts.

Call Your Industry Analyst

Industry analysts have significant industry expertise. Directly or through the assistance of Client Inquiry Center (CIC) personnel, you have access to the industry analysts associated with your service. This access is on an as-required basis relative to those markets, products, and technologies within the scope of your service. Analysts may be called directly when you know exactly what you need and who at Dataquest can provide the information.

Call the Client Inquiry Center

Many of Dataquest's services provide a Client Inquiry Center (Enquiry Desks for European customers). These centers are responsible solely for the quick turnaround of your fact-based questions. CIC personnel have access to industry service publications and database information, and they are trained to help you locate information within your Dataquest service. CIC personnel will also put you in touch with appropriate industry analysts when you require in-depth analysis of issues and trends, or opinion about the implications of recent industry events. The CIC may be called when you need an answer to a fact- or data-related question, when you need a backup to your regular analysts should they not be available, or when you need direction to new areas as your questions develop.

Dataquest is committed to personally handling each of your calls. Figure 2-1 illustrates how inquiries in the CIC are handled. We will ensure that you are put in touch with the right individual, or if you wish, you may choose to leave a voice-mail message when a particular analyst is not immediately available.

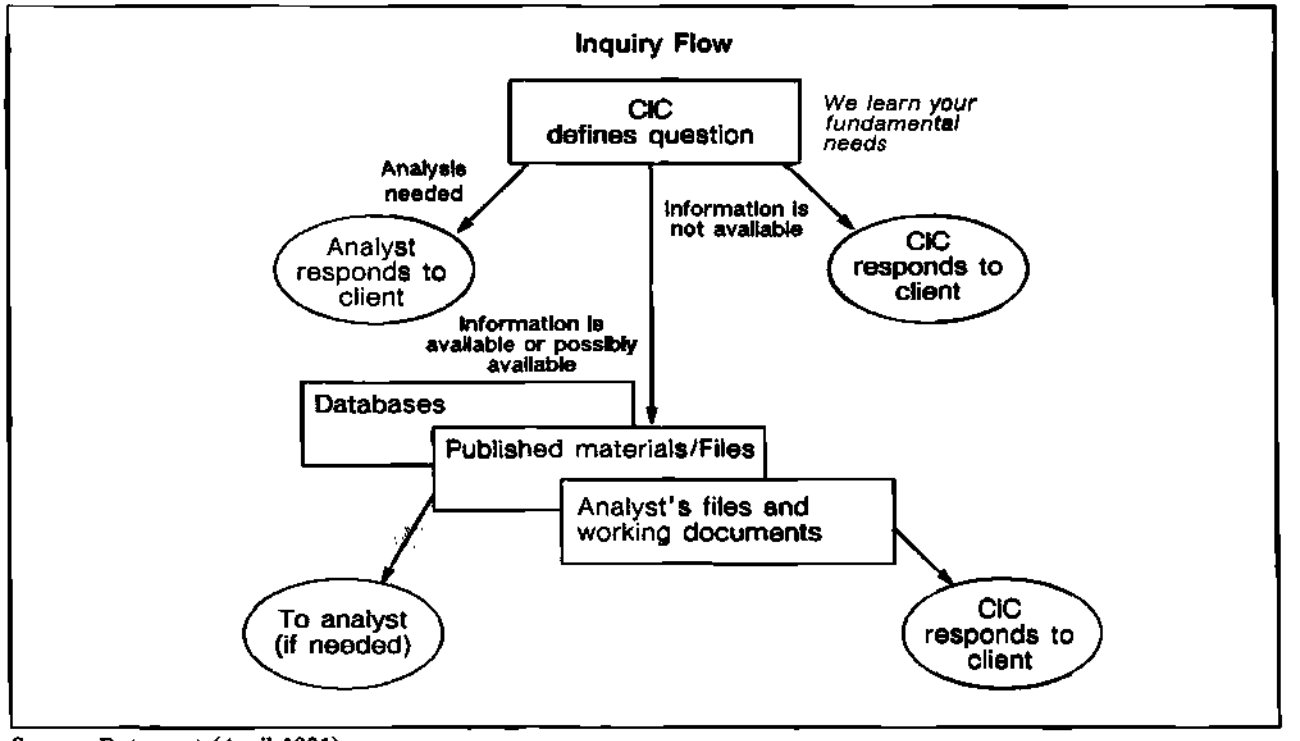
The more Dataquest knows about your inquiry, the better we will be able to help you. When you call with a question, the CIC will want to know:

- What information you already have on the subject
- What related information you are gathering
- How you plan to use the information
- What you are trying to demonstrate

It will also help us to know what stage of the market research process you are in, as well as the depth of information you require. The more we know, the better we will be able to offer additional or related information, or offer insights into different ways to approach the question. Of course, tell us only what you are comfortable with—we don't need or want to know proprietary information. Figure 2-2 shows the mix of people available to respond to your inquiries.

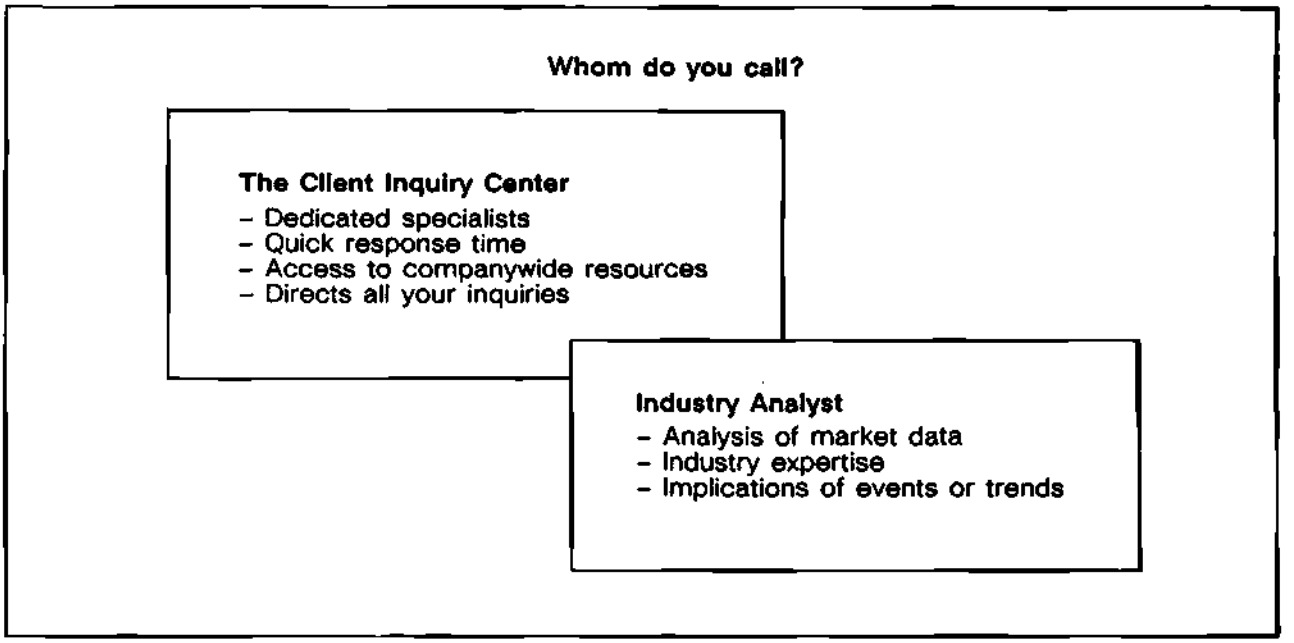
©1991 Dataquest Incorporated April—Reproduction Prohibited

Figure 2-1
Client Inquiry Center Flow



Source: Dataquest (April 1991)

Figure 2-2
Whom to Call for Your Inquiry



Source: Dataquest (April 1991)

©1991 Dataquest Incorporated April—Reproduction Prohibited

Information Resource Center

Dataquest's Information Resource Center (IRC) is a valuable supplement to the information delivered through your industry service. It consists of a 1,200-square-foot corporate library in San Jose, plus two major satellite libraries located in Boston and the United Kingdom. The IRC maintains a wide selection of industry directories, trade press periodicals, financial reports from most of the publicly held companies followed by Dataquest industry services, government reports, and CD-ROM-based and on-line information services.

The European Corporate Library maintains more than 300 titles and reference works concerning the European Community, including approximately 30 files and 100 reference works on the 1992 single European market objective. The U.K. library collection includes basic reference works produced by Her Majesty's Government, the Department of Trade and Industry, and other governmental agencies. Special reports have also been collected from a variety of sources, including the U.K. government, trade associations, the Financial Times, and other research organizations.

Appendix A lists the CD-ROMs and computer databases available to clients at the San Jose IRC. The San Jose IRC is staffed by three degreed professionals (Master of Library Science), as well as assistants who specialize in managing the corporation's secondary research resources.

Clients typically use the IRC in the following ways:

- To obtain financial information on the leading companies within their industry
- To collect recent publications on new areas of the market
- To research a market or topic not covered by a Dataquest industry service

You are encouraged to use the IRC. If it is not convenient to visit an IRC, your Client Inquiry Center staff can often make many of the center's resources available to you through your inquiry privilege.

Policies and Procedures

Because the IRC is a private company library, our collections are limited to the following individuals:

- All permanent Dataquest employees
- Current clients—Binderholders and designated alternates from within the client company
- Consultants/contractors working on specific Dataquest projects (only for duration of contract)
- Prospective clients escorted by a Dataquest salesperson

Non-Dataquest Consultants

It is Dataquest policy to deal directly with Dataquest clients in answering their information needs. The Information Resource Center does not authorize the use of library facilities by consultants working for clients.

©1991 Dataquest Incorporated April—Reproduction Prohibited

Chapter 3

How to Use Your Industry Service

Receiving value from your industry service requires knowing where to find the information you need and how to use that information. The following guidelines will help you get the most out of the many elements of your service.

What Written Materials Will You Receive?

You will receive written material at least twice a month. Some industry services are segmented into key market areas (product or geographic) to allow you to choose the coverage that is most relevant to the markets in which you participate. You will receive written material covering both the broad-based issues of the industry as a whole, as well as the more focused issues of the particular market segment. All written material will be labeled as belonging to one of the following:

- The *Source: Dataquest* binder
- The *Dataquest Perspective* binder
- The segment binder

Source: Dataquest

Source: Dataquest is a regularly updated reference binder in which you'll find the following:

- *How to Use Dataquest:* You are currently in this document.
- *Dataquest High-Technology Guide—Segmentation and Glossary:* This document describes in detail the segmentation and terms used by all Dataquest services to define the markets they track. This guide should be used whenever you are looking for definitions of products, applications, regions, technologies, and environments referred to by your industry service. This document also provides you with standard definitions of research terms that appear in your industry service publications, such as retirements, average selling price, and compound annual growth rate.
- *Dataquest Methodology:* This document will help you understand the research methodology Dataquest uses to gather information on the industries covered by our industry services. It also describes the general assumptions used to generate industry forecasts.
- *Market Statistics:* Each Dataquest industry service provides its clients with documents that contain detailed tables consisting of history, market forecasts, and market share data. We encourage you to use these tables as an opportunity to review your business outlook with Dataquest analysts. Updates and detailed discussions of these data are provided in the *Dataquest Perspective* on an ongoing basis. For segmented services, top-level market statistics are provided in the *Source: Dataquest* binder, and the more detailed statistics for each segment can be found in each segment binder.
- *Company Backgrounders:* You will receive a set of *Company Backgrounders*—profiles on the top players in your industry. These documents are published annually. You should refer to them for corporate overview information, such as financial reports, product line descriptions and analysis, sales and manufacturing locations, and joint ventures, mergers, and acquisitions.

With the exception of the *Company Backgrounders,* these documents will be individually bound and delivered annually or twice yearly, as required. Each *Company Backgrounder* will be updated once a year and will be shipped shortly after the close of the fiscal year for that company. At the time of arrival, the earlier version of the document should be removed from the binder and archived as desired so that the most recent information will be easily accessible to you.

Dataquest Perspectives

Dataquest Perspectives are designed to deliver analysis and Dataquest's view of important issues in your industry. This is a multitopic publication delivered twice a month that contains articles under the following major topic headings:

- Market Analysis: These articles may cover either a product market, regional market, application market, or a distribution channel. Industry service forecast updates are presented and discussed in this section of the *Dataquest Perspective.*
- Product Analysis: These articles analyze the impact of new products on the industry.
- Company Analysis: This section highlights new activities or organizational changes within companies. The articles provide more in-depth analysis of a company's product strategy, financial performance, or marketing performance and strategy than is contained in the *Company Backgrounders.* Articles may also be written about companies for which there is no *Company Backgrounder.*
- Technology Analysis: This section analyzes the impact of key or emerging technologies on your industry. These articles are designed to assist you in strategic and competitive evaluations.
- Conferences and Exhibitions: These articles will identify important industry trends and analyze key events at the conferences and exhibitions attended by Dataquest analysts.
- News and Views: These shorter articles provide Dataquest's perspectives on major industry events.

Dataquest Perspective offers a twice-monthly opportunity to engage your industry service analysts in discussion of the issues and events contained in each publication. For this reason, we provide the name of the author of each article along with a brief synopsis. Clients are encouraged to call the appropriate analyst with questions or a request for more information.

How Do You File Your Written Materials?

Your *Source: Dataquest* binder holds a collection of reference and statistical material. Each document that belongs in this binder will be clearly marked as such and should be filed behind the appropriate tab as indicated in the Table of Contents. Outdated sections should be either discarded or filed separately for archival purposes.

Clients will receive at least 24 *Dataquest Perspectives* each year. These should be filed in the *Dataquest Perspective* binder in chronological order. If you subscribe to a segmented service, at least 4 of your 24 annual *Dataquest Perspectives* will focus on issues specifically related to the markets covered under that industry segment. The industrywide *Dataquest Perspectives* are filed in the core *Dataquest Perspective* binder, and the segment-specific editions are filed in the segment binder.

Each *Dataquest Perspective* will be identified by the name of the service and the name of the segment, if appropriate. It will also have the date, volume, and number on the first page. For example, a subscriber to the Telecommunications—North America service may receive the following two *Dataquest Perspectives:*

- Telecommunications—North America
  Vol. 1, No. 1
- Telecommunications—North America
  Image Communications
  Vol. 1, No. 1

The first document would be filed in the core Telecommunications—North America *Dataquest Perspective* binder. The second would be filed in the Image Communications segment binder.

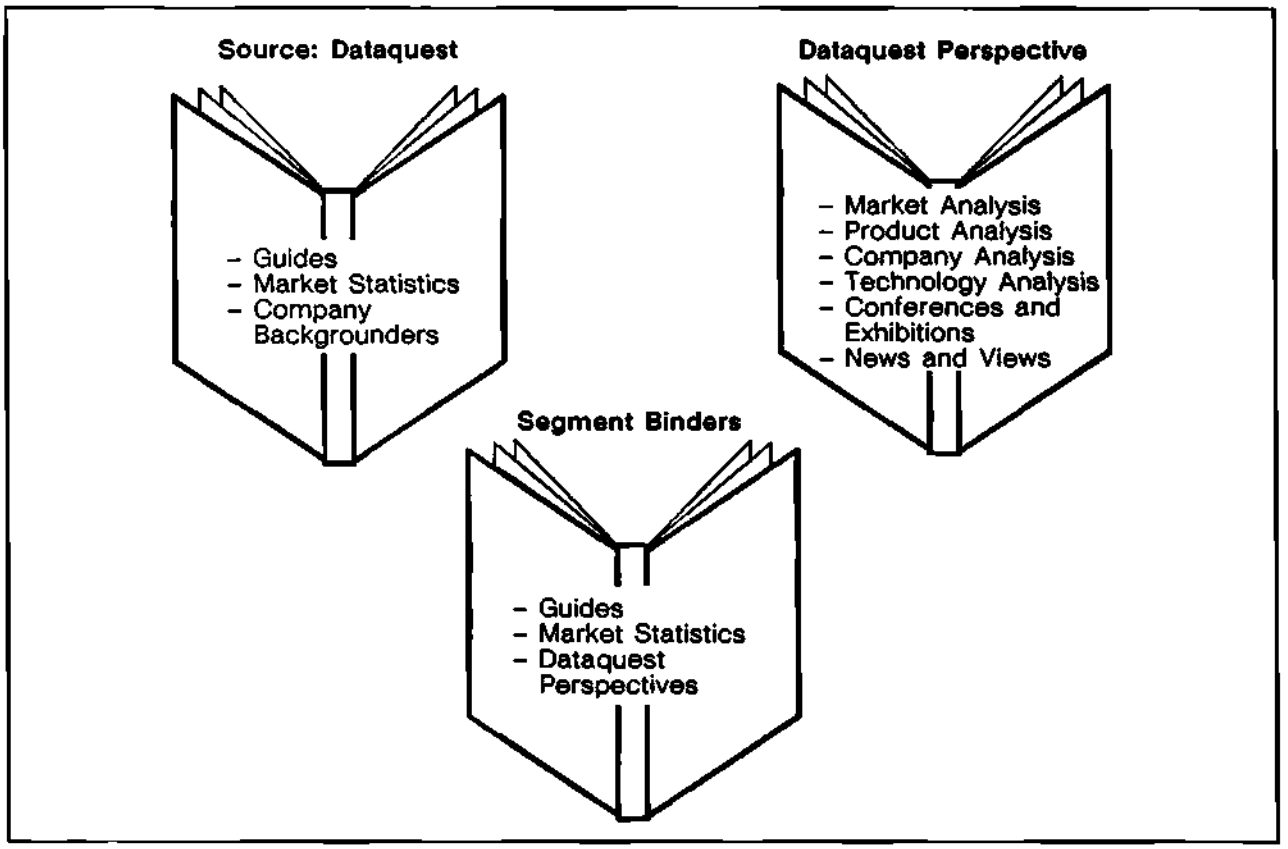
The contents of your binders are illustrated in Figure 3-1. Subscribers to a standalone European country segment will receive detailed market statistics for that particular country, top-level European statistics, and the pan-European Perspectives. The binder contents are illustrated in Figure 3-2.

How Do You Find the Written Material?

Dataquest is committed to not only providing you with the highest quality research, but also

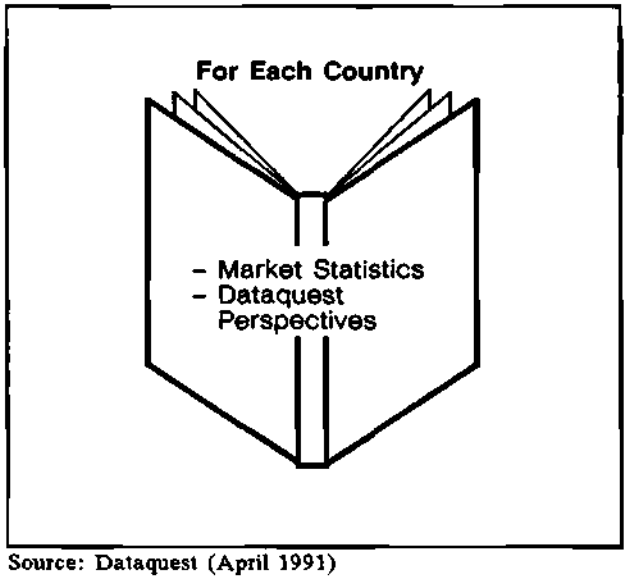
©1991 Dataquest Incorporated April—Reproduction Prohibited

Figure 3-1
Contents of Your Binder



Source: Dataquest (April 1991)

Figure 3-2
Standalone European Country Binder Contents



Source: Dataquest (April 1991)

making it easy for you to access the information. Clients are provided with the following tools:

- The spines of all binders list the types of information you will find in that binder.
- "What's in This Binder?", appearing immediately following the title page, summarizes the documents in that binder and highlights what can be found in other binders of that service.
- A detailed Table of Contents is contained in the *Source: Dataquest* and segment binders.
- Each bound document in the *Source: Dataquest* and segment binders has its own Table of Contents, including a list of tables where appropriate.
- To help you access the articles you need in a timely manner, Dataquest provides you with a comprehensive index which is delivered quarterly and provides a year-to-date

©1991 Dataquest Incorporated April—Reproduction Prohibited

cross-reference by company name and major topic. The index lists the titles of all articles and of all tables and figures that appear in issues of the publication. Listings include the title, date, and page number for each entry. The first page of each quarterly index provides an explanation of how the index can best be used, along with an example. Segment Perspectives are indexed separately and incorporated into the year-end index provided for the entire service.

©1991 Dataquest Incorporated April—Reproduction Prohibited

Chapter 4

Customizing Your Industry Service

As a subscriber to a Dataquest syndicated market research service, clients receive significant tactical and strategic information. Dataquest also offers a variety of individualized and proprietary programs to clients to help them solve their specialized information and analysis needs. Each project is treated with the strictest confidence.

We carefully review each project with the client prior to beginning the actual research. Dataquest's consulting staff designs a research plan that most effectively meets each client's unique requirements. This includes determining the appropriate information to be gathered, the proper sample size, appropriate collection techniques, and the best analytic methods to be used.

Custom Consulting

Dataquest's custom consulting helps clients in any of the following ways:

- Analyzing specific markets and competitive environments
- Developing strategies for increased market penetration
- Evaluating new business, product, and distribution plans
- Verifying critical market assumptions
- Assessing the impact of emerging technologies on existing products and markets
- Assisting in developing international business strategies, including:
  - Identifying strategic partners, both domestic and international
  - Defining technology "fits"

Custom consulting is structured to provide assistance across all TID services beyond the scope of each service. In areas where new, original work is needed, consulting provides value not only through its own individualized proprietary efforts, but also through its integration of TID information and analysis resources.

Among the elements that consulting can bring to a project are specialized planning assistance, proprietary analyses, in-person interviews, mail surveys, telephone surveys, focus groups, and custom database cuts.

Multiclient Studies

Custom Consulting engages not only in full-custom research projects, but also in the generation of multiclient studies. These studies allow Dataquest to offer clients in-depth information on emerging and/or niche markets at an amortized cost for consulting.

Retainer Consulting

Dataquest also offers its clients retainer consulting. Dataquest analysts and consultants provide consulting advice on an ongoing basis and with quick turnaround to address a variety of client management and marketing needs.

Primary Research

Dataquest's Primary Research services offer a comprehensive range of survey research capabilities that can provide vital information tailored to each client's specific needs. This is important when survey work, but not analysis, is needed. Studies of any type, size, or aspect can be performed as a supplement to existing market research efforts, when nonbiased third-party research is required, or to provide complete primary research capabilities when company resources are not available. Primary Research assumes total responsibility for a project at any stage, from questionnaire development through sample selection, data collection, and final tabulation. The following

are examples of the broad range of business applications addressed by Primary Research:

- Market penetration surveys
- Customer needs and satisfaction surveys
- New product research
- Product pricing and positioning surveys
- Annual trend surveys
- Installed base surveys
- Sales trend identification

End-User-Based Services

Score Reports

Customer satisfaction surveys track the level of satisfaction by users of PCs, copiers, electronic printers, PBXs, and public key systems. Key indicators measured include value for price, quality, commitment to customer, features, product delivery, technical documentation, and service. The Score Report is conducted four times a year so that manufacturers can monitor trends in end-user satisfaction levels over an extended period of time.

Score Reports are based on telephone interviews with an annual sample of over 5,000 respondents. A stratified sampling plan is used, with users selected randomly by vendor from a database of U.S. business establishments. No manufacturers' lists are used.

The Score Report survey meets the requirements for measuring customer satisfaction as defined by the Malcolm Baldrige National Quality Award. The Baldrige Award is granted annually by the U.S. Department of Commerce in recognition of U.S. companies that excel in quality achievements and management.

CPE Market Dynamics

This end-user information service provides quarterly data on PBX, Centrex services, and key systems users' purchases by manufacturer, system model, RHC region, state, and vertical market. There are two proprietary custom options, as follows:

- Product-Presence-Hit Rate (PPH) Analysis: Assesses a company's position in the marketplace as a function of product acceptance, distribution, or sales effectiveness.
- Win-Loss Analysis: This option takes PPH analysis one step further, delving into why systems sales are being won or lost by you and your competitors. A customized direct mail, telephone, or personal interview program is established to contact the appropriate end users.

©1991 Dataquest Incorporated April—Reproduction Prohibited

Chapter 5

Whom Do You Call at Dataquest?

Clients who have questions or need assistance in any way are encouraged to call Dataquest at their earliest convenience. Table 5-1 is an overview of who to contact at Dataquest.

Table 5-1

Who to Contact at Dataquest

Question/Concern	Who to Contact
My subscription (e.g., billing, renewal)	My customer service representative
Subscribing to another service	My sales account manager
Data or facts about my industry	Client Inquiry Center
Opinion or analysis about my industry	Analyst in the service
Other services/products offered by Dataquest	My sales account manager
New services/products I would like Dataquest to offer or feedback on current offerings	Product Marketing Components: (408) 437-8624 Systems: (408) 437-8517 Telecommunications: (408) 437-8602 Peripherals: (408) 437-8308 Ledgeway: (617) 862-8500
An upcoming conference	Conference Department U.S.—(408) 437-8245 Europe—(44) 895-835050 Japan/Asia—(81) 3-5566-0416
A possible proprietary consulting project	Consulting Department, sales account manager, or service analyst
Library visits	Client Inquiry Center, service analyst, or corporate librarian in the U.K.
The new Dataquest format for research delivery	(408) 437-8215, or dedicated Voice Mail Hot Line: (408) 437-7878
Reprints of selected articles	Sales Department—Technology Products: (800) 624-3282

Source: Dataquest (April 1991)

Chapter 6

About Dataquest...

Dataquest was formed in 1971 with the sole purpose of delivering timely and accurate information on critical issues in the high-technology arena. Quoting from the Dataquest mission statement:

> "Our goal is to be the acknowledged worldwide leader in market intelligence for the industries we serve by providing indispensable information and analysis to our clients."

As a member of The Dun & Bradstreet family of companies, Dataquest has access to supplemental information from Dun & Bradstreet and its subsidiaries. Together with our own primary and secondary research capabilities and analyst expertise, this relationship offers the most comprehensive information available on topics pertinent to your industry.

Dataquest comprises two basic business units. Dataquest's Technology Information Division (TID) provides data and analysis on the high-technology electronics industry, encompassing semiconductors, systems, peripherals, application markets, software, and service and support. A cross-industry financial program supported by TID analysts and assigned account managers is tailored to the needs of the financial community. The Machinery Information Division (MID) offers a full range of marketing research and consulting services for professionals in all areas of the heavy equipment and material-handling industries.

The Technology Information Division

The information service you have purchased from Dataquest is part of our Technology Information Division (TID) family of products. TID provides information services that are both tactical and strategic in nature, and include syndicated industry services, custom consulting, multiclient studies, primary research, specialized information services for the financial community, product specification directories, and standalone reports on technology markets. These services are described in more detail in the following paragraphs.

There are five research groups within TID. Each provides data and analysis covering the global electronics industry from semiconductors to systems, from hardware to software, and from applications to service.

Semiconductor Group

This group covers the entire semiconductor "food chain," including manufacturing equipment and materials, device technologies and markets, and end-use applications and procurement issues. Its information services are worldwide in scope and include targeted North American, European, Japanese, and Asian services. The Semiconductor Group is divided into the following 9 services:

- Semiconductors—Worldwide
  - Segments:
    - Semiconductor Memories
    - ASICs
    - Analog and Mixed Signal ICs
    - Microcomponents
    - Gallium Arsenide Semiconductors
- Semiconductors—Europe
- Semiconductors—Japan
- Semiconductors—Asia
- Semiconductor Application Markets—Worldwide
- Semiconductor Application Markets—Europe
- Semiconductor Application Markets—Japan
- Semiconductor Procurement
- Semiconductor Equipment, Manufacturing, and Materials

Systems Group

This group covers business and technical computer systems and applications, both hardware and software, ranging from palmtops to PCs to supercomputers.

Computer Systems Services

The computer systems services cover the following six segments:

- Business Computers
- Servers
- Supercomputers
- Technical Computers
- Unix Systems
- Workstations

European Computer Systems

This service covers the same product areas for 14 European regions.

Microcomputer Systems Group

This worldwide service tracks and analyzes PCs by packaging type, microprocessor, operating system, price point, environment, and region of the world. It includes the following segments:

- Personal Computers—North America
- Personal Computers—Europe
- Personal Computers—Asia
- Personal Computers—European Quarterly Statistics
- Personal Computers—European Price Tracking

Business Applications

This service covers electronic equipment environments in the office that are primarily software driven and looks at the ways in which these environments drive their associated hardware markets. Business Applications is divided into two services:

- Office Software
- Personal Computer Software

Technical Applications

The CAD/CAM/CAE service provides information on four key applications: Mechanical, AEC, GIS/Mapping, and Electronic Design Automation. Its geographic coverage extends to North America, Europe, and Asia. The service is segmented as follows:

- Electronic Design Automation
- Mechanical Applications
- Architecture, Engineering, and Construction, and Geographic Information Systems
- Personal CAD
- CAD/CAM—Europe
- CAD/CAM—Asia

In addition, CASE is covered through consulting.

Telecommunications Group

The Telecommunications Group is divided into two services, the Telecommunications North America service and the Telecommunications Europe service.

These worldwide services divide their coverage of the industry into five major product segments, as follows:

- Image Communications
- Networking
- Personal Communications
- Public Network Equipment and Services
- Voice Communications

Regional market options include country-specific coverage of any of the following European countries: France, Germany, Italy,

©1991 Dataquest Incorporated April—Reproduction Prohibited

Netherlands, Spain, Sweden, and the United Kingdom.

Peripherals Group

This group covers markets for devices that are typically attached to multiuser host systems or serve an output function.

Computer Storage Service

The Computer Storage service covers the following four segments:

- Rigid Disk Drives
- Tape Drives
- Optical Disk Drives
- Flexible Disk Drives

Graphics and Displays Service

The Graphics and Displays service covers the following four segments:

- Graphics Processors
- Monitors
- Display Terminals
- Network Stations

Document Management Group

The Document Management group is made up of the following four services:

- Copying and Duplicating (including fax coverage)
- Electronic Printers—North America
- Electronic Printers—Europe
- Electronic Publishing

Ledgeway/Dataquest

Ledgeway/Dataquest is the group that provides strategic and tactical information on the fast-growing services industry. Computer systems vendors typically obtain 25 to 30 percent of their revenue from pre- and postsale services. In addition to services provided by manufacturers, there is a very large and fast-growing industry for professional and systems integration services. Ledgeway/Dataquest covers both of these market sectors.

Ledgeway/Dataquest offers 10 different subscription programs. All programs include access to Ledgeway/Dataquest analysts for inquiry support, periodic bulletins on key events in the service industry, and attendance at Ledgeway/Dataquest's annual ServiceTrends conference.

The ServiceTrends Program

The most widely subscribed service, now in its eighth year, is Ledgeway/Dataquest's ServiceTrends program. In addition to the cornerstone of the program, Ledgeway/Dataquest's annual two-volume *Trends and Forecast* report, which provides in-depth market size and forecast information and analysis of market trends, four topical reports are provided. In 1991, these topical reports are:

- *Global Support Strategies*
- *Measuring and Managing Customer Satisfaction*
- *Japan and the Pacific Rim: Customers or Competitors*
- *Self-Service: Opportunity or Threat*

The Professional ServiceTrends program features analysis of customer wants and needs for systems integration and professional services, in addition to a market trends report, which forecasts market size, growth rates, and analyzes trends. In addition, there are six profiles provided on leading participants in the industry.

Sector Market Programs

Sector market programs are focused on narrow segments of the service market and feature an annual market trends and forecast report, user wants and needs analysis, a pricing trends and data study (for all but the European ServiceTrends program), and six profiles of leading service vendors in each sector. Ledgeway/Dataquest's sector market programs are as follows:

- European ServiceTrends
- Independent/Multivendor Services

©1991 Dataquest Incorporated April—Reproduction Prohibited

- Network/Communications Support
- Mini/Mainframe Software Support
- PC/Workstation Software Support
- Technical Workstation Service and Support
- PC/End-User Computing Services
- Channel Support Strategies

In addition to its subscription services, Ledgeway/Dataquest has a very professional and active custom consulting group that conducts custom projects focused on the following areas:

- Customer satisfaction and service quality audits
- Key competitor analysis and positioning
- New service product market analysis and strategy formation

Subscription services and custom consulting are provided covering worldwide markets.

The Executive and Financial Group

Dataquest's Executive and Financial Group (EFG) offers a number of cross-industry services that are designed primarily for clients in the financial and executive communities. These services offer clients the following benefits:

- Access to all Dataquest research professionals
- Access to TID *Dataquest Perspectives*
- Access to TID conferences
- A personal account manager

EFG includes the following services, which are differentiated largely in terms of the type of clients they serve.

Financial Services Program

The Financial Services Program (FSP) is designed to serve the needs of clients who evaluate loans and investments, monitor portfolios, identify markets and prospects, and develop strategies for penetration of new markets. FSP clients include banks, venture capital firms, CPAs, leasing companies, and development agencies. The program benefits these clients by helping them develop financial strategies in high-technology areas, identify financial opportunities, evaluate proposed client investments and relationships, and monitor companies and markets.

Strategic Executive Service

The Strategic Executive Service (SES) is a networking and technology advisory program specifically designed for CEOs or senior executives. The service is open by invitation only to the presidents of technology companies. Dataquest senior staff from all high-technology industry service groups provide decision support to each president. SES also hosts an annual Presidents' Summit Conference, bringing together subscribers to focus on future trends in high technology products and markets. It is a highly customized service for executive decision makers.

Equipment Leasing Service

At the core of Equipment Leasing Service (ELS) is a portfolio of more than 300 individual future value projections for specific products from more than 45 leading computer, peripherals, and telecommunications vendors. These projections are calculated through a proprietary model and are delivered to clients along with relevant research newsletters. Clients also receive inquiry access to specialized leasing analysts. ELS is designed for companies that lease high-technology equipment. The service assists clients in the areas of lease origination sales, vendor sales, equity sales, asset management and remarketing, and new business development and marketing.

Technology Investment Program

The Technology Investment Program (TIP) is designed to serve the needs of clients in the securities industry, investment banking industry, equity research markets, and institutional investment fields. The service provides clients with company evaluations, product and technology assessments, and other forms of information that help identify target companies for merger/acquisition, joint venture, initial public offerings, and equity investment.

©1991 Dataquest Incorporated April—Reproduction Prohibited

Other Dataquest Services

Conferences

Technology Information Division Conferences

Dataquest hosts a number of conferences each year to present industry forecasts and discuss critical issues and trends. Clients obtain a number of benefits from attending these conferences, including:

- Receiving Dataquest updates on key markets
- Meeting with industry leaders and users
- Discussing market events and their significance to your organization with Dataquest analysts

As an industry service client, you may purchase tickets to any Dataquest conference you wish to attend. Each ticket entitles you, or someone you designate, to attend one Dataquest conference. A complete list of conferences is included in Appendix B of this document. To purchase a conference ticket, or to obtain more information about Dataquest's conferences, contact Dataquest's conference department at any of the following locations:

- North America
  (408) 437-8245
- Europe
  (44) 895-835050
- Japan/Asia
  (81) 3-5566-0416

Invitational Computer Conferences

Dataquest's Invitational Computer Conferences (ICCs) bring major computer manufacturers together with buyers in 41 regional markets around the world. The one-day ICC format combines hands-on product displays with technology seminars designed to educate prequalified regional buyers throughout the United States, Europe, and Asia/Pacific. Each SalesEvent ensures a focused conference, whereby the manufacturers have a selectively targeted audience of buyers and the buyers can learn about new technology, receive a hands-on view of products and solutions, and discuss their application needs with exhibiting regional sales and technical managers. Three ICC series are held as follows:

- *OEM Peripherals* (in various U.S. and European locations), serving OEMs, systems integrators, volume end users, and government buyers/integrators who are all looking to buy computer peripherals.
- *Computer Connectivity* (in various U.S. and European locations), serving MIS/DP managers, systems integrators, network managers, and value-added resellers/dealers who are all looking to buy connectivity/networking solutions.
- *Asia Pacific* (in various Asian locations), serving OEMs, systems integrators, volume end users, and government purchasers who are all looking to buy computer peripherals.

Technology Products

Dataquest also provides standalone products, including specification guides in both hard copy and electronic format (disk), reports, and monthly newsletters that are marketed and sold individually to broad customer audiences. These products are designed to be complementary to the TID syndicated market research services and include highly tactical information on product specifications and pricing, as well as in-depth analyses of specific markets and technology trends. See Appendix C for a current list of products.

©1991 Dataquest Incorporated April—Reproduction Prohibited

Chapter 7

Subscription Terms

Basic Terms of Syndicated Industry Services

The service begins on the date of the first billing. At that time, the subscriber receives the *Source: Dataquest* binder with the current documents and a *Dataquest Perspectives* binder complete with documents covering the last six months. Clients also receive the current year-to-date index as well as the previous year's annual index.

Subscribers to a segment of a service receive a segment binder containing recent segment-specific *Dataquest Perspectives* and the current version of the detailed, segment-specific market statistics. For the duration of the subscription, subscribers receive a copy of each *Dataquest Perspective* published and any annual updates to *Source: Dataquest* documents as they are produced. The inquiry privilege may be used to supplement the material in the binders.

Add-On Subscriptions

Subsidiaries, divisions, regional offices, majority-owned affiliates, and parent companies of a subscribing organization within the same region are eligible for add-on subscriptions at a percentage of the base subscription price. Add-on subscriptions include complete copies of all published material, inquiry privileges specific to the markets subscribed to, and conference attendance at discounted prices. Regions are defined as North America, Europe, and Japan.

Payment Terms

Dataquest's terms, including the applicable sales or value-added tax, are net 30 days.

Base Price

Dataquest reserves the right to change its subscription prices to reflect broadened scope or increased costs. Subscribers will be notified in advance of any such price increase.

A Reminder

Your agreement specifies the individuals in your company who have access to Dataquest information. You will need to obtain written consent from Dataquest to disclose data, analysis, and written materials to any other person or entity beyond those specified by the terms of the agreement.

Dataquest also asks that you not use any data obtained through your industry service in any legal proceedings, or as the basis for advertising copy, press releases, collateral material, or any other promotional material. For further information on the conditions pertaining to your industry service, please refer to your industry service agreement, or contact your sales representative.

Your industry service agreement provides you with a license to use your industry service for the length of time designated in the agreement. If you decide not to renew your industry service at the end of this time, it is your obligation to return these materials to your nearest local Dataquest office.

We Thank You for Choosing Dataquest as Your Marketing Research Partner.

We hope this guide has helped you. Please take advantage of the services we have described. Dataquest's goal is total satisfaction. If you have any questions or comments about this guide or the services it describes, please let us know.

Appendix A

Dataquest Information Resource Center CD-ROMS and Computer Databases

PATENTS

Micropatent

This CD-ROM is a basic search and current awareness tool for U.S. patents, containing abstracts and selected front-page information from patents published by the U.S. Patent and Trademark Office. It covers 1975 to date, with limited information 1969 to 1974. Patent number, inventor, title, and assignee are just a few of the ways to search this CD. It is updated monthly. Book version not available.

FINANCIAL INFORMATION

Compact d Sec—USA

This CD-ROM contains financial and management information on 11,000 public companies filing with the SEC. The current and historical financial information is culled from annual reports and 10-Ks. It is updated monthly. Book version not available; however, the library files have annual reports, 10-Ks, quarterly reports, and 10-Qs. Please check the lateral files and the listing on top of the files.

Compact d Sec—Canada

This CD-ROM provides financial information on 6,000 Canadian companies and is updated quarterly. Book version not available; however, the library files have annual reports. Please check the lateral files and the listing on top of the files.

Compact d Sec—Europe

This CD-ROM provides financial and factual information on 2,000 publicly held European companies and is updated quarterly. Book version not available; however, the library files have annual reports. Please check the lateral files and the listing on top of the files.

COMPANY DIRECTORIES

Corptech

This database contains information on developers and manufacturers of high-technology products in the United States. It is searchable by product, location, size, status, and name and is updated quarterly. Book version available.

Thomas Register

This CD-ROM provides product and directory information for manufacturing companies in the United States and Canada. It is updated monthly. Book version available.

ARTICLE SEARCH

Computer Select (formerly Computer Library)

This CD-ROM is a major upgrade to Computer Library. In addition to the ever-growing list of periodicals included in Computer Select, the full contents of Data Sources, the most comprehensive computer industry directory available, have been added. You'll be able to retrieve specifications on over 67,000 hardware, software, and data communications products, as well as profiles of the over 1,000 companies that make them. New searching capabilities include locating articles by choosing lists of publications, article types, date ranges, topics, and other fields. It is updated monthly. Book version of Data Sources available.

COMPUTER DIRECTORIES

ICP Software Information Database

This CD-ROM provides information on micro, mini, and mainframe software products offered by over 4,000 vendors and is updated quarterly. Book version available.

©1991 Dataquest Incorporated April—Reproduction Prohibited

Appendix B

Dataquest 1991 Conference Schedule

North America		
Forecast '91-Technology Briefing	March 5	San Jose
Ledgeway Service & Support	April 8-9	San Francisco
Semicon/West	May 22	Redwood City
Document Management	June 27-28	San Francisco
Personal & Wireless Communications	August 12-13	Monterey
Portable Computing	September 11-12	San Jose
Semiconductor	October 14-16	Monterey
Europe		
Computer Industry	February 14-15	London
	February 19-20	Milano
	February 25-26	Frankfurt
	March 6-7	Paris
Semicon/Europa '91	March 6	Zurich
Semiconductor	May 29-31	Marbella
Printer	June 11-12	Amsterdam
Colour Market	June 12-13	Amsterdam
Copying & Duplicating	June 13-14	Amsterdam
Telecommunications	November 7-8	London
Japan and Asia		
Semiconductor	April 22-23	Tokyo
Computer & Telecommunications	June 25-26	Tokyo
Strategic Industry	September 24-25	Taipei
Peripherals	October 1-3	Tokyo

For reservations or further information call: U.K. 895-855050 San Jose (408) 437-8245 Tokyo 3-5566-0411
January 1991—Subject to revision

Appendix C

Technology Products

SpecCheck Guides

Copier SpecCheck-On-Disk Disk version of the Copier SpecCheck Guide. Allows custom sorts on 500 models and 24 vendors. Six annual updates on either 3.5-inch or 5.25-inch format.

Copier SpecCheck Guide Detailed specifications and pricing information on 500 copier models. Two full books, two updates per year.

Fax SpecCheck-On-Disk Disk version of Fax SpecCheck Guide. Allows custom sorts on 600 models and 47 vendors. Six annual updates on either 3.5-inch or 5.25-inch format.

Fax SpecCheck Guide Detailed specifications and pricing information on 600 fax models. Two full books, two updates per year.

PC SpecCheck-On-Disk Disk version of PC SpecCheck Guide. Allows custom sorts on 400 models and 47 vendors. Six annual updates on either 3.5-inch or 5.25-inch format.

PC SpecCheck Guide Detailed specifications and pricing information on 400 PC models. Four full books per year.

Personal Page Printer SpecCheck-On-Disk Disk version of Personal Page Printer SpecCheck Guide. Allows custom sorts on 400 models and 100 vendors. Four annual updates on either 3.5-inch or 5.25-inch format.

Personal Page and Ink Jet Printers SpecCheck Guide Detailed specifications and pricing information on 275 personal page and ink jet printer models. Two full books per year.

Dot Matrix Printer SpecCheck Guide Detailed specifications and pricing information on 300 dot matrix printers. Two full books per year.

High-Speed Page and Line Printers SpecCheck Guide Detailed specifications and pricing on 300 high-speed page and line printers. Two full books per year.

Reports

Imaging Materials Series

Series of reports on key areas of the imaging materials industry. Reports currently available or planned are:

Toner in the '90s: The Shape of Things to Come Detailed analysis of the liquid and dry toner and developer industry. The report looks at market size, structure and growth, U.S. and foreign producers, and trends in materials manufacturing and distribution. Includes directory of suppliers. Available now.

Specialty Papers and Films: New Technology, Media, and Markets In-depth report on the hard-copy media field for paper and film products. The report looks at imaging processes, imaging hardware, end-use applications for hard-copy output, and market size and forecast. Includes directory of suppliers. Available June 1991.

The Photoreceptor Industry: A Marketing and Technical Analysis Detailed analysis of photoreceptor technology and the industry. Volume I chronicles the evolution of the industry in terms of equipment, manufacturing, and distribution, providing market size and forecasts. Volume II is a complete reproduction of U.S. patent abstracts from 1979-1990. Includes directory of manufacturers. Available Fall 1991.

Other Reports

Fax On Demand—Marketing Tool for the '90s A useful report to help end users evaluate and select voice/fax systems and implement fax-on-demand services for their business. Includes applications, technology, and economic considerations for fax-on-demand, as well as a directory of product vendors and service providers. Available June 1991.

Color Scanner User Survey for U.S. Publishing Markets Extensive survey of key end-user

markets in publishing, advertising, printing services, graphic design, PostScript output services, and Fortune 1000 companies to ascertain purchase intentions and installed base of color and monochrome scanners. Available May 1991.

Semiconductor Industry Insights—from Silicon to Systems Analysis of the global semiconductor industry containing market forecasts, key drivers, product demand, semiconductor production, equipment, and materials.

Voice Processing Opportunities in the U.S.—A Market Assessment and End-User Survey Extensive end-user survey providing networking information, applications, satisfaction level, purchase decision making, and selection criteria by key vertical markets. Also includes market shares, technology, standardization, revenue, and pricing forecasts through 1994.

High-Speed Printing Applications in Banking A vertical market study comprising two reports and videotapes/transcripts of three focus sessions. Study focuses on high-speed printing applications in the banking industry and examines the applications that banks print internally and externally, as well as special printing capability needs of the banking industry.

Portable Computing in the 1990s Three-part series on the latest products, features, and options for transportables, laptops, notebooks, palmtops, and electronic daybooks.

PC LAN Markets in Europe 1990 Analysis of all the major PC LAN vendors in 13 European countries. Market shares, forecasts, distribution channels, and shipments segmented by end-user types.

Computer Usage in European Banks 1990 In-depth, two-volume study on the demand for hardware, applications, LANs, and operating systems in European banks, segmented by bank size. A widespread survey of banks in nine European countries was supplemented by personal interviews with key decision makers at the largest banks.

Monthly Newsletters

Copier FAXts A look at new products, distribution, organizational news, and trade show highlights for the copier and fax industries.

IC Europe All the latest local intelligence and analysis of new products, alliances, technology impacts, and forecasts for the European semiconductor industry.

European Monitor Monthly newsletter with all the latest news on vendor, product, and distribution developments in the European personal computer market.

Price Tracking Flash Monthly newsletter on PC product announcements and changes in price, configuration, and distribution for PC products by 16 manufacturers in 14 European countries.

Other Technology Products

Company Backgrounders by Dataquest Detailed vendor profiles on almost 300 leading worldwide high-technology companies highlighting company strategic direction, business direction, detailed product line summaries, information on joint ventures, mergers and acquisitions, and licensing agreements.

DQ Monday On-Line News, analysis, and current prices for 25 leading semiconductor product groups for all the major markets: United States, Europe, Japan, Hong Kong, Taiwan, and Korea.

DQ Test Target Package of ten 8.5 x 11-inch copier/fax test patterns: gray scale, black and white, and color.

International Test Target Package of ten standard European-size test targets.

©1991 Dataquest Incorporated April—Reproduction Prohibited

Dataquest

Dataquest Research and Sales Offices:

Dataquest Incorporated
1290 Ridder Park Drive
San Jose, California 95131-2398
Phone: (408) 437-8000
Telex: 171973
Fax: (408) 437-0292

Technology Products Group
Phone: (800) 624-3280

Dataquest Incorporated
Ledgeway/Dataquest
The Corporate Center
550 Cochituate Road
Framingham, MA 01701
Phone: (508) 370-5555
Fax: (508) 370-6262

Dataquest Incorporated
Invitational Computer Conferences Division
3151 Airway Avenue, C-2
Costa Mesa, California 92626
Phone: (714) 957-0171
Telex: 5101002189 ICCDQ
Fax: (714) 957-0903

Dataquest Australia
Suite 1, Century Plaza
80 Berry Street
North Sydney, NSW 2060
Australia
Phone: (02) 959 4544
Telex: 25468
Fax: (02) 929 0635

Dataquest GmbH
Kronstadter Strasse 9
8000 Munich 80
West Germany
Phone: 011 49 89 93 09 09 0
Fax: 49 89 930 3277

Dataquest Europe Limited
Roussel House, Broadwater Park
Denham, Uxbridge, Middx UB9 5HP
England
Phone: 0895-835050
Telex: 266195
Fax: 0895 835260/1/2

Dataquest Europe SA
Tour Galliéni 2
36, avenue du Général-de-Gaulle
93175 Bagnolet Cedex
France
Phone: (1) 48 97 31 00
Telex: 233 263
Fax: (1) 48 97 34 00

Dataquest Hong Kong
Rm. 401, Connaught Comm. Bldg.
185 Wanchai Rd.
Wanchai, Hong Kong
Phone: 8387336
Telex: 80587
Fax: 5722375

Dataquest Israel
59 Mishmar Ha'yarden Street
Tel Aviv, Israel 69865
or
P.O. Box 18198
Tel Aviv, Israel
Phone: 52 913937
Telex: 341118
Fax: 52 32865

Dataquest Japan Limited
Shinkawa Sanko Building
1-3-17 Shinkawa, Chuo-ku
Tokyo 104 Japan
Phone: (03) 5566-0411
Fax: (03) 5566-0425

Dataquest Korea
Daeheung Bldg. 1105
648-23 Yeoksam-dong
Kangnam-gu
Seoul, Korea 135
Phone: (02) 556-4166
Fax: (02) 552-2661

Dataquest Singapore
4012 Ang Mo Kio Industrial Park 1
Ave. 10, #03-10 to #03-12
Singapore 2056
Phone: 4597181
Telex: 38257
Fax: 4563129

Dataquest Taiwan
Room 801/8th Floor
Ever Spring Building
147, Sect. 2, Chien Kuo N. Rd.
Taipei, Taiwan R.O.C. 104
Phone: (02) 501-7960
Telex: 27459
Fax: (02) 505-4265

Dataquest West Germany
In der Schneithohl 17
6242 Kronberg 2
West Germany
Phone: 06173/61685
Telex: 418089
Fax: 06173/67901

0009733

Dataquest Research Methodology

Source:
Dataquest

Dataquest

Dataquest Research Methodology

Source: Dataquest

Published by Dataquest Incorporated

The content of this report represents our interpretation and analysis of information generally available to the public or released by knowledgeable individuals in the subject industry, but is not guaranteed as to accuracy or completeness. It does not contain material provided to us in confidence by our clients.

Printed in the United States of America. All rights reserved. No part of this publication may be reproduced, stored in retrieval systems, or transmitted, in any form or by any means—mechanical, electronic, photocopying, duplicating, microfilming, videotape, or otherwise—without the prior written permission of the publisher.

© 1991 Dataquest Incorporated
March 1991

Dataquest's Research Philosophy—Methodology for Value

From semiconductors to systems, office to factory automation, Dataquest provides quality research on more than 25 separate high-technology industries and their markets.

Fundamental to the way Dataquest conducts its research is an underlying philosophy that says the best data and analysis come from a well-balanced program. Such a program includes a balance between primary and secondary data collection techniques; between supply-side and demand-side analysis; between focused, industry-specific research and coordinated, "big picture" analysis; and between the informed, insightful perspectives of experienced industry professionals and the rigorous, disciplined techniques of seasoned market researchers. Ultimately, this leads to a balance between data and analysis—the combination of which provides unique insight and ultimate value to our clients.

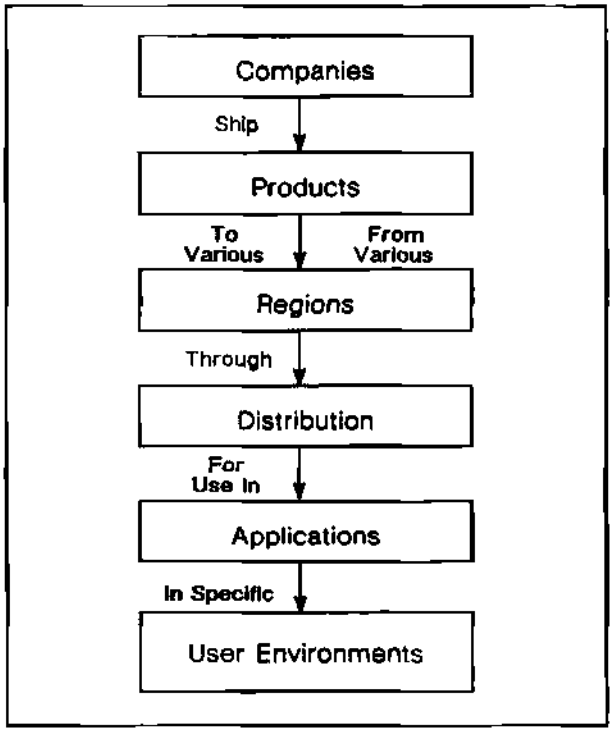
Market Segmentation—Setting the Standards

The design of market segmentation and data standards is a critical issue at Dataquest. Much effort is devoted to choosing and defining the way products, industries, and markets are segmented. Dataquest's objective is to provide data and analysis along lines of segmentation that are logical, appropriate to the industry in question, and immediately useful to clients.

Over the years, Dataquest has consistently established industry-accepted standard segmentations for the way we follow products and their movement. Figure 1 reflects the way we track products. Further, we spend a great deal of time and effort in defining *how* we track these products and determining what *our* definitions are for the market metrics we use—for example, shipments, installed base, retirements, factory revenue versus end-user revenue, market share, and so on.

We follow several dimensions. Sometimes there are one-to-one, or dedicated, relationships between dimensions—for example, between software products and their applications. We believe that all major high-technology industries mirror this scheme. Note that we do not use the term vertical markets. This term is often used to refer to either applications or environments because both terms describe the use of a product. Application describes what the product is used for, and environment describes where the product is used. The term vertical market often is used for either of these terms and thereby can cause confusion.

Figure 1
How Dataquest Tracks High Technology



Source: Dataquest (March 1991)

We have therefore standardized on the following terminology, which distinguishes between application and environment, for each dimension we follow:

- Major product categories:
  - Materials
  - Components
  - Boards and subsystems
  - Equipment
  - Software
  - Consumables
  - Services
  - Others
- Product—A good or service
- Product category—A group of similar products
- Region—Geographic areas of both shipments and consumption
- Distribution—The path by which a product moves from manufacturer to ultimate user
- Application—The use to which a product is put; the function it performs
- Environment—Where a product is ultimately used

The Dataquest Staff

Dataquest believes that in order for an analyst to understand and analyze an industry, the analyst must have competed in it. To that end, our staff is heavily populated with professionals who have extensive experience in the industries they analyze. These analysts have held high-level positions in engineering, marketing, product development, and other related areas.

These industry veterans are complemented by a staff of professional market researchers who understand the principles of market research and who direct Dataquest's programs in primary and secondary research, demographics, economics research, statistical analysis, forecasting, and modeling. Figure 2 illustrates our staffing philosophy. This blend of experience and training is unique in the research industry and allows Dataquest to provide its clients with market research of unequaled value.

To develop industry analysis and data, Dataquest collects a wide spectrum of information from a carefully selected portfolio of sources. Data are collected directly by our researchers in the United States, Europe, Japan, and Asia.

Primary Research

The principal data collection methodology at Dataquest is primary research—firsthand data collection by Dataquest researchers. Primary research is conducted with businesses, households, government, and schools; manufacturers, suppliers, and distributors; and product end users. Dataquest's in-house Primary Research Group (located in San Jose and Paris) processes more than 10,000 interviews each month, through both mail and telephone interviews, as well as using focus groups and personal interviews. Questionnaires are developed by the Primary Research Group in conjunction with Dataquest industry analysts.

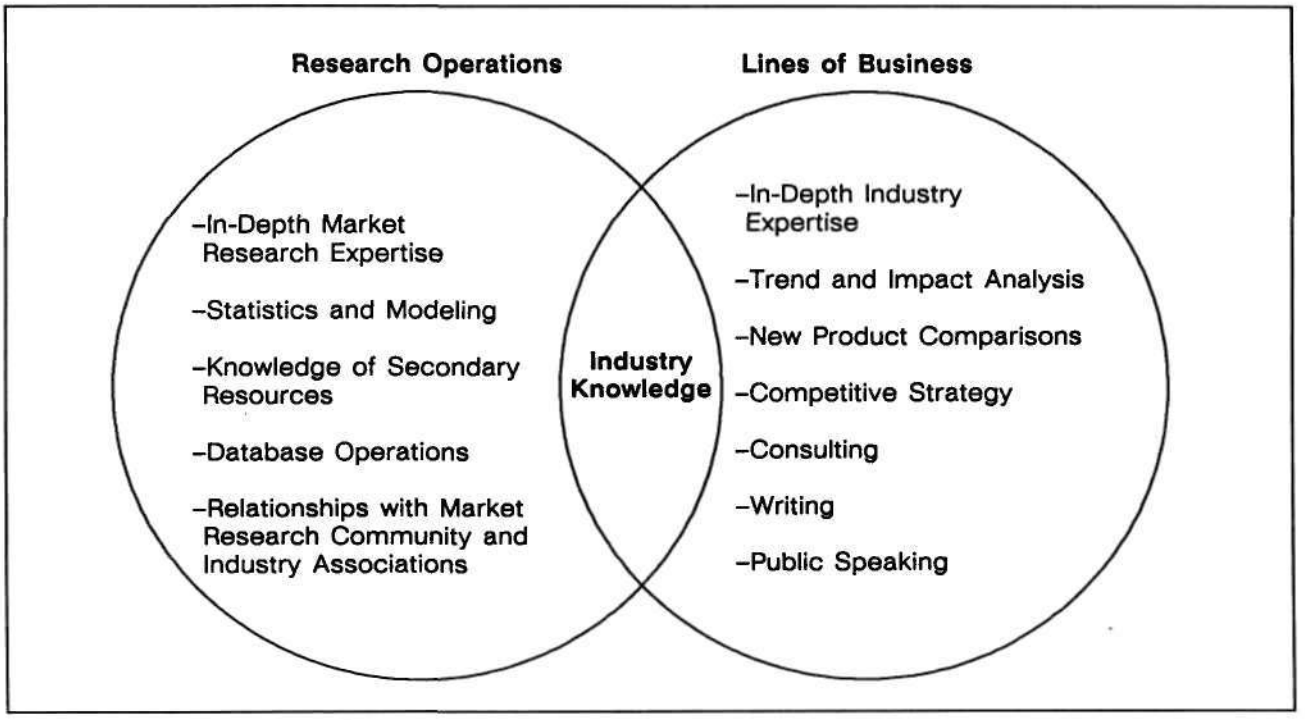
All surveys have been designed and demographic samples selected to answer specific inquiries. These samples conform with Dataquest's standard demographic profiles so that results will comply with existing data structures.

The samples are drawn from a variety of sources, frequently from the databases of our parent company, The Dun & Bradstreet Corporation, including the Dun's Market Identifier File of 6 million U.S. businesses. We also draw samples from the databases of Computer Intelligence and Focus Research. The number of interviews conducted is usually specified to produce data with a reliability of ± 5 percent at a 95 percent confidence level.

Following questionnaire development and sample selection, each survey undergoes a rigorous pretesting to make sure the interview captures the desired information. Once adjustments have been made, the telephone surveys are conducted on-line by Dataquest's in-house team of professional interviewers. Call monitoring allows us to provide quality control throughout the process. All data entry and tabulation are done in-house.

©1991 Dataquest Incorporated March—Reproduction Prohibited

Figure 2
Research Organization



Source: Dataquest (March 1991)

Firsthand Observation

On a daily basis, Dataquest watches and measures high technology around the world, using yet another technique of primary research: firsthand observation. Dataquest analysts regularly visit the laboratories, R&D facilities, and manufacturing plants of the companies they follow. They view the technologies and new products; study the manufacturing yields and levels of automation; and meet the people behind the products and companies, from start-up companies to industry leaders.

Secondary Sources

Primary research is supplemented with a review of secondary-source materials. Dataquest's Information Resource Centers throughout the world maintain an extensive collection of information including technical, trade, and general business periodicals; reports; economic data; technical papers; patents; government data; directories; financial literature; product literature; press releases; and many on-line databases. These sources provide specific data points and qualitative input to Dataquest analysis. They cover trends in technology, pricing, manufacturing capacity, competition, product features, demand, buyer behavior, and macroenvironmental forces such as demographics, the economy, and the regulatory arena. The following steps reflect the overall research process at Dataquest:

- Initiate and clarify research request
- Develop methodological approach
- Develop questionnaire
- Select sample
- Load questionnaire (on-line interviewing)
- Prepare estimates (if appropriate)
- Conduct interviewer briefing
- Pretest
- Interview

©1991 Dataquest Incorporated March—Reproduction Prohibited

- Perform quality check and call monitoring
- Merge data
- Perform scrubbing, tabulation, and statistical analysis
- Approve data
- Report on and deliver results
- Maintain database (as required)

The following is a typical cadre of sources:

- Industry contacts
- Industry associations and user groups
- Trade shows and conferences
- Demographics
- D&B economic research
- D&B credit services
- Computer intelligence
- Document management systems
- Focus Research
- Government and regulatory agencies
- Industry and trade publications
- Public databases and libraries
- Annual reports and Forms 10-K
- Product specifications and press releases
- Patent activity

Market Sizing and Market Share

Dataquest conducts surveys of manufacturers and distributors in their respective industries monthly, quarterly, or annually. These surveys collect information on shipment and inventory levels, pricing, and short-term market expectations. Data are checked and cross-checked across data collection points at the supplier, manufacturer, distributor, and end-user levels.

This data collection effort resides at the core of our standard syndicated industry services. We use demand-based surveys for many of our newer products and custom consulting. However, the balance of this discussion focuses on our standard, syndicated industry service product line.

We first develop a company universe for each industry. The sources reflected in Figure 2 are checked to make sure that we have a full census of industry participants.

Next, Dataquest analysts and researchers derive estimates for each product or product category for which we collect shipment and revenue data. The estimates are then provided to vendor representatives for correction or substantiation.

The data collected in our vendor surveys are always considered public information. The data are used to allow bottom-up analysis defining market revenue, market size, and market share. The names of respondents are always kept confidential, and all data are published as Dataquest estimates. All respondents are notified of our policies when our market estimates are initially sent.

Following is a list of steps we go through to derive estimates and reconcile the responses for final approval and reporting:

- We establish product category or model-level detail.
- We establish estimates and check against the following:
  - Aggregate data
  - Industry forecast
  - Historical performance
  - Growth rate of competition
  - Growth rate of related products
- We use the following sources:
  - Vendor verification
  - Quarterly financials
  - Industry associations
  - Distribution channel data
  - Manufacturing capacity
  - Life-cycle analysis
  - Components and peripherals purchases
  - Consumables production
  - Ongoing dialog with industry sources

©1991 Dataquest Incorporated March—Reproduction Prohibited

  - Industry analysts' qualitative insight
  - Government statistics
  - Other secondary sources
- We reconcile responses against Dataquest segmentation standards.

Market Forecasts

We believe that complex interrelationships among the various products, markets, and high-technology industries that we follow should be understood and accounted for in the assumptions underlying each forecast. Forecasts must reconcile the complementary nature of systems, peripherals, and components.

Our forecast methodology begins with the completion of our vendor-based data acquisition, which is used to establish market size for the given year of data collection. These data are used to measure the accuracy of our previous year's projection for the current year. This infrastructure creates a critical foundation that is the starting point for our forecasts.

No single forecast model applies at Dataquest because of the large scope of products and industries that we follow. We have a basic forecasting framework in place that incorporates both quantitative and qualitative data to derive forecasts. Analysts take the following factors into consideration when deriving and cross-checking forecasts and their assumptions:

- Macroeconomics
- Emerging technologies
- Life-cycle analysis
- Retirements
- Environmental trends
- Demographic trends
- Product availability
- Buying intentions
- Captive production
- Historical growth
- Historical pricing
- Installed base
- Saturation
- Obsolescence
- Import and export
- Most likely constraints
- Total available market

Finally, we regularly hold research forums that provide an open exchange of opinions for our analysts.

Throughout Dataquest, each variable must be defined and measured in the same way. Analysts may vary the relationships between variables but not the values themselves. Not all variable relationships hold true for all industries; therefore, analysts may specify which sets of variables to use. Data must be reported according to Dataquest standard segmentation, and all final data must be approved before they are reported. *All* preliminary data are clearly stated as such. All final data are reported as Dataquest estimates. Our information is sourced appropriately with the phrase "Source: Dataquest," and the data are stamped with a date so that users have a clear understanding of what iteration they are using and the assumptions behind those data.

Dataquest Market Research—What's behind the Numbers?

When Dataquest clients receive forecast data with the familiar line "Source: Dataquest," they receive the end result of a rigorous process of primary and secondary data collection; supply-side, demand-side, and macroenvironmental analysis; and the cross-industry perspective afforded by Dataquest's uniquely broad and in-depth worldwide coverage of high technology.

Behind the numbers is a thorough discussion, involving industry professionals and research experts, and testing of the assumptions used to develop Dataquest's forecasts. In this way, clients get more than simply a single point of data for planning and decision making. Behind the numbers is a commitment to quality—a worldwide organization of people committed to supplying the highest-quality *information* and *analysis* to Dataquest's clients.

©1991 Dataquest Incorporated March—Reproduction Prohibited

Dataquest

Dataquest Research and Sales Offices:

Dataquest Incorporated
1290 Ridder Park Drive
San Jose, California 95131-2398
Phone: (408) 437-8000
Telex: 171973
Fax: (408) 437-0292

Technology Products Group
Phone: (800) 624-3280

Dataquest Incorporated
Ledgeway/Dataquest
The Corporate Center
550 Cochituate Road
Framingham, MA 01701
Phone: (508) 370-5555
Fax: (508) 370-6262

Dataquest Incorporated
Invitational Computer Conferences Division
3151 Airway Avenue, C-2
Costa Mesa, California 92626
Phone: (714) 957-0171
Telex: 5101002189 ICCDQ
Fax: (714) 957-0903

Dataquest Australia
Suite 1, Century Plaza
80 Berry Street
North Sydney, NSW 2060
Australia
Phone: (02) 959 4544
Telex: 25468
Fax: (02) 929 0635

Dataquest GmbH
Kronstadter Strasse 9
8000 Munich 80
West Germany
Phone: 011 49 89 93 09 09 0
Fax: 49 89 930 3277

Dataquest Europe Limited
Roussel House, Broadwater Park
Denham, Uxbridge, Middx UB9 5HP
England
Phone: 0895-835050
Telex: 266195
Fax: 0895 835260/1/2

Dataquest Europe SA
Tour Galliéni 2
36, avenue du Général-de-Gaulle
93175 Bagnolet Cedex
France
Phone: (1) 48 97 31 00
Telex: 233 263
Fax: (1) 48 97 34 00

Dataquest Hong Kong
Rm. 401, Connaught Comm. Bldg.
185 Wanchai Rd.
Wanchai, Hong Kong
Phone: 8387336
Telex: 80587
Fax: 5722375

Dataquest Israel
59 Mishmar Ha'yarden Street
Tel Aviv, Israel 69865
or
P.O. Box 18198
Tel Aviv, Israel
Phone: 52 913937
Telex: 341118
Fax: 52 32865

Dataquest Japan Limited
Shinkawa Sanko Building
1-3-17 Shinkawa, Chuo-ku
Tokyo 104 Japan
Phone: (03) 5566-0411
Fax: (03) 5566-0425

Dataquest Korea
Daeheung Bldg. 1105
648-23 Yeoksam-dong
Kangnam-gu
Seoul, Korea 135
Phone: (02) 556-4166
Fax: (02) 552-2661

Dataquest Singapore
4012 Ang Mo Kio Industrial Park 1
Ave. 10, #03-10 to #03-12
Singapore 2056
Phone: 4597181
Telex: 38257
Fax: 4563129

Dataquest Taiwan
Room 801/8th Floor
Ever Spring Building
147, Sect. 2, Chien Kuo N. Rd.
Taipei, Taiwan R.O.C. 104
Phone: (02) 501-7960
Telex: 27459
Fax: (02) 505-4265

Dataquest West Germany
In der Schneithohl 17
6242 Kronberg 2
West Germany
Phone: 06173/61685
Telex: 418089
Fax: 06173/67901

0009692

Dataquest High-Technology Guide

Segmentation and Glossary

1991

Source:
Dataquest

Dataquest

Dataquest High-Technology Guide

Segmentation and Glossary

1991

Source:
Dataquest

Dataquest

Published by Dataquest Incorporated

The content of this report represents our interpretation and analysis of information generally available to the public or released by responsible individuals in the subject companies, but is not guaranteed as to accuracy or completeness. It does not contain material provided to us in confidence by our clients.

Printed in the United States of America. All rights reserved. No part of this publication may be reproduced, stored in retrieval systems, or transmitted, in any form or by any means—mechanical, electronic, photocopying, duplicating, microfilming, videotape, or otherwise—without the prior written permission of the publisher.

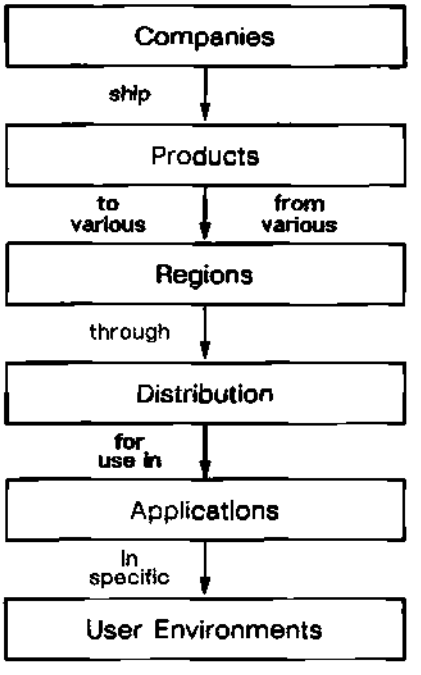
© 1991 Dataquest Incorporated January

High–Technology Guide

The *High–Technology Guide* provides a reference for Dataquest research, analysis, and publications. The segments and terms found in this guide are used consistently in our research and methodology and throughout Dataquest products.

The *High–Technology Guide* is divided into two parts: segmentation and glossary. The segmentation section provides a comprehensive listing of the classifications used in our research. This segmentation is broken into different dimensions including companies, products, regions, distribution, applications, and user environments. These dimensions are illustrated below (see Figure 1). The glossary is an alphabetical list defining the terms found in the segmentation section.

Figure 1
Research Dimensions



Source: Dataquest (January 1991)

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Table of Contents

	Page
SEGMENTATION	1
COMPANIES	3
PRODUCTS	5
Materials	7
Components	7
Boards and Subsystems	13
Equipment	13
Software	36
Consumables	38
Services	38
Other Products	41
GEOGRAPHIC REGIONS	43
North America	46
Europe	48
Japan	50
Rest of Asia—Rest of World	51
DISTRIBUTION	53
Distribution Channel	55
Distribution Method	55
APPLICATIONS	57
General Productivity	59
Organizational	61
Entertainment	66
Industry Specific	66
USER ENVIRONMENT	67
Home	69
Business	69
Natural Resources and Construction	69
Process Manufacturing	69
Discrete Manufacturing	69
Transportation	70
Communication	70
Utilities	70
Wholesale Trade	70
Retail Trade	70
Finance	70
Insurance	70
Real Estate	70
Hotels and Other Lodging	70
Business Services	71
Health Care	71
Other Services	71
Education	71
Government	71
Size	72
RESEARCH ITEMS	73
GLOSSARY	77

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Segmentation

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Companies

The companies section contains more than 3,500 companies on which Dataquest conducts research. These companies are studied because of their concentration or emphasis in technology markets and industries. The company segmentation shows the breadth and depth of collective coverage that Dataquest maintains. Because of the extensive nature of the company list, it is not published in this guide but can be provided upon request.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Products

The products section lists high-technology products. This section presents the segmentation of the technology as defined by Dataquest.

The major categories of products are as follows:

- Materials
- Components
- Boards and Subsystems
- Equipment
- Software
- Consumables
- Services
- Other Products

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Products

MATERIALS

- Wafer
  - Silicon Wafer
  - Epitaxial Wafer
- Gas
  - Bulk Gas
    - Nitrogen
    - Oxygen
    - Hydrogen
    - Argon
  - Specialty Gas
    - Silicon Precursor
    - Dopant
    - Plasma Etchant
    - Reactant Gas
    - Atmospheric/Purge Cylinder Gas and Other
  - Plastics

COMPONENTS

- Semiconductor
  - Integrated Circuit
    - Bipolar Digital (by Technology)
      - TTL/Others
      - ECL
    - Bipolar Digital (by Function)
      - Bipolar Digital Memory
        - Bipolar RAM
        - Bipolar Nonvolatile Memory
        - Other Bipolar Memory
      - Bipolar Digital Microcomponents
      - Bipolar Digital Logic
        - Bipolar ASIC
          - Bipolar Gate Array
          - Bipolar PLD
            - Bipolar PLA
            - Bipolar PMD
            - Bipolar FPGA

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

COMPONENTS

- Bipolar ASIC (Continued)
  - Bipolar Cell-Based IC
- Bipolar Custom IC
- Bipolar Standard Logic
- Other Bipolar Logic

MOS Digital (by Technology)
- NMOS/PMOS
- CMOS
- BiCMOS

MOS Digital (by Function)
- MOS Memory
  - DRAM
    - 16K DRAM
    - 32K DRAM
    - 64K DRAM
    - 128K DRAM
    - 256K DRAM
    - 1Mb DRAM
    - 4Mb DRAM
    - 16Mb DRAM
  - SRAM
    - Slow SRAM
      - 1K SRAM
      - 4K SRAM
      - 8K SRAM
      - 16K SRAM
      - 64K SRAM
      - 256K SRAM
      - 1Mb SRAM
      - 4Mb SRAM
    - Fast SRAM
      - 1K SRAM
      - 4K SRAM
      - 8K SRAM
      - 16K SRAM
      - 64K SRAM
      - 256K SRAM
      - 1Mb SRAM
      - 4Mb SRAM

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

COMPONENTS

- Nonvolatile Memory IC
  - ROM
    - 4K ROM
    - 8K ROM
    - 16K ROM
    - 32K ROM
    - 64K ROM
    - 128K ROM
    - 256K ROM
    - 1Mb ROM
    - 2Mb ROM
    - 4Mb ROM
    - 8Mb ROM
    - 16Mb ROM
  - EPROM
    - 16K EPROM
    - 32K EPROM
    - 64K EPROM
    - 128K EPROM
    - 256K EPROM
    - 1Mb EPROM
    - 2Mb EPROM
    - 4Mb EPROM
    - 8Mb EPROM
  - EEPROM
    - 1K EEPROM
    - 2K EEPROM
    - 4K EEPROM
    - 8K EEPROM
    - 16K EEPROM
    - 32K EEPROM
    - 64K EEPROM
    - 128K EEPROM
    - 256K EEPROM
    - 512K EEPROM
    - 1Mb EEPROM
  - Other MOS Memory
- MOS Microcomponents
  - MOS Microprocessor (by Word Length)
    - 8-bit MOS MPU

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

COMPONENTS

- MOS Microprocessor (by Word Length) (Continued)
  - 16-bit MOS MPU
  - 16/32-bit MOS MPU
  - 32-bit MOS MPU
  - 32/64-bit MOS MPU
  - 64-bit MOS MPU
- MOS Microprocessor (by Technology)
  - CISC MOS MPU
  - RISC MOS MPU
- MOS Microcontroller
  - 4-bit MOS MCU
  - 8-bit MOS MCU
  - 16-bit MOS MCU
  - 32-bit MOS MCU
  - Digital Signal Processor
    - DSP Microprocessor (DSMPU)
    - Microprogrammable DSP (MPDSP)
    - Special-Function DSP (SFDSP)
- MOS Microperipheral
  - System Support Peripheral
    - Traditional Peripheral
      - Counter/Timer
      - DMA
      - Interrupt Controller
      - Memory Management
      - Real-Time Clock
      - Others
    - General-Purpose I/O
    - DRAM Controller
    - Cache Controller
    - PC Logic Chip Set
  - Display Peripheral
    - Alphanumeric CRT Controller
    - Graphics Controller
    - Keyboard Controller
    - Printer Controller
    - Others
  - Mass Storage Peripheral
    - Floppy Disk Controller
    - Hard-Disk Controller
    - Optical Disk Controller
    - Others

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

COMPONENTS

- Communications Peripheral
  - LAN
  - ISDN
  - Modem
  - Serial I/O
  - UART/USART
  - Others
- Floating-Point Coprocessor
  - 16-bit
  - 32-bit
- MOS Logic
  - MOS ASIC
    - MOS Gate Array
    - MOS PLD
      - MOS PLA
      - MOS PMD
      - MOS FPGA
    - MOS Cell-Based IC
  - MOS Custom IC
  - MOS Standard Logic
  - Other MOS Logic
- Analog Integrated Circuit
  - Monolithic Analog IC
    - Linear IC
      - Amplifier IC
      - Voltage Regulator
      - Voltage Reference IC
      - Comparator IC
      - Special-Function IC
      - Special Consumer IC
      - Special Automotive IC
      - Linear Array/ASIC
    - Mixed Signal IC
      - Data Converter IC
      - Telecommunication IC
      - Interface IC
      - Switch/Multiplexer IC
      - Disk Drive IC
      - Mixed Signal ASIC
  - Hybrid Analog IC

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

COMPONENTS

- Discrete Semiconductor
  - Transistor
    - Small Signal Transistor
    - Power Transistor
      - Bipolar Power Transistor
      - MOS Power Transistor
      - Insulated Gate Bipolar Transistor
  - Diode
    - Small Signal Diode
    - Power Diode/Rectifier
  - Thyristor
  - Other Discrete Semiconductor
- Optoelectronic Semiconductor
  - Light-Emitting Diode/Display
  - Optocoupler
  - CCD
  - Laser Diode
  - Photosensor
  - Solar Cell
- III-V Semiconductor
  - GaAs Digital IC
  - GaAs Analog IC
  - III-V Discrete Transistor
  - Optoelectronic IC
- Passive Component
  - Cable
  - Capacitor
  - Cathode Ray Tube (CRT)
  - Connector
  - Inductor
  - Potentiometer
  - Relay
  - Resistor
  - Socket
  - Splice (Optical)
  - Transducer
  - Liquid Crystal Display
  - Switch

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

BOARDS AND SUBSYSTEMS

- Graphic Board
  - Mac-Type Add-On Graphic Board
  - IBM-Type Add-On Graphic Board
- Imaging Subsystem
  - Add-On Memory Board
  - Controller Board
    - Storage Controller Board
    - Printer Controller Board
  - Magnetic Recording Head
  - Board-Level Computer
- Storage Subsystem

EQUIPMENT

- Data Processing Equipment
  - Computer Systems by Product Segment
    - General-Purpose Computer System
      - Supercomputer
        - Corporate Supercomputer
        - Departmental Supercomputer
        - Research Supercomputer
      - Mainframe Computer
      - Midrange Computer
        - Superminicomputer
        - Minicomputer
        - Microcomputer
      - Workstation Computer
        - Graphic/Project Supercomputer
        - Superworkstation
        - Traditional Workstation
        - Entry-Level Workstation
      - Personal Computer
        - Desktop Personal Computer
        - Desk-Side Personal Computer
        - Transportable Personal Computer
        - Laptop A/C Personal Computer
        - Laptop D/C Personal Computer
        - Notebook D/C Personal Computer
        - Pen-Based Personal Computer

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Hand-Held Personal Computer
- Special-Purpose Computer System
- Data Storage Device
  - Flexible Disk Drive
    - Fixed Media
      - Sub-3.5-Inch Disk Drive
        - 0 to 30MB
        - 31 to 60MB
        - 61 to 100MB
        - 101 to 200MB
        - 201 to 500MB
        - 501+MB
      - 3.5-Inch Disk Drive
        - 0 to 30MB
        - 31 to 60MB
        - 61 to 100MB
        - 101 to 200MB
        - 201 to 500MB
        - 501 to 1,000MB
        - 1,001+MB
      - 5.25-Inch Disk Drive
        - 0 to 30MB
        - 31 to 60MB
        - 61 to 100MB
        - 101 to 200MB
        - 201 to 500MB
        - 501 to 1,000MB
        - 1,001+MB
      - 8 to 10.5-Inch Disk Drive
        - 0 to 30MB
        - 31 to 60MB
        - 61 to 100MB
        - 101 to 200MB
        - 201 to 500MB
        - 501 to 1,000MB
        - 1,001+MB
      - 14-Inch Disk Drive
        - 0 to 30MB
        - 31 to 60MB

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

14-Inch Disk Drive (Continued)
61 to 100MB
101 to 200MB
201 to 500MB
501 to 1,000MB
1,001+MB

Rigid Disk Drive
Fixed Media
Sub-3.5-Inch Disk Drive
0 to 30MB
31 to 60MB
61 to 100MB
101 to 200MB
201 to 500MB
501+MB

3.5-Inch Disk Drive
0 to 30MB
31 to 60MB
61 to 100MB
101 to 200MB
201 to 500MB
501 to 1,000MB
1,001+MB

5.25-Inch Disk Drive
0 to 30MB
31 to 60MB
61 to 100MB
101 to 200MB
201 to 500MB
501 to 1,000MB
1,001+MB

8 to 10.5-Inch Disk Drive
0 to 30MB
31 to 60MB
61 to 100MB
101 to 200MB
201 to 500MB
501 to 1,000MB
1,001+MB

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

14-Inch Disk Drive
- 0 to 30MB
- 31 to 60MB
- 61 to 100MB
- 101 to 200MB
- 201 to 500MB
- 501 to 1,000MB
- 1,001+MB

Removable Media

Sub-3.5-Inch Disk Drive
- 0 to 30MB
- 31 to 60MB
- 61 to 100MB
- 101 to 200MB
- 201 to 500MB
- 501+MB

3.5-Inch Disk Drive
- 0 to 30MB
- 31 to 60MB
- 61 to 100MB
- 101 to 200MB
- 201 to 500MB
- 501 to 1,000MB
- 1,001+MB

5.25-Inch Disk Drive
- 0 to 30MB
- 31 to 60MB
- 61 to 100MB
- 101 to 200MB
- 201 to 500MB
- 501 to 1,000MB
- 1,001+MB

8 to 10.5-Inch Disk Drive
- 0 to 30MB
- 31 to 60MB
- 61 to 100MB
- 101 to 200MB
- 201 to 500MB
- 501 to 1,000MB
- 1,001+MB

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- 14-Inch Disk Drive
  - 0 to 30MB
  - 31 to 60MB
  - 61 to 100MB
  - 101 to 200MB
  - 201 to 500MB
  - 501 to 1,000MB
  - 1,001+MB
- Dual Media
  - Sub-3.5-Inch Disk Drive
    - 0 to 30MB
    - 31 to 60MB
    - 61 to 100MB
    - 101 to 200MB
    - 201 to 500MB
    - 501+MB
  - 3.5-Inch Disk Drive
    - 0 to 30MB
    - 31 to 60MB
    - 61 to 100MB
    - 101 to 200MB
    - 201 to 500MB
    - 501 to 1,000MB
    - 1,001+MB
  - 5.25-Inch Disk Drive
    - 0 to 30MB
    - 31 to 60MB
    - 61 to 100MB
    - 101 to 200MB
    - 201 to 500MB
    - 501 to 1,000MB
    - 1,001+MB
  - 8 to 10.5-Inch Disk Drive
    - 0 to 30MB
    - 31 to 60MB
    - 61 to 100MB
    - 101 to 200MB
    - 201 to 500MB
    - 501 to 1,000MB
    - 1,001+MB

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- 14-Inch Disk Drive
  - 0 to 30MB
  - 31 to 60MB
  - 61 to 100MB
  - 101 to 200MB
  - 201 to 500MB
  - 501 to 1,000MB
  - 1,001+MB
- Optical Disk Drive
  - CD-ROM
  - WORM Optical Disk Drive
    - 5.25 Inch
    - 8 to 12 Inch
    - 14 Inch
  - Rewritable Optical Disk Drive
    - 2 to 5.25 Inch
    - 8 to 12 Inch
  - Optical Jukebox
- Tape Drive
  - 1/4-Inch Tape Drive
    - Start-Stop
    - Streamer
      - 8 Inch
      - 5.25 Inch
      - 3.5 Inch
  - 1/8-Inch Tape Drive
    - Cassette
    - Cartridge
  - 1/2-Inch Tape Drive
    - 1/2-Inch Vacuum Column
    - 1/2-Inch Tension Arm
    - 1/2-Inch Streaming
    - 1/2-Inch Cartridge
  - Reel-to-Reel Tape Drive Recap
  - Helical Scan Tape Drive
    - VHS
    - DAT
    - 8mm
    - Others
- Input/Output Device
  - Terminal
    - Alphanumeric (CRT) Terminal
      - Minicomputer-Based Terminal

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Alphanumeric (CRT) Terminal (Continued)
  - Non-IBM, Protocol-Specific Terminal
  - IBM 3270 Protocol Terminal
  - Host/Vendor-Independent Terminal
  - Processing Terminal
- Graphics Terminal
- Point-of-Sale Terminal
- Funds Transfer Terminal (ATMs)
- Smart Card
- Other Specialized Terminal

Electronic Printer
- Serial Printer
  - Serial, Impact, Dot Matrix Printer
    - Dot Matrix Printer by Speed
      - 0 to 180 cps
      - 181 to 250 cps
      - 251 to 399 cps
      - 400+ cps
    - Dot Matrix Printer by Size
      - Total < 9 Wire (Pin)
      - Total 9 Wire (Pin)
      - Total 18 Wire (Pin)
      - Total 24 Wire (Pin)
  - Serial, Impact, Fully Formed Printer
    - 0 to 30 cps
    - 31+ cps
  - Serial, Nonimpact, Direct Thermal Printer
  - Serial, Nonimpact, Thermal Transfer Printer
    - Wax-Based
    - Sublimation
    - Dry Silver
  - Serial, Nonimpact, Ink Jet Printer
- Line Printer
  - Line, Impact, Dot Matrix Printer
    - 0 to 450 lpm
    - 451 to 650 lpm
    - 651+ lpm
  - Line, Impact, Fully Formed Printer
    - 0 to 450 lpm
    - 451 to 650 lpm
    - 651 to 1,050 lpm

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Line, Impact, Fully Formed Printer (Continued)
  - 1,051 to 1,250 lpm
  - 1,251+ lpm
- Line, Nonimpact, Direct Thermal Printer
- Line, Nonimpact, Thermal Transfer Printer
- Page Printer
  - 0 to 6 ppm
  - 7 to 10 ppm
  - 11 to 15 ppm
  - 16 to 20 ppm
  - 21 to 30 ppm
  - 31 to 50 ppm
  - 51 to 80 ppm
  - 81 to 150 ppm
  - 151+ ppm
- Other Input/Output Devices
  - Monitor
  - Remote Batch, Job-Entry, and Output
  - Key Entry Equipment
  - Media-to-Media Data Conversion
  - Magnetic Ink Character Recognition (MICR)
  - Optical Scanning Equipment
  - Computer Plotters
    - Small Format Pen Plotter
    - Large Format Pen Plotter
    - Small Format Electrostatic Plotter
    - Large Format Electrostatic Plotter
    - Ink Jet Plotter
    - Thermal Plotter
    - Photosensitive Plotter
    - Laser Plotter
  - Voice Recognition Computer Device
  - Voice Synthesizer
  - Mouse
  - Keyboard
  - Digitizer
- Office Equipment
  - Copier and Duplicator
    - Personal Copier (Up to 12 cpm)
    - Segment 1 (Up to 20 cpm)

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Copier and Duplicator (Continued)
  - Segment 2 (21 to 30 cpm)
  - Segment 3 (31 to 44 cpm)
  - Segment 4 (45 to 69 cpm)
  - Segment 5 (70 to 90 cpm)
  - Segment 6 (91+ cpm)
- Full-Color Copiers
- Electronic Calculator (without Alpha Keyboard)
- Dictating, Transcribing Machine
- Electronic Typewriter
- Word Processor
- Banking System
  - Check-Handling System
- Cash Register
- Mailing, Letter-Handling, Addressing Equipment
- Other Office Equipment

Communications
- Telecommunicatons
  - Image Communications
    - Facsimile
      - Classification by Type
        - Standalone Systems
        - PC Facsimile Cards
        - LAN to Fax Gateways
      - Classification by Technology
        - Group I
        - Group II
        - Group III
        - Group III Bis
        - Group IV
      - Classification by Feature
        - Ultra Low End
        - Low End
        - Midrange
        - High End
      - Classification by Price
        - <$1,000
        - $1,000 to $1,499
        - $1,500 to $1,999
        - $2,000 to $2,499
        - $2,500 to $2,999
        - $3,000 or More

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Classification by Printing Technology
  - Thermal
  - Thermal Transfer
  - Plain Paper (Laser, LED, etc.)
- ISDN Terminals
- Servers
- Teleconferencing
  - Audio
  - Video
    - Captured Image
    - Near-Full Motion
    - Codecs
    - PX64
  - Telex
    - Machines
    - Black Boxes
    - Gateways
    - Message Switches
  - Videotex
    - Terminals

Personal Communications

- Mobile Radio
  - Cellular Handsets
    - Classification by Type
      - Car-Mounted
      - Transportable
      - Portable
    - Classification by Technology
      - Analog
        - C450
        - NMT450
        - NMT900
        - TACS
        - ETACS
        - Radiocom 2000
        - AMPS
        - RTMS–Italy
      - Digital
        - GSM
        - Others

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Cordless Handsets
  - CT0
  - CT1
  - CT2
  - CT3
  - DECT
  - GSM
  - Base Stations
- Global Positioning Systems
- Mobile Infrastructure
  - Base Stations
- Personal Communications Networks (PCN)
  - Mininetworks
- Public Mobile Radio (PMR)
- Paging Systems

Networking

- Cable (Private)
- Data PBX
- Encryption Units
- Front-End Processors
  - IBM and IBM-Compatible
  - Proprietary
- ISDN
- Local Area Networks (LANs)
  - Terminal Servers
    - Ethernet
    - Token Ring
    - Others
  - PC Network Operating Software
  - PC LANs
  - Classification by Type
    - IBM PC/Compatible
    - Apple Macintosh
  - Classification by Technology
    - 802.3
    - 802.5
    - Arcnet
    - FDDI
    - Others
  - Classification by Media
    - Coaxial
    - Unshielded Twisted Pair (UTP)
    - Fiber-Optic
    - Datagrade

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Local Operating Network Systems (LONs)
- Modems
  - Classification by Standards
    - U.S. Standards
      - 212 A
      - V.22 Bis
      - 201 B/C
      - 208 A/B
      - V.29
      - V.32
      - V.33
      - 16.8 Kbps
      - 19.2 Kbps
      - V.35
      - V.36
        - Proprietary Dial-Up 9.6 Kbps
    - European Standards
      - V.21/23
      - V.21/23 PC
      - V.22
      - V.22 PC
      - V.22 Bis
      - V.22 Bis PC
      - V.26
      - V.27
      - V.29 Basic
      - V.29 Premium
      - V.32
      - V.32 PC
      - Proprietary Dial-Up 9.6 Kbps
      - V.33
      - 16.8 Kbps
      - 19.2 Kbps
      - Proprietary Baseband
      - Proprietary DOVE
- Multiplexers
  - Classification by Technology
    - Time Division (TDM)
      - Low-End Point-to-Point/Dual Trunk
      - Low-End Networking
      - Channels Banks/Primary MUX
      - T1/E1 Point-to-Point/Dual Trunk

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Time Division (TDM) (Continued)
  - T1/E1 Network Access
  - High-End Networking
  - Greater than T1/E1
- Statistical Time Division (STDM)
  - Classification by Size
    - Low End (Up to 16 Channels)
    - Midrange (Up to 48 Channels)
    - High End (More than 48 Channels)

Network Management Systems
- Public
  - Carrier
  - Local
  - Long Distance
- Private
  - LANs
  - T1/E1
  - X.25
  - Modems
  - Voice (Call Accounting)
  - Switch and Patch
  - Matrix
  - Mini/Mainframe-Based
  - Test Equipment
    - Analyzers
  - Operator Support Systems

Network-Terminating Devices

Operator Support Systems

Other Datacom Equipment
- Fiber-Optic Multiplexers

Public Data Network Systems (Equipment)
- X.21 Switches

Servers

Value-Added Networks (Equipment)

X.25
- Classification by Type
  - Packet Assemblers/Disassemblers (PADs)
    - Asynchronous Only
    - Synchronous Only
    - Multiprotocol
  - Packet Switches (Nodes)

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Classification by Capacity
  - Low End (Up to 100 Packets per Second)
  - Midrange (Up to 1,000 pps)
  - High End (More than 1,000 pps)
- Public Network Equipment
- Cable
  - Coaxial
  - Fiber-Optics
    - Monomode
    - Multimode
  - Multipair
- Cable TV
- Carrier Equipment
- Central Office
  - Classification by Type
    - Local
    - Trunk
    - Gateway
  - Classification by Technology
    - Analog
    - Digital
      - ISDN
        - Basic Rate Interface (BRI)
        - Primary Rate Interface (PRI)
    - Others
  - Classification By Size
    - Less than 2K Lines
    - 2K to 10K Lines
    - More than 10K Lines
- Digital Access Crossconnect Systems (DACS)
  - Classification by Type
    - 1/0 DCS
    - 1/1 DCS
    - 3/1 DCS
    - 3/1/0 DCS
    - 3/3 DCS
    - 4/1 DCS
    - 4/3 DCS
    - 4/4 DCS
    - OCN/OCN

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Classification by Capacity
  - Low End
  - Midrange
  - High End
- Fiber-Optic Terminal (FOTs)
- Line Conditioners
- Main Distribution Frame (MDF)
- Connectors
- Microwave
  - Classification by Type
    - Systems
    - Antenna
    - Accessories
    - Electronics
  - Classification by Usage
    - Short Haul
    - Long Haul
  - Classification by Technology
    - Analog
    - Digital
- Multiplexers
  - Classification by Type
    - Multiplexers
    - Fiber-Optic Terminals
  - Classification by Technology
    - Analog
    - Digital
  - Classification by Standards
    - European/CEPT Standard
      - 2 Mbps
      - 8 Mbps
      - 34 Mbps
      - 140 Mbps
      - 565 Mbps
      - 2.4 Gbps
    - U.S. Standard
      - 1.5 Mbps
      - 6 Mbps
      - 45 Mbps
      - 90 Mbps
      - 135 Mbps
      - 1.2 Gbps

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- SONET
- Synchronous Digital Hierarchy (SDH)
- Asynchronous Transfer Mode (ATM)
- Fast Packet Switching
- Frame Relay

Network Termination Units
- ISDN
- DSU/CSU
- NTU

Operating Support Systems

Pay Phones

Public Paging Systems

Local Loop Equipment
- Analog
  - PCM Repeaters
  - Digital
- Twisted Pair
- SLC-96 and Compatibles
- Others
- Fiber Optics
  - Universal Digital Line Carrier (UDLC)
  - Integrated Digital Line Carrier (IDLC)
  - Flexible Access System (FAS)
  - SONET
  - 802.6 Metropolitan Area Network (MAN)
  - Others
- Wireless
  - Basic Exchange Telephone Radio Service (BETRS)
  - Cordless

Satellite Communications
- Space Stations
- Earth Stations
  - VSAT
  - Master—Hub
  - Remote
    - Receive Only—Data Broadcast
    - Interactive
- Direct Broadcast
- Teleport
- Television Receive Only
- Video Distribution

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Satellite Communications (Continued)
  - Home
  - Intelsat
  - Eutelsat
  - Others
- Signaling
- Telex
  - Low End (Less than 20 Ports)
  - Midrange(20 to 80 Ports)
  - High End (More than 80 Ports)
- X.25
  - Classification by Size
    - Low End
    - Midrange
    - High End

Voice Communication

- Answering Machines
- Attendant Consoles
- Automatic Call Distributors (ACDs)
  - Classification by Type
    - Standalone
    - Integrated
    - Analog
    - Digital
  - Classification by Capacity
    - 1 to 8 Agent Positions
    - 9 to 24 Agent Positions
    - 25 to 48 Agent Positions
    - 49 to 100 Agent Positions
    - More than 100 Agent Positions
- Business Communications Systems
  - Classification by Type
    - Private Branch Exchange (PBX)
    - Key Telephone System (KTS)
  - Classification by Technology
    - Analog
    - Digital
    - ISDN
      - Terminals
      - ISDN
      - Proprietary
      - Servers
    - Network
      - BRI

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Network (Continued)
  - PRI
  - Proprietary
  - Gateways
- Basic

Classification by Capacity
- 1 to 8 Lines
- 9 to 24 Lines
- 25 to 48 Lines
- 49 to 100 Lines
- 101 to 400 Lines
- 401 to 1,000 Lines
- More than 1,000 Lines

Cable (Private)

Call Management Systems
- Centrex
- KTS
- PBX

Integrated Voice/Data Workstations (IVDT)

Intercom Systems

ISDN Terminals
- Voice
- Data
- Video
- Integrated

Private Paging Systems

Trading Turrets/Dealer Boards

Voice-Messaging Systems
- Classification by Capacity
  - 1 to 4 Ports
  - 5 to 8 Ports
  - 9 to 16 Ports
  - 17 to 32 Ports
  - 33 to 64 Ports
  - 65 to 128 Ports
  - More than 128 Ports

Voice Response Units (VRUs)
- Classification by Capacity
  - 1 to 4 Ports
  - 5 to 8 Ports
  - 9 to 16 Ports
  - 17 to 32 Ports
  - 33 to 64 Ports
  - 65 to 128 Ports
  - More than 128 Ports

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Voice Terminals
  - Classification by Type
    - Corded
    - Cordless
  - Classification by Technology
    - Analog
    - Digital
      - Pulse Dial
      - Tone Dial (DTMF)

- Industrial Electronic Equipment
  - Security/Energy Management
    - Alarm System
      - Intrusion Detection Alarm System
      - Fire Detection Alarm System
        - Discrete Device, Security/Energy Management
  - MPU Load Programmer
  - Computerized Energy Control System

  - Manufacturing System
    - Wafer Fabrication Equipment
      - Lithography Equipment
        - Proximity/Contact Aligners
        - Projection Aligner
        - Steppers
        - Direct-Write E-Beam
        - Maskmaking E-Beam
        - X Ray

      - Automatic Photoresist Processing Equipment
      - Etch-and-Clean Equipment
        - Wet Process
        - Dry Strip
        - Dry Etch
        - Ion Milling

      - Deposition Equipment
        - Chemical Vapor Deposition
        - Physical Vapor Deposition
        - Silicon Epitaxy Deposition
        - Metalorganic CVD Deposition
        - Molecular Beam Epitaxy Deposition
        - Diffusion
        - Rapid Thermal Processing

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Ion Implantation
  - Medium Current Ion Implantation
  - High-Current Ion Implantation
  - High-Voltage Ion Implantation
- Optical CD/Wafer Inspection
- Other Process Control Equipment
- Factory Automation Equipment
- Other Water Fabrication Equipment

Test Equipment
- ATE (Automatic Test Equipment)
  - Discrete Component Tester
  - Semiconductor Tester
  - Interconnect/Bare PCB Tester
  - In-Circuit PCB Tester
  - Functional PCB Tester
  - Combined PCB Tester
  - Manufacturing EATE N/A
- General Test Equipment

Process Control System
- Process Control System, Controller
- Process Control System, Recorder
- Process Control System, Indicator
- Process Control System, Auxiliary Station
- Process Control System, Nonunified System
- Process Control System, Industrial Process

Programmable Machine Tool
- Boring Programmable Machine Tool
- Drilling Programmable Machine Tool
- Grinding Programmable Machine Tool
- Horizontal Turning Programmable Machine Tool
- Vertical Turning Programmable Machine Tool
- Milling Programmable Machine Tool
- Machining Center Programmable Machine Tool
- Other Cutting Programmable Machine Tool
- Punch/Shear/Bend Programmable Machine Tool
- Flexible Manufacturing System Programmable Machine Tool

Mechanical Assembly Equipment

Plastic Processing Machinery

Robot System
- Robotic Electronic Assembly
- Robotic Nonelectronic Assembly

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Robot System (Continued)
  - Material-Handling/Loading Robot System
  - Painting Robot System
  - Spot-Welding Robot System
  - Arc-Welding Robot System
  - Machining Robot System
  - Other Robot System
- Automated Material Handling
  - Guided Vehicle
  - Programmable Conveyor
  - Storage/Retrieval Automatic Material-Handling System
  - Programmable Monorail
  - Warehousing
  - Programmable Overhead Crane
  - Other Automated Material-Handling Equipment
- Instrumentation
  - Integrating and Totalizing Meter for Gas
  - Counting Device
  - Digital Panel Meter
  - Analog Panel Meter
  - Panel Type Instrument
  - Elapsed-Time Meter
  - Portable Electronic Measuring Instrument
  - Electronic Recording Instrument
  - Physical Property Test, Inspection, and Measurement
  - Commercial Meteorological and General-Purpose Instrument
  - Nuclear Radiation Detection and Monitoring
  - Surveying and Drafting Instrument
  - Ultrasonic Cleaners, Drill
  - Meteorological Instrument
  - Geophysical Instrument
  - Analytical and Scientific Instrument
- Medical Equipment
  - Diagnostic Medical Equipment
    - Automatic Blood Analyzer
    - CAT Scanner
    - Digital Radiography
    - Electrocardiograph
    - Electroencephalograph
    - Magnetic Resonance Imaging

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Medical Equipment (Continued)
  - Respiratory Analysis
  - Ultrasonic Scanner, Medical
  - X Ray, Medical
  - Other Diagnostic Medical Equipment
- Patient-Monitoring
- Prosthetic Medical Equipment
  - Hearing Aid
- Surgical Support
- Therapeutic
  - Defibrillator
  - Dialysis, Diathermy
  - Electrosurgical
  - Pacemaker
  - Ultrasonic Generator
  - Other Therapeutic Medical Equipment
- Other Industrial Electronic Equipment
  - Vending Machine
  - Laser System (Excluding Communication)
  - Power Supply
  - Traffic Control
  - Particle Accelerator
  - Industrial and Scientific X Ray
  - Laboratory and Scientific Apparatus
  - Teaching Machine and Aid
  - Scientific Not Elsewhere Classified
- Consumer Electronic Equipment
  - Audio Consumer
    - Audio Amplifier
    - Compact (Disc) Player, Music
    - Consumer Radio
    - Stereo (Hi-Fi) Component
    - Stereo Headphone
    - Electronic Musical Instrument
    - Tape Recorder, Consumer
  - Video, Consumer
    - Video Camera, Consumer
    - VTRs (VCRs)
    - Videodisc Player

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Video, Consumer (Continued)
  - Color Television
  - Black-and-White Television
  - HDTV
  - Remote Control
  - LCD Television
- Personal Electronic
  - Game
  - Camera
  - Watch
  - Clock
  - Toy
  - Sewing Machine
  - Other Personal Electronic
- Appliance
  - Air Conditioner
  - Microwave Oven
  - Washer and Dryer
  - Refrigerator
  - Dishwasher, Disposal
  - Range and Oven, Consumer
  - Rice Cookers
  - Fans
  - Heaters
  - Vacuum Cleaners
  - Food Processors
  - Other Consumer Appliance
- Other Consumer Electronic
  - Automatic Garage Door Opener
  - Residential Smoke Alarm
  - Consumer Electronic Equipment Not Elsewhere Classified

Military/Aerospace Electronic Equipment

- Military Electronic Equipment
  - Radar, Military
  - Sonar, Military
  - Missile-Weapon
  - Space Military Equipment
  - Navigation, Military
  - Communication, Military
  - Electronic Warfare

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

EQUIPMENT

- Military Electronic Equipment (Continued)
  - Reconnaissance
  - Aircraft System
  - Military Computer System
  - Simulation and Training, Military
  - Miscellaneous Military Equipment
- Civil Aerospace
  - Radar, Civilian
  - Civilian Space
  - Civil Navigation/Communication
  - Civil Aircraft Flight System
  - Civil Simulation and Training
- Transportation Electronic Equipment
  - Entertainment, Transportation
  - Body Controls
  - Driver Information
  - Powertrain
  - Safety and Convenience
- Other Electronic Equipment

SOFTWARE

- Application Software (See Applications Segmentation)
- System Software
  - Operating System Software
    - Database
      - Document Management
      - Data Acquisition and Control
      - Storage Management
      - Database Administration
      - On-Line Transaction Processing
    - Development Tools
    - Editors
    - Language
      - Compilers
      - Assemblers
      - Translators
      - Data Translator
      - Query Languages

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

SOFTWARE

- Interactive Languages
  - Fourth-Generation Languages
  - Visual Programming Languages
- Graphic
- Communication Management
  - User Interface
  - Device Interface
- Protocol
- Security

Operating Environment

Operating System

- Proprietary
  - IBM/VM/MVS
  - DEC VMS
  - Others
- Open
  - UNIX
    - OSF1
    - Sun OS
    - System V/BSD
    - Mach
    - XENIX
    - Others
      - Pick
      - Theos
      - Others
  - Real-Time
- PC
  - DOS
  - OS/2
  - Macintosh
  - Others
- Operating Utilities
  - Peripheral I/O Management
  - System Subroutine Libraries
  - Data Center and System Management
  - Information Resource Management
  - Information Center
  - System Utilities

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

CONSUMABLES

- Paper
  - Cut Sheet
  - Form
  - Label
- Toner and Developer
- Print Ribbon
- Photoreceptor
- Print Element
  - Printwheel
  - Golf Ball
  - Thimble
- Computer Storage Media
  - Flexible Disk
  - Rigid Disk
  - Computer Storage Tape
  - Optical Media
- Transparency
- Other Consumable

SERVICES

- Telecommunications Services
  - Core Services
    - Classification by Type
      - Local Telephone Services
      - Long Distance Services
      - International Services
    - Classification by Technology
      - Analog
      - Digital
        - ISDN
          - HO
          - BRI
          - PRI
        - Others
    - Classification by Product
      - Toll Revenue
      - WATS Outgoing
      - WATS Incoming (800 Service)
      - 900 Service
      - Switched Digital Services
        - Switched 56 Kbps
        - X.21

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

SERVICES

- Classification by Product (Continued)
  - Analog Private Lines
    - Conditioned
    - Unconditioned
  - Digital Private Lines
    - Classification by Capacity
      - 0 to 19.2 Kbps
      - 19.2 Kbps to 64 Kbps
      - 64 Kbps to H11
      - H11 to 772 Kbps
      - T1
      - E1
      - 8 Mbps
      - T3
      - 34 Mbps
      - More than T3
  - Centrex
    - Classification by Type
      - ETN
      - ACD
      - CLASS
      - Routing
      - Billing
      - Network Management
    - Classification by Size
      - 1 to 8 Lines
      - 9 to 24 Lines
      - 25 to 48 Lines
      - 49 to 100 Lines
      - 101 to 400 Lines
      - 401 to 1,000 Lines
      - More than 1,000 Lines
  - B-ISDN
  - Operator Services
- Enhanced Services
  - Audiotex Access Services
  - Voice Mail
  - Cable TV
  - Directory Inquiry
  - Electronic Messaging
    - X400
    - EDI
    - Others

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

SERVICES

- ISDN
- Public Data
- Satellite
  - VSAT
  - Others
- Teleconferencing
- Teleport Services
- Telex Services
- Facsimile Services
- Value-Added Networks (VANs)
- VideoConferencing
  - Ad Hoc
  - Carrier Provided
- Virtual Private Network Services
- Videotex Access Services
- X.25
- Voice Messaging

Mobile Services
- Cellular
  - Classification by Technology
    - Analog
      - C450
      - NMT450
      - NMT900
      - TACS
      - ETACS
      - Radiocom 2000
      - AMPS
      - RTMS-Italy
    - Digital
      - GSM
      - Others
- Cordless
  - Portable
    - CT2
    - CT3
    - DECT
  - Mobile
    - GSM
- Global-Positioning Systems
  - Location Identification Systems

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

SERVICES

- Personal Communications Networks (PCN)
  - SubGSM
- Public Mobile Radio (PMR)
  - Data Services
- Public Paging Systems
- Messaging Services
- Hardware Maintenance
  - Contract Maintenance
  - Time and Materials
- Parts
- Software Support
- Customer Training/Education
- Network Support
- Professional
  - Systems Integration
  - Facilities Management

OTHER PRODUCTS

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Geographic Regions

The geographic regions segmentation shows the classification scheme used by Dataquest to define the regions of the world. Dataquest classifies the world into the following regions:

- North America
- Europe
- Japan
- Rest of Asia—Rest of World

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Geographic Regions

Worldwide



North America
Europe
Japan
Rest of Asia—Rest of World

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

North America



North America

United States

East North Central Division
- Illinois
- Indiana
- Michigan
- Ohio
- Wisconsin
- East North Central Other

East South Central Division
- Alabama
- Kentucky
- Mississippi
- Tennessee
- East South Central Other

Mountain Division
- Arizona
- Colorado
- Idaho

Mountain Division (Continued)
- Montana
- Nevada
- New Mexico
- Utah
- Wyoming
- Mountain Other

Middle Atlantic Division
- New Jersey
- New York
- Pennsylvania
- Middle Atlantic Other

New England Division
- Connecticut
- Maine
- Massachusetts
- New Hampshire
- Rhode Island
- Vermont
- New England Other

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

United States (Continued)

Pacific Division
- Alaska
- California
- Hawaii
- Oregon
- Washington
- Pacific Other

South Atlantic Division
- Delaware
- District of Columbia
- Florida
- Georgia
- Maryland
- North Carolina
- South Carolina
- Virginia
- West Virginia
- South Atlantic Other

West North Central Division
- Iowa
- Kansas
- Minnesota
- Missouri
- Nebraska
- North Dakota
- South Dakota
- West North Central Other

West South Central Division
- Arkansas
- Louisiana
- Oklahoma
- Texas
- West South Central Other

Puerto Rico Division
- Puerto Rico

United States Other

Canada

North America Other

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Europe



Western Europe

Western Europe Major

- France
- Germany
- Italy
- Netherlands
- Spain
- Sweden
- United Kingdom

Western Europe Other

- Austria
- Belgium
- Cyprus
- Denmark
- Finland
- Gibraltar
- Greece
- Iceland
- Ireland
- Liechtenstein
- Luxembourg
- Malta
- Monaco
- Norway
- Portugal
- San Marino
- Switzerland

European Community (EC)

- Belgium
- Denmark
- France
- Germany
- Greece
- Ireland
- Italy
- Luxembourg

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

European Community (EC) (Continued)
- Netherlands
- Portugal
- Spain
- United Kingdom

European Free Trade Association (EFTA)
- Austria
- Finland
- Iceland
- Norway
- Sweden
- Switzerland

Eastern Europe
- Albania
- Bulgaria
- Czechoslovakia
- Hungary
- Poland
- Romania
- Union of Soviet Socialist Republics
- Yugoslavia

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Japan



Japan

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Rest of Asia—Rest of World



Rest of Asia—Rest of World

Four Tigers
- Hong Kong
- Korea
- Singapore
- Taiwan

Other Asia
- Bangladesh
- Brunei
- Burma
- Cambodia
- China
- East Timor
- India
- Indonesia
- Laos
- Macau
- Malaysia
- Maldives
- Nepal
- Pakistan
- Philippines
- Sri Lanka
- Thailand
- Vietnam

Rest of World

Australia/New Zealand
- Australia
- Christmas Island
- Cocos Islands
- New Zealand
- Norfolk Island

Oceania
- American Samoa
- Canton and Enderbury Islands
- Cook Islands
- Fiji
- French Polynesia

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Oceania (Continued)
- Guam
- Johnson Island
- Kiribati
- Midway Islands
- Nauru
- New Caledonia
- Niue
- Pacific Islands
- Papua New Guinea
- Pitcairn
- Samoa
- Solomon Islands
- Tokelau
- Tonga
- Tuvalu
- Vanuatu
- Wake Island
- Wallis and Futuna Islands

Africa
Central America
Caribbean
Middle East
South America
Atlantic
Inner Asia

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Distribution

The distribution segmentation outlines the path by which a product moves from the manufacturer to the ultimate end user. This segmentation is used by Dataquest to analyze markups, discounts, and buyer behavior.

Dataquest defines the major distribution classifications as follows:

- Distribution channel
- Distribution method

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Distribution

DISTRIBUTION CHANNEL

- Direct
- Indirect
  - Value-Added Reseller/Systems Integrator
  - Original Equipment Manufacturer
  - Distributor
    - Regional Bell Operating Company (RBOC)
      - Independent Telephone Company
      - Telephone Interconnect Supplier
  - Dealer
  - Mass Merchandiser
  - Manufacturers' Representatives/Agents

DISTRIBUTION METHOD

- Direct Sales Force
- Telemarketing
- Mail Order
- Company-Owned Store

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Applications

The applications segmentation describes the use to which a product is put or the function it performs. Sometimes there are one-to-one relationships between products and their applications and the actual functions that a product performs.

The major applications as defined by Dataquest are as follows:

- General productivity
- Organizational
- Entertainment
- Industry specific

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Applications

GENERAL PRODUCTIVITY

- Document/Media Creation and Editing
  - Computer-Aided Printing and Publishing
    - Electronic Publishing
    - Technical Publishing
  - Graphics
    - Chart and Map Generation
    - Image Generation
    - Graphic Design Art
      - Image Editing
      - Draw/Paint
      - Image Capture
      - Clip Art
      - Illustration
    - Presentation Graphics
  - Color Prepress
    - Input
    - Image Processing
      - Image Manipulation
      - Color Correction
      - Color Pagination
    - Composition and Translation
    - Color Separation
  - Page Composition and Page Makeup
    - Page Description
    - Page Imaging
    - Document Architecture
    - Desktop Publishing
    - Scientific Visualization/Simulation
  - Multimedia
    - Animation
    - Desktop
      - Video
        - Compression
        - Digitizer
        - Full-Motion
        - Real-Time
      - Videodisc

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

GENERAL PRODUCTIVITY

- Holography
- Photo Realism
- Information Retrieval

- Forms

- Publishing Utilities
  - Tagging
  - PostScript Printing
  - Compression/Decompression
  - File Translation/Data Conversion

- Document Management
  - Author/Editor
  - Image Processing
  - Scanning
    - Text
    - Image
  - Word Processing
  - Typography

- Communication
  - Electronic Mail

- Spreadsheet/Decision Support/Executive Information Systems
  - Spreadsheet
  - General-Purpose Simulation
  - Modeling
  - Forecasting

- Learning/Education/Training
  - Instructional
    - Computer Training/Assisted Instruction
  - Educational Simulation
  - Learning

- Project Management
  - Calendaring
  - Scheduling
  - Ticketing
  - Library Management

- Time Management
  - Application Utilities
  - Integrated Applications
  - Relational Database Management System

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

ORGANIZATIONAL

- Management and Administration
  - Accounting
    - Accounts Payable
      - Checkbook Management
    - Accounts Receivable
      - Billing/Invoicing
    - General Ledger
    - Payroll
    - Tax Accounting
    - Personal Finance
  - Capital Assets
    - Fixed Assets
    - Lease Accounting
  - Human Resource/Personnel Management
    - Benefits Administration
    - Employment Administration
  - Finance
    - Financial Planning
    - Budgeting
    - Cost Accounting
    - Investment/Portfolio Management
    - Cash/Money Management
    - Deposit/Loan Management
    - Treasury/Stocks/Bonds
  - Purchasing
    - Contract Administration
    - Vendor Management
  - Planning
    - Business Planning
    - Strategic Planning
    - Command, Control, Communications, and Intelligence
  - Facilities Management
    - Facility Planning
    - Facility Simulation
    - Equipment/Maintenance Management
    - Property/Real Estate Management
    - Facility Security Management

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

ORGANIZATIONAL

- Sales and Marketing
  - Marketing Research
  - Advertising and Promotional
  - Public Relations
  - Order Entry/Processing
    - Customer/Prospect Management
      - Credit Management
    - Sales Support/Administration
- Research, Engineering, and Development
  - Industrial Automation
    - Shop Floor Plan and Control
    - CAM/Automated Assembly
    - Manufacturing Engineering Tools
    - Other Planning and Control
    - Test and Measurement
    - Others
  - Design Automation
    - CAD/CAM/CAE
      - Modeling
        - Two-Dimensional
        - Three-Dimensional
        - Solid
      - Mechanical
        - Documentation/Drafting
          - Detail Drafting
          - Document Management
          - Schematics
          - Technical Illustration
          - Charts
        - Conceptual Design
          - Industrial Design
          - Design Layout
          - Styling
        - Functional Design
          - Component
          - Assembly Verification
          - Linkage/Mechanism
        - Analysis
          - Fatigue
          - Structural

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

ORGANIZATIONAL

- Analysis (Continued)
  - Thermal
  - Vibrational
  - Magnetic
  - Composite
  - Mass Property
- Manufacturing Engineering
  - Tool Design
  - Fixture Design
  - Part-Processing Design
- Manufacturing Process Simulation
  - NC Part Programming
  - Coordinate Measuring Machines
  - Off-Line Robotics
  - QC Analysis
- AEC (Architectural, Engineering, and Construction)
  - Architectural
  - Civil
  - Facility Design
  - Process Plant Design
- Geographical Information Systems
  - GIS/Mapping
  - Raster-Based GIS Systems
- Electronic Design Automation
  - Electronic Computer-Aided Engineering
    - Digital Design
      - Design Entry
        - Schematic Entry
        - Libraries
      - Design Verification
        - Simulation
        - Simulation Acceleration
        - Hardware Modeling
        - Static Timing Analysis
      - Logic Synthesis
      - Test Automation
        - Automatic Test Vector Generation
        - Design for Testability/Test Synthesis
        - Fault Simulation

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

ORGANIZATIONAL

- Analog Design
  - Design Entry
    - Schematic Capture
    - Libraries
  - Design Verification
    - Circuit Simulation
    - Mixed Signal Simulation
- IC Layout and Verification
  - Editing
  - Layout
  - Verification
  - Module Generation
- PCB Layout

Software Development
- Computer-Aided Software Engineering
- Artificial Intelligence
- General Software Development

Earth Resources
- Seismic Analysis
  - Geophysical Seismic Imaging
- Oil Field Services
- Remote Sensing

Technical Data Analysis
- General Scientific
  - Scientific Research/Analysis
  - Scientific Visualization
  - Scientific Simulation
- Chemistry
  - Crystallography
  - Modeling
  - Analysis
- Simulation
- Laboratory
- Analytical Instruments
- Instrument Automation
- Quality Control/Assurance
- Research and Laboratory Analysis
- Others

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

ORGANIZATIONAL

- Medical
  - Body Scanning
  - Patient Monitoring
  - Others
- Diagnostic
- Therapeutic

Manufacturing and Distribution
- Distribution Planning and Control
  - Transportation/Fleet Management
    - Route Planning
    - Dispatching
  - Warehouse Management
    - Automated Warehousing and Materials Handling
  - Inventory and Distribution Management and Control

Manufacturing Planning and Control
- Material/Process Requirements Planning, Production and Process Management
- Shop Floor Planning and Control
- CAM/Automated Assembly
- Manufacturing Engineering Tools
- Other Planning and Control
  - Simulation
    - Robot Programming and Simulation
  - Quality Assurance
    - Detection and Tracking
  - Fault Management/Adaptive Control
- Test and Measurement
- Inspection
  - Machine Vision

Others
- Real-Time Data Acquisition and Control
  - Simulation
  - C^3i
  - Others
- Building Automation

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

ORGANIZATIONAL

Others (Continued)
- Traffic Control
- Railroad Control
- Power Grid Control
- Water Quality and Sewage Control
- Atmospheric Monitoring

ENTERTAINMENT

INDUSTRY SPECIFIC

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

User Environment

The user environment segmentation is based on industry classifications derived from a format that reflects the United States Department of Commerce's Standard Industrial Classification (SIC) code scheme and the International Standard Industrial Classification of all economic activities used by the United Nations.

Environments are a description of where a product is used ultimately. The major user environments as defined by Dataquest are as follows:

- Home
- Business
- Education
- Government

Dataquest has a classification scheme available at the two-, three-, and four-digit SIC levels, which can be provided on request.

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

User Environment

HOME

BUSINESS

Natural Resources and Construction
- Agricultural Production—Crops
- Agricultural Production—Livestock
- Agricultural Services
- Forestry
- Fishing, Hunting, and Trapping
- Metal Mining
- Coal Mining
- Oil and Gas Extraction
- Nonmetallic Minerals, except Fuels
- General Building Contractors
- Heavy Construction, except Building
- Special Trade Contractors

Process Manufacturing
- Food and Kindred Products
- Tobacco Products
- Textile Mill Products
- Lumber Wood Products
- Paper and Allied Products
- Printing and Publishing
- Chemicals Allied Products
- Petroleum and Coal Products
- Rubber and Miscellaneous Plastics Products
- Leather and Leather Products
- Stone, Clay, and Glass Products
- Primary Metal Industries

Discrete Manufacturing
- Apparel and Other Textile Products
- Furniture and Fixtures
- Fabricated Metal Products
- Industrial Machinery and Equipment
- Electronic and Other Electric Equipment
- Instruments and Related Products

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

BUSINESS

Discrete Manufacturing (Continued)
- Miscellaneous Manufacturing Industries
- Transportation Equipment

Transportation
- Railroad Transportation
- Local and Interurban Passenger Transit
- Trucking and Warehousing
- Water Transportation
- Transportation by Air
- Pipelines, except Natural Gas
- Transportation Services

Communication
- Communication

Utilities
- Electric, Gas, and Sanitary Services

Wholesale Trade, Durable Goods
- Wholesale Trade—Durable Goods

Wholesale Trade, Nondurable Goods
- Wholesale Trade—Nondurable Goods

Retail Trade
- Building Materials and Garden Supplies
- General Merchandise Stores
- Food Stores
- Automotive Dealers and Service Stations
- Apparel and Accessory Stores
- Furniture and Home Furnishings Stores
- Eating and Drinking Places
- Miscellaneous Retail

Finance
- Depository Institutions
- Nondepository Institutions
- Security and Commodity Brokers

Insurance
- Insurance Carriers
- Insurance Agents, Brokers, and Service

Real Estate
- Real Estate
- Holding and Other Investment Offices

Hotels And Other Lodging
- Hotels and Other Lodging

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

BUSINESS

Business Services
- Business Services
- Legal Services

Health Care
- Health Services

Other Services
- Personal Services
- Auto Repair, Services, and Parking
- Miscellaneous Repair Services
- Motion Pictures
- Amusement And Recreation Services
- Social Services
- Museums, Botanical, Zoological Gardens
- Membership Organizations
- Engineering and Management Services
- Services, NEC

EDUCATION

Elementary
Secondary
Higher Education
Four-Year Institution
Two-Year Institution
Public
Private

GOVERNMENT

Government by Function
- Executive, Legislative, and General
- Justice, Public Order, and Safety
- Finance, Taxation, And Monetary Policy
- Administration of Human Resources
- Environmental Quality and Housing
- Administration of Economic Programs
- National Security and International Affairs

Government
- Federal
- State
- Local

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

SIZE (BUSINESS, EDUCATION, GOVERNMENT)

Revenue (Millions of U.S. dollars)

- 0 to 99.9
- 100 to 499.9
- 500 to 999.9
- 1 to 4.9
- 5 to 9.9
- 10 to 49.9
- 50+

Employees

Small

- 0 to 9
- 10 to 19
- 20 to 49

Medium

- 50 to 99
- 100 to 249

Large

- 250 to 499
- 500 to 999
- 1,000+

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Research Items

The research items segmentation is a listing of general terms used by Dataquest to organize, describe, and analyze data for technology markets and industries. A typical use of research items is to describe market data in terms of shipments, retirements, and installed base.

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Research Items

Application
Assembler
Average Selling Price
Average Usage
Average Volume
Balance of Trade
Bit
Byte
Capital Spending
Captive Production
Compound Growth Rate
Consumption
Conversion Revenue
Cost
End User
End-User Average Selling Price
End-User Revenue
Environment
Export
Factory Average Selling Price
Factory Revenue
Gross Lease Additions
If-Sold Value
Import
Industry
Input/Output (I/O) Ratio
Installed Base
Internal Transfer
Inventory
Joint Venture
Lease
Lease/Rental Conversions
List Price
Manufacturer
Manufacturer's Suggested Retail Price
Market
Market Share
Markup
Merchant Production
Net Additions
New Placement Demand
Placement
Product
Product Category
Production
Replacement Demand
Research and Development
Residual Value
Retirement
Return
Revenue
Shipment
Subsidiary
Tie Ratio
Unit
Useful Life
Users per System
Year-Average Population

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

The segmentation represents Dataquest's view of the high-technology marketplace and is not intended to represent the availability of data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Glossary

This glossary includes definitions of the major terms associated with Dataquest's segmentation of the high-technology marketplace.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

III-V discrete semiconductor. 1: A semiconductor device with low noise, low power, and high power in the range of one-half watt to one watt. 2: A device of gate structures based on D-MESFET and E/D MESFET devices.

A

academic support. College expenditures that include expenditures for support services that are an integral part of the institution's primary missions of instruction, research, or public service. Includes expenditures for libraries, galleries, audio/visual services, academic computing support, auxiliary support, academic administration, personnel development, and course and curriculum development.

accounting software. 1: A software application that supports a system of recording and summarizing business and financial transactions and analyzing, verifying, and reporting results. 2: A software application used to manage an organization's money and/or assets. This type of software includes general ledger, accounts payable/receivable, and inventory control.

accounts payable (AP). An application that supports the accounts payable function, which is the amount owed by a business to its suppliers and other regular trading partners.

accounts receivable (AR). An application that supports the accounts receivable function, which is the amount owed to a business by its customers.

ACD. See **automatic call distributor.**

adaptive control. 1: The property of a control system that allows it autonomously to maintain a manufacturing or process environment within predetermined control limits. 2: A device with parameters that adjust automatically to compensate for changes in the dynamics of the process to be controlled.

add-on graphics board. A graphics board that is added to a basic computer to enhance the computer's current graphic capability.

add-on graphics board, Mac-type. Personal computers that were designed to run applications exclusively through a graphical user interface (i.e., windows, menus, and icons). Mac-type systems include Apple's Macintosh series (512E, Plus, SE, and II), Atari's ST series (524 and 1024), and Commodore's Amiga. This term also refers to peripherals intended for use in Mac-type systems.

add-on memory board. A printed circuit board populated with memory integrated circuits (IC), usually DRAMs or SRAMs, that plugs into personal computers via connectors on the central processing unit bus. These boards are used to increase central processing unit storage capacity.

AEC. See **architecture, engineering, and construction.**

aerial. See **antenna.**

AGVS. See **automatic guided vehicle system.**

AI. See **artificial intelligence.**

air conditioner. 1: An apparatus for controlling the temperature and humidity of air. 2: A broad field including numerous processes, among which are refrigeration, heating, ventilation and humidification, and electronic air filtering.

aircraft system (military). Electronic power devices used in airplanes to perform functions like flight control, communication and navigation, lighting computer system (including air data, mission and fire control), engine control, instrumentation, integral targeting system, associated test system, and integrated system.

alarm system. A system designed to warn of an intrusion, a fire, or other undesired occurrence. Alarm systems have three functions in common: detection, control, and annunciation signaling.

alphanumeric CRT controller. A character set of both letters and numbers that is used to control electron beams, which are used to present data in a visual form.

alphanumeric CRT terminal. A display terminal that provides character information to the operator.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

amateur radio. A radio used for two-way radio communications by private individuals. It is not used for enterprise activity.

AMH. See **automated materials handling.**

amplifier IC. A linear IC that provides a voltage or power gain to an applied signal.

analog. 1: Representation of data by means of continuously variable physical quantities, such as voltage, current, or frequency. 2: A circuit or system in which the output signals bear a continuous relationship to the input signals. 3: A representation of an event in another form, e.g., the representation of voice sounds as continuously variable electrical signals.

analog design verification. A software application that includes analog simulation, analog synthesis, monte carlo analysis, worst-case analysis, and parametric plotting.

analog loop. A nondigital portion of the telecommunications network.

analog panel meter. 1: An electrical switchboard or instrument board with continuously variable electrical signals known as analog signals. 2: A mounting plate for the controls and/or other parts of equipment, utilizing analog signals.

analysis. Separation of a whole into its parts; proof of a mathematical proposition by assuming the result and deducing a valid statement by a series of reversible steps. Includes mass properties, kinematic and dynamic mechanism analysis, structural, thermal, composite, fluids, and vibration analysis. Finite element and finite difference are common analysis technologies used.

analytical and scientific instrument. Instruments used to measure, access, control, and monitor objects and systems.

animation. A software application to present either continuous pictures or images or to present them in rapid succession.

answering machine. A device, hooked to a telephone, that can record and play messages as they pass through a phone when a user is unable to pick up the telephone.

antenna. 1: A conductor or system of conductors that serves to radiate or intercept energy in the form of electromagnetic waves. 2: A device for transmitting or receiving radio waves. Also called aerial.

AP. See **accounts payable.**

appliance. 1: An instrument or device designed for a specific household or office purpose. 2: A piece of equipment for adapting a tool or machine to a special purpose.

application. The use to which a product is put; the function it performs.

application software. A software program or set of programs designed for a specific application, such as inventory control or linear programming.

application-specific integrated circuit (ASIC). A single-user IC that is manufactured using vendor-supplied tools and/or libraries. (May be sold by an ASIC or standard-product group.)

application utilities. A software application that enhances the operation of other standalone applications; Typically operates concurrently with these standalone applications.

AR. See **accounts receivable.**

architectural. Computer-aided tools intended for use in design and drafting of facilities' architectural aspects.

architecture, engineering, and construction (AEC). The use of computer-aided tools by architects, contractors, plant engineers, civil engineers, and others associated with these disciplines to aid in designing and managing buildings, industrial plants, ships, and other types of nondiscrete entities.

arc-welding robot systems. A system in which a robot carries an arc-welding torch to produce welds.

argon. An inert gas extensively used in discharge tubes.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

artificial intelligence (AI). The ability of a machine to perform functions normally associated with human intelligence, such as learning, adapting, reasoning, self-correcting, and improving automatically.

ASCII. Standardized coding for alphanumeric and other standard keyboard characters.

ASIC. See **application-specific integrated circuit.**

ASP. See **average selling price.**

AS/RS. See **automated storage/retrieval system.**

assembler. A company that adds manufacturing value to a product.

assembly. 1: A group of subassemblies and/or parts that, when put together, create a major subdivision of the final product. When two or more components or subassemblies are put together by the application of labor and machine hours, it is called an assembly. An assembly may be an end product or a component for a higher-level assembly. 2: The semiconductor manufacturing steps of mounting a die in a package, bonding the pads to the package leads, and sealing the package.

assembly verification. The integration of various component designs into an assembly to test size/shape and functional characteristics.

asynchronous telecommunications software. A software application that emulates a standard computer terminal (e.g., DEC VT-100) and performs file transfer between asynchronously connected computers and/or provides remote operation of another computer.

ATE. See **automatic test equipment.**

ATM. See **automated teller machine.**

atmospheric monitoring. A real-time software application that monitors weather-related data from satellites and other monitoring sites around the world.

atmospheric/purge cylinder gas. A specialty gas; a cylinder gas for purging certain processing systems and equipment when manufacturers are concerned about possible back contamination of the house lines.

attendant console. A specialized telephone instrument that allows fast and efficient answering and routing of telephone calls.

audio amplifier. A device that uses transistors or vacuum tubes to obtain voltage, current, or power to amplify sound.

audio conferencing. The ability to communicate among more than two people at one time via a speakerphone or the telephone system/network.

audio equipment. Amplifiers, preamplifiers, control consoles, and other equipment used in studio, broadcast, and home environments. Equipment interprets frequencies corresponding to audible sound waves.

automated assembly system. The assembly of parts into subassemblies and/or complete assemblies using programmable equipment that may include robots. In discrete piece manufacturing, this system includes spot- and arc-welding and adhesives. In electronics, this system includes component placement and printed board component insertion. Usually, these automated assembly systems include sensors.

automated guided vehicle system (AGVS). An unmanned mobile transporter under programmable control that moves materials and tooling throughout a factory and/or warehouse. Includes towing vehicles, pallet trucks, light-load transporters, unit-load transporters, and self-loading and unloading vehicles.

automated materials handling (AMH). The automated handling of discrete or bulk materials in manufacturing systems. Materials handling includes the movement, storage, identification, and controlling of materials.

automated storage/retrieval system (AS/RS). All computer hardware, software, and equipment that are used together for mechanical hoists and carriages and that interface with racks and bins for automatic storage and retrieval of unit loads, pallets, and individual parts. An AS/RS moves materials from inventory to operations and back to inventory, frequently for work-in-process inventory.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

automated teller machine (ATM). A machine used by financial institutions and designed to perform many of the banking functions performed by human tellers. (See also **funds transfer terminal.**)

automatic blood analyzer. Equipment used to analyze, detect, and decipher blood types and blood-related diseases.

automatic call distributor (ACD). A computer-based system located at a customer's premises that: (1) provides real-time monitoring of a telephone system's work load; (2) distributes calls to the agent who is idle longest; and (3) uses a queuing or waiting list assignment that holds the callers in queue until an agent is available, averages the random flow of traffic, and decreases peak traffic load. An ACD also contains features known as gates or agent split groups that provide functional divisions within the routing scheme and allow calls to be directed to a specific group or agent.

automatic photoresist processing equipment (colloquial: track). Equipment used to dispense and process photoresist material onto a wafer. Track equipment, as this equipment is usually called, includes wafer clean/bake, wafer prime, wafer coat/bake, wafer develop/bake, and resist stabilization equipment.

automatic test equipment (ATE). Computer-controlled equipment that inspects electronic devices, both active and passive. ATE usually includes analytical and statistical data-reduction capabilities and can document test results by display, hard copy, and electronic storage. ATE can perform printed circuit board (PCB) inspection by mechanical, electrical, and visual means in an automatic, programmable mode. ATE includes both bare boards and boards that have been loaded with electronic devices. In the latter case, diagnostic capabilities are included as a part of the system definition if they are part of the equipment.

automatic warehousing system (AWS). A dedicated storage and retrieval system that is used not on the factory floor but in a warehouse that may or may not be located within a manufacturing facility. An AWS includes a control system and associated material-handling equipment and structures, but excludes the building unless it is a structural part of the automated system. The control system includes both hardware and software.

automation. The system or technique of the production process that minimizes human intervention. Self-controlled machines are used to accomplish human tasks or tasks not able to be accomplished by human intervention.

average selling price (ASP). The average price of a product, inclusive of any discounts. (See also **end-user ASP** and **factory ASP.**)

average usage. The average number of units of product used per unit of time.

average volume. The average number of units of product produced per unit of time.

awarded contract. A binding agreement granted to a specific company.

AWS. See **automatic warehousing system.**

B

balance of trade. 1: The difference between the value of a country's exports and imports of tangible goods over a given period, usually one year. 2: The difference between the value of a country or region's exports of tangible goods to and imports of tangible goods from a second country or region.

banking system. Systems used in the banking/finance industries to facilitate the transmission of funds to improve efficiencies. Systems include: payroll allocation and deduction; demand deposit accounting; savings, both regular and certificates of deposit; and loan processes.

baseband modem. A type of modem that utilizes all of the available analog bandwidth on a line.

basic exchange telecommunications radio system (BETRS). A radio system network that provides cost-effective basic telephone service within remote areas.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

benefits administration. A software application with the primary function of administering and aiding in managing an organization's employee benefits.

BETRS. See **basic exchange telecommunications radio system.**

BiCMOS. Bipolar complementary metal oxide semiconductor. See **BiMOS.**

BiMOS (BiCMOS). Bipolar metal oxide semiconductor (MOS). An integrated circuit (IC) manufactured with both bipolar and MOS processes that yields a component with the benefits of both technologies.

bipolar. 1: A semiconductor technology employing two junction transistors. 2: A device in which both majority and minority carriers are present. A transistor structure with electrical properties determined within the silicon material.

bipolar application-specific IC. See **application-specific integrated circuit.**

bipolar cell-based IC. See **cell-based integrated circuit.**

bipolar custom IC. See **custom integrated circuit.**

bipolar digital logic. See **logic circuit.**

bipolar digital microcomponent. See **microcomponent.**

bipolar FPGA. See **field-programmable gate array.**

bipolar gate array. See **gate array.**

bipolar memory. See **memory.**

bipolar nonvolatile memory. See **nonvolatile memory.**

bipolar PLA. See **programmable logic array.**

bipolar PLD. See **programmable logic device.**

bipolar PMD. See **programmable multilevel logic device.**

bipolar standard logic. See **standard logic.**

bipolar transistor. A transistor that uses positive- and negative-charge carriers. Bipolar transistors provide current gain—that is, a current input results in a larger current output.

bit. Abbreviation for binary digit. A unit of information equal to one binary decision, or the designation of one of two possible and equally likely values or states of anything used to store or convey information.

black-and-white television. Television in which the reproduced picture is displayed in shades of gray between black and white. Also known as monochrome television.

board-level computer. A single, or multiple, board-level CPU that is sold individually or incorporated in systems-level products (boxes). Typically, these are products that are not considered complete packaged systems. Prices range from the low hundreds to the low thousands of dollars. Frequently, software is bundled with the board for a specific application.

body control. Electronic equipment used to direct, manage, or guide an automobile or truck. Examples include electronic suspension, cruise control, intermittent wipers, load-sensitive braking, antitheft devices, electronic steering, and electronic mufflers.

book publishing software. Software with the main purpose/use of printing books or written or printed literary works.

boring programmable machine tool. A factory tool designed to machine internal work such as cylinders, holes, and castings.

broadband communications. Communications that utilize a bandwidth greater than a voice-grade circuit.

broadcast. 1: The transmission of packets on a contention bus where all data are heard by all devices on the channel and are selected by each device through address-recognition techniques. 2: To send messages or to communicate simultaneously with many or all points on a circuit. 3: The transmission of radio frequencies from a source to all devices that are capable of receiving the signal. Microwave transmission is one method of transmission. 4: Radio or television transmission intended for public reception.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

broadcast and studio equipment. Equipment used to make information public by means of radio or television.

broadcast transmitter antenna. An electronic device for generating and amplifying a radio-frequency carrier for transmission through space from an antenna.

bubble memory. A storage medium that allows information to be stored on magnetically charged crystal chips. Bubble memories can hold data without electricity to sustain them; blackouts, changes in current, and static charges do not affect them. Such memories process material 75 times as fast as disk memories. However, bubble memory processors cannot handle multiprogramming, i.e., performing parallel operations with several programs.

budgeting. An application that supports future resource planning.

building automation. A software application with the primary functions of managing the operations of a facility, including fire detection, energy management, and alarm systems. Large manufacturing plants and skyscrapers use real-time computers to control and monitor conditions. This may include fire detection and control systems; security systems; clocking, documenting, and energy management for heating, ventilation, and air conditioning.

bulk gas. A discrete delivery of gas in a liquid state.

bundled distribution and warehouse package. Hardware and/or software modules used for planning and control of warehouse or product distribution systems. These packages are not available separately from the total warehouse or distribution system.

business. A commercial or mercantile environment usually referred to as a vertical market. See "User Environment" section.

byte. 1: A single group of eight bits processed together. 2: The number of bits that a computer processes.

C

C³I. See command, control, communications, and intelligence.

cable. An assembly of one or more conductors within an enveloping protective sheath, constructed to permit the use of the conductors singly or in groups.

cable television equipment. All equipment for both the head and subscriber ends of a cable television system.

cache. A fast, small memory (typically SRAM) used to enhance CPU performance, separate from main processor memory.

cache controller. A device that governs the area of a system that stores only data the system may need in the immediate future.

CAD. See computer-aided design, drawing, or drafting.

CAE. See electronic computer-aided engineering and mechanical computer-aided engineering.

CAGR. See compound annual growth rate.

calculator. A device capable of performing logical and arithmetical digital operations of any kind.

calendaring. 1: An application to support the scheduling of meetings and other events. It is usually a tickler file, reminding people of upcoming commitments. 2: In the papering industry, paper with a hard, smooth finish.

call management systems. The equipment and service that records the calling activity of a centrex, PBX, or key telephone system in order to generate reports that support telephone cost allocation and other telephone management information needs.

call processing equipment. Call processing equipment provides additional functions and capabilities beyond traditional call processing. This classification includes add-on products such as voice-messaging systems, call accounting systems, and automatic call distributors.

CAM. See computer-aided manufacturing.

capacitor. A commonly used component that stores electrical energy. It is sometimes referred to as a condenser.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

capital assets. An application that assists a company in managing its capital assets, which are any physical property or right that is owned and has a money value.

capital spending. The purchase of a capital asset or an asset that is needed to create a product and is acquired with the intention of keeping (rather than being resold).

captive production. The sale of a good to a division within the manufacturing company.

carrier equipment. A cable-based system that provides transmission of multiple signals over a common metallic or fiber-optic cable. This segment includes subscriber carrier systems, trunk carrier systems, Basic Exchange Transmission Radio (BETR) systems, and repeaters.

cartography. An application that supports map production and/or resource management. May contain a spatially indexed data structure.

cartridge tape drive. A tape drive that uses a special metal and plastic protective device for the tape, which can be used for 1/4-inch or 1/2-inch tape products.

CASE. See **computer-aided software engineering.**

cash register. A device that automatically registers visibly the amount of a specific sale. Many are used to trace inventory and other product information through the sale of the product.

cassette tape drive. A tape drive that uses a small container of tape similar to that used for commercial audio recording purposes.

cathode ray tube (CRT). A television-like display screen which, on receipt of information bearing electronic signals, produces a visual display of the information (text, graphics). The CRT consists of a vacuum tube display in which a beam of electrons is projected onto a fluorescent surface of phosphors, producing a visual display. Used in most computer display terminals. Also referred to as video display terminal/visual display tube (VDT).

CAT scanner. A computerized axial tomography—frequently shortened to CT. A reconstructive imaging technique employing an X-ray source and array of detectors rotated about the body of the patient. The host computer calculates an image based on the appearance of a thin volume in the plane of the rotation.

CBIC. See **cell-based integrated circuit.**

CCD. See **charge-coupled device.**

CCIT. A French acronym for the International Telegraph and Telephone Consultative Committee, a committee of the international standards organization made up of telecommunication authorities of member countries. The committee's primary purpose is to develop and produce standards for telecommunication networks.

CCME. See **computational chemistry/molecular engineering.**

CCTV. See **closed circuit television.**

CD. See **critical dimension** and **compact disc.**

CD-ROM (compact disc read-only memory). See **CD-ROM disc drive.**

CD-ROM disc drive. All CD-ROM discs are 4.7 inches (12cm) in diameter, have a 1.6-micro-inch-pitch single-spiral track, and have 2.048 data bytes per sector.

cell-based integrated circuit (CBIC). An ASIC device that is customized using a full set of photomasks and uses automatic placement of cells and automatic routing.

cellular handset. See **cellular telephone.**

cellular service. One type of mobile communications, where a low-power radio is used between limited-distance "cells."

cellular telephone. Mobile radio equipment associated with cellular radio services.

central office (CO). 1: The physical location that contains the equipment that supports the telephone network. 2: The switching equipment that connects local access lines to toll circuits.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

central office switching equipment. Equipment comprised of electronic systems that interconnect local telephone lines (loops) and connect local telephone lines to long distance trunk lines.

central processing unit (CPU). A microprocessor or microcontroller. Central processing unit of a computer.

centrex. An optional service that provides voice/data switching by using the utility's central office.

charge-coupled device (CCD). ICs that combine charge-coupled signal transfer with arrays of photosensors to provide image sensing. CCDs are available as linear or area arrays.

chart. Any table, graph, or drawing depicting a range of technical data.

chart and map generation. A graphics software application that is designed specifically for charts and predefined maps.

check-handling system. A system to improve the speed and accuracy of check-handling processes within the banking and finance industries.

chemical vapor deposition (CVD). A formation of a stable compound on a heated substrate by thermal reaction or decomposition of gaseous compounds. A process that chemically isolates and deposits a specific material on a wafer. CVD equipment includes atmospheric-pressure CVD (APCVD), plasma-enhanced CVD (PECVD), and low-pressure CVD (LPCVD) techniques. Historically, the CVD market was split into APCVD, PECVD, and LPCVD technologies, because each had its own applications. Now, because of advanced reactors that are crossing application boundaries, it makes more sense to divide the market by film application rather than by equipment technology.

chemistry. 1: An application to support the science dealing with the composition structure and properties of substances and with the transformations that they undergo. 2: Chemical processes and phenomena.

circuit. 1: The electrical path between two or more points. 2: A means of two-way communication between two points, consisting of a sending and a receiving channel or a combined sending and receiving channel. 3: A transmission path between two or more points.

CISC MPU. See **complex-instruction-set computing microprocessor.**

citizens band: mobile and base. A frequency band allocated for private individual radio service (460 to 470 megahertz or 26.965 to 27.405 megahertz).

civil aerospace. Civilian travel in space.

civil aircraft flight system. Same as military aircraft, except related to civilian activity.

civil application. A software application used for civil engineering tasks, typically for design and drafting of sites for buildings, streets, highways, bridges, dams, airports, and utilities.

civilian space. Equipment used by civilians to explore the earth's atmosphere. Includes satellites, reconnaissance equipment, and ground control equipment.

civil navigation/communication. Same as military navigation/communications, except related to civilian activity.

civil radar. Same as military radar, except related to civilian activity.

civil simulation and training. Same as military simulation and training, except related to civilian activity.

closed circuit television (CCTV). A television system where television signals are not broadcast, but are transmitted over a closed circuit and received by interconnected receivers.

CMOS. See **complementary MOS.**

CO. See **central office.**

coaxial cable. Type of transmission cable with one or more central conductors, surrounded by an insulator.

CODEC. See **coder/decoder circuit.**

coder/decoder circuit. An integrated circuit that codes a voice signal into a binary waveform or decodes a binary waveform into a voice signal. Such circuits now are used in digital communications applications.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

college. A postsecondary school that offers general or liberal arts education, usually leading to an associate, bachelor's, master's, doctor's, or first professional degree. Junior colleges and community colleges are included under this category.

color prepress. A process that converts visual material to electronic signals.

color separation. A process of photographing objects using three filters, each corresponding in color and light transmission to one of the additive primary colors; analogous to seeing.

color television. An electronic system that transmits signals to a visual image that can be viewed in an array of colors on a screen.

combined elementary and secondary school. A school that encompasses instruction at both the elementary and secondary levels. Examples of combined elementary and secondary school grade spans would be 1 through 12 or 5 through 12.

combined PCB tester. Testing equipment that combines functional and in-circuit test techniques and capabilities that result in a test strategy to suit any given board's production history and fault spectrum to achieve the highest board fault coverage at the lowest cost.

command, control, communications, and intelligence (C^3I). Systems used to display the ongoing status of tactical or strategic operations in dynamic scenarios for rapid decision making.

commercial antenna. See **antenna.**

commercial meteorological and general-purpose instrument. Equipment used to obtain quantitative information about the weather.

communication. 1: The transmission of information from one point or person or equipment to another. 2: The sensing of a measurement signal or phenomenon for display, recording, amplification, transmission, computing, or processing into useful information.

communication management. The organization of stations, peripherals, and devices capable of intercommunications but not necessarily on the same channel.

communication peripheral. An interface device for machine-to-machine connections.

compact disc (CD). A disc from which data are read optically by means of a laser.

compact disc player. 1: A recording and playback system used to play recorded music by means of a small plastic optical disc similar to multiplex stereo broadcast and reception. Each wall of the record groove carries a single channel of information. 2: A recording device in which the sounds are mechanically impressed onto a disc.

comparator. A type of amplifier that produces a logic output (1 or 0) based on comparison of an input voltage with a fixed reference voltage. A widely used form of linear integrated circuit.

compiler. 1: Computer routine that translates symbolic instructions to machine instructions and replaces certain items with subroutines. 2: An automatic coding system in a computer that generates and assembles a program from instructions written by a programmer. 3: A computer language system consisting of various subroutines that have been evaluated and computed into one routine handled by a computer. 4: Software used to convert application programs from computer language to machine language.

complementary MOS. A semiconductor technology that uses both P-channel and N-channel transistors on the same silicon substrate to gain the primary advantages of very low power and high noise immunity.

complex-instruction-set computing (CISC) microprocessor. The number of instructions a microprocessor runs for a specific application. Known as a general-purpose processor.

component. An assembly, device, or piece of equipment that is part of a larger assembly or system.

component design. Design of the individual components in an assembly.

composite analysis. The analysis of composite materials (such as carbon fiber) as they change in the manufacturing process and are used in the final assembly.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

compound annual growth rate (CAGR). The average rate of growth compounded over a specified period. The formula used to calculate CAGR is:

$$\left(\frac{\text{Value in period 1+n}}{\text{Value in period 1}}\right)^{\left(\frac{1}{n}\right)} - 1$$

computational chemistry/molecular engineering (CCME). The use of computers to model molecular structures, to predict physical properties of molecules, and to design new compounds for specific purposes.

computer-aided design (CAD). Systems that function as tools to expedite mechanical and electronic design. Most CAD systems consist of a graphics computer terminal linked with a computer and a software package with features that aid in design and drafting, keep track of parts, run simulations, and provide illustrated parts or circuit diagrams. Programs complete the layout, geometric transformations, projections, rotations, magnifications, and interval (cross-sectional) views of a part and its relationship with other parts.

computer-aided manufacturing (CAM). The use of computers to program, direct, and control production equipment in the fabrication of manufactured items.

computer-aided software engineering (CASE). A combination of artificial intelligence and structured programming techniques used to aid in the development of large software programs.

computerized energy control system. A system with the resources for producing heat, electricity, and/or power and the capability of running on computers.

computer plotter. A visual display on which a dependent variable is graphed by an automatically controlled pen or pencil or other image development device/technique as a function of one or more variables. See also **plotter.**

computer storage media. The substance upon which data are stored electronically. Media may be flexible disks, rigid disks, tape, or optical disks.

computer storage tape media. Long, thin, flexible tape appropriate for digital magnetic recording and storage of computer data.

computer system. A combination of hardware, software, firmware, and peripheral components that has been assembled to satisfy a particular goal or set of goals.

computer systems performance segments. The following are Dataquest segments for computer systems performance: Level I—low-performance minicomputers, microcomputers, and personal computers; Level II—medium-performance minicomputers and microcomputers, very low end workstations, and high-end personal computers; Level III—low-performance superminis, midrange workstations, and high-performance minicomputers; Level IV—midrange superminis, low-end mainframes, and high-end workstations; Level V—high-performance superminis and midrange mainframes; Level VI—low-end supercomputers and very high performance superminis; and Level VII—supercomputers and high-end mainframes.

computer to PBX interface/digital multiplex interface (CPI/DMI). Two different standards for communication between systems.

computer to plate. A process that merges type and black-and-white images and combines the functions of typesetting, camera photography, and contact platemaking.

conceptual design. An application that supports styling, industrial design, and other design applications emphasizing visualization, aesthetic, and ergonomic considerations.

connector. A device used to join or fasten transistors, establishing a relationship between active and passive devices.

consortium. An international business agreement; an association or society.

consumable. Material that is capable of being consumed.

consumer electronics. The application of electronics in consumer equipment.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

consumer integrated circuit (IC). An analog circuit that meets specific consumer end-market applications. These circuits are dedicated to specific applications, such as audio or radio, and would not be used for general purpose.

consumer N.E.C. Consumer equipment not elsewhere classified.

consumer radio. A device used by the general public for communication by electromagnetic waves transmitted through space to produce sound.

consumption. The markets' purchase and use of goods and services, including lease or rental.

contract administration. The management of agreements between a company and its vendors and/or customers.

contract maintenance service. Ongoing repair services based on agreed upon terms and conditions (such as hours of coverage and level of services) as stipulated in a written agreement between the customer and the service provider.

controller. A device or group of devices that serve to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected.

controller board. A printed circuit board that provides programmable logic that controls the sequence of operations of the functional stages of a peripheral device.

conversion revenue. The revenue generated by changing from an equipment rental contract to a purchase or lease contract.

coordinate measuring machine. Machine used to measure the physical dimensions of a part.

copier. A reproduction device designed to produce replicas of hard-copy originals. Copiers may use either an analog or a digital scanning system.

coprocessor. A logic device that operates in association with a microprocessor to enhance system performance. Coprocessors are not capable of independent operation.

cordless telephony. The transmission of speech or other information via radio, enabling two persons to converse over almost any distance without a connecting cord to a base unit.

corporate publishing. Publishing that supports the main business of an organization or person; printed and published products are produced in the normal course of operations, but not as a primary source of revenue.

corporate supercomputer. An information system priced at more than $2 million. Performance speed is more than 200 mflops; current upper limit is approximately 2 Gflops. Currently used mainly for batch applications, but the trend is toward interactive use. Optimized for very heavy, numerically intensive applications. Requires special environmental controls and cooling techniques.

cost. The expenditure necessary to produce a product.

cost accounting. An application that supports a branch of accounting that is concerned with the collection, determination, and control of costs, particularly those costs associated with producing products or services.

counter/timer circuit. A circuit that receives uniform pulses representing units to be counted and provides a voltage proportional to their frequency.

counting device. A device register or location in computer storage for storing numbers or number representations in a manner that permits these numbers to be increased or decreased by the value of another number or to be changed or reset to zero or to an arbitrary value.

CPE. See **customer premise equipment.**

CPI/DMI. See **computer to PBX interface/digital multiplex interface.**

CPU. See **central processing unit.**

critical dimension (CD). Refers to a line, element, or feature that must be manufactured and controlled to very tight specifications.

CRT. See **cathode ray tube.**

CT2. See **digital cordless telephone.**

© 1991 Dataquest Incorporated January—Reproduction Prohibited

custom/contract programming. Programming services that include applications development and software systems conversions.

customer management. A software application used to maintain lists of purchasers of a company's products and services.

customer premise equipment (CPE). Telecommunication equipment used at an end user's location, as compared with use at the local telephone utility.

customer training/education service. Activities designed to instruct customers in the installation, usage, programming, management, and maintenance of hardware, software, and networking products.

custom integrated circuit. A handcrafted, single-user integrated circuit that is customized using a full set of photomasks and requires manual placement and routing. Can be either bipolar or MOS technology process.

CVD. See chemical vapor deposition.

D

daisywheel. See printwheel.

DAT. See digital audiotape.

data acquisition and control. See real-time data acquisition and control.

database. The entire body of data that has to do with one or more related subjects. Typically, it consists of a collection of data files stored in a computer system.

database administration. A control program function that provides access to data sets, enforcement of data storage conventions, and regulation of the use of input/output devices.

database management system (DBMS). 1: A software application that provides storage maintenance functions for data stored in sequential, hierarchical, relational, or object format. Example of DBMS products include FOCUS (hierarchical), Ingres (relational), and GBASE (object oriented). 2: A systematic approach to storing, updating, and retrieving information stored as data items, commonly referred to as data files.

database publishing. A system with the main purpose/use of printing the ordered collections of data.

data capture. A process that takes possession or control of information.

data center. A program designed primarily to acquire, analyze, process, store, retrieve, and disseminate one or more types of data.

data center construction/relocation services. Services in which a vendor performs or manages the contracting of site management services including the design and building of a customer's data center and/or the relocation and installation of customer's equipment.

datacom equipment. See data communications equipment (DCE).

data communications equipment (DCE). Equipment used for transmitting data between points of origin and reception. It includes products such as modems, statistical multiplexers, T-1 multiplexers, front-end processors, data PBX systems, data network management systems, DSU/CSU equipment, local area networks, and private packet data switching equipment.

data converter. An integrated circuit that changes alternating current to direct current or direct current to alternating current.

data creation. The process of producing or originating information.

data network management system. A product or device that diagnoses, isolates, reinstates, or accumulates information for network components or provides reports and analysis of network performance.

data PBX system. A digital private branch exchange system that allows terminals to switch and contend for computer ports by providing RS-232-C connections. This system does not provide voice switching. Data PBX base units and add-on channels also are included in this classification.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

data processing (DP). 1: The preparation of source media that contain data or basic elements of information and the handling of such data according to precise rules of procedures to accomplish such operations as classifying, sorting, calculating, summarizing, recording, and computing. 2: The handling of information in a sequence of reasonable operations.

data service unit (DSU) and channel service unit (CSU). These provide an interface to digital services, such as the AT&T Dataphone Digital Service (DDS).

data storage device. A product designed to hold data until needed. Storage devices are rated by technology (rigid, flexible, and optical disk drives and tape drives), physical size in inches (diameter for rigid and flexible disk drives, width for tape drives), and capacity in bytes. (See also **disk drive, tape drive.**)

data translation. 1: A device that transforms computer information to data from one language to another language without affecting the meaning. 2: To change one binary word to another.

DBMS. See **database management system.**

DCE. See **data communications equipment.**

dealer. 1: Independent businesses selling products under contract to one or more vendors. 2: A product reseller selling to end users. A dealer's primary added value is distribution; secondary added values are service, training, and support.

defibrillator. An electronic instrument used for stopping spontaneous, local contraction of muscle fibers (fibrillation) during a heart attack by applying controlled electronic pulses to the heart muscles.

departmental supercomputer. An information system with price ranging from $100,000 to $2 million. Performance speed ranges from 10 to 200 mflops. Acquired usually by users who need heavy number-crunching capabilities but cannot afford a full-scale supercomputer costing more than $2 million. This computer is a vector processor and thus uses a fundamentally different execution technique from scalar processors, such as mainframe computers and superminicomputers, and is typically configured as a uniprocessor rather than a parallel processor. Typical environment is a "cool room" with a raised floor and/or an ordinary office with no special environmental controls. Number of concurrent users typically ranges from 10 to 50.

deposition. The layering of various chemicals on a wafer. The introduction of dopant to wafers in high-temperature furnaces, chemical vapor deposition (CVD), sputtering, and implant.

deposit/loan management. An application that facilitates the control and earning potential of loans and deposits.

design layout. An initial design process in which the major components and part interfaces are defined.

desk-side personal computer. The desk-side personal computer meets all the qualifications listed for desktop personal computers but is further defined as being a personal computer that has been specifically designed to be placed next to or under the computer operating or desk surface, including foot/stand on bottom of system.

desktop personal computer. The desktop computer classification includes all personal computers except those products that are designed and sold as local area network servers, desk-side personal computers, and all forms of portable computers. Further, these systems are based on keyboard input devices.

desktop publishing. 1: Generalized computing platforms used to perform electronic publishing tasks as one of many applications. 2: The formatting of text and graphics into publishing-quality printed output.

desktop terminal equipment. Telecommunications equipment that is actually used on a desktop. This segment includes products such as single-line telephone equipment and integrated voice/data workstations.

desktop video. Tabletop televised images.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

detail drafting. The representation of a part in standard geometric drafting format. This representation will include all part geometry dimension and notations describing mechanical/structural, functional, and material characteristics.

detection and tracking. A real-time application that detects, tracks, and controls various systems and processes. (See also **data acquisition and control.**)

device interface. 1: An electronic device that enables one piece of gear to communicate or control another. 2: A device linking two incompatible devices. 3: A card containing circuits that allow a device to interface with other devices.

diagnostic. 1: Pertaining to the detection, discovery, and further isolation of a malfunction or mistake. 2: Medical applications that aid in diagnosing medical problems. X-rays, CAT scans, and ultrasound are examples.

dialysis. The separation of substances in solutions by means of their unequal diffusion through semipermeable membranes.

diathermy. The therapeutic use of high-frequency electric currents to produce localized heat in body tissue.

dictating/transcribing machine. A device that automatically records human speech onto a form of magnetic tape that can be played back for transcription.

diffusion. 1: A process used in the production of semiconductors that introduces minute amounts of impurities into a substrate material. 2: The movement of particles away from regions of higher concentration caused by the random thermal motion of atoms and molecules to areas of lower concentration.

digital. 1: Pertaining to the class of devices or circuits in which the output varies in discrete steps. 2: Circuitry in which data-carrying signals are restricted to either of two voltage levels, corresponding to logic 1 or 0.

digital access cross-connect system. A system that is composed of multiplex equipment that allows digital lines to be remapped electronically at a different digital level.

digital audiotape (DAT). A 4mm helical scan device (i.e., data recorded at an angle rather than parallel).

digital cordless telephone. Mobile telephone that uses digital radio transmission technology. CT2 is a standard for these devices.

digital design verification. A software application that includes logic simulation, timing analysis, hardware accelerators, hardware modelers, electrical rule checking, mixed signal simulation, transmission line simulators, and signal noise analysis.

digital panel meter. 1: An electrical switchboard or instrument board using continuously variable electrical signals known as analog signals. 2: Digital signals versus analog signals.

digital radiography. Equipment used for electronically detecting the arrival of X-ray photons transmitted through or emitted from an object on various media and converting the sensed analog signals to digital signals.

digital signal processor (DSP). High-speed general-purpose arithmetic unit used for performing complex mathematical operations such as Fourier transforms.

digitizer. A device used for the creation of digital information from alphanumeric or line artwork. More sophisticated digitizers are able to reproduce halftone images and usually are termed scanners.

diode. 1: A semiconductor device used to permit current flow in one direction in a circuit and to inhibit current flow in the other direction.

direct channel. The sale of equipment directly to the end user by a vendor that contributes significant development or integration to the product. Can be either sales of complete systems by turnkey vendors or sales of components of systems sold by individual suppliers.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

direct memory access (DMA). A computer feature, set up by the central processing unit (CPU), that provides for high-speed direct data transfer from a peripheral device to the computer memory or to magnetic disk or tape storage units. This feature releases CPU time to perform other procedures. Most DMA devices employ a CPU-cycle-stealing approach.

direct sales force. A sales method that employs a sales force to move a product through the distribution channel by making face-to-face contact with the consumer. Also referred to as outside sales.

direct thermal printer. A printer that uses point-specific heat and heat-sensitive substrate that change color when exposed to heat.

direct write e-beam. Equipment used in semiconductor manufacturing where electron beams are used to create heat that will expose selected areas of a wafer's surface to create a specific design. (See also **lithography.**)

disaster recovery and contingency planning. The planning and implementation of data backup and recovery procedures for a customer's site, based on an analysis of the critical business functions.

discrete component testers. Equipment used to test, check, and monitor the functionality of devices that have a single functional capability per package. These devices include resistors, capacitors, diodes, transistors, and other devices not classified as integrated circuits.

discrete device, security energy management. A circuit complete in itself used in the security and energy industries.

discrete semiconductor. An individually packaged semiconductor component complete in itself, such as a diode or transistor.

disk. 1: A high-capacity random-access storage device. Data are written onto and read from the surfaces of a stack of revolving record-like disks coated with magnetic material. May be fixed or removable. Capacity ranges from 0 to more than 1,000 pages per disk. Referred to as a rigid disk. (See also **random access.**) 2: A random-access magnetic storage medium in the form of a platter or thin wafer. (See also **magnetic disk.**)

disk drive. The unit that controls the reading and writing of disks.

disk drive IC. An analog IC designed for the mass-storage peripheral market. These ICs include read/write amplifiers, data separators, data processors, servo controllers, and motor controllers.

diskette (floppy disk). A record-like disk of magnetically coated Mylar enclosed in a protective square envelope. Holds from 80 to 250 pages of text. Unlike cassettes or cartridges, which store text serially, diskettes are formatted in a random manner, which allows faster access.

disk, magnetic. A storage device containing information recorded on the magnetizable surface of a rotating disk; a magnetic disk storage system is an array of such devices, with associated reading and writing heads mounted on movable arms.

disk operating system (DOS). 1: A computer system based on the Intel 80XX or 80XXX architecture that use the MS/PC-DOS operating system software. 2: An operating system that uses magnetic disks as its primary on-line storage.

dispatching. A software application used to execute the route plans of multiple vehicles, taking real-world events into account.

display peripheral. A component used to address the man-to-machine interface, whereas communication peripherals are used to address the machine-to-machine interface.

distribution. 1: The act or process of distributing. 2: The path by which a product moves from the manufacturer to the ultimate end user. 3: To place or position so as to properly apportion over or throughout an area.

distribution channel. The route taken either by the title to a product or by the physical product itself as it moves from the producer to the ultimate end user. The channel for a product extends to the last consumer who buys it without requesting any significant change in its form. When form is altered and another product emerges, a new channel is started.

distribution frame. A unit for terminating telephone wiring. This unit is typically used for terminating and cross-connecting telephones to the switching system.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

distribution method. A method employed to move a product through the distribution channel. It is separate and distinct from the channel in that many channel members may employ the same distribution method.

distributor. A wholesaler that sells to other resellers or end users. The distributor's primary function is to stock the inventory of multiple manufacturers to provide volume buying power to its end users.

DMA. See direct memory access.

documentation/drafting. A software application that includes detail drafting, schematics, technical illustration, charts, specifications, bills of materials, training manuals, and other drawing- or drafting-related applications. International standards such as ISO, DIN, or ANSI can be used to define text and feature format.

document management. A documentation system, generally computerized, that links and tracks all documents (drawings, procedures, specifications) related to an assembly or process.

dopant. Atoms of materials such as phosphorus, boron, or arsenic that are diffused into silicon to create resistors, diodes, and transistors.

DOS. See disk operating system.

dot matrix printer. A printer that produces images through selective printing of dots chosen from a dot array matrix. Dot matrix printers are segmented by the number of wires in the printhead: 9, 18, or 24 and greater wires. Within these technology segments, additional segments are defined by speed of printing, expressed in characters per second (cps).

DP. See data processing.

DRAM. See dynamic random-access memory.

DRAM controller. A device that governs DRAMs in some predetermined manner. Holds a process or condition at a desired level or status as determined by comparison of the actual value with the desired value.

drilling programmable machine tool. A machine tool fitted with an end-cutting tool that is rotated with sufficient power to create a hole or enlarge an existing hole in solid material.

drive. See tape drive.

drive, disk cartridge. A disk drive using a removable one- or two-platter cartridge; may incorporate a fixed-media capability.

drive, fixed Winchester. A disk drive that includes all fixed-media Winchester drives.

driver information. An electronic device used to assist the driver by giving visual or audio signals for direction. Examples include digital gauges, service reminders, digital clocks, trip/navigation computers, heads-up display, audio annunciator, CRT display, miles-to-empty indicator, and shift indicator.

dry etch. A technique in semiconductor manufacturing used to produce more uniform pattern definition on wafers without immersing the wafer in a liquid bath. Techniques include plasma etching and reactive etching through which gases and energetic ions remove unwanted chemical material from a wafer.

dry silver. A photosensitive film or paper coated with silver compounds that is developed by the application of heat. Popularized by 3M.

dry strip. A process in semiconductor manufacturing for removing photoresist from the wafer after etching. Dry strip comprises barrel strippers and single-wafer strippers.

DSMPU. See DSP microprocessor.

DSP. See digital signal processing.

DSP microprocessor (DSMPU). A general-purpose, programmable integrated circuit similar to a conventional microprocessor. Its distinction is characterized by the efficiency with which it implements repetitive multiplications and additions required by DSP algorithms.

DSU/CSU. See data service unit (DSU) and channel service unit (CSU).

DTMF. See dual-tone multifrequency signaling.

dual-disk drive. A system that provides for the use of two disks at the same time.

dual-tone multifrequency signaling (DTMF). A standard signaling method for touch-tone telephones using a combination of two different tones for any button pushed.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

duplicator. 1: A small offset printing press that uses a planographic image carrier. These presses are usually capable of one or two colors and are smaller, easier to operate, but less sturdy than offset presses. 2: Machine that requires a special master to make copies but produces copies at a higher rate of speed than copying. It differs from printing in that a direct-image master is used that yields a limited number of copies. Offset, spirit, gelatin hecto, stencil, and sometimes xerography are considered duplicating processes. (See also **copier.**)

dynamic random-access memory (DRAM). A random-access memory device that must be electrically refreshed frequently (many times each second) to maintain information storage. DRAM densities can range from 16K, with approximately 16,000 bits, to 16Mb, with approximately 16 million bits.

E

8mm tape cartridge. A class of tape drives using 8mm cartridges; used in camcorders.

E-1 multiplexer. An electronic device that consolidates or pools multiple digital streams representing voice or data signals onto a single high-speed E-1 data line. An E-1 line operates at 2.048 Mbits/second, a standard within Europe. See **T-1 multiplexer** for U.S. standard.

earth resources application. Studying the earth resources by performing seismic analysis, mapping, and oil field services.

EATE (electronic automatic test equipment). See **automatic test equipment.**

e-beam. A sophisticated system used in semiconductor manufacturing that uses an electron beam for maskmaking or for projecting patterns onto wafers. E-beam equipment allows smaller geometries (typically less than 1 micron) than are possible under other production methods.

ECAE. See **electronic computer-aided engineering.**

ECL. See **emitter-coupled logic.**

EDA. See **electronic design automation.**

education. The process of providing schooling or training by formal instruction and supervised practice.

educational publishing. A system with the main purpose/use of printing materials used for the process of educating.

EEPROM. See **electrically erasable programmable read-only memory.**

elapsed time meter. An electronic measuring instrument that counts the actual time taken to observe a recurring event.

electrically erasable programmable read-only memory (EEPROM). A nonvolatile memory device that can be erased and programmed electrically.

electrocardiograph. An instrument used to graphically record electrical manifestations of heart activity obtained from the body's surface.

electroencephalograph. An instrument used to graphically record electrical discharges of the cerebral cortex by electrodes attached to the surface of the scalp.

electronic calculator. A product with components that perform calculations and digitally display results. (See also **calculator.**)

electronic computer-aided engineering (ECAE). Computer-aided tools used in the engineering or design phase of electronic products (as opposed to the physical layout phase of the product). Examples of ECAE applications are schematic capture, simulation, and test pattern creation. ECAE systems are used most often by electrical engineers.

electronic design automation (EDA). Computer-based tools that are used to automate the process of designing an electronic product, including boards, ICs, and systems. Formerly referred to as ECAD.

electronic forms generation. The process of automatically producing documents requesting information.

electronic game. Home electronic games that typically are attached to television receivers.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

electronic keyboard. A keyboard on which characters are generated or encoded by electronic means, usually by contact closure, as opposed to mechanical linkages. Electronic keyboards have a different feel, and some have a built-in artificial bottoming feel and/or audible click to assure the operator a key actually has been depressed.

electronic mail (e-mail). An application that supports the movement of information between users connected to a networked computer system.

electronic musical instrument. An instrument that allows the transmission of musical sound by the use of transistors.

electronic publishing. Fully integrated automation of the printing procedure.

electronic warfare (EW). Electronic operations between enemies. Includes warning receivers, jammers, assorted electronic countermeasure systems, and associated test equipment.

electrostatic plotter. A plotter using the corona from high voltages applied to needles or nibs to produce shaped electrostatic charges on paper; toner is attracted to the charged area, and heat and pressure are used to fuse the toner to the paper.

elementary/secondary school. A regular school, defined as schools that are part of state and local school systems and most nonprofit private elementary/secondary schools, both religiously affiliated and nonsectarian.

e-mail. See **electronic mail.**

emerging technology. A technology that is not in widespread use and that appears to have potential for widespread acceptance.

emitter-coupled logic (ECL). 1: A form of integrated circuit used to implement very high speed logic functions. 2: The emitters of the input logic transistors are coupled to the emitter of a reference transistor.

employees. All civilians, who, during a reference time period, did any work for pay or profit (minimum of an hour's work) or worked 15 hours or more as unpaid workers in a family enterprise.

encryption. Process of encoding data, voice, or video transmissions for security purposes.

encryption unit. A device that encodes/decodes data, voice, or video transmissions for security purposes.

end user. The final purchaser of a finished product.

end-user average selling price. The average price that a user pays for a product inclusive of channel markups and discounts.

end-user revenue. End-user average selling price multiplied by shipment quantity.

enhanced service. Equipment and service charges associated with enhanced data communication networks, which may include protocol, electronic mail, or facsimile.

enrollment. In education, the total number of students registered in a given school unit at a given time, generally in the fall of a year.

entertainment system. 1: Electronic equipment used for amusement or pastime and not intended to, but may, increase productivity or skill. Examples include: radio, seek/scan, graphic equalizer, power amplifiers, noise reduction, cellular telephone, optical disk, CB radio, and digital audiotape. 2: A computer application to keep or hold the mind, something directing or engaging.

entry-level workstation. A low-cost computer workstation, priced less than $15,000. It is targeted at the end user who is sensitive to price. This segment tends to be dominated by occasional users who are not paid for producing documents on their system. Entry-level workstations mainly run 2-dimensional graphics and have a rating of less than 12 mips and a rating of 0.5 to 1.5 mflops.

environment. Where a product is used ultimately.

epitaxial wafer. Single-crystal silicon grown on a crystalline silicon substrate.

EPROM. See **erasable programmable read-only memory.**

equipment/maintenance management. A software application that assists in the management of equipment and the respective maintenance requirements and contracts. May also calculate depreciation.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

erasable programmable read-only memory (EPROM). A nonvolative memory device that can be erased by ultraviolet (UV) light and reprogrammed by the user.

ET. See **typewriter.**

etch-and-clean equipment. Equipment used in semiconductor manufacturing to remove and clean material from wafers.

EW. See **electronic warfare.**

expenditure. Charges incurred, whether paid or unpaid, which are presumed to benefit the current fiscal year. These include all charges for current outlays plus capital outlays and interest.

export. The delivery of products to a foreign country for the purpose of trade or sale.

F

fab. Abbreviation for wafer fabrication. See **fabrication.**

fabrication. A manufacturing operation that makes components rather than assemblies.

fabric ribbon. Fabric ribbons are struck repeatedly by the print mechanism until all the ink is depleted. Such ribbons are used commonly for general-purpose printing and are the most economical and durable ribbon substrate. Most fabric ribbons are made of nylon and are available in several forms, e.g., cartridge or web ribbon.

facilities design/management. A software application used to lay out, inventory, and manage assets (such as personnel, space, equipment, and utilities) within a building or geographic service area.

facilities management service. The responsibility of providing ongoing administration of a data processing or communications facility by a vendor.

facility planning and simulation. A facility system model is exercised and refined through a series of simulation steps until a detailed, optimum configuration is reached.

facsimile (fax). 1: An electronic device that uses telephone lines to transmit documents to and receive documents from a second facsimile machine. 2: An exact copy or the process of transmitting printed matter or still pictures by a system of either telephones, telegraph, or radio for reproduction.

factory automation equipment. Equipment that includes various types of capital equipment that are automated and used throughout a manufacturing facility.

factory average selling price. The average price per unit that is paid for a product. This figure takes into account discounts given to the distribution channel and multiple-purchase discounts.

factory revenue. The amount of money received by a manufacturer for its goods.

fast packet switch. A packet-switching technique in which small packets are switched at high-speed using hardware for the transport of voice, data, and video.

fast SRAM. A static RAM device that runs at speeds less than 70 nanoseconds. (See also **static random-access memory.**)

fatigue. In electronics, the degradation of the performance of materials, parts, or circuits with time.

fault detection, fault management, and adaptive control. A software application that determines if a manufacturing system or a process is functioning or performing within control limits. Fault management and adaptive control is a control method in which control parameters are continuously and automatically adjusted in response to measured process variables to achieve near-optimum performance.

fax. See **facsimile.**

FDDI. See **fiber distributed data interface.**

federal government. A form of government in which power is distributed between a central authority and a number of constituent territorial units.

FERRAM. See **ferroelectric random-access memory.**

© 1991 Dataquest Incorporated January—Reproduction Prohibited

ferroelectric random-access memory (FERRAM). A nonvolatile, radiation-hard, fast read/write memory that can store data over long periods of time without power.

fiber distributed data interface (FDDI). A standard for high-speed packet switched data.

fiber optic. 1: The technique of transmitting light through long, thin, flexible fibers of glass, plastic, or other transparent material. Bundles of fiber can transmit complete images. 2: A technique used in electromagnetic wave propagation in which infrared and visible light frequencies are transmitted by a light-emitting diode (LED) or a laser through a low-loss glass fiber. This method is used in very high frequency (VHF) radiation transmission.

field-programmable gate array (FPGA). An integrated circuit incorporating an array of programmable logic elements that are not preconnected. Interconnections between the various elements are user programmable and consist of predetermined levels of interconnect that can be connected to, or disconnected from, other interconnect lines as defined by the user. Can be of either bipolar or MOS technology.

field-programmable logic array (FPLA). A logic array in which programming is accomplished by blowing fuse links or shorting base-emitter junctions.

film ribbon. See **single-strike ribbon** or **multistrike ribbon.**

finance. An application to support the management of money or other liquid resources and their respective management within an organization.

fixed asset. An application that supports the management of an organization's fixed assets, which are a capital asset that cannot be readily liquidated, such as plant, land, equipment, and long-term investments. Management of expected costs based on a specific level of production or other activity.

fixed disk. A memory disk that cannot be removed from the read/write device, as opposed to a removable hard disk, diskette, or magnetic tape.

fixed media rigid disk drive. A fixed media rigid disk drive has the platter enclosed in a housing that is not designed to be accessible to the user.

fixture design. The design of a variety of structural aids that hold the component or assembly during the manufacturing process.

flexible disk. See **flexible disk computer storage media.**

flexible disk computer storage media. A flexible disk made of a 3-mil polyester substrate coated with gamma ferric iron oxide particles dispersed in an epoxy binder and encased in a vinyl jacket. These are commonly supplied in 3.5- or 5.25-inch diameters.

flexible manufacturing system programmable machine tool. A manufacturing system that typically consists of a computer-integrated group of numerical control (NC) machines or workstations linked with material transfer devices for complete automatic processing of differing product parts or the assembly of these parts into different units.

floating-point coprocessor. A separate microprocessor used in the efficient handling of floating-point operations.

floppy (flexible) disk. A small, thin, electromagnetic media used for storing digital information.

floppy disk controller. A device controlling the storage and retrieval of data from a floppy disk.

font generation. Process whereby typeface and size is selected.

font management. The understanding, use, and control of fonts or typefaces that are displayed on a terminal or monitor, or printed out on a device such as a printer, plotter, or typesetter. Font management requires the understanding of the physical location of where the fonts reside—whether in diskette, hard disk, ROM, RAM, card, or cartridge. It also requires the knowledge of the type of font—whether bit map or outline, scalable or fixed point and pitch—and the applications and print system capability to address and place the fonts accurately on the screen or printing media.

forecasting. To estimate in advance or anticipate; to predict future events, trends, business conditions, etc.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

form. 1: Any material that has been printed for the primary purpose of facilitating the entry of written information by hand or machine. A form has repetitive information printed in fixed positions. Blank paper may be included, especially if it is continuous and has undergone some alteration such as punching or perforating to facilitate manual or machine entries. 2: Allows the user to graphically design a form for publication—may include data entry and database capabilities.

four-year institution. An institution legally authorized to offer and that does offer at least a four-year program of college-level studies wholly or principally creditable toward a baccalaureate degree.

FPGA. See **field-programmable gate array.**

FPLA. See **field-programmable logic array.**

front-end processor. A computer-based product expressly designed to relieve host computers of certain communications processing tasks. Included are remote concentrators that are not attached directly to a host computer. This segment does not include general-purpose computer systems functioning as front-end processors.

full-color copier. A reproductive device that can recognize the full range of colors on an original and reproduce them using the three subtractive primary colors and produce a full-color copy.

fully formed printer. A printer that prints fully formed characters by applying pressure on or to the paper and obtaining the characters from a wheel, band, type train, or drum. Such devices can be serial, fully formed printers and line, fully formed printers.

functional design. An application that supports component design, assembly verification, linkage and mechanism design, and other detail or functional design activities.

functional PCB tester. An equipment tester that accesses the normal input/output interface of the unit under test (UUT). Generally, this consists of the edge-connector pins, plus any special interface that may have been provided for testing. Provides stimulus patterns and measurement verification that the UUT actually operates correctly.

funds transfer terminal. A machine used by financial institutions and designed to perform many of the banking functions performed by human tellers. (See also **automated teller machine.**)

G

GaAs. See **gallium arsenide semiconductor.**

GaAs analog IC. There are two overlapping subsets in this segment; analog products and monolithic microwave integrated circuits (MMICs). Analog products have output that are linearly proportional to their inputs and function at a varying range of frequencies across the spectrum, depending on particular device design. MMICs operate in the microwave frequency spectrum (above 3 GHz).

gallium arsenide semiconductor (GaAs). A compound of gallium and arsenic used as a semiconductor material. GaAs devices are relatively expensive devices exhibiting very low internal noise and very high speed.

game. A software application or activity engaged in for diversion or amusement.

gas. A consumable material used throughout the fabrication of semiconductor devices. Includes both bulk and specialty gases.

gate array. 1: An ASIC device that is customized using the final layers of interconnect. (Included in this category are generic or base wafers that include embedded functions such as static RAM.) May be of either bipolar or MOS process technology.

gateway. Equipment or conceptual point that connects two otherwise incompatible systems. (See also **protocol converter.**)

general analysis. A software application designed to solve various technical problems and to further research subjects. The analysis is usually mathematical in nature and performed by scientists, physicists, chemists, biologists, and engineers.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

general ledger. A software application that supports the business function of entering accounting transactions and their subsequent transferring and reporting.

general operating system. An operating system with use not restricted to a particular type of computer or a specialized application.

general productivity. A software application that is used to enhance productivity within general disciplines.

general-purpose computer system. A computer system that is not configured for a specific purpose but rather for a general application. This category includes supercomputers, minisupercomputers, parallel processor computers, mainframes, workstations, and the like.

general-purpose input/output (I/O) circuit. A circuit that permits a system to communicate via a wide variety of input/output (I/O) devices with the outside world, which can include printers, modems, and monitors.

general test equipment. Test equipment not included under the definition of automatic test equipment (ATE).

geographic information system (GIS). A mapping software application that contains the functions of cartographic software and also allows data analysis through Boolean operations on multiple data layers.

geophysical instrument. An instrument used to observe and measure the physics of the earth and its environment.

GIS. See **geographic information system.**

global positioning system. Equipment that calculates location based on one of several technologies such as radio or internal navigation.

golf ball. A type of print element invented by IBM for use in the IBM Selectric typewriter. It is a round, metal element with raised characters.

government. The organization, machinery, or agency through which a political unit exercises authority and performs functions and which is usually classified according to the power within it. Includes the executive, legislative, judicial, administrative, and regulatory functions.

graphic design art. A method of applied art used to form a visual end product that conveys information. Methods include drawing, painting, photography, printing, and bookmaking.

graphics. Software that permits the pictorial representation of information at a screen or printer. Early graphics packages showed bar charts or line graphs on a character-based terminal by placing characters such as + or * on grids created by repetitions of characters such as | and or _ . The term has come to apply usually to bit-mapped graphics, which are capable of processing images, freehand input, and icons on a pixel-by-pixel basis. Examples of graphics software include MacDraw and MacPaint.

graphics/animation/imaging. A software graphics application used by scientists and engineers to process and display complex technical data. It also includes applications that use computers to generate or manipulate graphics images that are the end product, i.e., cartoons.

graphics board. An add-on board connected to the bus that provides video capabilities for a personal computer.

graphics controller. A device that governs information flow used to create visual images of data.

graphics draw/paint. A software application that creates, retrieves, modifies, and prints graphic images.

graphics supercomputer. The performance of mips, mflops, transforms per second, and shaded polygons per second distinguishes graphics supercomputers from superworkstations. Performance ratings range from 20 to 40 mips and 16 to 40 mflops. The best distinction between graphics supercomputers and superworkstations is the graphics performance ratings, 100K to 600K 3-D vector transforms/second and 25K to 150K Gouraud-shaded polygons/second. The average price ranges from $75,000 to $150,000.

graphics terminal. A display terminal that provides graphical presentation of information to the operator. 1: Data conversion graphics terminals support the use of graphics to summarize or

© 1991 Dataquest Incorporated January—Reproduction Prohibited

otherwise relate discrete data that were not originally graphics data. 2: Concept design graphics terminals support graphics displays that help realize accurate images of ideas conceived in the human mind. 3: Imaging graphics terminals display a real image, visible or nonvisible, that was digitized to allow enhancements or data extraction.

grinding programmable machine tool. A standalone machine with expanding use of computer numerical control (CNC) and with advance efforts to incorporate grinders into flexible, automated systems. Creep-feed is a type of grinding technology.

gross lease additions. The total volume of new equipment leases.

H

hand-held personal computer. The hand-held personal computer is a less-than-2-pound, fully functional personal computer. To be considered a hand-held personal computer, units must operate using a fully implemented version of MS-DOS and be able to run some of the shrink-wrapped MS-DOS-based applications. These units are expected to have a subsize keyboard and utilize nonstandard mass storage devices. The criterion for inclusion in this classification is that the device may be held in one hand using the other hand for data entry via the included keyboard. They are fully battery powered units.

hard disk. See **rigid disk.**

hard disk controller. A device that controls the storage and retrieval of data from a user's hard disk drive.

hardware. Electronic equipment, systems, or peripheral devices.

hardware maintenance service. Remedial repair services for equipment, systems, and peripherals. Hardware maintenance can include on-site support, telephone/remote support, preventive maintenance, and other activities necessary to maintain hardware operation.

HDTV. See **high-definition television.**

head; manganese-zinc, landable. A type of head used in sealed fixed-media drives where heads land on the lubricated media surface and use hot-pressed manganese-zinc pole pieces.

health care. An environment or industry that includes establishments primarily engaged in providing medical, surgical, and other health services.

helical scan tape drive. A storage tape drive that records data on an angle rather than parallel. Tape dimensions can be 4mm, 8mm, 13mm, or 19mm. Segments of this category are VHS, DAT, 8mm, and other. (See also **VHS, DAT.**)

high-definition television (HDTV). A television standard with high-resolution, digitized images; wide, theater-like screen; and digital stereo sound. Requires a broader video bandwidth to accommodate increased picture transmission.

higher education. Study beyond secondary school at an institution that offers programs terminating in an associate, baccalaureate, or higher degree.

high school. A secondary school offering the final years of high school work necessary for graduation, usually including grades 10, 11, and 12 or grades 9, 10, 11, and 12.

home. The usual place of residence. A home-based business is an enterprise producing goods or services that is operated in or from the home.

horizontal-turning programmable machine tool. The tool of a machine that holds a piece along the horizontal axis for a certain function to be performed such as cutting, boring, or drilling.

host/vendor independent terminal. A host-independent display terminal produced by an independent manufacturer. It may operate in either character or block mode. The independent manufacturer does not supply mainframes or minicomputers to which its display terminals may attach. Not included is any terminal that is from an independent manufacturer and that is protocol-specific to either a minicomputer-based or a non-IBM, protocol-specific terminal.

hotels and lodging. An environment or industry that includes commercial and noncommercial establishments engaged in furnishing lodging, or lodging and meals, and camping space and camping facilities.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

household. The set of persons occupying a housing unit. Thus, counts or estimates of households, householders, and occupied housing units are always defined the same.

hybrid. 1: Made up of several different components. 2: A hybrid integrated circuit is made by putting several integrated circuit die and/or passive components on a ceramic substrate with a metal pattern. 3: A substrate containing more than one component. The substrate consists of multiple ceramic layers and also can contain multiple packages. 4: A device in a speech transmission system consisting of transformers that convert a two-wire channel into a four-wire channel, thus creating a separate wire pair for each direction of transmission.

hybrid analog IC. An analog IC that combines one or more semiconductor chips with other technologies, such as chip capacitors and film resistors, on a single substrate.

hydrogen. A chemical element used for hydrofining for sulfuration of petroleum products or to reduce metallic oxide ores.

I

IBM 3270 protocol terminal. A terminal that is protocol-specific to IBM's 3270 Information Display System. Included is any IBM 3270-type terminal or 3270-compatible terminal produced by another manufacturer. A terminal that can provide the appearance of a 3270 device when used with a protocol converter is not included.

IBM/VM/MVS. An IBM standard multiuser operating system.

IC. See **integrated circuit.**

IC layout and verification. A software application tool that is used to create and validate physical implementations of an integrated circuit (IC). IC layout tools include polygon editors for creating geometric data, symbolic editors, placement and routing (gate array, cell, and block), and DRC/ERC verification tools.

IDVT. See **integrated voice/data workstation.**

if-sold revenue. The amount of money paid for products based on list price. List price does not take into account discounts or markups.

if-sold value. A measure that reflects unit shipments multiplied by list price.

IGBT. See **insulated gate bipolar transistor.**

illustration software. An object-oriented software program that allows the user to create original artwork consisting of lines, arcs, and other mathematically generated geometric objects. (Line art is a term sometimes used to describe the results of illustration software.) Some illustration software can perform raster-to-vector conversion by allowing users to trace over scanned raster art. This trace can occur on screen or on a graphics tablet. Illustration software usually offers raster-fill patterns that extend to cover an area in an illustration bounded by geometric objects.

image communication. Equipment used in a business or residence to transmit image and text. Facsimile equipment, video teleconferencing, telex, and videotex are included in this classification.

image-editing software. A software program that allows a user to modify existing artwork existing in raster format. This art may have been scanned or captured as analog signal data and converted to digital data. Image-editing software can handle binary data, in which case it is called print software; or it can handle grey-scale and/or color data, in which case it is called image-retouching software.

image generation. Synonymous with image synthesis and equivalent to the historical use of graphics.

image management. The process of directing, controlling, or handling something that closely resembles another.

image processing. A series of actions, changes, or functions that bring about a particular result for something that resembles another.

imaging. See **graphics/animation/imaging.**

imaging subsystem. A peripheral device that does not possess video display terminal (VDT) functionality, but acts as output devices for the display of graphics and/or image data.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

impact printer. A family of printers that use direct impression impact of a type bar, type head, or matrix pin to exert pressure against a paper ribbon and a platen to create a character.

import. The supply of products from a foreign country for the purpose of trade or sale.

in-circuit PCB tester. An equipment tester that incorporates pin electronics (drivers and receivers) that verify the functionality of each part on an assembled circuit board. Verifies each component's parameter and limited functionality.

indirect channel. A variety of distribution channels in which product is brought to the end user. It includes value-added resellers (VARs) and original equipment manufacturers (OEMs).

inductor. A passive component that stores energy in the form of a magnetic field (flux) around a core body.

industrial design. A process that integrates the design tools defining the style and functional aspects of the total design.

industrial electronic equipment. Electronic equipment used in a manufacturing environment or industry.

industrial marking. A specified format on media that is recognized by electronic or visual means. Examples are the printing and use of forms, bar codes, ticket printing (lottery and airline, for example), and labels.

industry. A collective term for many of the productive activities of a nation or other large group. A collective term in which a number of firms produce the same kind of commodity or service or are engaged in the same kind of operation.

INEWS. See **integrated electronic warfare system.**

information center. A center designed specifically for storing, processing, and removing information for dissemination at regular intervals, on demand or selectively, according to the user's needs.

information resource management. A program that works with definitions, uses, values, and distribution of information that is processed by a user and handled by a computer system.

infrared. Those radiations, such as are emitted by a hot body, with wavelengths just beyond the red end of the visible spectrum. Wavelengths longer than those of visible light and shorter than those of radio waves.

ink jet. An image-producing process currently used in electronic printers, plotters, and full-color copiers that uses piezoelectric technology to expel a very small droplet of liquid ink through nozzles onto the output paper.

ink jet printer. A nonimpact printing method that uses ink droplets to form a printed image. This technology usually is classified by the nature of the drop stream; two major categories are continuous flow and drop-on-demand.

input/output (I/O) device. 1: Equipment used to communicate with a computer. 2: A general term applied to equipment used in communicating with a computer and the data involved in the computer. 3: The transmission of information from an external source to a computer or vice versa.

input/output (I/O) ratio. 1: A ratio of the value of a resource input to the value of the final product output, typically expressed as a percentage. 2: A measure of throughput for a computer system.

inspection. The process of testing or measuring an object or process by remote sensing in imaging technology.

installed base. The total number of product in active, day-to-day use.

institutional support. In higher education, the expenditures that include day-to-day operational support for colleges, excluding expenditures for physical plant operations. Examples of institutional support include general administrative services; executive direction; planning, legal and fiscal operations; and community relations.

instruction. In higher education, expenditures of the colleges, schools, departments, and other instructional divisions of higher education institutions and expenditures for departmental research and public service that are not separately budgeted. Includes expenditures for both credit and noncredit activities. Excludes expenditures for academic administration where the primary function is administration.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

instructional. Products used to increase the understanding (either problem-solving or self-improvement) of a specific subject matter. The primary focus of these products is the imparting of knowledge or skills to the user.

instructional staff. In education, the number of full-time equivalent positions, not the number of different individuals occupying the positions during the school year.

instrumentation. Designing, manufacturing, and using instruments for detection, observation, measurement, automatic control, automatic computation, communication, or data processing.

insulated gate. A gate that is separated from other conducting surfaces through a nonconducting material.

insulated gate bipolar transistor (IGBT). A power transistor that has the insulated gate properties of a MOS transistor with the low saturation ON voltage of a bipolar transistor.

insurance. An environment or industry that covers carriers of all types of insurance and insurance agents and brokers.

integrated application. A software application that combines several functions into one software package, which may include word processing, database management, and spreadsheet capabilities but is not exclusive to these functions. Data must be able to be shared among these functions.

integrated circuit (IC). A combination of interconnected semiconductor elements inseparably associated on or within a continuous substrate. Complete module of components manufactured as single, solid units made by either a film deposition or a diffusion process.

integrated electronic warfare system (INEWS). A combination of interconnected circuit elements associated on or within a continuous substrate to produce integrated systems used specifically in military operations.

Integrated Services Digital Network (ISDN). A digital network having the capabilities of simultaneous signaling, switching, and transporting over a single facility. A new worldwide telephone standard that will make it easier to communicate information such as voice, data, and video over phone lines.

integrating and totalizing meter for gas and liquid. A meter that registers consumption and positive displacement, including meters, fuel dispenser meters, and gas meters.

integrated voice/data workstation (IDVT). Terminal that possesses both telecommunications and computational capability.

integration. Integration of data types can be achieved using page composition and pagination applications.

intelligent terminal. An interactive terminal in which part of the processing is accomplished by a small computer or processor contained in the terminal itself. This type of terminal is sometimes referred to as a smart interactive terminal. Such a terminal has the following characteristics: (1) self-contained storage; (2) user interaction—with the terminal or the central computer; (3) stored program; (4) part of processing accomplished in the terminal; (5) on-line via communications line with large central computer and database; (6) human-oriented input—such as keyboard and light pen; and (7) human-oriented output—such as serial printer and CRT.

interactive language. Within a system, a human user or device serviced by the computer can communicate directly with the operating program or language.

intercom systems. A system that provides internal communication, allowing calling to be confined to inside the system. In most cases, key systems provide the intercom lines that allow quick communication between stations on the key system.

interconnect and bare-board tester. Equipment designed to check, monitor, and identify printed circuit boards for electrical connectivity and detect manufacturing defects.

interface IC. An analog IC that is dedicated to interfacing digital information (in bits) with external nonsemiconductor devices such as displays, lines, solenoids, and other peripheral devices.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

internal transfer. The process of conveying or moving goods and services from the producer within a company.

international telephone service. Telecommunication services between offices or stations in different states or between mobile stations that are not in the same state or are subject to different states.

interrupt controller. 1: An internal controller chip that can break into the normal flow process of a routine such that the flow can be resumed from that point at a later specified time. 2: A condition or event that temporarily suspends normal processing operations. 3: A temporary disruption of the normal operation of a routine by a special signal from the computer. 4: Copying technology: A feature that allows a job to be stopped to allow another job to be run without the loss of programming for the first job.

intrusion-detection alarm system. A warning system used to detect when someone or something has intruded in a specified area. (See also **alarm system.**)

inventory. Items used in the process of manufacturing a product and distributing it to the end user. Inventory can be stored at a stock point or at a work-in-process location. Inventory may consist of finished goods, parts of intermediate items, work-in-process, or raw materials.

inventory and distribution management. An application that monitors the status of materials at all levels of production, including receipts, issues, and inventory balances. It identifies both unit quantities and dollar values and provides essential input to both the general ledger for cost accounting and the production planning modules.

I/O device. See **input/output device.**

ion implantation. The use of an ion beam to bombard a silicon wafer, altering the concentrations of p-type and n-type material. This method of doping allows for very precise control of the device parameters. This process introduces dopant atoms into the surface of silicon wafers and accelerates them so that they bombard the wafer, causing them to penetrate the exposed portions of the wafer.

ion milling. A technique in semiconductor manufacturing in which a beam of charged particles is used to remove material from a wafer.

I/O ratio. See **input/output ratio.**

IR. See **infrared.**

ISDN. See **Integrated Services Digital Network.**

IVR. See **interactive voice response system.**

J

joint venture. Two or more companies providing capital or other resources to invest or make available for investment in the ownership of a new enterprise.

K

keyboard. An input device that allows an operator to enter alphanumeric characters through a typewriter-style key arrangement augmented with special function keys—manual operation of keys will generate electrical signals or cause tape to be punched, or both.

keyboard controller. A device that governs the functions of a keyboard transmitting a command to do something within a system.

key entry equipment. Data entry equipment such as key disk, key tape, or keypunch equipment.

key telephone system. A customer premises telephone switching system that allows telephones to interface to the public telephone central exchange or office without using an access code. This category includes the electromechanical 1A2 and electronic segments.

L

label. 1: A set of symbols used to identify or describe an item, record, message, or file. May be the same as the address in storage. 2: Matter attached to a document to identify or provide information. 3: To assign a symbol, acronym, or word as a means of identification to create a specialized record or filing handle. 4: A

© 1991 Dataquest Incorporated January—Reproduction Prohibited

descriptive or identifying word or phrase. 5: To address, using self-adhesive addressing labels.

laboratory. 1: A software application that involves the use of computers inside analytical instruments and in linking these instruments together (instrumentation automation). Mass spectrometers and blood/gas analyzers are examples. 2: A place equipped for experimental study in a science or for testing and analysis.

laboratory and scientific apparatus. Any instrument, material, or equipment designed for a specific operation or particular use in the laboratory.

LAN. See **local area network.**

LAN-based e-mail. A software application that enables users of a local area network (LAN) to send and receive textual data. Some LAN-based e-mail software can send and receive computer files and graphic images.

language. In software, a set of commands that permits the programmer to perform arithmetic functions on data and/or give commands to specific hardware components of the computer system, such as the printer, terminals, disk, or memory. Statements in languages are generally required to be performed in a fixed order, although the order may be affected by loops and branches in the program and the values of parameters that control the looping and branching. Examples of low-level languages are C and assembler; high-level, or third-generation, languages include FORTRAN, COBOL, BASIC, and PL/1.

language editor. A set of computer commands forming code to edit files. May involve deleting undesired information, selecting desired information, inserting invariant symbols, and applying standard processes.

laptop A/C. The laptop A/C units reflect the standard laptop design, i.e., clamshell-style case with the display mounted in the top portion of the shell and covering the keyboard until the unit is opened for use. These units, like transportables, are designed to be easily moved from place to place but operate only on A/C power and do not contain batteries of any kind.

laptop D/C. The laptop D/C units are identical in style to the laptop A/C units except that they are powered by batteries and can be operated without direct connection to A/C power lines. Some of these laptop D/C units have a combination of battery- and A/C-power capability.

laptop personal computer. The laptop-case style is conducive to operation on the user's lap and is designed to be used in areas where space is restricted. This case style is referred to as the clamshell-type of system, with the display screen mounted in the top of the unit in such a way as to cover the keyboard when closed and be at the proper viewing angle in relationship to the keyboard when opened and ready for operation. This unit is completely self-contained and can be carried as a single unit that includes the keyboard, display, mass storage, and main system unit.

large-format plotter. This plotter uses media engineering size C (17 x 22 inches) or larger and corresponding metric sizes. (See also **plotter.**)

laser (light amplification by stimulated emission of radiation). 1: A device that transmits an extremely narrow and coherent beam of electromagnetic energy in the visible light spectrum. 2: A laser that operates at optical frequencies. In communications, lasers may be amplitude-modulated and used to carry speech information that is received by a light beam detector.

laser diode. A laser diode is a laser that is constructed with a semiconductor material. Many III-V semiconducting materials can be made to emit coherent light, creating a laser.

laser plotter. A device that produces an inscribed visual display of the variation of dependent variable as a function of one or more variables by the use of intense coherent beams of light.

laser printer. A type of nonimpact printer that combines laser beams and electrophotographic technology to form images on paper.

laser system. Any electronic device or system that is actuated by beams of coherent visible and infrared light to accomplish a task.

LCD. See **liquid crystal display.**

learning. An application that assists the user in learning. The subject can range from classic school subjects to games, art, and languages.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

lease. A contract by which one conveys equipment, facilities, or property for terms specified.

lease accounting. An application that supports the management of leases.

leased circuit. A service offering that provides a customer with permanent (rather than dialed) connections to all points on the circuit for the duration of a contract.

lease/rental conversion. The volume of contractual conversions between rental and lease options.

LED. See **light-emitting diode.**

library management. A software application that supports the administration of a library, including cataloging.

LIDM. See **line, impact, dot matrix.**

LIFF. See **line, impact, fully formed.**

light communication system. Electromagnetic radiation of a wavelength originating at one place and reproduced at a distant point.

light-emitting diode (LED). A pinhead-size device with a pn junction formed from combinations of gallium, arsenic, and phosphorus. Light emission is the result of hole-electron recombinations that take place near the junction of the p-doped and n-doped regions. As the electrons in the n region of the diode travel through the area near the junction, they recombine with a hole. As a result of this recombination between an electron and atom, light in the form of photons is produced. The wavelength of color of the light is determined by the energy level.

light-emitting display. Light-emitting diodes grouped together in a matrix of dots to form characters.

linear array/ASIC. An ASIC that is purely analog.

linear IC. An IC that is purely analog; both inputs and outputs are analog signals. Sometimes, linear and analog ICs are used interchangeably. Dataquest uses linear as an analog-only segment of the analog market (mixed signal analog/digital is the other segment).

line conditioner. Equipment that changes/enhances the transmission characteristics of a circuit.

line, impact, dot matrix (LIDM). A printer that prints one line of dots at a time using an array of elements in a printhead.

line, impact, fully formed (LIFF). A printer that creates one line of characters at a time by placing characters—from a band, type train, or drum—on the paper by the pressure of an impact mechanism (hammer).

line, nonimpact, thermal transfer (LNTT). A printer that prints a line at a time, using an electrically heated element to produce images.

line printer. A printer that usually prints one line at a time at a higher speed than a character printer. Typical line printers use a drum, chain, or train of print elements and have a hammer for each print position in the line. They usually have a buffer to hold one print line. Line printers are segmented by technology (dot matrix, fully formed, thermal) and by speed, expressed in lines per minute (lpm).

linkage mechanism. An assembly of components, with two or more movable parts usually providing some means of power, control, or fastening application.

liquid crystal display (LCD). A high-contrast, black-on-white display screen that uses closely spaced crystal segments on a square dot matrix. The crystal segments butt together to form solid characters. A liquid crystal hermetically sealed between two glass plates.

list price. The price of a product as indicated in the seller's price book. This figure is usually quantity one and is synonymous with manufacturer's suggested retail price.

lithography. 1: A printing process that prints from a planographic image on a printing plate. Lithographic presses are configured as sheetfed and web presses, depending on the format of the paper used. 2: A technique used in semiconductor manufacturing in which a silicon wafer is coated uniformly with a radiation-sensitive film (the resist) and an exposing source illuminates selected areas of the wafer's surface through a mask or template for a particular design.

LNTT. See **line, nonimpact, thermal transfer.**

local area network (LAN). The hardware, software, and peripherals that enable connection of a device to a cable-based network system that

© 1991 Dataquest Incorporated January—Reproduction Prohibited

serves a building or a campus environment. Excluded are connections that are point-to-point, or go through PBXs or data PBXs. Ethernet and Token-Ring are popular LAN technologies.

local government. The political unit or organization governing counties, municipalities, townships, school districts, and numerous kinds of special districts.

local loop. The portion of the telecommunications system that connects the customer's equipment with the local telephone company's network.

local telephone service. A service that includes message telecommunications services, private line services, wide-area telecommunications services (WATS), and centrex services.

logic circuit. 1: A circuit (usually electronic) that provides an input-output relationship corresponding to a Boolean-algebra logic function. 2: An electronic device or devices used to govern a particular sequence of operations in a given system. 3: Circuits that perform basic logic decisions *and/or/not*, used widely for arithmetic and computing functions. Circuits can be of either bipolar or MOS technology.

long distance telephone service. The revenue generated by all long distance carriers for interstate and intrastate long distance telephone services.

M

machining-center programmable machining tool. A machine that is designed to fabricate a complete or near complete part of a single machine, with machining centers that perform a number of different operations in a single setup.

machining robot system. A robot that can pick up parts and place them in a new location. Parts are usually moved in and out of machinery or transferred from station to station.

mag card/mag tape. A tape or card that is coated or impregnated with magnetic material, on which information may be stored in the form of coded polarized spots.

magnetic. The effects of magnetism/flux on the system.

magnetic disk. 1: A random-access storage device consisting of magnetically coated disks accessible to a reading and writing arm, similar to an automatic record player. Data are stored on the surface of each disk as small, magnetized spots arranged in circular tracks around the disk. The arm is moved mechanically to the desired disk and then to the desired track on that disk. 2: A flat, circular plate with a magnetic surface on which data can be stored by selective magnetization of portions of the flat surface.

magnetic ink recognition. Property of automatic devices that can detect or read ink-containing particles of magnetic substance, i.e., the ink used for printing on some bank checks for magnetic ink character recognition (MICR).

magnetic media. Any of a wide variety of belts, cards, disks, or tapes (as contrasted with paper tape) coated or impregnated with magnetic material for use with the appropriate equipment and on which dictation or keystrokes can be recorded and stored.

magnetic recording head. A magnetic head that transforms electric variations into magnetic variations for storage on a magnetic medium such as tape or disk.

magnetic resonance imaging. Equipment used on an object placed in a spatially varying magnetic field that is subjected to pulses of radiation; the resulting nuclear magnetic resonance spectra are combined to give cross-sectional images.

magnetic tape. A serial-access magnetic storage medium. Typically, a flat ribbon of metal, plastic, or paper that is coated on one side with material that can be magnetized; information is stored on the tape by a combination of magnetized spots in certain patterns. (See also **magnetic media.**)

mailing/letter-handling/addressing equipment. Mailing systems and equipment that have been automated with components to increase capabilities and to streamline efficiencies.

mail order. A sales method by which a consumer may order products through a catalog.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

main distribution frame (MDF). A unit used in telephone wiring for terminating and cross-connecting telephone wiring to the telephone-switching system. The MDF is the primary (or first) distribution point. (See also **distribution frame.**)

mainframe computer. A general-purpose information system with price range of $350,000 and up. CPU bit width ranges from 32 to 64 bits. Physical environment can be either with or without special environmental controls and requires full-time support by professional computer systems support staff with 10 or more members. Number of concurrent users is 250 or more.

maintenance management. The upkeep of property, equipment, or tooling through planning, analysis, and documentation of maintenance functions.

management. An application that supports the management of data that can be achieved using document image management software and systems.

manufacturer. A producer or assembler of goods.

manufacturer's representative/agent. An independent contractor who represents multiple manufacturers. She or he does not take title to the product.

manufacturer's suggested retail price. See **list price.**

manufacturing automation. The use of a computer to aid and improve a manufacturing process.

manufacturing EATE N.E.C. Equipment that tests electronic systems that are composed of a number of subsystems. The testing equipment must verify operability and be capable of locating a faulty subsystem or component in event of failure.

manufacturing engineering tools. The small segment of manufacturing engineering that is concerned with tool and fixture design and the development of manufacturing processes.

manufacturing system. A system used to process raw material into a finished product.

mapping. Computer-aided tools that allow geographically related data to be captured, edited, analyzed, and managed. Typical users are civil and utility engineers, geophysicists, and geologists.

market. The demand for a product or service.

market share. A comparison of a company's performance with the total market so that its relative position and the amount of the market it captured is derived.

markup. 1: The amount added to the cost to determine the selling price for a specific product. 2: The amount added to the cost to determine the selling price for a specific product.

maskmaking e-beam. Semiconductor production equipment utilizing a method that allows submicron pattern generation for producing semiconductor mask plates or maskless lithography. (See also **lithography.**)

mask ROM. A semiconductor read-only memory programmed to the customer's specified pattern during the manufacturing process. (See **read-only memory.**)

mass merchandiser. A segment of the distribution channel with storefront locations. It differs from a dealer in that its primary business is the sale of a broad range of consumer goods.

mass property. The analysis of the physical characteristics of a part, assembly, or system. The evaluation of multiple properties—measures volume, weight, and surface area and locates center of gravity.

mass storage peripheral. A device that interfaces with the system or machine to external memory storage.

material. The designation of a number of basic metals, compounds, and gases to make up thermoelectric materials.

material-handling equipment and systems. Equipment such as 1: Movement—Automated guided vehicle systems, conveyors, and monorails;

© 1991 Dataquest Incorporated January—Reproduction Prohibited

cranes and lift trucks are included only when they are computer-controlled; material-handling robots are included in Robotics in Manufacturing. 2: Storage—Automated storage and retrieval systems; miniload, microload, and carousels. 3: Identification—Bar codes, radio frequency, machine vision, and other sensors used for identification are covered in Sensors in Manufacturing. 4: Controls—Computers, programmable controllers, and software used in material handling are included in Computers in Manufacturing and Software in Manufacturing.

material-handling/loading robot systems. Robotics used in the loading, moving, storage, and unloading of materials.

material requirement planning (MRP). A planning method that uses bills of material, inventory data, and a master production schedule to calculate material requirements. This method makes recommendations to restock materials inventory. Further, because material requirements planning is time-phased, this method makes recommendations to reschedule open orders when due dates and need dates are not in phase. Originally seen only as a better way to order inventory, material requirements planning is thought of today primarily as a scheduling technique, i.e., a method to establish and maintain valid due dates on orders.

matrix printer. An impact printer that uses wire, hammer-like bristles, or needles to create characters formed by small dots. Matrix printers produce either serial or line output. The serial printer employs a moving printhead with a matrix block (i.e., 5 x 7 or 7 x 9) of needles. The printhead sweeps across the page to print full characters one at a time. The line printer uses a horizontal band with raised dots that moves from left to right across the paper. The individual needles strike programmed character dots to form one row of dots per sweep across the page. Successive passes of the line printer form complete characters and complete rows of textual data. High-resolution text, comparable to daisywheel output, may be produced by overlapping matrix printers that print characters via a highly concentrated matrix or successive, staggered passes of the printhead. Fonts for matrix printers are stored in ROM or PROM memory.

MBE. See **molecular beam epitaxy deposition.**

MCAE. See **mechanical computer-aided engineering.**

MCU. See **microcontroller.**

MDF. See **main distribution frame.**

mechanical. Mechanical CAD/CAM is the software application of computer-aided tools to design, analyze, document, and manufacture discrete parts, components, and assemblies.

mechanical assembly equipment. 1: Machinery or equipment that assembles mechanical parts into subassemblies or final products. 2: Dial or rotary assembly machines; in-line transfer machines; flexible assembly equipment (except robots).

mechanical computer-aided engineering (MCAE). The application of CAD/CAM tools for mechanical design and analysis. MCAE applications range from conceptual product design through detailed product design and analysis to supporting production design. Commonly used MCAE products are solid modeling and finite element analysis technology.

mechanical computer-aided manufacturing. See **mechanical.**

media-to-media data conversion equipment. Computer output-to-microfilm recording units, tape print units, card-to-tape conversion units, as well as document entry devices.

medical. An environment or industry that uses computers to control and/or collect and analyze data from patients, medical equipment, and/or instruments.

memory. 1: A device into which data can be entered and stored for later retrieval. 2: An integrated current (IC) designed for the storage and retrieval of information in binary form; can be either bipolar or MOS technology and includes dynamic random-access memory (DRAM), static random-access memory (SRAM), read-only memory (ROM), programmable read-only memory (PROM), erasable programmable read-only memory (EPROM), and electrically erasable programmable read-only memory (EEPROM).

© 1991 Dataquest Incorporated January—Reproduction Prohibited

memory management unit (MMU). 1: An integrated circuit that manages the storage and retrieval of data found by cell location or address. 2: A component (or set of components) that implements the memory management function in a processor-based system.

merchant production. The sale of a good to a company other than the manufacturing company.

merger and acquisition. In financial terms, it means to absorb or acquire one company by another.

metalorganic CVD (MOCVD). A technique used to deposit material onto a wafer.

metal oxide silicon (MOS). 1: A circuit in which the active region is a metal oxide semiconductor sandwich. The oxide acts as the dielectric insulator between the metal and the semiconductor. 2: A process that results in a structure of metal over silicon oxide over silicon. 3: Technology that employs field effect transistors having a metal or conductive electrode that is insulated from the semiconductor material by an oxide layer of the substrate material.

meteorological instrument. An instrument used to monitor and observe the weather.

metropolitan statistical area. A large population nucleus, together with adjacent communities, that has a high degree of economic and social integration with that nucleus. Each metropolitan statistical area (MSA) must include at least: (a) one city with 50,000 or more inhabitants, or (b) a census bureau-defined urbanized area of at least 50,000 inhabitants and a total MSA population of at least 100,000 (75,000 in New England).

microcomponent. 1: An integrated circuit (IC) with high-speed, low-power density considered as a single part. 2: An IC that contains a processing unit or acts as an interface chip to such a device. Types of microdevices include microprocessor (MPU), microcontroller (MCU), microperipheral (MPR), and digital signal processor (DSP).

microcomputer. An information system with price ranging up to $100,000, with the majority priced at less than $50,000. CPU bit width is normally 32 bits, but can be as low as 8 bits. Traditionally used as a desk-side or desktop system configuration. Normally a multiuser system used in a common work area. Usually has a merchant (nonproprietary) microprocessor.

microcontroller (MCU). An integrated circuit, containing a CPU, memory, and I/O capability, that can perform the basic functions of a computer.

microperipheral (MPR). A support device or circuit for a microprocessor or microcontroller that either interfaces with external equipment or provides system support.

microprocessor (MPU). A single-chip component, or a collection of architecturally interdependent components, functioning as the central processing unit (CPU) in a system. A microprocessor may contain some input/output circuits, but it usually does not operate in a standalone environment.

microprogrammable digital signal processor (MPDSP). An integrated circuit that allows high-performance, modular DSP architectures to be designed using standard off-the-shelf components. Products include bit-slice and building block components.

microwave. 1: Any radio wave with a frequency higher than 890 MHz or a wavelength of between 1ml and 1m. 2: A form of electromagnetic radiation that has frequencies of 1 GHz. These high-frequency bands of energy are used extensively for radar and wideband communications.

microwave antenna. A device used for receiving and transmitting microwave signal beams. (See also **antenna.**)

microwave monolithic integrated circuit (MMIC). An electronic circuit employing monolithic integrated circuit technology fabricated by microelectronic techniques and capable of operating at frequencies above 1 GHz.

microwave oven. An oven that uses electron waves to produce heat for faster cooking of foods.

microwave radio equipment. Equipment that includes transmitter/receiver systems, power supplies, repeaters, and other equipment used in microwave radio systems. It also includes analog and digital equipment used both in common carrier and in private industrial systems.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

midrange. The combination of microcomputer, minicomputer, and superminicomputer.

military/aerospace electronic equipment. Electronic equipment used in the military and civilian aerospace industries.

military communication equipment. Voice, data, and cryptographic equipment used for communication in the military.

military computer system. A computer system used for military purposes; a set of hardware components that form a system intended solely for military applications. This category includes general-purpose CPUs, storage, input/output, and terminals and includes both commercial, ruggedized, and mil'spec versions for integration into military systems and for government-sponsored programs.

military electronic equipment. Electronic equipment used exclusively by the military. Usually, this equipment must meet government specifications and regulations.

military simulation and training. The performance of military maneuvers/exercises as training for real-life military situations. This category includes flight and battle simulators and equipment operation and maintenance systems.

milling programmable machine tool. A machine tool for the removal of metal by feeding a workpiece through the periphery to remove the material through the motion of workpiece and cutter.

minicomputer. An information system with prices ranging from $10,000 to $300,000 but mainly falling between $25,000 and $150,000. CPU bit width ranges from 8 to 16. Minicomputers are situated usually in a common work area and occupy more floor space than most tower configurations. Number of concurrent users ranges from 15 to 100. System usually incorporates proprietary processor, with notable exceptions, and is often packaged with third-party application software and/or peripherals and then resold into specialized applications or vertical markets. Examples of models are the HP 1000, HP 3000/70, PDP-11/84, and IBM Series/1.

minicomputer-based terminal. A display terminal provided by a minicomputer manufacturer or a display terminal that is protocol-specific to an IBM System/34, /36, or /38 computer. This terminal may operate in either character or block mode. Excluded from this category is any minicomputer-compatible terminal supplied by an independent manufacturer.

miscellaneous military equipment. Equipment that includes classified systems, test equipment (N.E.C.), vehicle control, medical equipment, assorted development and office equipment, and research and development equipment; all used in the military.

mixed signal ASIC. An ASIC that has one analog input or output and one digital input or output.

mixed signal IC. An integrated circuit that has one analog input or output and one digital input or output.

MMIC. See **microwave monolithic integrated circuit.**

MMU. See **memory management unit.**

mobile communications equipment. Equipment (base stations, mobile units, and antenna) used primarily for portable public or private communications.

mobile infrastructure. The central base station and other central equipment that provide mobile communication services.

mobile radio base station equipment. The base/centralized station equipment associated with cellular radio systems. This category includes both switching equipment and radio transmitter/receiver equipment.

mobile radio service. Service or network revenue associated with cellular radio systems. (See also **mobile service.**)

mobile radio system equipment. Electronic equipment used in the transmission and receiving of radio signals. Equipment includes main central control, base control mobile stations, and handheld car units. Used primarily with cellular and other mobile communication technologies.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

mobile service. Radio service between a fixed location and one or more mobile radio stations, or between mobile stations.

mobile telephone service (MTS). Radio communication between a mobile (portable) unit and the public switched network including cellular service.

modeling. An application that supports the representation of a process or system by using equations that simulate and represent behavior under varying conditions.

modem. 1: An electronic device that provides modulation and demodulation functions of transmitted data signals over telephone lines. They convert digital data signals to analog for transmission over leased lines or the analog public switched telephone network. 2: The integrated circuits used in a modem.

molecular beam epitaxy deposition (MBE). A technique used in semiconductor manufacturing to deposit a single crystal layer on a substrate by use of a molecular beam.

molecular engineering. See **computational chemistry/molecular engineering.**

money management. An application that identifies and controls the source, flow, location, and earning potential of an organization's cash and investments.

monitor. 1: To check the operation and performance of a system or circuit by examining parts of transmissions. 2: The physical CRT unit, associated electronics, and housing used in display systems. 3: A station or equipment arranged to supervise system operation. 4: To supervise and verify the correct operation of a system, device, or program. 5: The screen of a video display terminal. 6: An analog monitor can display an almost infinite number of colors, while a digital monitor can display a more limited range of colors.

monolithic analog integrated circuit. An analog IC constructed from a single piece of material. All circuit components are manufactured in or on top of a single crystal of semiconductor material.

MOS. See **metal oxide silicon.**

MOS application-specific IC. See **application-specific integrated circuit.**

MOS cell-based IC. See **cell-based integrated circuit.**

MOS custom IC. See **custom integrated circuit.**

MOS digital. A semiconductor technology in which the active devices are n-channel, p-channel, or complementary MOS transistors that operate in a digital or binary mode. (See also **digital.**)

MOS FPGA. See **field-programmable gate array.**

MOS gate array. See **gate array.**

MOS logic. See **logic circuit.**

MOS memory. See **memory.**

MOS microcomponent. See **microcomponent.**

MOS microcontroller. See **microcontroller.**

MOS microperipheral. See **microperipheral.**

MOS microprocessor. See **microprocessor.**

MOS nonvolatile memory. See **nonvolatile memory.**

MOS PLA. See **programmable logic array.**

MOS PLD. See **programmable logic device.**

MOS PMD. See **programmable multilevel logic device.**

MOS standard logic. See **standard logic.**

MOS transistor. A field-effect transistor (FET) with a gate that is insulated from the semiconductor substrate by a thin layer of silicon dioxide. Being field-effect transistors, MOS-FET provide a voltage-input-to-current-output relationship called transconductance. MOS-FET are excellent switches because voltage at the gate turns the output current on or off.

mouse. A hand-held device that is moved on a surface to provide coordinate input to a graphics system. It is used most often to position a pointer or cursor.

MPDSP. See **microprogrammable digital signal processing.**

© 1991 Dataquest Incorporated January—Reproduction Prohibited

MPR. See **microperipheral.**

MPU. See *microprocessor.*

MPU load programmer. A device that allows engineers and IC designers to program a variety of programmable devices (ICs), thereby speeding up the design process. The device to be programmed is loaded directly on the device programmer.

MTS. See **mobile telephone service.**

multilingual publishing. A system with the purpose/use of printing in a variety of languages.

multimedia. A process that uses more than one form of communication.

multiplexer equipment. Public telecommunication equipment used to combine a number of channels for transmission over a common medium, such as satellite, microwave radio, cable carrier, or fiber-optic cable. Excluded from this are data-only customer premises multiplex equipment and multiplex equipment that is integral to carrier or microwave radio systems.

multistrike ribbon. A ribbon that advances only part of a character width; characters slightly overlay one another on the ribbon, but no character hits the exact same spot on the ribbon.

multiuser system. A computer system inherently designed for environments with multiple users.

N

natural resources and construction. An environment or industry that includes establishments primarily engaged in agricultural production, forestry, commercial fishing, hunting and trapping, and related services; and mining or quarrying, developing mines, or exploring for nonmetallic minerals except fuel. Also, certain well and brine operations and primary preparation plants, such as those engaged in crushing, grinding, washing, or other methods of concentration.

navigation, military. A process for directing ships, aircraft, spacecraft, and other crafts to a specific destination. Equipment determines position, distance, and course of vessel or craft.

n-channel metal oxide semiconductor (NMOS). Pertaining to MOS devices made on p-type silicon substrates in which the active carriers are electrons that flow between n-type source and drain contacts. The opposite of PMOS. NMOS is two to three times faster than PMOS. (See also MOS.)

net additions. 1: The change in stock, such as installed base or inventory. 2: The relative increase or decrease in the total installed base of a product.

NETVIEW. IBM network management product.

network management. A software application that controls the logical connections and information flow among computers on a network. This software may have additional functions such as performance measurement and diagnostic and accounting functions.

network support services. All services that help customers better utilize their networking facilities. The services include site planning, installation, and ongoing on-site and remote maintenance support, as well as professional services such as network design/planning, integration, administration, and operations management.

network terminating devices. Equipment that connects a data network to the data terminal.

new placement demand. The total end-user demand for new products (as compared with replacement products).

newspaper publishing. A system with the main purpose/use of printing newspapers; typically daily or weekly publication containing such elements as news, feature articles, and advertising.

nitrogen. A chemical element.

NMOS. See **n-channel metal oxide semiconductor.**

non-IBM, protocol-specific terminal. A terminal that is protocol-specific to a Burroughs, Honeywell, or Sperry mainframe computer. Included is any terminal of this type that connects to another computer by means of protocol emulation.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

nonimpact printer. A hard-copy computer output device that forms images through electrostatic or other nonimpact methods. These printers include ink jet, laser, and thermal printers. (See also **ink jet printer.**)

nonvolatile memory. An integrated circuit using two-junction transistor technology where memory retains information when the power is off. Also known as core or permanent memory. Can be either bipolar or MOS technology process.

nonvolatile random-access memory (NVRAM). A read/write semiconductor memory device that does not lose information when the power is turned off.

notebook personal computer. The notebook personal computer is a system that resembles a laptop personal computer in general form factor and appearance. This personal computer is smaller and lighter in weight than a laptop D/C unit. The "standard" notebook size is 8.5 inches by 11 inches by 2 inches or less, and the weight of these units is in the 5- to 7-pound range. Notebook computers also, presently, make use of industry-storage mass storage media including 3.5-inch floppy disk.

nuclear radiation detection and monitoring instrument. An instrument used to detect, inspect, monitor, and control alpha particles (neutrons, protons, and electrons) that emanate from the atomic nucleus as a result of radioactivity and nuclear actions.

numerical control. 1: Computer instructions that automate machining and drafting tools. 2: A technique of simulating the operation of a machine tool. 3: Descriptive of systems in which digital computers are used for the control of operations, particularly of automatic machines. A technique of controlling a machine or process through the use of command instructions in coded numerical form.

numerical-control (NC) part programming. The programming of a numerical-control machine tool or automated processing system. Graphics and language-based programming tools are available.

NVRAM. See **nonvolatile random-access memory.**

O

OCR. See **optical character reader.**

OEM. See **original equipment manufacturer.**

office equipment. Equipment used in a business or office environment. Equipment may include copiers and duplicators, electronic calculators, dictating machines, electronic typewriters, word processors, banking systems, cash registers, and mail- and letter-handling equipment.

off-line robotics programming. A special-purpose process simulation that graphically represents the sequence of steps to program a robot for a particular operation. The resulting data can be downloaded to a robot to update its control program.

oil field services. A software application that uses small computers in the oil rigs or the wellhead areas to log and analyze data from sensors in the well.

OLTP. See **on-line transaction processing.**

one-time programmable read-only memory (OTP ROM). An EPROM packaged in plastic without a quartz window for erasure. Such a device is therefore programmable only once.

on-line transaction processing (OLTP). The input, tracking, and output of a well-defined record of information, processed in real time rather than batch. Examples include ATMs and airline reservations systems. OLTP systems are usually large and complicated enough that each one is customized, so there are few generic OLTP products. The RAMP-C and Debit-Credit benchmarks are examples of OLTP standards.

op amp. See **operational amplifier.**

open systems interconnection (OSI). A communication standard for network architecture that allows communication between various equipment.

operating environment. A set of conventions for screen appearance, keyboard, mouse and screen operations, and program functions. Operating environments function within an operating system.

operating system. 1: The software program in a computer that maps logical constructs to physical locations in the computer. The operating system is the program that lets a user access data by a file

© 1991 Dataquest Incorporated January—Reproduction Prohibited

name without knowing where the file is physically located on the disk. 2: The operating system controls the computer's operations by managing disk, screen, file maintenance, and printer activity, while loading and running application programs.

operating utilities. A program or routine of general usefulness and applicable to many jobs or purposes.

operational amplifier (op amp). A type of integrated circuit (IC) that generates an amplified output that is exactly proportional to its input.

operator support system. Special equipment and/or software that facilitates the operation of a switchboard or comparable equipment.

optical CD/wafer inspection. Critical dimension (CD) refers to the line, element, or feature that must be manufactured and controlled to stringent specifications. Wafer inspection refers to the inspection of a patterned wafer for process defects by visual image process techniques.

optical character reader (OCR). 1: A device or scanner that can read printed or typed characters and convert them into a digital signal for input into a data or word processor. 2: The machine identification of printed characters through the use of light-sensitive devices; computer-input-only hardware.

optical disk controller. A device that controls the storage and retrieval of data from a video disk that is sensed through a laser beam.

optical disk drive. A data storage device utilizing laser technology. Types include CD-ROM, WORM, and erasable optical disk drives.

optical jukebox. A library system that holds multiple disk drives and optical disks to create a large storage environment on optical media.

optical media. The substance on which data are stored electronically and read by laser technology.

optical-scanning equipment. See **optical character reader.**

opto. See **optoelectronic.**

optocoupler. 1: A device that transmits electrical signals, without electrical connection, between a light source and a receiver. Also called an optoisolator. 2: A device that consists of an LED separated from a photo detector by a transparent, insulating, dielectric layer, all mounted in an opaque package. A current pulse in the LED causes a radiation pulse to flow across the dielectric layers to a photo detector, which produces a current pulse at the output. The input and output circuits are coupled with high-standoff voltage isolation.

optoelectronic (opto). A semiconductor device in which photons cause electron flow or vice versa. Optoelectronic chips contain transducers used between photonic circuit media and electronic media; they also may contain amplifiers, logic functions, and/or other photonic or electronic functions.

order entry and sales support. An application to support the process of accepting and translating what a customer wants into terms used by the manufacturer. This can be as simple as creating shipping documents for a finished goods product line to a more complicated series of activities including engineering effort for make-to-order products.

order entry/processing. Acceptance and translation of customer requirements into terms used by a manufacturer.

organization operation. A software application that supports the day-to-day running of an organization.

original equipment manufacturer (OEM). 1: An OEM may manufacture a product for assembly into another system or larger configuration by another manufacturer or vendor. 2: A purchaser of materials, components, or equipment to be incorporated into its product line. 3: A product reseller that integrates hardware, software, and/or services. The reseller may or may not own the hardware or software. An OEM differs from a VAR in that it adds its own label to the product and backs up its warranties.

OSI. See **open systems interconnection.**

OS/2. Computer systems based on the Intel 80XXX architecture and using OS/2 operating system software.

other. A subject or segment that is not distinctly defined within the Dataquest High-Technology Segmentation scheme.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

OTP ROM. See **one-time programmable read-only memory.**

P

PABX. See **private automatic branch exchange.**

pacemaker. An electronically pulsed oscillator implanted in the body to deliver electric pulses to the heart at a fixed rate in response to a sensor that detects when a person's heart rate slows.

packet assembler/disassembler (PADS). A system element that buffers data sent to and from character-mode devices and assembles and disassembles the packets needed for X.25 operation.

packet data switching. Data network switches that connect terminals and packet assemblers/disassemblers to a pre-edit node using a high-speed link (56,000 bps). Can be public or private.

PADS. See **packet assembler/disassembler.**

page composition. Refers to the page composition software used to produce finished draft or camera-ready pages whereby text and graphics have been aesthetically laid out using an editable WYSIWYG display environment.

page, nonimpact, plain paper (PNPP). A printer with the ability to buffer, in part or in whole, a page of images received from an electronic source and then to transfer these images to a receiving substrate.

page printer. A printer that prints characters one at a time to full-page format. Page printers are rated by speed categories, expressed in pages per minute (ppm).

paging equipment. Communication equipment that produces an audio signal in a radio receiver carried by an individual to tell him that he is needed at the telephone. Communication system for summoning individuals or making public announcements.

paging system. The equipment necessary to selectively alert individuals by tone or voice paging, either by pocket radio receivers or speakers within a building.

painting robot system. A system consisting of a number of robots programmed to paint by carrying spray guns and applying a coating of material. Also known as finishing robot.

PAL. See **programmable array logic.**

panel-type instrument. 1: Switches, dials, and buttons that are mounted on an electronic unit that controls and monitors a system. 2: Electronic instrumentation devices mounted on a panel for a variety of equipment purposes.

paper. Sheets of fiber formed on a fine screen from a water suspension. There are hundreds of different types of paper based on weight, brightness, color, opacity, and coating.

particle accelerator. A device that accelerates electrically charged particles (protons, electrons) to high energies.

part process design. The design of the actual manufacturing process and sequence.

parts service. Spare hardware modules or components used in the repair and/or replacement of failed hardware units.

passive device. 1: An inert component that may control, but does not create or amplify, energy. 2: A device that exhibits no transistance. A component that does not provide rectification, amplification, or switching but reacts to voltage and current. 3: Pertaining to a general class of device that operates as signal power alone.

patient monitoring. Equipment used to monitor, control, and record data on activity concerning or affecting a patient's health.

pay phones. A telephone instrument located in a public location that accepts coins for operation.

payroll. A software application that supports an organization making payment to its employees for work performed.

PBX-private branch exchange. See **PBX telephone system.**

PBX telephone system. A telephone switching system on the customer premises that, by dialing an access code, permits a telephone to interface to the public telephone central exchange or office.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

PC. See **personal computer system.**

PCB layout. Products that are used to create the layout of the traces and components to be placed on a printed circuit board.

p-channel metal oxide semiconductor (PMOS). An MOS device made on an n-type silicon substrate in which the active carriers are holes (p) flowing between p-type source and drain controls.

PC logic chipset. A semiconductor device (or set of devices) that integrates standard logic and controller functions onto a very large scale integration (VLSI) chip, resulting in a reduced component count on the PC motherboard.

PCN. See **personal communications network.**

pen-based personal computer. This is a new classification of portable computers for 1991. The general identifier for this class of machines is that they utilize a pen or stylus for data input and do not normally require a keyboard to operate. (Keyboard options are included in some of these models, but the system can be fully utilized without the inclusion of a keyboard.) Pen-based computers do not have to be able to run MS-DOS or applications that run under DOS. It is expected that there will be three or more operating systems utilized in this product: PenPoint by GO Corporation, Pen Windows by Microsoft, and others that have not been made public at the time of publication.

percent retirement. See **retirement.**

periodical publishing. A system with the main purpose/use of printing publications issued at intervals.

peripheral device. 1: Any instrument, device, or machine that enables a computer to communicate with the outside world, or areas in the operation of the computer. 2: Equipment that is connected to a computer but is not part of the computer. Examples include printers, terminals, and disk drives.

peripheral I/O management. 1: A program that interacts with the central processing unit (CPU) of a computer to communicate with devices beyond the CPU. The program interprets and responds to instructions from the CPU. 2: Information flows between the CPU and a unit of peripheral equipment.

personal communications network (PCN). A class of communications technology that allows communication with a mobile entity. Sample technologies include mobile radio, cellular, and paging services.

personal computer operating system. A personal computer operating system is a program that supervises and controls the operation of a personal computer.

personal computer system. A personal computer intended for use on the user's desk or work surface and not designed to be readily moved from place to place. Personal computers are those systems that include, as part of the basic system, a BIOS- or ROM-based software code that is designed to permit the use of the system with any of the existing personal computer operating systems.

personal electronics. Electronic equipment for personal use.

personal finance. A software application that records, processes, and reports on personal financial data, including personal banking, credit card management, and budgeting. These applications are suitable for small businesses as well as home use.

personnel management. A software application that supports an organization in managing its employees; may include many subapplications.

photoblank. A blank glass plate that is processed to become a photomask for use in semiconductor manufacturing.

photomask. A glass plate covered with an array of patterns, used to form circuit patterns on semiconductor wafers. Photomasks may be made of emulsion, chrome, iron oxide, silicon, or a number of other materials.

photoreceptor. The photoreceptor is the central element in an electrophotographic copier or nonimpact printer. The photoreceptor consists of two parts; a support or substrate, usually in the form of a drum or flexible belt, and a photoconductive coating consisting of one or more layers.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

photoresist. The light-sensitive film spun onto semiconductor wafers and exposed using high-intensity light through a photomask.

photosensitive. Capable of emitting electrons when struck by light rays.

photosensitive plotter. A plotter that uses photosensitive properties to create an image.

photosensor. An optoelectronic semiconductor that responds to radiant energy. Examples are photodiodes and phototransistors.

physical property test, inspection, and measurement. An instrument designed to inspect and measure physical property.

physical vapor deposition (PVD). A process through which specific materials are physically layered on a wafer. Includes sputtering and evaporation.

pin diode. A diode made by diffusing the semiconductor with p-dopant from one side and n-dopant from the opposite side with the process so controlled that a thin or intrinsic region separates the n and p regions. (See also **power diode.**)

PLA. See **programmable logic array.**

placement. End-user consumption of a product that is either purchased, leased, or rented.

planning. An application that facilitates the quantitative aspects of business planning, such as modeling, budgeting, analysis, and forecasting.

plasma etchant. A highly ionized gas (plasma) in the manufacture of high-density semiconductors.

plastic-processing machinery. Numerically controlled machinery used for injection, structural foam, extrusion, blow molding, thermoforming, and reaction injection.

plastics. 1: A polymetric material of large molecular height that can be shaped by flow; usually refers to the final product. Examples include polyvinyl chloride, polyethylene, and urea formaldehyde. 2: Displaying or associated with plasticity.

PLC. See **programmable logic controller.**

PLD. See **programmable logic device.**

plotter. 1: A recorder that charts, in graph form, a dependent variable as a function of one or more variables with an automatically controlled pen or pencil. 2: Any (vector or raster) computer hardcopy devices that perform mainly graphics functions. These devices include pen plotters, electrostatic plotters, photographic and laser plotters, and ink jet plotters.

PMD. See **programmable multilevel logic device.**

PMOS. See **p-channel metal oxide semiconductor.**

PMR. See **private mobile radio.**

PMR. See **projection microradiography.**

PNPP. See **page, nonimpact, plain paper.**

point-of-sale terminal. A terminal device that operates as a cash register in addition to transmitting information.

polysilicon. A silicon layer grown on a wafer in a furnace.

population. The total of individuals occupying an area or making up a whole. A *de facto* population should include all persons physically present in a country (state, province, region, city, or town) or designated area at a reference date. A *de jure* population, by contrast, should include all usual residents of a given country or designated area, whether or not they are physically present at the reference date. By definition, therefore, a *de facto* total and a *de jure* total are not entirely comparable.

portable electronic measuring instrument. An electronic measuring instrument that can be carried or transported with ease.

portable radio receiver transmitter. A device for converting radio waves into perceptible signals.

portfolio management. A software application that allows investors to clarify, estimate, and control the sources of risk and return in their portfolio.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

postsecondary education. The provision of formal instructional programs with a curriculum designed primarily for students who have completed the requirements for a high school diploma or equivalent.

potentiometer. A device for the measurement of an electromotive force by comparison with a known potential difference.

power diode rectifier. A diode is a two-terminal device that permits current flow in only one direction. This property is used in diodes and rectifiers to convert AC current to DC.

power grid control. See **power management.**

power IC. An analog integrated circuit that can control one or more amps of current, dissipate one or more watts of power, or is capable of operating with voltages exceeding 100 volts.

power management. A real-time application that monitors and controls power generation equipment and power line grids.

power supply. 1: A unit that supplies electrical power to another unit. 2: Energy source that provides power for operating electronic apparatus.

power train. The mechanism by which power is transmitted from the engine to other part of the vehicle that it drives. Examples include ignition, spark timing, fuel control, turbo control, emissions systems, voltage regulator, alternator, engine control, and diagnostics.

power transistor. 1: A transistor that dissipates power of one or more watts. 2: A transistor designed for high-current, high-voltage applications.

premises switching equipment. Voice equipment that provides switching or call-routing functions. Includes equipment such as PBX telephone system and key telephone system.

presentation graphics. 1: A software application with a principal function of formatting text or numeric data into specified formats for the presentation of ideas. This may include graphs, charts, and/or lists suitable for professional presentations. 2: An image written, printed, drawn, or engraved; an image outlined or set forth for commercial, professional, or industrial purposes.

print element. The mechanisms used in fully formed character printers and typewriters by which marks are made on the paper. The three types of print elements are printwheels, also known as daisywheels, golf balls, and thimbles.

printer. The unit that produces copy on paper—a typewriter or a line printer. Often connected to a CPU that transforms electronic data into hard-copy form. (See also **ink jet printer** and **line printer.**)

printer controller. 1: Within a printer, the device used to regulate, accelerate, decelerate, start, stop, reverse, or protect devices connected to an electric controller. 2: A device or instrument that holds a process or cartridge at a desired level. 3: Hardware and/or software, usually either printed circuit board- or diskette-based, that takes data streams from software and converts it to printer-specific commands. The controller may reside in a CPU; may be connected to the print engine by an interface cable, a diskette or chip set in the CPU or printer; or, as in most cases, may be a physical attachment to or integrated component of the printer itself.

printer controller board. See **printer controller.** (Except all devices are loaded onto a board.)

printer, impact. Family of printers that use direct impression impact of a typebar, type head, or matrix pin to exert pressure against a paper ribbon and a platen to create a character.

printer, nonimpact. A printer capable of imaging on a substrate without physically striking it; these include ink jet, laser, and thermal printers.

print system network. Hardware and software that is integrated to manage the information sent to one or a number of printers, usually shared by more than one user. The system may be as simple as a switch box connected to two CPUs and one printer, or as complex as a full local area network that controls print streams to many printers from multiple CPU systems and controls job-queuing management, printing error conditions, spooling, and rerouting.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

printwheel. A print element for certain character printers. The characters are engraved at the end of spokes, the entire printwheel resembling a daisy. Also known as daisywheel.

private automatic branch exchange (PABX). One type of telephone switching system that is typically used in larger businesses. The PABX allows computer-like programming of incoming and outgoing calls to optimize network configurations and provide additional call management features.

private line. A telecommunications network connection for the exclusive use of one organization. (See also **leased circuit.**)

private mobile radio (PMR). See **cellular service.**

private packet data switching. A private packet data network switch connects terminals and packet assemblers/disassemblers to a packet node using a high-speed link (56,000 bps). (See also **packet data switching.**)

private school or institution. A school or institution that is controlled by an individual or agency other than a state, a subdivision of a state, or the federal government; usually supported primarily by funds other than public funds; and is operated by other than publicly elected or appointed officials.

process control, nonunified system. System-type instruments and related equipment for process control activated from standardized electrical transmission signals, in which control and signal conditioning are separated from the display and operator interface.

process control system. 1: Monitoring and maintaining the operation of plants that manufacture homogeneous materials such as oil, chemicals, and paper. Process control systems are capable of detecting errors in input variables and environment and taking corrective action. Closed-loop systems are self-correcting, and open-loop systems alert an operator. 2: A computer-based system that controls physical transformation and/or the mixing of products in a fluid state.

process control system, auxiliary station. Peripheral equipment of a process control system not in direct communication with the central processing unit or system.

process control system, controller. The controller describes that portion of a process control system that continuously measures the value of a variable quantity or condition and then automatically acts on the controlled equipment to correct any deviation from a desired present value.

process control system, indicator. A portion of the process control system that produces a diagram measuring the pressure volume changes in a running system.

process control system, industrial process computer. A computer that monitors the manipulations and changes of numerous conditions within a process control system automatically.

process control system, recorder. A portion of a process control system that makes a graphic or acoustic record of one or more variable quantities.

processing terminal. A display terminal that has local processing capability but is dependent on communication with a host, controller, or server to provide files and application programs. Such a terminal does not have a mass data storage device.

process manufacturing. 1: *Continuous process* produces a continuous stream of products, the units of which are not differentiated from one another (i.e., gasoline). 2: *Batch processing* produces product by reference to a recipe (i.e., bread).

processor. A device for handling information in a sequence of reasonable operations. Any device that can perform operations on data.

process planning and control. See **process control system.**

process simulation. The computerized simulation of the sequence and interdependencies of manufacturing processes. Also involves process modeling and includes NC part programming as a subset.

product. A good or service.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

product category. A grouping of similar products.

production. The manufacture of goods.

production planning and control. Software used to plan for factory resources of a manufacturing company.

professional publishing. Systems dedicated exclusively to the job of publishing; typically, PC-based professional publishing systems focus on a single task or stage in the document production cycle, rather than managing the entire document production process.

professional services. A range of services including consulting on information technology, contract/custom programming, systems integration, facilities management, education, and ongoing maintenance.

programmable array logic (PAL). PAL is a trademark of Monolithic Memories, Inc. (now part of Advanced Micro Devices), referring to a family of logic devices that are customer programmable.

programmable logic array (PLA). 1: A form of programmable logic device containing a structured, partially interconnected set of gates and inverters that are fuse programmed by the user. Can be manufactured in bipolar or MOS technology.

programmable logic controller (PLC). A device or transmission control unit in which hardwired functions have been replaced with software or microcode. A programmable controller enables a user to add, change, or tailor computer capacities to the user's needs; programmable solid-state devices that replace mechanical relays for controlling sequential operations, timing, counting, and similar simple control actions. Where the capabilities exist as a function of the PLC, this definition includes more sophisticated tasks such as mathematical computations, data acquisitions, reporting, and process equipment control.

programmable logic device (PLD). A type of application-specific integrated circuit (ASIC) that is user programmable (after assembly) rather than mask programmable. The function of a PLD is determined by blowing fuse links or programming memory devices to create the desired interconnections between the fixed logic elements on the device. Can be either a bipolar or MOS technology. (See also **programmable logic array.**)

programmable machine tool. Numerical control (NC), computer numerical control (CNC), direct numerical control (DNC), and flexible machining centers used for metal cutting and metal forming.

programmable multilevel logic device (PMD). A semiconductor that can be manufactured by a bipolar or MOS technology process. The device, evolved from the basic programmable logic array (PLA), incorporates architectures to implement complex logic functions efficiently. PMDs can implement multiple levels of logic without sacrificing input/output or I/O cells or pins.

programmable read-only memory (PROM). A nonvolatile fuse-programmable solid-state memory circuit that is programmable only once, with special equipment. It is a programmed ROM that may be programmed after manufacture by blowing fuse links or shorting base-emitter junctions. PROMs provide high-speed access to frequently needed data and instructions. They allow a vendor company to customize a system before delivery to the user.

projection/aligner. Wafer fabrication lithography equipment that uses mirrors instead of lenses. The wafer and mask are separated by distance, not allowing the entire wafer to be exposed. This process lines up two or more layers of a wafer so that the components of one layer are compatible with the components of the other layer. (See also **lithography.**)

projection microradiography (PMR). An electron beam is focused onto an extremely fine pencil, generating a point source of x-rays; enlargement is achieved by placing the sample very near this source and several centimeters from the recording material.

project management. A software application that supports the ordering of activities across time. This application assists in planning and implementing projects by providing tools for forecasting requirements, projecting costs, and providing other charting and analysis features.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

PROM. See **programmable read-only memory.**

prosthetic medical equipment. Equipment used in the surgical and dental specialties concerned with the artificial replacement of missing body parts.

protocol. A set of rules (not a program) for software programs to conform with in data communications. A program that reacts properly to data sent to it in a form that does not conflict with these rules and that sends data in conformance with these rules is said to support, or be in compliance with, the particular protocol. An example of a protocol is the one used by humans over two-way radio: the protocol is that one person finishes speaking by saying "over"; the other party then speaks, until finished and says "over"; the end of transmission is signalled by saying "over and out." Examples of protocols in data communications are BSC (IBM) and T201 (Tymnet).

protocol converter. Equipment that converts data from one format (protocol) to another. (See also **gateway.**)

proximity/contact aligner. Equipment that places a mask in direct contact with the wafer after the mask is aligned. With proximity, the mask does not come into direct contact with the wafer. (See also **lithography.**)

PTT. Postal, telegraph, and telephone organization. An organization that provides basic telecommunications services. For U.S., see regional bell operating companies.

public data network service. A packet-switched or circuit-switched network service available for public use. It includes the equipment and service charges associated with data communications networks that are offered to the general public. These networks connect user terminals and computers to the network and may offer enhanced or value-added services, such as conversion of speeds, codes, protocols, electronic mail, or facsimile.

public packet data switching. See **packet data switching.**

public school or institution. A school or institution controlled and operated by publicly elected or appointed officials and deriving its primary support from public funds.

public switching equipment. Equipment used in public telecommunications to switch or route voice and data calls. This segment includes equipment such as digital central office switching equipment and digital access cross-connect systems.

public telecommunications equipment. Equipment that includes public network services and equipment. It includes the various voice and data communications services provided by common carriers and the transmission and switching equipment used to implement these networks.

public telecommunications service. A service provided by public telecommunications carriers. It includes services such as local telephone, long distance telephone, international telephone, leased circuit, public data network, enhanced network, and mobile communications.

public transmission equipment. The equipment used in public telecommunications to transmit voice and data signals. It includes equipment such as multiplex equipment, carrier equipment, microwave radio equipment, and satellite earth state equipment.

publishing. 1: The business or profession of the commercial production and issuance of literature and information. 2: Computer-aided systems to automate the creation and printing of documents.

punch/shear/bend programmable machine tool. Describes the action that occurs to a composite or material, generally metal, on a machine. Punching literally punches a hole in the material, shearing cuts the material, and bending forms the material to a specified predetermined shape. These three activities are performed on three separate machines.

purchasing. A software application that has computer-assisted generation or procurement documents specifying materials, quantities, and delivery times.

purchasing and vendor management. Contains statements as to the quantity, description, and price of the goods; agreed terms as to payments, discounts, date of performance, and transportation.

PVD. See **physical vapor deposition.**

PW--private wire leased circuits. See **private line.**

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Q

QC. See quality control.

QC analysis. Quality control analysis is generally performed throughout the manufacturing process, comparing the actual part shape or feature size to the design specification.

quality. The measure of how well a product or service meets customer expectations. Alternately, the ability to produce consistently a product or service within control limits or well-defined specifications.

quality assurance. The establishment and execution of procedures to measure product quality and adherence to acceptance criteria.

quality control. Process by which product is measured to ensure conformance to specification and standards.

query language. A generalized computer language that is used to interrogate a database.

R

R&D. See research and development.

radar. A radio device used to locate objects by frequency waves reflected off the object and received by the sender, allowing the sender to determine characteristics of an object. Includes airborne, shipboard, and ground search, flight control acquisition, detection, tracking, and associated test systems.

radio. 1: The use of electronic waves/signals to produce sound. 2: Home radio receivers including AM, AM-FM, and FM radios that are classified as table models, clock models, and portable radios. This category does not include high-fidelity receivers, radio-phonograph combinations, and television receivers, nor does it include automobile radios, stereos, or tape players.

railroad control. An application that monitors and controls railroad and urban rapid transit traffic.

RAM. See random-access memory.

random-access memory (RAM). An integrated circuit permitting read-and-write access to any memory cell or address in a completely random sequence. Can be of either bipolar or MOS technology process. A memory device with the qualities of allowing arbitrary reading or writing of a desired data location. The system accesses the addressed material without reading through intervening data. Information may be retrieved more speedily from RAM than from serial media, such as tape. Also called read-and-write and scratch-pad memory.

rapid thermal processing (RTP). Process that uses machines of low temperature for contact alloying and systems for the deposition of thin gate oxides. Similar to the diffusion furnace.

RBOC. See regional bell operating company.

reactant gas. Molecules that act upon one another to produce a new set of molecules.

read-only memory (ROM). 1: Computer memory that can be read from but not written to. Permanent memory on chips wherein information can be retrieved but not stored. Memory is not lost when the power to the computer system is turned off. 2: A memory device the contents of which can be read but not altered. (See also **mask ROM.**)

real estate. An environment or industry that includes owners, lessors, lessees, buyers, sellers, agents, and developers of real estate.

real-time clock. A clock that indicates actual time, such as elapsed time, as opposed to a fictitious time established by a program.

real-time data acquisition and control. 1: The process by which events in the real world are translated to machine-readable signals. 2: Automated systems in which sensors of one type or another are attached to machinery. 3: Data processing is performed so that the results are available in time to influence the controlled or monitored system.

reconnaissance. Equipment used to secure data/information about activity and resources concerning an enemy or potential enemy's territory.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

reduced-instruction-set computing microprocessor (RISC MPU). The number of instructions a microprocessor runs for a specific application are reduced from a general-purpose complex-instruction-set computing (CISC) microprocessor to create a more efficient computing engine.

reel-to-reel tape drive. A tape format in which the running tape is wound onto a separate take-up reel. Also known as open reel.

regional bell operating company (RBOC). Seven holding companies formed by the divestiture of AT&T to provide regulated and nonregulated telecommunications services in the United States.

relational database management system. A software application for the storage, retrieval, update, and analysis of multiple databases. These databases are linked (related) through one or more identical fields, called keys.

relay. 1: An electronic or electromechanical device for transferring a signal from one electrical circuit to another. 2: To forward a message through an intermediate station. (See also **passive device.**)

remote batch. A method of entering jobs into the computer from a remote terminal.

remote control. Any system of control performed from a distance. The control signal may be conveyed by intervening wires, sounds, light, or radio signals.

remote processing. A procedure in which the operating system can be used to process messages received from remote locations via telephone lines and telephone equipment. In effect, it is an extension of the data processing and programming facilities of the computer to remote locations.

remote sensing. The acquisition of information (usually in the form of an image) about an object or area by recording electromagnetic radiation emanating from or reflected from the target. The electromagnetic energy is received and processed by a detector system that is not in physical contact with the target under study. Common platforms for detector systems are aircraft and satellites, but the definition is not restricted to these two.

removable media disk drive. Removable media rigid disk drive has the platter enclosed in a housing that is designed to be user-accessible.

replacement demand. The subsequent demand by end users for new equipment.

research and development (R&D). Basic and applied research directed toward the discovery, invention, design, or development of new products and processes.

research supercomputer. An information system defined by a minimum of 32 low-performance computing nodes. Optimized to run highly parallel applications. Price ranges between $300,000 and $2 million.

residual value. The value of a product at the end of its useful life. Typically used with depreciation and leasing calculations.

resistor. A passive device that measurably opposes the passage of an electric current (e.g., doped silicon). (See also **passive device.**)

respiratory analysis. Equipment used to examine, detect, and analyze the respiratory system.

retail trade. An environment or industry that includes establishments engaged in selling merchandise for personal or household consumption and rendering services incidental to the sale of the goods. In general, retail establishments are classified by kind of business according to the principal lines of commodities sold.

retirement. The number of products that are removed from use. A product is considered retired from the installed base if it is scrapped, returned to the manufacturer, or placed in storage.

return. The number of units previously sold outright that have been returned or retired by the customer. (See also **retirement.**)

revenue. The amount of money that a company receives from its customers for goods and services.

rewritable optical disk drive. An optical disk drive that uses removable media that can be erased and reused many times (also called erasable optical disk drive).

ribbon. A strip of inked material or fabric, which when struck with a print element forms a character on paper. (See also **single-strike ribbon, web ribbon, film ribbon, multistrike ribbon.**)

© 1991 Dataquest Incorporated January—Reproduction Prohibited

rigid disk. See **rigid disk computer storage media.**

rigid disk computer storage media. A rigid disk has a nonflexible substrate and can be made of aluminum, plastic, glass, or other rigid material.

RISC MPU. See **reduced-instruction-set computing microprocessor.**

robot. A reprogrammable multifunctional manipulator designed to move objects through variable motions for the performance of a variety of tasks. Intelligent robots commonly rely on vision systems to control their behavior through their ability to recognize objects.

robotic electronic assembly. Electronic manipulative machines that can perform functions ordinarily ascribed to humans in the assembly of material.

robotic nonelectric assembly. Same as robotic electronic assembly except that robots are mechanically maneuvered rather than through the methods and principles of electronics.

robot programming and simulation. The use of computer-controlled manipulators or arms to automate a variety of manufacturing processes such as welding, material handling, painting, and assembly.

robot system. Programmable manipulative machines that can perform functions ordinarily ascribed to humans. Included are robotic mechanisms, control hardware and software, and all associated peripheral equipment. These peripherals include end effectors and grippers that are used for the processing of parts, tools, and assemblies within the factory.

ROM. See **read-only memory.**

routing. An application that supports route planning. It is used to schedule the sequence of stops a transport vehicle makes.

RTP. See **rapid thermal processing.**

S

safety and convenience. Equipment related to the automobile and truck industry including devices that prevent loss, hurt, or injury, or that lend ease and comfort to passengers. Examples include: climate control, light reminder, keyless entry, heated windshield, sensing wipers, automatic door lock, automatic headlights, dimming, rear window defogger, antiskid braking, window control, and airbags/restraint control.

satellite. 1: A specialized radio transmitter/receiver placed in orbit around the earth to provide transmission channels for information to be transmitted over great distances. 2: A celestial body orbiting another of larger size.

satellite communication equipment. Equipment used for communication by use of an active or passive satellite to extend the range of a radio, or other transmitter, by returning signals to earth from an orbiting satellite.

satellite earth station equipment. The total earth-based equipment used in connection with orbiting, geostationary satellites. This category includes the Very Small Aperture Terminals (VSAT), as well as the antennae and electronic transmitting/receiving terminals.

scanner. Input devices used for the optical sensing of images and text and/or graphics for conversion to dot patterns for incorporation into a document. This category includes both ICR and OCR scanners with a resolution of less than 400 dpi.

scheduling. An application that supports the scheduling of events.

schematic. This is a detailed diagram. In a mechanical application, schematics are used to describe hydraulic and pneumatic systems. A set of symbols are available for both applications representing standard components.

scholarships and fellowships. College expenditures applying only to money given in the form of outright grants and trainee stipends to individuals enrolled in formal coursework, either for credit or not. Aid to students in the form of tuition or fee remissions is included. College work-study funds are excluded from this category and are reported under the program in which the student is working.

Schottky TTL (STTL). A form of transistor-transistor logic using Schottky diodes as transistor clamps to increase the speed of circuit operation. A high-speed form of bipolar logic.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

scientific application. A diverse group of software applications covering varied subject matter and research on the natural sciences when these are concerned with the physical world and its phenomena. Applications are divided into two subcategories: general analysis and scientific research. General analysis is the use of computers to solve various technical problems and to further research on subjects; this use is generally mathematical in nature. Scientific research applications are used specifically in the following fields: thermonuclear chemistry, nuclear physics, general physics, mechanical sciences, electronics research, geophysics, fluid dynamics, thermodynamics, materials research, and genetic engineering.

scientific research. A software application that pertains to research and development, not to applied science.

scientific visualization. An image computer is used for scientific modeling, technical data analysis, medical imaging, or similar large-volume data analysis.

security. 1: The existence and enforcement of techniques that restrict access to data and the conditions under which data can be obtained. 2: A measure taken by a command to protect a system from espionage, observation, sabotage, annoyance, or surprise. 3: Protection of a system by use of commands and codes.

security/energy management. Safety and power management within industrial equipment and manufacturing.

seismic analysis. 1: Seismic analysis helps support exploration activities by indicating favorable conditions for finding oil or coal reservoirs. 2: Analysis relating to an earth vibration caused by earthquakes, or other natural phenomena.

semiconductor. 1: A group of materials that are electrical nonconductors in a pure state that can be altered by the selective introduction of impurities into its crystalline structure. Its resistivity can sometimes be changed by light, an electric field, or a magnetic field. 2: An electronic device made using semiconductor material.

semiconductor tester. Equipment designed to test, check, and monitor the functionality of electronic circuit packages of varying complexity and functionality.

serial, impact, dot matrix (SIDM). A printer that creates a character image by selectively placing individual dots on the substrate using mechanical force.

serial, impact, fully formed (SIFF). A printer that prints one character at a time using type elements to create fully formed character impressions.

serial input/output (SIO). 1: A device that permits data to be transmitted into and out of a computer over a single conductor one bit at a time. 2: Pertaining to time sequential transmission of, storage of, or logical operations on parts of data words. 3: A technique for handling binary data words (which have more than one bit). 4: A device or technique where data are transferred to or from an I/O port in a serial or in-line manner.

serial, nonimpact, direct thermal (SNDT). A printer that creates the desired image a dot at a time using point-specific heat and a heat-sensitive substrate that changes color when exposed to heat.

serial, nonimpact, ink jet (SNIJ). A printer that creates the desired image a character at a time by emitting ink from an array of orifices or nozzles.

serial nonimpact, thermal transfer (SNTT). A printer that creates the desired image a dot at a time using point-specific heat to transfer ink from a ribbon to a receiving substrate.

server. A processor that provides a specific service to a network, such as connecting nodes of different networks.

services. Intangible items of trade, such as education, transportation, banking, and legal and medical care.

SFDSP. See special-function DSP products.

sheet feeder. A sheet feeder is mounted on top of a printer and automatically inserts cut sheets into the printer and receives the ejected paper in a hopper. Sheet feeders may be single or dual tray

© 1991 Dataquest Incorporated January—Reproduction Prohibited

for the feeding of letterhead and second sheets, or they may incorporate an envelope-feed tray for the printing of letters and envelopes simultaneously.

shipment. The number of products delivered.

shop floor and cell control. A system for utilizing data from the shop floor as well as data-processing files to maintain and communicate status information on shop orders and work centers. Provides actual output data for capacity control purposes.

shop floor planning and control. See **shop floor and cell control.**

SIDM. See **serial, impact, dot matrix.**

SIFF. See **serial, impact, fully formed.**

silicon epitaxy deposition. A process through which vaporized silicon is deposited on a wafer. (See also **deposition.**)

silicon precursor gas. A specialty gas used in semiconductor manufacturing. Gases such as silane, dichlorosilane, trichlorosilane, and silicon tetrachloride are used in epitaxial and chemical vapor deposition (CVD) processes to deposit layers of silicon or silicon components onto silicon substrates.

silicon wafer. A nonmetallic element that is the most widely used semiconductor material today. Silicon is used in its crystalline form as the substrate of semiconductor devices.

simulation. An application or system that uses representative or artificial data to reproduce various conditions in a model that are likely to occur in the actual performance of a system. Simulation frequently is used to test the behavior of a system under different operating policies.

simulation and training equipment. Equipment used to augment the acting out of real-life maneuvers/exercises as training in preparation for real-life situations. Equipment includes aircraft, flight and situation simulators, equipment operation, and maintenance systems.

single-strike ribbon. A film ribbon. Each time a character strikes the ribbon, the ribbon advances far enough so that the next character has a completely new ribbon area to strike. The ink formulation is such that the ink on the ribbon is depleted from the area where the print element strikes the ribbon. These ribbons produce the highest print quality, but ribbon life is low compared with that of fabric and multistrike ribbons.

single-user enhanced system. See **workstation computer.**

SIO. See **serial input/output.**

slow SRAM. A random-access memory (RAM) integrated circuit (IC) that runs at speeds greater than 70 nanoseconds. (See also **static random-access memory.**)

small-format pen plotter. A computer plotter that uses engineering-size A (8.5 x 11 inches) or B (11 x 17 inches), architectural-size 1 (9 x 12 inches) or 2 (12 x 18 inches), or metric-size A4 (21 x 29.7 centimeters) or A3 (29.7 x 42 centimeters) media. (See also **plotter.**)

small-signal diode. A diode with a forward current of less than 100 milliamperes (0.1 amperes). The sides of the silicon chip are metallized and encapsulated in a tubular glass package.

small-signal transistor. A transistor that dissipates power of less than 1 watt.

smart card. A credit card or credit-card-size device that contains one or more integrated circuits. These devices usually are carried by an individual. Common applications include financial transactions, record keeping, and user identification.

smart interactive terminal. See **intelligent terminal.**

smart power. An integrated circuit (IC) that contains both control logic circuits and power control elements.

smoke alarm. A detector that is activated automatically when exposed to smoke.

SNA. See **system network architecture.**

SNDT. See **serial, nonimpact, direct thermal.**

© 1991 Dataquest Incorporated January—Reproduction Prohibited

SNIJ. See **serial, nonimpact, ink jet.**

SNTT. See **serial, nonimpact, thermal transfer.**

socket. An opening that supports and electrically connects to vacuum tubes, bulbs, or other devices or components when they are inserted into it.

software. 1: Any set of explicit procedures constituting a computer program. 2: Programs, procedures, rules, and any associated documentation pertaining to computer operations.

software support service. Activities that assist the end user in use and implementation of software products. Software support includes bug fixing, updates, and documentation, as well as support of ongoing operating problems including product-specific consulting, programming services, and training.

solar cell. A pn junction device that converts the radiant energy of sunlight directly and efficiently into electrical energy.

solid modeling. An application that represents the external and internal part geometries, allowing the solid nature of an object to be represented in a computer. Solid models are constructed in two ways: using primitive building blocks (constructive solid geometry) and/or using boundary definitions (boundary representation).

solid state. Pertaining to circuits and components using semiconductors. (See also **semiconductor.**)

solid-state subsystem. Computer memory products that comprise a block of semiconductor memory, a controller/formatter for it, a power source or access to power, a host bus interface, hardware, and software. These include modules external to the computer and kits for installation inside computers.

sonar. A device used to detect submerged objects by sonar waves reflected off the object. Also can be used to measure depth or distance. Includes search, detection, tracking, guidance, navigation, communication, sonabuoys, and associated test systems.

SONET. See **synchronous optical network.**

space military equipment. Military equipment used beyond the earth's atmosphere. Includes satellites with accompanying communication and reconnaissance equipment, various other space platforms, launch vehicles, and ground control.

special automotive IC. An analog IC designed for a specific automotive application.

special consumer IC. An analog IC designed for use solely in consumer home entertainment and appliance products.

special-function analog IC. An analog integrated circuit function used in specialized applications. Examples are sensors, timers, and oscillators. These devices differ from application-specific standard products (ASSPs) in being functional blocks rather than complex configurations of functions for specific applications.

special-function DSP products (SFDSP). Products built using DSP techniques and architectures but designed for specific functions. Examples include: modems, codecs, speech processors, digital television circuits, digital filters, and fast Fourier transform (FFT) chips. Generally, these devices cannot be programmed by users to perform operations other than their defined function.

special-function IC. A linear IC that does not fall into the standard product categories. This product has a specific function such as timer, oscillator, signal generator, or sensor but is not limited to a single application or market.

special-purpose computer system. A computer system designed for a specific purpose. For example: a banking computer system, word processor, or cash register.

specialty gas. A gas used in manufacturing semiconductors that is supplied in gas cylinders rather than in bulk because smaller volumes are used.

splice. A joint used to connect two lengths of conductor with good mechanical strength and good conductivity. (See also **passive device.**)

spot-welding robot system. A robot carries a resistance welding gun to produce welds.

spreadsheet. An application with the principal function of organizing data into columns and rows to allow the user to perform numerical analysis.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

SRAM. See **static random-access memory.**

standard cell. An integrated circuit designed to a customer's specifications using precharacterized cells as building blocks.

standard logic. Off-the-shelf integrated circuits belonging to "families." Bipolar digital families include AS, FAST, LS, and ALS. MOS digital families include HC, HCT, and FACT. Standard logic is available from a number of suppliers and may be used in many different applications. Sometimes referred to as glue logic. Normally has less than 150 logic gates.

start-stop tape drive. A tape drive that starts and stops on reading or writing a data record.

state government. One of the constituent units of a nation having a federal government.

static random-access memory (SRAM). A RAM that maintains memory as long as power is applied and does not require refreshing. SRAM densities can range from 1K, with approximately 1,000 bits, to 4Mb, with approximately 4 million bits.

statistical multiplexer. An electronic device that consolidates several data streams onto a single high-speed bit stream for transmission over a telephone line.

stepper. A semiconductor manufacturing device that uses a step-and-repeat process to transform the pattern image of a reticle or mask onto the surface of the semiconductor wafer.

stereo headphone. A device worn on the head that permits the transmission of sound through two earphones connected by a band.

stereo (hi-fi) component. Equipment that produces high-fidelity reproduction of sound.

storage controller board. 1: A board containing input data or parameters for an application of a general routine. 2: Those parts mounted on a board that carry out the instructions in proper sequence, interpret each instruction, and apply the proper signal.

storage management. Functions that manage the storage of information in which information can later be retrieved. Includes storage protection, storage temperature, storage print, and storage allocation.

storage subsystem. Computer memory product that comprises a storage device(s), a controller/formatter for it, a power source or access to power, a host bus interface, hardware, and software. These include modules external to the computer and kits for installation inside computers.

streamer tape drive. A tape drive that uses a continuously moving tape; one that does not start and stop on each data record.

streaming tape drive. Tape drives (1/4-inch and 1/2-inch width) where the data stream over the head without stopping (continuous flow).

structural. The dynamics of the physical system; usually refers to the static stability/integrity of a part, assembly, or system.

structural modeling/analysis. A software application for modeling and analysis of the integrity of a structure.

STTL. See **Schottky TTL.**

studio transmitter link. Equipment used to generate and amplify a radio signal.

styling. A detailed design process where aesthetic considerations are foremost. Systems supporting this application have special refinements for rendering, modeling, and editing functions.

subsidiary. A company partially or wholly owned by another company.

supercomputer. A high-performance computer designed for numerically intensive applications. The current price ranges from approximately $100,000 to $20 million.

superminicomputer. An information system with price ranging typically from $100,000 to $1 million, with a minority below $100,000. CPU bit width ranges from 32 to 48 bits, with emphasis on 32. Environment is almost exclusively an ordinary office with no special environmental controls. Equipment typically is supported full-time by a professional computer systems support staff of fewer than 10 members. It usually is built around proprietary processor and typically supports from 32 to 350 concurrent users. Examples of models are the HP 3000/930 and 950, DEC VAX 8700 and Micro VAX 3500, and IBM 9370.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

superworkstation. A superworkstation has higher graphics performance than a traditional workstation. It also has a higher processing performance rating to support graphic computations. The average price is $40,000 to $80,000 with performance ratings of 8 to 20 mips and 2 to 16 mflops.

surgical support. Equipment relating to, or having connection with, surgery.

surveying and drafting instrument. An instrument used to detect, access, and measure radiation. The instrument is used in the drawing of objects, structures, or systems by engineers and scientists.

switch. 1: A mechanical or electrical device that competes with or breaks the pattern of a current or sends it over a different path. 2: A device that connects, disconnects, or transfers one or more circuits and is not designated as a controller, relay, or control valve. (See also **passive device.**)

switch/multiplexer IC. Analog switches gate analog signals under the control of logic. Multiplexers are specialized analog switches that select only one of many inputs.

synchronous optical network (SONET). An emerging standard for optical networks.

system management. The administration and operation of a computer system including staffing, scheduling, equipment, and service contract administration, equipment utilization practices, and time-sharing.

system network architecture (SNA). An IBM standard for data communication.

systems integration service. The implementation phase of tying together dissimilar devices. Services are coordinated by a single contractor who manages the procurement, installation, integration, and support of all software, hardware, and communications devices.

systems integrator. See **value-added reseller.**

system software. Software that provides support structure in which applications may operate. This includes operating systems, operating environments, and utilities.

systems planning and design. "Front-end" consulting services that are required to determine the nature of a customer's needs and the actions necessary to meet those requirements.

system subroutine library. An organized collection of computer programs that is maintained online with a computer system by being held on a secondary storage device and is managed by the operating system.

system support peripheral. An integrated circuit (IC) considered a traditional peripheral, where each processor has a set of six to eight dedicated peripherals that provide rudimentary functions necessary to construct a microprocessor (MPU)-based system. (See also **traditional peripheral.**)

system utilities. Products that aid in the maintenance and/or repair of computer hardware, operating systems, or data recovery.

T

2-D modeling. The representation of a part in two dimensions (has an x and y coordinate). This format requires three or more views (top, front, side) to depict all aspects of the part. This is the most common geometric modeling format and is used extensively with a drafting function.

3-D modeling. The representation of a part in three dimensions, usually in a wire-frame format (has an x, y, and z coordinate). This format is used commonly in high-level CAD systems to determine the placement and fit of components in an assembly. This format is not generally used for final drafting, although some systems have the capability to translate the 3-D image to a 2-D standard drafting format.

T-1. A high-speed, time-division, digital network link operating at 1.544 Mbps and above.

T-1 multiplexer. A unit that allows multiplexing, or combining, several voice and/or data channels onto one communications link, in this case, a high-speed T-1 channel.

tape drive. A class of computer backup device that uses reel-to-reel, cartridge, or cassette tapes as media.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

tape recorder. A device that records and plays sound from magnetic tape.

tax accounting. An application concerned with keeping records for tax purposes, setting up accounts for paying taxes, making tax computations, and preparing tax returns.

TDM. See **time-division multiplexer.**

teaching machine and aid. Equipment designed to assist in the training, educating, and instructing of persons to acquire knowledge or skill in a particular field(s) of interest.

technical data analysis. An application that analyzes technical or experimental data. The data may have been generated from instruments, captured from other electronic measuring devices (such as thermocouples or strain gauges), or generated by other analysis programs.

technical illustration. A drawing of a component or assembly that generally is intended for publication. This drawing will omit unnecessary dimensions and other detailed drating items and will be drawn so as to depict the part realistically.

technical productivity. An application that enhances the productivity of technical disciplines and is specialized for the engineering, scientific, or manufacturing fields.

technical publishing. The printing of user manuals or guides.

telecommunication integrated circuit (IC). An analog IC designed for the voice and data communication market.

telecommunications. Products and services that provide or manage the flow of information from person to person, person to machine, machine to person, or machine to machine. The telecommunications market is segmented into a combination of the premises and public telecommunications market segments.

telecom services. Includes that portion of telecommunications charges related to access and use of the public network. These charges typically are seen as a monthly usage charge for local, long distance, and private line access/utilization.

teleconferencing. Equipment and services related to one-way and two-way video communications that use specialized video equipment and/or transmission networks. These communications enable conferencing between locations.

telemarketing. A sales method that employs a sales force to move a product through the distribution channel by contacting the consumer via the telephone. Also referred to as inside sales.

telemetering system. See **telemetry.**

telemetry. Transmission of data from remote measuring instruments by electrical or, usually, radio means.

telephone. A terminal or handset used for voice and data transmission and communications. It functions as an interface between a user and a telephone switching system.

TELeprinter EXchange (TELEX). A worldwide dial-up telegraph service enabling users to communicate directly and temporarily among themselves by means of start-stop apparatus and circuits of the public telegraph network.

teletex. An interactive communications network designed for transmission of text and graphics to televisions or other low-cost terminals.

TELEX. See **TELeprinter EXchange.**

tension arm tape drive. A 1/2-inch reel-to-reel tape drive that uses mechanical tension arms to provide tape tension and buffing.

terminal equipment. 1: A device at a node of a network through which information can be entered, extracted, or monitored. 2: Any device capable of sending and/or receiving information over a communications channel. Includes a keyboard and display that cannot stand alone because it lacks processing capability. Terminals are usually simple ASCII text-entry devices.

terms and conditions. The provisions of a contract that are stated or offered for acceptance that determine the nature and scope of the agreement.

test and measurement. The process of determining the magnitude of the response of an object to a given stimulus. Also the degree to which an object may be characterized along a dimension

© 1991 Dataquest Incorporated January—Reproduction Prohibited

(quantification of an entity). Computer-based inspection and test systems used for quality and/or process control data analysis; data may be collected by manual input or sensory devices.

test equipment. Equipment designed to test, check, monitor, and identify varying degrees of device functionality and complexity that may include quality, speed, and performance. Automated test systems and equipment such as IC testers and PC-board testers, as well as general test equipment (such as oscilloscopes, spectrum analyzers, and digital multimeters).

text capture. Process whereby words or groups of words are controlled.

therapeutic. Medical applications involved in treating specific medical conditions.

thermal. The effects of temperature on the system.

thermal plotter. 1: A process that produces a visible image by heat-induced chemical reactions or chemically reactive media. 2: A thermally induced phase change process of a pigment-binder mixture, which is transferred from a donor sheet to the media.

thermal transfer printer. An imaging process using heated printing elements to produce prints or copies; can be either dye diffusion (coated paper) or wax based (plain paper). This process currently is used in electronic printing, facsimile machines, and full-color copiers.

thimble. A thimble-shaped print element that floats freely across the platen of a character printer, working in a similar fashion to a daisy-print element. It is shaped like a cup, with the spokes extending around the rim of the cup, with characters positioned at the end of the spokes.

thyristor. A type of diode that consists of a four-layer slice of silicon. The device is characterized by continuous switching. Once a thyristor has been triggered into conducting current, it will continue to conduct current until the main current falls to zero.

ticketing. A software application that supports the sale and management of tickets. The application may be as simple as ticketing a single event or as complex as ticketing airline reservations.

tie ratio. A ratio that describes the relationship between two or more product units, usually used when one product is part of or connected to another product. For example, a disk drive tie ratio to PCs of 0.8 indicates that 80 percent of the PCs contain a disk drive.

time and materials service. Remedial repair services on a per-call basis. Pricing is based on the actual length of time-to-repair, travel charges, and specific parts or materials required to complete repairs.

time-division multiplexer (TDM). One of several technologies used to multiplex, or combine, several voice and/or data channels onto one communications link. TDM uses "time slicing" to allocate blocks of time to each channel. See also **statistical multiplexer.**

TLX. See TELeprinter EXchange.

toner. The substance used that develops a latent xerographic image from a photoreceptor onto a substrate, usually paper. Monocomponent toner contains both the imaging material and the carrier (usually called developer) needed to transport the toner to the latent image. In dual-component toner, the imaging material and developer are held separately until they are mixed by the copier or printer itself. Liquid toner has the imaging material suspended in a solvent.

tool design. The design of custom-made tooling to facilitate an effective manufacturing process.

tools. A software program that is used by application developers or users to create applications. Examples are spreadsheets, word processors, editors, macro languages, screen painters, and report generators. Tools are higher-level products than languages; a tool is written in a language. Unlike languages, most tools are nonprocedural, i.e., they do not require users to create code that is sequentially executed. A good example of this is a spreadsheet, where the developer/user navigates up, down, and sideways with the arrow keys or mouse and can add or delete rows and columns at any time. Examples of tools include Lotus 1-2-3 (spreadsheet); Multimate (word processor); EDLIN (line editor); and Ojectworks (graphical editing and object manipulation environment).

© 1991 Dataquest Incorporated January—Reproduction Prohibited

trading turret/dealer board. A specialized type of telephone system that allows simultaneous access to multiple telephone lines. This system is used in any business that requires frequent conversations between two or more parties (i.e., stock brokers).

traditional peripheral. An integrated circuit that has an intermediary control device, which links a peripheral unit to the control processors.

traditional workstation. A midrange workstation priced between $15,000 to $50,000. Its performance ratings are 4 to 15 mips and 0.5 to 2 mflops.

traffic control. A real-time software application, mechanism, and system used to monitor and control, exert control over, and/or enforce the movement of vehicles.

transducer. Any device or element that converts an input signal into an output signal of a different form. (See also **passive device.**)

transistor. A transistor is as a current-amplifying device or switch, as follows: 1: Current amplifying—a small change in a small current flows between the collector and the emitter. 2: Switch—a sufficiently large voltage applied to the base causes the maximum amount of collective current to flow. It can be manufactured in bipolar or MOS technology process. A bipolar transistor consists of a sandwich of doped silicon layers. The transistor has three electrical connections: base, emitter, and collector. Each of these areas provides access to one of the doped regions.

transistor-transistor logic (TTL). A logic circuit design with the diode inputs replaced by a multiple-emitter transistor.

translator. The process performed by an assembler, compiler, or other routine that accepts statements in one language and converts them to another language. 2: A device that transforms signals from one form to another form. 3: A system that has a number of inputs and outputs and is connected so that input signals representing information expressed in a certain code result in output signals that represent the input information in a different code.

transmitter. 1: A device for transmitting a coded signal. 2: The carbon device in the telephone handset used to convert speech to electrical energy.

transparency. 1: The property of being insensitive to the meaning of a code being manipulated. An example is a paper-tape transmitter capable of transmitting any code submitted to it. If a device interprets and reacts to coded information that it is handling, it is said to be code sensitive (not transparent). 2: Clear substrates upon which images can be written, copied, or printed for projection onto a screen by an overhead projector.

transportable personal computer. The transportable personal computer is a self-contained system that can be moved from place to place as a single unit. These systems include, in a single unit, the keyboard, display, mass storage, and main system unit. Such a personal computer operates on A/C power only (no battery power).

transportation. An environment or industry that includes establishments providing, to the general public or the other business enterprises, passenger and freight transportation.

transportation electronic equipment. Electronic equipment used in the automotive railway and airline industry.

transportation management. The planning, analysis, and control of activities for transporting or being transported.

TTL. See **transistor-transistor logic.**

two-year college. A postsecondary school that offers general or liberal arts education usually leading to an associate degree or courses that are creditable toward a baccalaureate degree.

two-year institution. An institution legally authorized to offer and offering at least a two-year program of college-level studies that terminates in an associate degree or is principally creditable toward a baccalaureate degree.

typewriter. A machine for writing in characters by means of a keyboard operated by striking through an inked ribbon. Usually refers to the standard office typewriter (mechanical, electrical, or electronic).

© 1991 Dataquest Incorporated January—Reproduction Prohibited

U

UART/USART. See universal asynchronous receiver/transmitter/universal synchronous asynchronous receiver/transmitter.

ultrasonic cleaners, drills. 1: An instrument used to clean debris and swarf from surfaces by immersion in a solvent in which ultrasonic vibrations are excited. 2: A drill in which ultrasonic vibrations are generated by the compression and extension of a core electrostrictive or magnetostrictive material.

ultrasonic generator. A generator consisting of an oscillator driving an electracoustic transducer used to produce acoustic waves.

ultrasonic scanner, medical. A device that produces a picture display of ultrasonic frequency waves sent through the sample to be inspected or examined.

ultraviolet electrically programmable ROM. An EPROM that is erasable with an ultraviolet light source.

unit. A single quantity.

universal asynchronous receiver/transmitter/ universal synchronous asynchronous receiver/ transmitter (UART/USART). An electronic circuit that converts data between the parallel format and the serial format transmitted sequentially over a communication line.

UNIX. An operating system designed to be used with microprocessors and with the C programming language.

useful life. The economic life of a product. Typically used to determine depreciation and leasing schedules.

user interface. 1: The point at which a user interacts with a computer. 2: An interactive computer program that sends messages to and receives instructions from a terminal user.

users per system. The typical number of simultaneous users that a computer system will support.

utilities. An environment or industry that includes establishments providing electricity, gas, steam, water, or sanitary services to the general public or to other business enterprises.

UV EPROM. See ultraviolet electrically programmable ROM.

V

vacuum column tape drive. A 1/2-inch reel-to-reel tape drive with start-stop capability that uses vacuum columns to provide tape tension and buffing.

value-added network (VAN). A data communication network that provides enhanced services such as protocol conversion.

value-added reseller (VAR) systems integrator. A product reseller that integrates hardware, software, and/or services; it does not apply its label to the product. Systems integrators are a type of VAR and may or may not own the hardware or software.

VAN. See value-added network.

VAR. See value-added reseller systems integrator.

VAX/VMS. A Digital Equipment Corporation standard multiuser operating system.

VCR. See videocassette recorder and player.

vertical-turning programmable machine tool. The tool of a machine that holds a workpiece along the vertical axis for a certain function to be performed such as boring, drilling, and cutting.

vibrational. The effects of vibration and shock on the system.

video. 1: Relates to the bandwidth (megahertz) and spectrum position of the signal arising from television scanning. 2: The reception or recording of electronic signals that create images on a screen or display.

video camera. A camera that records visual images and sounds on magnetic tape.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

videocassette recorder and player (VCRs or VTRs). A complete system that has a tape format such as beta, VHS, or 8mm.

videodisc player. A complete video system that has a disc format.

video equipment. Equipment includes amplifiers, television cameras, and other equipment such as synchronization equipment, live cameras, and control consoles.

video home system (VHS) helical scan tape drive. A 13mm helical scan tape drive commonly used for recording television broadcasts.

videotex. An information delivery system that uses information from a database that allows the user to interact with the service, selecting information to be displayed on the user's CRT providing financial services, electronic mail, and teleshopping.

virtual private network (VPN). Similar in function to a leased circuit with the exception that the circuit is not dedicated to one customer.

VLSI. Very large scale integration.

VMS. See **voice-messaging system.**

voice-messaging system (VMS). A computer-based system that enables flexible, nonsimultaneous voice communications. This definition does not include personal-computer-board-level products.

voice-recognition computer device. The capability of a computer to recognize spoken commands. Each user must first "train" the computer by speaking a series of words that the computer can analyze and match with stored information.

voice response unit (VRU). A computer-connected device that selectively links sentences of stored words, creating a spoken word.

voice synthesizer. A device that simulates speech by assembling a language's elements under digital control.

voice terminal. See **telephone.**

voltage regulator and reference IC. 1: A device that provides power to other circuits at a specified DC voltage. 2: A device that provides a specified constant DC voltage to a load over a wide range of variations in input voltage and output current.

VPN. See **virtual private network.**

VRU. See **voice response unit.**

VTR. See **videocassette recorder and player.**

W

wafer. A thin (10 to 20 mils) disk of semiconductor material from which semiconductors are fabricated.

wafer fab. The integrated circuit production process—from raw wafers through a series of diffusion, etching, photolithographic, and other steps to finished wafers.

wafer fabrication equipment. Machinery used to produce wafers in the semiconductor industry. (See also **e-beam, etch-and-clean equipment, stepper.**)

wafer inspection. Inspection of patterned wafers for process defects by visual and image-processing techniques.

water quality and sewage control. A real-time software application that monitors and controls water quality and sewage.

WATS. See **wide area telephone service.**

web ribbon. Web or towel ribbons are wide ribbons used on line, dot matrix, and line, fully formed printers. They are as wide as the print line is long—usually approximately 15 inches.

wet chemical. A chemical used in semiconductor wafer fabrication. Examples are acids and solvents.

wet etch. Immersing method for wafers in an etching solution. Chemical removal of a material by bathing the wafer in acid.

white-collar worker. A person working in an occupation classified by the Bureau of Labor Statistics under the following category headings: managerial and professional specialty and technical, sales, and administrative support.

wholesale trade. An environment or industry that includes establishments or places of business primarily engaged in selling merchandise to retailers; to industrial, commercial, institutional, farm, construction contractors, or professional business users; or to other wholesalers; or acting as agents or brokers in buying merchandise for or selling merchandise to such persons or companies.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

wide area telephone service. An enhanced telephone company service allowing reduced costs of certain telephone call arrangements. This service can be in-wats or 800-number service (calls can be placed to a location from anywhere at no cost to the calling party) or out-wats (calls can be placed out from a central location).

word processing. A software application with the principal function of editing, entering, and formatting text.

word processor (WP). A standalone word processor capable of functioning independently from a central controller or storage device, although they may communicate with each other. These products generally have removable magnetic media. Products that have evolved from electronic typewriters generally are not included in this category. The ability to share a printer among workstations does not disqualify a product from being a standalone word processor; shared-system word processors are connected to an external file server or controller; word-processor file servers are centralized data storage devices that are accessible and dedicated to shared word processing units.

work force. All persons of either sex who furnish the supply of labor for the production of economic goods and services during a specified time period.

workstation computer. A single-user computer that is distinguished from a personal computer by its features and by the user's potential migration path within the platform. A technical workstation is a system designed with integrated networking; high-performance graphics; floating point; coprocessor; and a virtual, multiuser/multitasking operating system (DOMAIN, UNIX, VMS).

WORM. See **write-once/read-many.**

WP. See **word processor.**

write-once/read-many (WORM). 1: The WORM optical disk market includes drives that can read and write data using various optical diskette media. 2: A data storage device using laser technology that uses a removable disk ranging in size from 3.5 to 14 inches.

X

X-ray (lithography). A machine that uses an X ray for generating a mask plate of direct image transfer to a semiconductor wafer.

X-ray, medical. Equipment used to detect, examine, treat, or analyze body systems through photographic X-rays.

X.25. A CCITT standard that defines the interface between a public data network and a packet-mode user device; also defines the services that these user devices can expect from the X.25 public data network.

Y

year-average population. The installed base of a product computed at the midyear between the beginning installed base and the ending installed base of the same year.

Z

zener diode. 1: A diode that has a controlled, reverse-voltage/current relationship. 2: A two-layer device that has a sudden rise in current above a certain reverse voltage.

© 1991 Dataquest Incorporated January—Reproduction Prohibited

Dataquest

Dataquest Research and Sales Offices:

Dataquest Incorporated
1290 Ridder Park Drive
San Jose, California 95131-2398
Phone: (408) 437-8000
Telex: 171973
Fax: (408) 437-0292

Technology Products Group
Phone: (800) 624-3280

Dataquest Incorporated
Ledgeway/Dataquest
The Corporate Center
550 Cochituate Road
Framingham, MA 01701
Phone: (508) 370-5555
Fax: (508) 370-6262

Dataquest Incorporated
Invitational Computer Conferences Division
3151 Airway Avenue, C-2
Costa Mesa, California 92626
Phone: (714) 957-0171
Telex: 5101002189 ICCDQ
Fax: (714) 957-0903

Dataquest Australia
Suite 1, Century Plaza
80 Berry Street
North Sydney, NSW 2060
Australia
Phone: (02) 959 4544
Telex: 25468
Fax: (02) 929 0635

Dataquest GmbH
Kronstadter Strasse 9
8000 Munich 80
West Germany
Phone: 011 49 89 93 09 09 0
Fax: 49 89 930 3277

Dataquest Europe Limited
Roussel House, Broadwater Park
Denham, Uxbridge, Middx UB9 5HP
England
Phone: 0895-835050
Telex: 266195
Fax: 0895 835260/1/2

Dataquest Europe SA
Tour Gallièni 2
36, avenue du Général-de-Gaulle
93175 Bagnolet Cedex
France
Phone: (1) 48 97 31 00
Telex: 233 263
Fax: (1) 48 97 34 00

Dataquest Hong Kong
Rm. 401, Connaught Comm. Bldg.
185 Wanchai Rd.
Wanchai, Hong Kong
Phone: 8387336
Telex: 80587
Fax: 5722375

Dataquest Israel
59 Mishmar Ha'yarden Street
Tel Aviv, Israel 69865
or
P.O. Box 18198
Tel Aviv, Israel
Phone: 52 913937
Telex: 341118
Fax: 52 32865

Dataquest Japan Limited
Shinkawa Sanko Building
1-3-17 Shinkawa, Chuo-ku
Tokyo 104 Japan
Phone: (03) 5566-0411
Fax: (03) 5566-0425

Dataquest Korea
Daeheung Bldg. 1105
648-23 Yeoksam-dong
Kangnam-gu
Seoul, Korea 135
Phone: (02) 556-4166
Fax: (02) 552-2661

Dataquest Singapore
4012 Ang Mo Kio Industrial Park 1
Ave. 10, #03-10 to #03-12
Singapore 2056
Phone: 4597181
Telex: 38257
Fax: 4563129

Dataquest Taiwan
Room 801/8th Floor
Ever Spring Building
147, Sect. 2, Chien Kuo N. Rd.
Taipei, Taiwan R.O.C. 104
Phone: (02) 501-7960
Telex: 27459
Fax: (02) 505-4265

Dataquest West Germany
In der Schneithohl 17
6242 Kronberg 2
West Germany
Phone: 06173/61685
Telex: 418089
Fax: 06173/67901

0008732

Dataquest

Forecasts

Source: Dataquest

CAD/CAM/CAE

Dataquest

Source: Dataquest

Published by Dataquest Incorporated

The content of this report represents our interpretation and analysis of information generally available to the public or released by knowledgeable individuals in the subject industry, but is not guaranteed as to accuracy or completeness. It does not contain material provided to us in confidence by our clients.

Printed in the United States of America. All rights reserved. No part of this publication may be reproduced, stored in retrieval systems, or transmitted, in any form or by any means—mechanical, electronic, photocopying, duplicating, microfilming, videotape, or otherwise—without the prior permission of the publisher.

© 1991 Dataquest Incorporated
September 1991

Table of Contents

	Page
Forecasting Methodology	1

List of Figures

Figure	Page
Figure 1 Information Compendium	2

Index of Tables

Topic	Page
ALL APPLICATIONS	
Table 1 Worldwide	3
Table 2 WW Technical Workstation	4
Table 3 WW Host/Server	5
Table 4 WW PC	6
Table 5 North America	7
Table 6 NA Technical Workstation	8
Table 7 NA Host/Server	9
Table 8 NA PC	10
Table 9 Europe	11
Table 10 Europe Technical Workstation	12
Table 11 Europe Host/Server	13
Table 12 Europe PC	14
Table 13 Asia	15
Table 14 Asia Technical Workstation	16
Table 15 Asia Host/Server	17
Table 16 Asia PC	18
Table 17 Rest of World	19
Table 18 ROW Technical Workstation	20
Table 19 ROW Host/Server	21
Table 20 ROW PC	22

©1991 Dataquest Incorporated September—Reproduction Prohibited

Forecasts

Forecasting Methodology

Fundamental to the way Dataquest conducts its research is an underlying philosophy that says the best data and analyses come from a well-balanced program. This program includes balance between primary and secondary collection techniques; balance between supply-side and demand-side analysis; balance between focused, industry-specific research and coordinated, "big-picture" analysis aided by integration of data from the more than 25 separate high-technology industries Dataquest covers; and balance between the perspectives of experienced industry professionals and rigorous, disciplined techniques of seasoned market researchers.

Dataquest also analyzes trends in the macroenvironment, which can have major influences on both supply-side and demand-side forecasting. In addition to demographics, analysts look at GNP growth, interest rate fluctuation, currency fluctuation, business expectations, and capital spending plans. In the geopolitical arena, the group looks at trade issues, political stability or lack thereof, tariffs, nontariff barriers, and such factors as the effect on Europe of the events of 1992.

Figure 1 is a pictorial summary of the information compendium offered by the Dataquest CAD/CAM/CAE Industry Service.

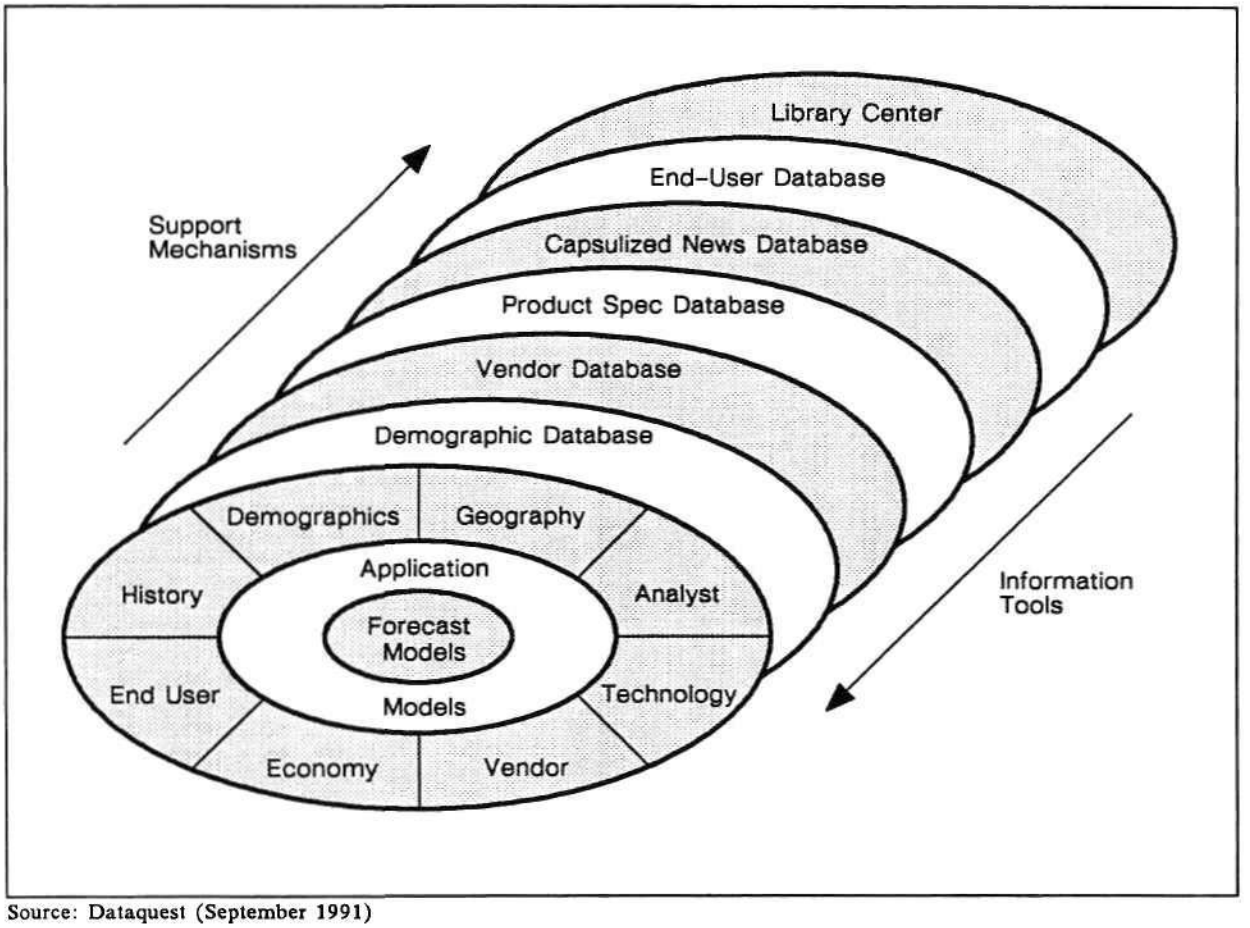
Dataquest's revenue and shipment estimates are based on the following sources:

- Information supplied by company management or gathered from publicly available published sources
- End-user surveys
- Information supplied by other Dataquest industry services relating to components/subsystems of CAD/CAM/CAE
- Information provided by OEMs or resellers of the manufacturers' products
- Senior staff estimates based on reliable historical data and in-depth understanding of a company's products and strategies

The CAD/CAM/CAE industry market estimates and forecasts are derived using the following research techniques:

- "Bottom-up" aggregation—This method involves adding all relevant vendor contributions to arrive at total market estimates for all historical data.
- Segment forecasting—For each application segment tracked by the CAD/CAM/CAE group, individual forecasts are derived following the basic information model defined previously. Specifically, each design phase covered within each application is segmented by channel, product, region, and platform. In this way, each application segment incorporates its own set of unique assumptions.
- Demand-based analysis—Market growth is tracked and forecast in terms of the present and anticipated demand of current and future users. This requires the development of a total available market (TAM) model and a satisfied available market figure to accurately assess the levels of penetration. Installed base and rates of product retirement are also evaluated. In addition, Dataquest analysts factor in the acceptance or ability for users to consume new technology.
- Capacity-based analysis—This method involves identifying future shipment volume constraints. These constraints, or "ceilings," can be the result of component availability, manufacturing capacity, or distribution capacity. In any case, constraint is capable of keeping shipments below the demand level.

Figure 1
Information Compendium



Source: Dataquest (September 1991)

©1991 Dataquest Incorporated September—Reproduction Prohibited

1

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Worldwide
PLATFORM: All Platforms

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	184,124	265,066	331,574	394,941	488,639	575,800	671,520	766,440	856,160	931,960	28%	14%
Workstation Shipments	212,159	299,379	360,569	427,541	525,125	609,050	701,430	792,160	878,530	951,100	25%	13%
CPU Installed Base	290,181	546,843	852,735	1,187,114	1,559,275	1,951,170	2,438,920	3,026,310	3,704,830	4,461,090	52%	23%
Workstation Installed Base	371,957	664,048	1,000,668	1,370,090	1,772,062	2,213,730	2,737,320	3,356,070	4,062,210	4,842,590	48%	22%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	107.0	74.1	76.5	60.1	55.8	52.1	49.5	47.6	46.5	46.2	-15%	-4%
Hardware-Only ASP	14.9	12.7	10.0	10.3	9.3	8.7	8.3	7.9	7.8	7.9	-11%	-3%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	5,391	5,854	6,445	7,163	7,960	8,784	9,626	10,452	11,407	12,393	10%	9%
CPU Revenue	3,303	3,759	4,681	5,631	6,416	6,455	7,124	7,800	8,568	9,197	18%	7%
Workstation Revenue	1,342	1,254	883	622	549	651	621	561	536	418	-20%	-5%
Peripheral Revenue (Turnkey)	746	840	881	909	995	1,677	1,881	2,091	2,302	2,778	7%	23%
Software Revenue	1,582	2,380	2,866	3,419	4,073	4,647	5,441	6,355	7,331	8,491	27%	16%
Bundled	1,060	1,116	1,327	1,796	2,007	2,184	2,433	2,681	2,883	3,196	17%	10%
Unbundled	522	1,264	1,538	1,623	2,066	2,463	3,008	3,674	4,447	5,295	41%	21%
Service Revenue	902	1,319	1,653	1,956	2,332	2,570	2,879	3,227	3,624	4,081	27%	12%
Total Revenue	7,876	9,553	10,964	12,538	14,365	16,000	17,946	20,034	22,361	24,965	16%	12%
Increase over Prior Year	49%	21%	15%	14%	15%	11%	12%	12%	12%	12%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Worldwide
PLATFORM: Technical Workstation

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	27,657	44,457	69,909	113,716	137,423	173,550	220,370	273,140	333,380	397,790	49%	24%
Workstation Shipments	27,657	44,457	69,909	113,716	137,423	173,550	220,370	273,140	333,380	397,790	49%	24%
CPU Installed Base	50,047	93,425	159,972	265,595	397,660	531,540	723,230	968,780	1,274,730	1,645,100	68%	33%
Workstation Installed Base	50,047	93,425	159,972	265,595	397,660	531,540	723,230	968,780	1,274,730	1,645,100	68%	33%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	69.7	61.3	57.7	54.1	50.0	47.4	45.5	44.4	44.0	44.2	-8%	-2%
Hardware-Only ASP	25.6	23.7	21.2	17.1	17.7	16.1	14.6	13.7	13.2	13.1	-9%	-6%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	1,087	1,522	2,309	3,185	3,712	4,522	5,318	6,226	7,234	8,373	36%	18%
CPU Revenue	898	1,214	1,846	2,609	3,037	3,535	4,133	4,816	5,591	6,448	36%	16%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	189	308	462	575	675	987	1,185	1,410	1,644	1,925	37%	23%
Software Revenue	533	1,052	1,458	1,998	2,442	2,808	3,519	4,401	5,369	6,457	46%	21%
Bundled	408	550	760	1,217	1,348	1,414	1,688	1,989	2,293	2,649	35%	14%
Unbundled	125	501	699	781	1,094	1,395	1,830	2,412	3,076	3,808	72%	28%
Service Revenue	217	472	808	1,158	1,441	1,696	2,031	2,436	2,875	3,372	61%	19%
Total Revenue	1,836	3,046	4,575	6,341	7,595	9,025	10,868	13,063	15,478	18,201	43%	19%
Increase over Prior Year	71%	66%	50%	39%	20%	19%	20%	20%	18%	18%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

©1991 Dataquest Incorporated September—Reproduction Prohibited

3

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Worldwide
PLATFORM: Host/Server

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	9,953	12,218	13,356	15,181	19,326	20,330	20,590	19,760	18,990	18,080	18%	-1%
Workstation Shipments	37,987	46,531	42,352	47,780	55,812	53,580	50,500	45,480	41,360	37,220	10%	-8%
CPU Installed Base	24,445	35,547	47,171	59,909	73,565	89,700	104,380	118,490	132,230	145,340	32%	15%
Workstation Installed Base	106,221	152,753	195,104	242,885	286,351	352,270	402,770	448,250	489,610	526,830	28%	13%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	521.5	342.5	402.2	321.8	211.5	195.1	186.0	178.9	174.2	170.1	-20%	-4%
Hardware-Only ASP	253.6	257.9	129.7	115.0	103.4	94.4	87.0	80.3	74.2	68.1	-20%	-8%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	3,376	3,290	2,798	2,474	2,466	2,298	2,161	1,937	1,801	1,622	-8%	-8%
CPU Revenue	1,564	1,593	1,635	1,629	1,723	1,190	1,109	989	920	688	2%	-17%
Workstation Revenue	1,342	1,254	883	622	549	651	621	561	536	418	-20%	-5%
Peripheral Revenue (Turnkey)	470	443	280	223	193	457	431	388	345	515	-20%	22%
Software Revenue	669	782	791	681	753	781	745	675	581	543	3%	-6%
Bundled	505	425	453	438	516	564	538	493	400	363	1%	-7%
Unbundled	164	357	338	243	237	217	207	182	180	180	10%	-5%
Service Revenue	625	772	756	675	747	712	670	602	551	504	5%	-8%
Total Revenue	4,670	4,844	4,345	3,831	3,966	3,790	3,576	3,214	2,933	2,669	-4%	-8%
Increase over Prior Year	27%	4%	-10%	-12%	4%	-4%	-6%	-10%	-9%	-9%		

Source: Dataquest
September 1991

4

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Worldwide
PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	146,514	208,391	248,309	266,044	331,889	381,920	430,560	473,540	503,780	516,090	23%	9%
Workstation Shipments	146,514	208,391	248,309	266,044	331,889	381,920	430,560	473,540	503,780	516,090	23%	9%
CPU Installed Base	215,689	417,870	645,592	861,610	1,088,051	1,329,920	1,611,320	1,939,040	2,297,860	2,670,650	50%	20%
Workstation Installed Base	215,689	417,870	645,592	861,610	1,088,051	1,329,920	1,611,320	1,939,040	2,297,860	2,670,650	50%	20%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	24.6	16.0	20.9	18.6	19.6	20.1	20.0	19.8	19.6	19.6	-6%	0%
Hardware-Only ASP	5.0	4.3	4.7	4.8	4.6	4.6	4.5	4.5	4.4	4.4	-2%	-1%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	928	1,042	1,339	1,504	1,782	1,964	2,147	2,289	2,371	2,399	18%	6%
CPU Revenue	841	953	1,200	1,393	1,656	1,731	1,882	1,996	2,058	2,061	18%	4%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	87	89	139	111	126	233	265	294	314	338	10%	22%
Software Revenue	381	547	617	740	878	1,058	1,177	1,279	1,381	1,492	23%	11%
Bundled	148	141	115	141	143	206	206	199	190	184	-1%	5%
Unbundled	233	406	502	599	735	852	971	1,080	1,191	1,308	33%	12%
Service Revenue	60	74	88	123	143	162	178	189	198	205	24%	7%
Total Revenue	1,369	1,663	2,044	2,366	2,804	3,185	3,502	3,758	3,950	4,095	20%	8%
Increase over Prior Year	170%	21%	23%	16%	18%	14%	10%	7%	5%	4%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

5

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: North America
PLATFORM: All Platforms

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	105,634	134,946	176,602	174,947	193,577	217,990	244,380	271,380	301,130	324,770	16%	11%
Workstation Shipments	118,568	149,870	187,084	185,705	206,610	228,810	253,860	279,530	308,390	331,000	15%	10%
CPU Installed Base	174,604	303,718	463,647	602,039	744,796	846,870	991,240	1,162,860	1,364,750	1,591,700	44%	16%
Workstation Installed Base	223,037	367,856	539,529	690,432	850,032	964,780	1,121,830	1,304,750	1,516,930	1,753,140	40%	16%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	110.7	89.6	79.0	70.1	68.6	62.3	58.0	55.1	53.5	52.7	-11%	-5%
Hardware-Only ASP	12.8	10.7	8.5	9.9	9.5	8.8	8.5	8.2	8.2	8.3	-7%	-3%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	2,504	2,396	2,423	2,569	2,674	2,721	2,889	3,067	3,374	3,649	2%	6%
CPU Revenue	1,589	1,529	1,867	2,074	2,161	2,151	2,304	2,466	2,716	2,819	8%	5%
Workstation Revenue	595	525	316	232	245	220	200	177	194	122	-20%	-13%
Peripheral Revenue (Turnkey)	321	343	240	263	268	350	385	424	464	708	-4%	21%
Software Revenue	728	946	1,096	1,229	1,437	1,556	1,772	2,049	2,303	2,618	19%	13%
Bundled	399	345	351	446	477	466	502	541	531	568	5%	4%
Unbundled	330	601	745	783	959	1,090	1,270	1,509	1,771	2,049	31%	16%
Service Revenue	492	609	670	777	882	910	998	1,106	1,238	1,383	16%	9%
Total Revenue	3,724	3,950	4,189	4,574	4,992	5,187	5,660	6,222	6,915	7,650	8%	9%
Increase over Prior Year	28%	6%	6%	9%	9%	4%	9%	10%	11%	11%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

6

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: North America
PLATFORM: Technical Workstation

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	15,173	19,852	28,962	42,349	46,228	55,820	71,750	89,710	111,440	133,140	32%	24%
Workstation Shipments	15,173	19,852	28,962	42,349	46,228	55,820	71,750	89,710	111,440	133,140	32%	24%
CPU Installed Base	30,312	49,325	75,929	113,197	162,126	191,890	249,380	324,820	422,010	540,890	52%	27%
Workstation Installed Base	30,312	49,325	75,929	113,197	162,126	191,890	249,380	324,820	422,010	540,890	52%	27%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	58.5	53.8	52.1	53.3	52.9	50.5	48.6	47.5	47.0	47.1	-2%	-2%
Hardware-Only ASP	23.7	22.8	21.6	17.1	16.9	15.2	13.9	13.1	12.7	12.7	-8%	-6%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	506	606	858	1,080	1,146	1,272	1,473	1,696	1,974	2,284	23%	15%
CPU Revenue	418	481	713	907	958	1,071	1,235	1,416	1,643	1,894	23%	15%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	88	125	145	173	189	201	239	280	331	389	21%	16%
Software Revenue	267	388	539	689	850	953	1,155	1,417	1,690	1,984	34%	18%
Bundled	181	172	233	330	349	347	397	445	494	550	18%	10%
Unbundled	85	216	306	358	502	605	758	972	1,196	1,434	56%	23%
Service Revenue	128	205	332	484	568	631	739	868	1,011	1,168	45%	16%
Total Revenue	901	1,198	1,729	2,253	2,565	2,856	3,367	3,981	4,675	5,436	30%	16%
Increase over Prior Year	43%	33%	44%	30%	14%	11%	18%	18%	17%	16%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

7

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: North America
PLATFORM: Host/Server

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	5,080	5,466	5,719	6,031	6,547	6,260	6,150	5,850	5,780	5,610	7%	-3%
Workstation Shipments	18,013	20,389	16,201	16,789	19,580	17,080	15,630	14,000	13,050	11,840	2%	-10%
CPU Installed Base	14,146	18,830	23,288	27,566	32,313	34,710	37,660	40,360	43,120	45,700	23%	7%
Workstation Installed Base	62,579	82,969	99,170	115,959	137,549	152,620	168,250	182,250	195,300	207,140	22%	9%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	492.3	340.5	320.9	393.6	332.2	313.1	300.5	289.9	280.6	273.0	-9%	-4%
Hardware-Only ASP	215.7	216.1	130.4	108.7	105.1	95.2	87.6	80.9	74.5	67.8	-16%	-8%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	1,536	1,339	995	878	875	734	663	587	591	551	-13%	-9%
CPU Revenue	725	612	587	571	570	388	347	306	312	164	-6%	-22%
Workstation Revenue	595	525	316	232	245	220	200	177	194	122	-20%	-13%
Peripheral Revenue (Turnkey)	216	202	92	74	61	126	116	104	86	265	-27%	34%
Software Revenue	294	333	295	242	239	216	191	166	104	84	-5%	-19%
Bundled	188	153	111	110	123	115	103	93	35	16	-10%	-33%
Unbundled	105	180	184	132	116	101	89	72	70	67	2%	-10%
Service Revenue	342	381	304	251	268	228	206	182	168	154	-6%	-11%
Total Revenue	2,172	2,053	1,594	1,371	1,382	1,178	1,061	934	864	788	-11%	-11%
Increase over Prior Year	8%	-5%	-22%	-14%	1%	-15%	-10%	-12%	-8%	-9%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

8

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: North America
PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	85,382	109,628	141,920	126,567	140,802	155,910	166,480	175,820	183,900	186,020	13%	6%
Workstation Shipments	85,382	109,628	141,920	126,567	140,802	155,910	166,480	175,820	183,900	186,020	13%	6%
CPU Installed Base	130,146	235,563	364,430	461,277	550,357	620,270	704,200	797,680	899,630	1,005,100	43%	13%
Workstation Installed Base	130,146	235,563	364,430	461,277	550,357	620,270	704,200	797,680	899,630	1,005,100	43%	13%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	19.5	17.0	25.7	16.5	16.3	15.2	14.6	14.6	14.6	14.9	-4%	-2%
Hardware-Only ASP	5.1	3.9	3.9	4.8	4.6	4.6	4.5	4.4	4.4	4.4	-3%	-1%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	462	452	570	611	652	715	753	784	809	815	9%	5%
CPU Revenue	446	436	567	595	634	692	722	745	762	761	9%	4%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	16	16	3	16	18	22	31	39	47	54	3%	24%
Software Revenue	168	225	262	298	348	388	426	467	508	550	20%	10%
Bundled	29	20	7	6	6	4	3	3	2	2	-33%	-20%
Unbundled	139	205	255	292	342	384	423	464	506	548	25%	10%
Service Revenue	22	23	34	42	46	50	53	56	59	62	21%	6%
Total Revenue	652	699	866	951	1,046	1,153	1,232	1,307	1,376	1,426	13%	6%
Increase over Prior Year	153%	7%	24%	10%	10%	10%	7%	6%	5%	4%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

9

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Europe
PLATFORM: All Platforms

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	46,359	78,139	96,895	130,744	166,731	201,680	239,730	275,280	305,910	331,440	38%	15%
Workstation Shipments	53,755	87,271	106,715	143,780	179,185	213,170	249,940	283,800	313,260	337,940	35%	14%
CPU Installed Base	67,302	144,190	235,984	352,443	483,830	640,430	829,720	1,055,170	1,311,370	1,593,290	64%	27%
Workstation Installed Base	83,392	169,421	271,104	400,865	541,616	714,600	915,250	1,150,190	1,414,700	1,704,070	60%	26%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	102.8	50.3	61.3	63.4	60.1	57.9	55.2	53.1	52.1	51.9	-13%	-3%
Hardware-Only ASP	12.6	11.8	12.6	11.3	9.6	8.9	8.3	7.8	7.6	7.8	-7%	-4%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	1,430	1,583	2,225	2,576	2,816	3,361	3,705	4,056	4,420	4,843	18%	11%
CPU Revenue	899	1,026	1,675	2,033	2,310	2,477	2,745	3,023	3,310	3,618	27%	9%
Workstation Revenue	331	320	280	240	178	219	209	186	165	142	-14%	-4%
Peripheral Revenue (Turnkey)	200	237	270	303	328	665	752	847	945	1,084	13%	27%
Software Revenue	447	857	965	1,161	1,448	1,544	1,847	2,217	2,651	3,165	34%	17%
Bundled	318	335	436	627	749	662	728	807	890	1,017	24%	6%
Unbundled	129	522	529	534	699	881	1,119	1,410	1,762	2,148	53%	25%
Service Revenue	190	456	610	755	945	1,079	1,219	1,383	1,568	1,793	49%	14%
Total Revenue	2,068	2,896	3,800	4,492	5,210	5,983	6,771	7,656	8,639	9,802	26%	13%
Increase over Prior Year	79%	40%	31%	18%	16%	15%	13%	13%	13%	13%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

10

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Europe
PLATFORM: Technical Workstation

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	7,724	14,572	25,818	39,982	47,598	59,550	72,940	88,520	106,360	128,460	58%	22%
Workstation Shipments	7,724	14,572	25,818	39,982	47,598	59,550	72,940	88,520	106,360	128,460	58%	22%
CPU Installed Base	11,978	26,402	51,605	89,775	133,400	183,880	248,170	328,090	425,850	545,710	83%	33%
Workstation Installed Base	11,978	26,402	51,605	89,775	133,400	183,880	248,170	328,090	425,850	545,710	83%	33%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	73.3	49.9	50.6	55.3	53.7	51.5	49.8	48.8	48.6	48.9	-7%	-2%
Hardware-Only ASP	31.3	24.7	24.5	17.8	19.0	17.2	15.7	14.9	14.3	14.2	-12%	-6%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	357	452	856	1,201	1,390	1,845	2,143	2,510	2,901	3,375	41%	19%
CPU Revenue	296	359	705	1,012	1,178	1,442	1,659	1,927	2,222	2,578	41%	17%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	60	93	151	189	211	403	484	584	679	797	37%	30%
Software Revenue	168	411	522	710	911	950	1,207	1,545	1,928	2,374	53%	21%
Bundled	143	179	257	443	542	451	534	636	733	858	40%	10%
Unbundled	25	232	266	267	369	499	674	909	1,196	1,516	96%	33%
Service Revenue	49	176	307	475	620	750	897	1,084	1,283	1,516	89%	20%
Total Revenue	573	1,039	1,686	2,386	2,921	3,545	4,248	5,140	6,113	7,265	50%	20%
Increase over Prior Year	137%	81%	62%	42%	22%	21%	20%	21%	19%	19%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

11

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Europe
PLATFORM: Host/Server

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	1,730	4,007	5,131	5,002	5,733	6,200	6,280	5,980	5,750	5,570	35%	-1%
Workstation Shipments	9,127	13,138	14,951	18,038	18,187	17,690	16,490	14,510	13,100	12,070	19%	-8%
CPU Installed Base	3,827	7,824	12,887	17,622	22,017	27,750	32,870	37,890	42,690	47,310	55%	17%
Workstation Installed Base	19,917	33,055	48,007	66,045	79,803	101,920	118,410	132,920	146,010	158,080	41%	15%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	578.5	235.1	338.4	339.9	258.3	244.2	232.9	221.4	211.1	202.6	-18%	-5%
Hardware-Only ASP	497.4	241.5	124.4	134.0	110.1	102.1	94.8	87.4	80.9	74.6	-31%	-7%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	825	828	974	880	808	802	751	660	592	537	-1%	-8%
CPU Revenue	377	394	603	574	571	400	370	322	286	248	11%	-15%
Workstation Revenue	331	320	280	240	178	219	209	186	165	142	-14%	-4%
Peripheral Revenue (Turnkey)	117	113	91	66	59	183	172	152	141	147	-16%	20%
Software Revenue	183	266	237	204	236	227	213	190	179	181	7%	-5%
Bundled	144	123	146	152	178	173	162	143	131	131	5%	-6%
Unbundled	39	143	91	52	58	54	52	47	48	50	11%	-3%
Service Revenue	129	252	270	240	274	269	251	221	201	189	21%	-7%
Total Revenue	1,137	1,345	1,482	1,323	1,318	1,297	1,216	1,071	972	907	4%	-7%
Increase over Prior Year	40%	18%	10%	-11%	-0%	-2%	-6%	-12%	-9%	-7%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

12

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Europe
PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	36,904	59,560	65,946	85,760	113,400	135,930	160,510	180,780	193,800	197,410	32%	12%
Workstation Shipments	36,904	59,560	65,946	85,760	113,400	135,930	160,510	180,780	193,800	197,410	32%	12%
CPU Installed Base	51,497	109,963	171,492	245,046	328,413	428,800	548,680	689,180	842,830	1,000,270	59%	25%
Workstation Installed Base	51,497	109,963	171,492	245,046	328,413	428,800	548,680	689,180	842,830	1,000,270	59%	25%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	19.4	10.1	13.7	20.2	19.2	22.1	22.4	22.6	22.7	22.9	-0%	4%
Hardware-Only ASP	5.5	4.5	5.4	5.0	4.8	4.8	4.7	4.7	4.6	4.6	-3%	-1%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	249	303	395	495	619	714	812	886	926	932	26%	9%
CPU Revenue	226	273	368	446	561	635	716	774	802	792	25%	7%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	23	30	28	49	58	79	96	112	125	140	27%	19%
Software Revenue	96	181	205	247	301	367	427	481	544	610	33%	15%
Bundled	31	33	33	32	29	38	33	27	26	28	-2%	-1%
Unbundled	65	147	172	215	272	329	394	454	518	582	43%	16%
Service Revenue	13	28	33	41	51	60	70	77	84	88	42%	11%
Total Revenue	358	511	633	783	971	1,141	1,308	1,444	1,554	1,630	28%	11%
Increase over Prior Year	273%	43%	24%	24%	24%	17%	15%	10%	8%	5%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

13

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Asia
PLATFORM: All Platforms

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	28,719	45,666	52,606	81,687	118,143	142,200	168,550	195,450	218,380	237,430	42%	15%
Workstation Shipments	35,506	54,922	60,325	89,438	127,914	151,750	177,320	203,040	224,760	242,630	38%	14%
CPU Installed Base	42,226	87,028	136,486	209,669	299,924	422,710	561,620	731,270	924,620	1,137,330	63%	31%
Workstation Installed Base	54,967	109,029	166,253	247,416	339,796	481,770	630,770	809,310	1,010,070	1,228,750	58%	29%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	105.1	100.6	99.5	51.6	46.8	43.9	42.0	40.6	39.6	39.2	-18%	-3%
Hardware-Only ASP	24.2	20.6	11.3	9.3	8.2	8.2	7.9	7.6	7.6	7.8	-24%	-1%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	1,267	1,707	1,667	1,857	2,293	2,491	2,776	3,025	3,253	3,479	16%	9%
CPU Revenue	691	1,095	1,047	1,403	1,808	1,668	1,878	2,073	2,258	2,420	27%	6%
Workstation Revenue	366	368	259	128	104	188	184	169	149	129	-27%	4%
Peripheral Revenue (Turnkey)	209	243	361	326	380	635	714	782	846	931	16%	20%
Software Revenue	385	549	771	972	1,119	1,450	1,699	1,936	2,198	2,489	31%	17%
Bundled	329	420	524	693	748	1,009	1,147	1,269	1,384	1,512	23%	15%
Unbundled	56	129	247	280	371	441	552	667	813	977	61%	21%
Service Revenue	193	227	340	379	455	520	588	649	713	782	24%	11%
Total Revenue	1,844	2,483	2,777	3,208	3,867	4,461	5,064	5,610	6,164	6,750	20%	12%
Increase over Prior Year	67%	35%	12%	15%	21%	15%	13%	11%	10%	9%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

14

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Asia
PLATFORM: Technical Workstation

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	3,758	8,703	13,916	29,346	41,227	55,130	71,660	89,500	108,450	126,790	82%	25%
Workstation Shipments	3,758	8,703	13,916	29,346	41,227	55,130	71,660	89,500	108,450	126,790	82%	25%
CPU Installed Base	6,306	14,930	28,518	56,860	94,656	145,840	212,520	298,090	402,770	525,790	97%	41%
Workstation Installed Base	6,306	14,930	28,518	56,860	94,656	145,840	212,520	298,090	402,770	525,790	97%	41%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	112.3	108.6	83.3	53.1	44.2	41.6	39.8	38.7	38.3	38.3	-21%	-3%
Hardware-Only ASP	25.9	24.7	15.1	16.3	18.2	16.5	14.9	13.8	13.2	13.1	-8%	-6%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	192	434	557	842	1,106	1,316	1,592	1,878	2,181	2,489	55%	18%
CPU Revenue	154	350	396	639	843	946	1,144	1,353	1,575	1,786	53%	16%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	37	85	161	203	262	371	447	525	606	704	63%	22%
Software Revenue	92	243	381	571	647	859	1,093	1,353	1,646	1,963	63%	25%
Bundled	77	192	261	426	437	589	725	864	1,009	1,164	54%	22%
Unbundled	14	51	120	145	210	270	369	489	637	799	96%	31%
Service Revenue	34	84	155	175	225	279	348	423	507	594	60%	21%
Total Revenue	318	762	1,093	1,587	1,978	2,454	3,033	3,655	4,333	5,047	58%	21%
Increase over Prior Year	76%	140%	44%	45%	25%	24%	24%	20%	19%	16%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

15

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Asia
PLATFORM: Host/Server

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	2,561	2,390	2,198	3,831	6,665	7,400	7,590	7,280	6,760	6,180	27%	-1%
Workstation Shipments	9,348	11,646	9,917	11,581	16,436	16,940	16,360	14,880	13,150	11,380	15%	-7%
CPU Installed Base	4,965	7,350	9,502	13,103	17,379	25,170	31,440	37,430	43,160	48,580	37%	23%
Workstation Installed Base	17,706	29,352	39,269	50,850	57,251	84,230	100,590	115,470	128,610	139,990	34%	20%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	514.1	552.7	622.9	270.1	154.8	146.2	141.7	138.0	134.8	131.0	-26%	-3%
Hardware-Only ASP	275.5	385.0	131.5	80.7	73.7	67.6	61.8	56.8	52.5	48.9	-28%	-8%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	868	1,006	759	645	711	688	668	611	540	466	-5%	-8%
CPU Revenue	378	522	407	439	538	365	353	323	286	244	9%	-15%
Workstation Revenue	366	368	259	128	104	188	184	169	149	129	-27%	4%
Peripheral Revenue (Turnkey)	124	116	93	77	69	135	130	119	105	94	-14%	6%
Software Revenue	182	171	246	220	260	313	313	292	270	249	9%	-1%
Bundled	165	141	188	165	203	257	253	236	214	194	5%	-1%
Unbundled	17	29	58	55	58	56	60	56	56	55	35%	-1%
Service Revenue	133	120	164	166	186	192	189	176	158	140	9%	-5%
Total Revenue	1,184	1,297	1,169	1,030	1,157	1,193	1,170	1,078	969	856	-1%	-6%
Increase over Prior Year	52%	10%	-10%	-12%	12%	3%	-2%	-8%	-10%	-12%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September--Reproduction Prohibited

16
TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Asia
PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	22,399	34,573	36,492	48,510	70,252	79,680	89,300	98,660	103,170	104,460	33%	8%
Workstation Shipments	22,399	34,573	36,492	48,510	70,252	79,680	89,300	98,660	103,170	104,460	33%	8%
CPU Installed Base	30,956	64,747	98,466	139,706	187,889	251,700	317,660	395,750	478,690	562,960	57%	25%
Workstation Installed Base	30,956	64,747	98,466	139,706	187,889	251,700	317,660	395,750	478,690	562,960	57%	25%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	31.0	24.4	28.7	18.2	20.0	19.7	19.6	19.4	19.2	19.2	-10%	-1%
Hardware-Only ASP	3.6	5.5	7.0	4.7	4.3	4.2	4.2	4.1	4.1	4.1	5%	-1%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	207	266	350	370	476	487	517	536	532	524	23%	2%
CPU Revenue	159	224	243	325	427	357	381	398	397	391	28%	-2%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	48	43	107	45	49	130	136	138	135	133	1%	22%
Software Revenue	111	135	144	182	211	278	292	290	281	276	18%	5%
Bundled	87	86	75	102	108	164	170	168	161	154	6%	7%
Unbundled	24	49	69	80	103	115	122	122	120	122	44%	3%
Service Revenue	26	22	21	38	44	49	51	50	48	47	14%	1%
Total Revenue	343	424	515	590	731	814	860	876	862	847	21%	3%
Increase over Prior Year	133%	24%	21%	15%	24%	11%	6%	2%	-2%	-2%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

17

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Rest of World
PLATFORM: All Platforms

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	3,412	6,315	5,471	7,563	10,188	13,930	18,850	24,330	30,740	38,320	31%	30%
Workstation Shipments	4,330	7,317	6,446	8,617	11,415	15,310	20,310	25,790	32,120	39,520	27%	28%
CPU Installed Base	6,048	11,907	16,617	22,963	30,725	41,150	56,340	77,010	104,080	138,770	50%	35%
Workstation Installed Base	10,561	17,742	23,782	31,376	40,619	52,580	69,460	91,820	120,500	156,630	40%	31%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	141.0	52.1	70.3	83.8	73.8	69.9	65.3	60.2	58.0	57.1	-15%	-5%
Hardware-Only ASP	46.8	22.7	15.3	12.2	10.1	9.3	8.4	7.9	7.3	6.9	-32%	-7%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	190	168	130	161	177	211	255	304	359	421	-2%	19%
CPU Revenue	123	109	92	122	136	159	196	238	285	340	2%	20%
Workstation Revenue	50	41	28	22	22	25	28	29	28	26	-18%	3%
Peripheral Revenue (Turnkey)	16	18	10	17	18	26	31	38	46	55	3%	25%
Software Revenue	22	29	35	58	69	97	123	153	179	219	33%	26%
Bundled	14	16	16	31	33	46	55	65	78	99	23%	25%
Unbundled	8	13	18	27	37	51	68	88	101	121	47%	27%
Service Revenue	27	27	33	45	50	61	74	89	104	123	17%	20%
Total Revenue	239	224	197	264	296	369	452	547	642	763	5%	21%
Increase over Prior Year	128%	-7%	-12%	34%	12%	25%	22%	21%	18%	19%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

18

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Rest of World
PLATFORM: Technical Workstation

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	1,002	1,330	1,213	2,039	2,371	3,040	4,020	5,410	7,120	9,400	24%	32%
Workstation Shipments	1,002	1,330	1,213	2,039	2,371	3,040	4,020	5,410	7,120	9,400	24%	32%
CPU Installed Base	1,451	2,768	3,920	5,764	7,478	9,930	13,150	17,770	24,100	32,710	51%	34%
Workstation Installed Base	1,451	2,768	3,920	5,764	7,478	9,930	13,150	17,770	24,100	32,710	51%	34%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	66.5	27.5	44.6	58.6	55.1	54.0	52.1	50.8	50.9	52.1	-5%	-1%
Hardware-Only ASP	27.3	26.1	19.9	14.6	14.6	13.3	12.2	11.5	11.2	11.0	-14%	-6%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	33	29	38	62	70	88	110	141	178	225	21%	26%
CPU Revenue	29	24	32	51	57	76	94	121	151	190	18%	27%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	3	5	6	11	13	12	16	21	27	35	41%	22%
Software Revenue	7	10	15	28	33	47	63	85	105	135	48%	32%
Bundled	6	7	8	18	20	26	33	44	57	77	36%	31%
Unbundled	1	3	7	10	13	21	30	41	47	58	92%	35%
Service Revenue	6	7	14	24	28	36	46	60	74	93	47%	27%
Total Revenue	45	46	67	115	131	171	220	287	357	453	30%	28%
Increase over Prior Year	118%	2%	44%	72%	14%	30%	29%	31%	25%	27%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

19

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Rest of World
PLATFORM: Host/Server

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	581	356	307	318	382	480	560	640	690	720	-10%	14%
Workstation Shipments	1,500	1,358	1,282	1,372	1,609	1,860	2,020	2,090	2,070	1,920	2%	4%
CPU Installed Base	1,506	1,542	1,494	1,618	1,855	2,070	2,410	2,810	3,270	3,750	5%	15%
Workstation Installed Base	6,019	7,377	8,659	10,031	11,749	13,500	15,530	17,620	19,690	21,610	18%	13%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	527.2	466.2	422.6	574.6	359.5	345.3	332.2	314.4	289.4	254.5	-9%	-7%
Hardware-Only ASP	220.3	310.9	180.9	154.7	149.2	135.1	123.1	112.0	100.8	89.8	-9%	-10%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	147	117	70	72	72	74	79	80	77	68	-16%	-1%
CPU Revenue	84	65	39	45	45	37	39	38	36	33	-15%	-6%
Workstation Revenue	50	41	28	22	22	25	28	29	28	26	-18%	3%
Peripheral Revenue (Turnkey)	13	12	4	5	5	12	13	13	13	9	-22%	15%
Software Revenue	10	13	13	16	17	25	27	27	27	28	14%	10%
Bundled	8	8	8	12	12	20	21	21	20	21	11%	12%
Unbundled	2	5	5	4	5	6	6	7	7	7	24%	6%
Service Revenue	20	19	17	19	20	22	24	24	23	21	-1%	1%
Total Revenue	178	149	100	107	109	122	130	130	128	117	-12%	2%
Increase over Prior Year	126%	-16%	-33%	6%	2%	12%	6%	0%	-2%	-8%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

20

TITLE: Final History and Forecast
APPLICATION: All Applications
REGION: Rest of World
PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	1,829	4,629	3,950	5,206	7,435	10,410	14,270	18,280	22,920	28,190	42%	31%
Workstation Shipments	1,829	4,629	3,950	5,206	7,435	10,410	14,270	18,280	22,920	28,190	42%	31%
CPU Installed Base	3,091	7,597	11,203	15,581	21,393	29,150	40,780	56,430	76,720	102,310	62%	37%
Workstation Installed Base	3,091	7,597	11,203	15,581	21,393	29,150	40,780	56,430	76,720	102,310	62%	37%
CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of U.S. Dollars)												
Turnkey ASP	20.2	9.8	11.5	16.2	9.4	9.2	9.4	9.1	8.8	8.8	-17%	-1%
Hardware-Only ASP	5.3	4.4	5.5	5.1	4.7	4.6	4.6	4.6	4.5	4.6	-3%	-0%
REVENUE DATA (Millions of U.S. Dollars)												
Hardware Revenue	11	21	22	27	35	48	66	84	104	128	35%	29%
CPU Revenue	10	20	22	26	35	47	63	79	97	117	35%	28%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue (Turnkey)	0	1	1	1	1	2	3	4	7	11	19%	76%
Software Revenue	5	6	7	13	19	25	32	41	47	57	37%	25%
Bundled	1	2	1	1	0	1	1	0	0	1	-18%	27%
Unbundled	5	5	6	12	18	25	32	40	47	56	40%	25%
Service Revenue	0	1	1	2	2	3	4	5	7	8	55%	29%
Total Revenue	16	28	30	43	56	77	102	130	158	193	36%	28%
Increase over Prior Year	198%	73%	7%	41%	32%	36%	34%	27%	22%	22%		

Source: Dataquest
September 1991

©1991 Dataquest Incorporated September—Reproduction Prohibited

Dataquest

Dataquest Research and Sales Offices:

Dataquest Incorporated
1290 Ridder Park Drive
San Jose, California 95131-2398
Phone: (408) 437-8000
Telex: 171973
Fax: (408) 437-0292

Technology Products Group
Phone: (800) 624-3280

Dataquest Incorporated
Ledgeway/Dataquest
The Corporate Center
550 Cochituate Road
Framingham, MA 01701
Phone: (508) 370-5555
Fax: (508) 370-6262

Dataquest Incorporated
Invitational Computer Conferences Division
3151 Airway Avenue, C-2
Costa Mesa, California 92626
Phone: (714) 957-0171
Telex: 5101002189 ICCDQ
Fax: (714) 957-0903

Dataquest Australia
Suite 1, Century Plaza
80 Berry Street
North Sydney, NSW 2060
Australia
Phone: (02) 959 4544
Telex: 25468
Fax: (02) 929 0635

Dataquest GmbH
Kronstadter Strasse 9
8000 Munich 80
West Germany
Phone: 011 49 89 93 09 09 0
Fax: 49 89 930 3277

Dataquest Europe Limited
Roussel House, Broadwater Park
Denham, Uxbridge, Middx UB9 5HP
England
Phone: 0895-835050
Telex: 266195
Fax: 0895 835260/1/2

Dataquest Europe SA
Tour Gallièni 2
36, avenue du Général-de-Gaulle
93175 Bagnolet Cedex
France
Phone: (1) 48 97 31 00
Telex: 233 263
Fax: (1) 48 97 34 00

Dataquest Hong Kong
Rm. 401, Connaught Comm. Bldg.
185 Wanchai Rd.
Wanchai, Hong Kong
Phone: 8387336
Telex: 80587
Fax: 5722375

Dataquest Israel
59 Mishmar Ha'yarden Street
Tel Aviv, Israel 69865
or
P.O. Box 18198
Tel Aviv, Israel
Phone: 52 913937
Telex: 341118
Fax: 52 32865

Dataquest Japan Limited
Shinkawa Sanko Building
1-3-17 Shinkawa, Chuo-ku
Tokyo 104 Japan
Phone: (03) 5566-0411
Fax: (03) 5566-0425

Dataquest Korea
Daeheung Bldg. 1105
648-23 Yeoksam-dong
Kangnam-gu
Seoul, Korea 135
Phone: (02) 556-4166
Fax: (02) 552-2661

Dataquest Singapore
4012 Ang Mo Kio Industrial Park 1
Ave. 10, #03-10 to #03-12
Singapore 2056
Phone: 4597181
Telex: 38257
Fax: 4563129

Dataquest Taiwan
Room 801/8th Floor
Ever Spring Building
147, Sect. 2, Chien Kuo N. Rd.
Taipei, Taiwan R.O.C. 104
Phone: (02) 501-7960
Telex: 27459
Fax: (02) 505-4265

Dataquest West Germany
In der Schneithohl 17
6242 Kronberg 2
West Germany
Phone: 06173/61685
Telex: 418089
Fax: 06173/67901

0011352

Market Share Estimates

Source: Dataquest

CAD/CAM/CAE

Dataquest

Market Share Estimates

Source: Dataquest

Table of Contents

	Page
Market Share Estimates	1
Market Database Methodology	1

Index of Tables

Topic	Page
ALL APPLICATIONS	
Table 1 Worldwide	3
Table 2 WW Technical Workstation	14
Table 3 WW Host/Server	21
Table 4 WW PC	25
Table 5 North America	32
Table 6 NA Technical Workstation	39
Table 7 NA Host/Server	44
Table 8 NA PC	47
Table 9 Europe	52
Table 10 Europe Technical Workstation	60
Table 11 Europe Host/Server	66
Table 12 Europe PC	69
Table 13 Asia	74
Table 14 Asia Technical Workstation	80
Table 15 Asia Host/Server	85
Table 16 Asia PC	88
Table 17 Rest of World	92
Table 18 ROW Technical Workstation	96
Table 19 ROW Host/Server	99
Table 20 ROW PC	101

Market Share Estimates

Market Share Estimates

The following is a description of the information reported in the *Market Share Estimates* book for each segment:

- *Source*—All companies in database; overview of industry
- Mechanical Applications—All companies in database with mechanical revenue
- AEC and GIS Applications—All companies in database with AEC or GIS revenue
- Electronic Design Automation Applications—All companies in database with EDA revenue
- Europe—All European-based companies and all other companies with more than $1 million in European revenue
- Asia—All Asian-based companies and all other companies with more than $1 million in Asian revenue
- Personal CAD and Distribution Channels—All companies in database with PC revenue

Market Database Methodology

Dataquest's CAD/CAM/CAE industry service is committed to consistently delivering to clients the most accurate data available on the CAD/CAM/CAE industry, both in terms of market history and forecast. Our annual delivery schedule is designed to meet that commitment, as follows:

- First quarter (January 31)—We will provide complete preliminary market share tables for the year just completed. Historical database is opened for changes for a six-month period.
- Second quarter (March 31): We provide complete preliminary forecast tables, including a new five-year forecast period.
- Third quarter (July 1): We send complete final updated market share tables based on additional data collection and analysis over the previous six months as well as company history tables. At this point, the market share database is frozen and will not be changed until the end of the year. For the next six months, supplementary market data will be based on this final market data.
- Fourth quarter (October 1): We provide complete final forecast tables, taking into consideration changes in the market during the previous six months.

Since January, when the preliminary market share numbers were published, over 35 new companies have been added to the market share database. This brings the total number of companies recognized in the CAD/CAM/CAE market to 430. The market share numbers also have been rechecked and verified for all vendors worldwide. Year-end 1990 financial results released this past spring have also been checked and incorporated into the final numbers.

Additionally, a number of companies significantly improved or made changes to their reporting methods during this past update cycle. These changes have been incorporated into this update. Dataquest's policy is to continually update its market information for any year, based on any new data received, in order to arrive at the most accurate market representation possible.

TABLE NUMBER: 1
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	1,777.3	1,140.9	343.6	67,855	12.4%	14.3%	8.4%	12.9%
Intergraph	1,013.3	541.5	201.2	10,585	7.1%	6.8%	4.9%	2.0%
Computervision	954.1	364.0	265.4	8,848	6.6%	4.6%	6.5%	1.7%
Digital	904.6	656.2	3.9	6,599	6.3%	8.2%	.1%	1.3%
Hewlett-Packard	812.4	593.9	75.9	48,409	5.7%	7.5%	1.9%	9.2%
Sun	589.3	512.8	.0	30,693	4.1%	6.4%	.0%	5.8%
Mentor Graphics	425.2	122.2	178.6	4,214	3.0%	1.5%	4.4%	.8%
Compaq	420.5	420.5	.0	70,078	2.9%	5.3%	.0%	13.3%
Fujitsu	395.4	248.5	107.4	8,778	2.8%	3.1%	2.6%	1.7%
McDonnell Douglas	352.7	181.9	122.0	4,907	2.5%	2.3%	3.0%	.9%
NEC	342.4	238.0	77.0	17,697	2.4%	3.0%	1.9%	3.4%
Siemens	269.7	136.3	95.2	3,652	1.9%	1.7%	2.3%	.7%
Autodesk	237.8	.0	237.8	0	1.7%	.0%	5.8%	.0%
Apple Computer	218.4	192.2	.0	42,000	1.5%	2.4%	.0%	8.0%
Cadence	211.2	.0	173.1	0	1.5%	.0%	4.2%	.0%
Nihon Unisys	210.9	141.3	27.4	1,900	1.5%	1.8%	.7%	.4%
Hitachi	208.3	100.0	87.5	6,400	1.4%	1.3%	2.1%	1.2%
Control Data	178.2	99.3	24.5	2,353	1.2%	1.2%	.6%	.4%
Valid	158.5	34.3	90.6	945	1.1%	.4%	2.2%	.2%
Silicon Graphics	151.3	137.8	.0	3,533	1.1%	1.7%	.0%	.7%
Schlumberger	143.0	50.8	52.3	1,500	1.0%	.6%	1.3%	.3%
Toshiba--NO OEM	100.1	50.0	40.0	2,224	.7%	.6%	1.0%	.4%
Dazix	99.8	18.1	39.9	735	.7%	.2%	1.0%	.1%
Mitsubishi Electric	90.3	71.5	11.8	1,700	.6%	.9%	.3%	.3%
Matra Datavision	82.6	37.2	33.1	901	.6%	.5%	.8%	.2%
Racal-Redac	82.3	4.1	66.3	380	.6%	.1%	1.6%	.1%
SDRC	80.5	.0	80.5	0	.6%	.0%	2.0%	.0%
CADAM	80.2	35.0	38.6	5,000	.6%	.4%	.9%	1.0%
Zuken	78.9	35.3	43.6	557	.5%	.4%	1.1%	.1%
ESRI	71.2	.0	63.0	0	.5%	.0%	1.5%	.0%
Mutoh Industries--NO OEM	70.4	36.3	26.0	1,625	.5%	.5%	.6%	.3%
Auto-Trol	67.1	26.8	23.5	789	.5%	.3%	.6%	.2%
Hitachi Zosen Info Systems	62.5	49.9	.6	633	.4%	.6%	.0%	.1%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 1
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Sharp System Products--NO OEM	55.6	28.9	26.7	350	.4%	.4%	.7%	.1%
Uchida Yoko	55.4	52.6	2.8	880	.4%	.7%	.1%	.2%
MacNeal-Schwendler	54.0	.0	51.9	0	.4%	.0%	1.3%	.0%
Norsk Data	50.0	25.6	8.8	500	.3%	.3%	.2%	.1%
Landmark Graphics	48.5	23.8	14.6	297	.3%	.3%	.4%	.1%
ISICAD	48.0	19.2	22.2	407	.3%	.2%	.5%	.1%
Cisigraph	43.2	15.2	15.0	400	.3%	.2%	.4%	.1%
Hakuto	41.7	28.8	12.9	1,220	.3%	.4%	.3%	.2%
STI-Straessle	39.6	9.1	21.8	370	.3%	.1%	.5%	.1%
Tokyo Electron--NO OEM	39.4	13.0	18.9	143	.3%	.2%	.5%	.0%
Wacom	38.9	7.8	27.2	632	.3%	.1%	.7%	.1%
Unisys	38.0	19.4	13.3	581	.3%	.2%	.3%	.1%
Seiko Instruments--NO OEM	36.3	15.6	16.5	232	.3%	.2%	.4%	.0%
Mitsui Engineering	34.7	24.3	7.0	227	.2%	.3%	.2%	.0%
Sumitomo Denko Workstation	31.2	31.2	.0	2,280	.2%	.4%	.0%	.4%
Nemetschek	30.9	12.3	18.5	500	.2%	.2%	.5%	.1%
Zycad	30.4	24.9	.0	250	.2%	.3%	.0%	.0%
ItalCad	30.0	14.1	7.2	280	.2%	.2%	.2%	.1%
Gerber Systems	29.5	14.5	9.8	399	.2%	.2%	.2%	.1%
Cimlinc	29.5	5.9	17.7	563	.2%	.1%	.4%	.1%
Scientific Calc.	28.6	3.9	16.8	102	.2%	.0%	.4%	.0%
PDA Engineering	28.4	.0	28.4	0	.2%	.0%	.7%	.0%
Viewlogic Systems	27.5	.0	23.1	0	.2%	.0%	.6%	.0%
Investronica SA	27.0	21.6	2.7	1,080	.2%	.3%	.1%	.2%
CADIX	26.9	10.8	13.5	198	.2%	.1%	.3%	.0%
Parametric Technology	26.5	.0	24.3	0	.2%	.0%	.6%	.0%
Synopsys	26.2	.0	23.6	0	.2%	.0%	.6%	.0%
Calay	26.1	8.3	15.2	425	.2%	.1%	.4%	.1%
EEsof	26.0	.1	22.7	18	.2%	.0%	.6%	.0%
Kewill Systems	25.0	7.5	13.8	500	.2%	.1%	.3%	.1%
Swanson Analysis	24.6	.0	24.6	0	.2%	.0%	.6%	.0%
PAFEC	23.3	.0	23.3	0	.2%	.0%	.6%	.0%
ICL	22.9	13.5	7.8	629	.2%	.2%	.2%	.1%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 1
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					--- Market Share ---			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Alias Research	22.8	.0	22.8	0	.2%	.0%	.6%	.0%
Ferranti	21.8	8.1	10.0	201	.2%	.1%	.2%	.0%
MCS	20.7	.0	18.3	0	.1%	.0%	.4%	.0%
GeoVision Corp.	20.4	14.5	4.3	240	.1%	.2%	.1%	.0%
Wiechers Datentechnik	20.3	16.2	4.1	494	.1%	.2%	.1%	.1%
Toyo Information Systems-NO OEM	20.1	12.2	5.9	210	.1%	.2%	.1%	.0%
Accugraph	19.4	8.6	8.8	500	.1%	.1%	.2%	.1%
Vero International Software	19.2	.0	17.5	0	.1%	.0%	.4%	.0%
Everex Systems	18.8	18.8	.0	5,723	.1%	.2%	.0%	1.1%
Teradyne	18.8	.0	15.5	0	.1%	.0%	.4%	.0%
Delcam International	18.8	6.6	9.4	312	.1%	.1%	.2%	.1%
Dell Computer	18.6	18.6	.0	4,650	.1%	.2%	.0%	.9%
Ziegler	18.5	.0	18.5	0	.1%	.0%	.5%	.0%
VLSI Technology	18.5	.7	15.2	53	.1%	.0%	.4%	.0%
ADRA Systems	18.0	6.2	10.0	320	.1%	.1%	.2%	.1%
Century Research Center	17.8	9.4	6.6	102	.1%	.1%	.2%	.0%
Xilinx	16.5	.0	14.8	0	.1%	.0%	.4%	.0%
Cimatron	15.9	7.2	7.2	471	.1%	.1%	.2%	.1%
CADKEY	15.8	1.0	14.8	150	.1%	.0%	.4%	.0%
Mannesmann PROCAD	15.7	8.0	4.4	218	.1%	.1%	.1%	.0%
Hahn & Kolb	15.4	9.3	4.6	220	.1%	.1%	.1%	.0%
ISYKON Software	15.4	7.7	5.4	220	.1%	.1%	.1%	.0%
ABB Cade International	15.2	8.9	4.6	66	.1%	.1%	.1%	.0%
Solbourne	15.1	15.0	.0	1,120	.1%	.2%	.0%	.2%
LSI Logic	14.6	1.5	11.0	37	.1%	.0%	.3%	.0%
Research Machines	14.3	14.3	.0	2,200	.1%	.2%	.0%	.4%
Graphtec Engineering	13.9	7.0	6.3	300	.1%	.1%	.2%	.1%
Synercom	13.7	.0	6.4	0	.1%	.0%	.2%	.0%
Ikos Systems	13.5	13.5	.0	61	.1%	.2%	.0%	.0%
Genasys II	13.2	4.6	7.9	46	.1%	.1%	.2%	.0%
Caditron	13.0	6.5	5.2	200	.1%	.1%	.1%	.0%
Sysscan	12.6	5.6	3.3	112	.1%	.1%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 1
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
LPKF	12.3	8.0	3.1	500	.1%	.1%	.1%	.1%
Exapt	12.3	6.0	4.2	211	.1%	.1%	.1%	.0%
Fides Industrielle Automation	12.2	1.4	11.0	75	.1%	.0%	.3%	.0%
Star Informatic	12.1	10.5	3.2	550	.1%	.1%	.1%	.1%
CAD Centre	12.1	.0	6.4	0	.1%	.0%	.2%	.0%
Sony	12.0	10.5	.0	697	.1%	.1%	.0%	.1%
Logic Automation	11.8	.0	11.8	0	.1%	.0%	.3%	.0%
CAD Lab	11.5	.0	9.2	0	.1%	.0%	.2%	.0%
Andor	11.1	2.8	7.9	100	.1%	.0%	.2%	.0%
Aries Technology	11.0	.0	9.9	0	.1%	.0%	.2%	.0%
Data I/O	10.8	.0	10.8	0	.1%	.0%	.3%	.0%
Silvar-Lisco	10.8	.0	7.0	0	.1%	.0%	.2%	.0%
Laser-Scan	10.7	2.6	5.3	35	.1%	.0%	.1%	.0%
Framasoft	10.5	.0	6.3	0	.1%	.0%	.2%	.0%
ICAD	10.5	.0	8.4	0	.1%	.0%	.2%	.0%
Aucotec	10.5	3.7	5.8	167	.1%	.0%	.1%	.0%
Microway	10.5	7.1	3.5	95	.1%	.1%	.1%	.0%
INS Engineering	10.5	7.6	1.8	94	.1%	.1%	.0%	.0%
Omron	10.4	9.4	1.0	300	.1%	.1%	.0%	.1%
ETAK	10.3	.5	9.7	27	.1%	.0%	.2%	.0%
Design Automation	10.2	.0	10.2	0	.1%	.0%	.3%	.0%
Kockums Computer Systems	10.1	2.5	5.6	500	.1%	.0%	.1%	.1%
ACTEL	10.0	.0	9.0	0	.1%	.0%	.2%	.0%
Altera	10.0	.0	8.5	0	.1%	.0%	.2%	.0%
Moss Systems	9.6	.0	8.6	0	.1%	.0%	.2%	.0%
Orcad	9.2	.0	9.2	0	.1%	.0%	.2%	.0%
MARC	9.1	.0	9.1	0	.1%	.0%	.2%	.0%
Soft-Tech Software Technologies	9.0	.9	7.2	225	.1%	.0%	.2%	.0%
Radan Computational	8.9	3.1	4.5	300	.1%	.0%	.1%	.1%
Tebis	8.4	1.3	5.9	42	.1%	.0%	.1%	.0%
Genrad	8.3	1.6	5.5	86	.1%	.0%	.1%	.0%
Analogy	8.1	.0	7.3	0	.1%	.0%	.2%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 1
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
DCA Softdesk	8.0	.0	8.0	0	.1%	.0%	.2%	.0%
Geobased Systems	7.7	1.5	5.8	161	.1%	.0%	.1%	.0%
CPU	7.6	.0	6.9	0	.1%	.0%	.2%	.0%
DAT Standard Information system	7.6	.0	7.2	0	.1%	.0%	.2%	.0%
Microsim	7.5	.0	7.1	0	.1%	.0%	.2%	.0%
Albert Nestler	7.4	2.4	3.2	95	.1%	.0%	.1%	.0%
BATISOFT	7.2	1.1	3.6	230	.0%	.0%	.1%	.0%
ERDAS	7.2	1.3	5.5	37	.0%	.0%	.1%	.0%
t2 Solutions	7.1	3.6	2.6	136	.0%	.0%	.1%	.0%
Ground Modelling Systems	7.1	4.7	3.5	40	.0%	.1%	.1%	.0%
ABB Engineering Automation	7.0	.0	7.0	0	.0%	.0%	.2%	.0%
Kloeckner-Moeller	6.8	4.1	2.4	107	.0%	.1%	.1%	.0%
Quickturn Systems	6.5	6.5	.0	50	.0%	.1%	.0%	.0%
rotring euroCAD	6.4	4.0	2.4	170	.0%	.1%	.1%	.0%
Engineering Mechanics	6.3	2.1	3.6	500	.0%	.0%	.1%	.1%
Spectrum Graphics	6.3	1.9	3.1	58	.0%	.0%	.1%	.0%
Meta-Software	6.2	.0	6.1	0	.0%	.0%	.2%	.0%
Comdisco Systems	6.2	.0	5.6	0	.0%	.0%	.1%	.0%
RIB/RZB	6.2	.6	4.9	30	.0%	.0%	.1%	.0%
Sigma Design	6.0	.0	5.9	0	.0%	.0%	.1%	.0%
Ascent Logic Corp	6.0	.0	4.8	0	.0%	.0%	.1%	.0%
CNC Software	6.0	.0	6.0	0	.0%	.0%	.1%	.0%
Mode CAD	6.0	1.5	4.2	50	.0%	.0%	.1%	.0%
Test Systems Strategies	6.0	.0	5.2	0	.0%	.0%	.1%	.0%
Mechanical Dynamics	6.0	.0	5.3	0	.0%	.0%	.1%	.0%
CAP Electronic Sweet's	5.9	.0	4.8	0	.0%	.0%	.1%	.0%
Technische Computer Systeme	5.8	1.2	4.6	147	.0%	.0%	.1%	.0%
Clemessy	5.5	4.4	.8	10	.0%	.1%	.0%	.0%
Seattle Silicon	5.5	.0	3.8	0	.0%	.0%	.1%	.0%
CAD Software	5.4	.0	4.6	0	.0%	.0%	.1%	.0%
Serbi	5.2	.0	5.2	0	.0%	.0%	.1%	.0%
debis Systemhaus	5.2	1.3	3.1	180	.0%	.0%	.1%	.0%
Computer-Aided Design Group	5.1	.0	3.7	0	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 1
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Olivetti	5.0	4.2	.0	800	.0%	.1%	.0%	.2%
Aspen Technology	5.0	.0	4.5	0	.0%	.0%	.1%	.0%
Strategic Mapping	5.0	.0	5.0	0	.0%	.0%	.1%	.0%
Geographic Systems (IIS)	4.9	.0	4.4	0	.0%	.0%	.1%	.0%
Micrografx	4.8	.0	4.8	0	.0%	.0%	.1%	.0%
Claris	4.7	.0	4.7	0	.0%	.0%	.1%	.0%
Geographic Systems (WPS)	4.6	.0	4.2	0	.0%	.0%	.1%	.0%
Computer Services Consultants	4.5	.0	4.5	0	.0%	.0%	.1%	.0%
Marcus Computer Systeme	4.4	2.3	1.5	137	.0%	.0%	.0%	.0%
Algor Interactive Systems	4.3	.0	3.8	0	.0%	.0%	.1%	.0%
Hochtief	4.2	.6	2.9	36	.0%	.0%	.1%	.0%
Technovision	4.2	.0	4.2	0	.0%	.0%	.1%	.0%
Pathtrace	4.1	1.1	2.7	58	.0%	.0%	.1%	.0%
BETRONEX	4.1	.0	4.1	0	.0%	.0%	.1%	.0%
ACDS	4.0	.0	3.4	0	.0%	.0%	.1%	.0%
Dynamic Graphics	4.0	.0	3.4	0	.0%	.0%	.1%	.0%
MapInfo	4.0	.0	3.2	0	.0%	.0%	.1%	.0%
Vantage Analysis Systems	4.0	.0	4.0	0	.0%	.0%	.1%	.0%
Whessoe Computing Systems	4.0	.0	4.0	0	.0%	.0%	.1%	.0%
AnaCAD	3.9	.0	3.9	0	.0%	.0%	.1%	.0%
Intercad	3.9	2.0	1.1	189	.0%	.0%	.0%	.0%
Integrated Computer Graphics	3.9	1.9	1.6	424	.0%	.0%	.0%	.1%
Radian Corporation	3.9	.0	2.3	0	.0%	.0%	.1%	.0%
Ontologic	3.8	.0	3.8	0	.0%	.0%	.1%	.0%
International Software Systems	3.8	.0	3.8	0	.0%	.0%	.1%	.0%
Foresight Resources	3.6	.0	3.2	0	.0%	.0%	.1%	.0%
LandCadd	3.5	.0	3.3	0	.0%	.0%	.1%	.0%
Micro Engineering Solutions	3.5	1.0	2.3	44	.0%	.0%	.1%	.0%
Sophia Systems	3.5	.9	2.3	50	.0%	.0%	.1%	.0%
Wisdom Systems	3.5	.0	2.6	0	.0%	.0%	.1%	.0%
American Small Business Comp.	3.5	.0	3.5	0	.0%	.0%	.1%	.0%
Robocom	3.5	.0	3.5	0	.0%	.0%	.1%	.0%
Datagraphic	3.4	1.7	1.4	55	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 1
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Bechtel Software	3.2	.0	3.0	0	.0%	.0%	.1%	.0%
Anilam Electronics	3.2	1.0	1.9	40	.0%	.0%	.0%	.0%
Complansoft CAD	3.2	1.6	1.6	220	.0%	.0%	.0%	.0%
Quad Design Technology	3.1	.0	2.9	0	.0%	.0%	.1%	.0%
Innovative Data Design	3.0	.0	3.0	0	.0%	.0%	.1%	.0%
Autometric	3.0	2.0	1.1	20	.0%	.0%	.0%	.0%
EPIC Design Technology	3.0	.0	2.7	0	.0%	.0%	.1%	.0%
Ultimap	3.0	1.1	.9	30	.0%	.0%	.0%	.0%
XAO Industrie	3.0	1.1	1.8	108	.0%	.0%	.0%	.0%
Motorola	2.9	.0	2.9	0	.0%	.0%	.1%	.0%
ISKA	2.9	1.3	1.2	53	.0%	.0%	.0%	.0%
Pacific Numerics	2.9	.0	2.9	0	.0%	.0%	.1%	.0%
Quantic Laboratories	2.9	.0	2.7	0	.0%	.0%	.1%	.0%
Cadtronic	2.8	1.6	1.3	84	.0%	.0%	.0%	.0%
Assigraph	2.8	.0	2.2	21	.0%	.0%	.1%	.0%
Academi Systems	2.7	.3	2.1	11	.0%	.0%	.1%	.0%
Scientific & Engineering SW	2.7	.0	2.7	0	.0%	.0%	.1%	.0%
Alper Systems	2.7	1.3	.7	18	.0%	.0%	.0%	.0%
Superdraft	2.7	1.3	1.3	147	.0%	.0%	.0%	.0%
FEA Limited	2.7	.6	.6	50	.0%	.0%	.0%	.0%
Gable CAD Systems	2.7	1.1	1.3	34	.0%	.0%	.0%	.0%
ALS Design	2.6	.0	2.6	0	.0%	.0%	.1%	.0%
CAMTEK	2.5	.0	2.1	0	.0%	.0%	.1%	.0%
ALDEC	2.5	.0	2.5	0	.0%	.0%	.1%	.0%
Infinite Graphics	2.5	.0	2.5	0	.0%	.0%	.1%	.0%
Kubota Computer	2.5	1.7	.9	347	.0%	.0%	.0%	.1%
Carrier Corporation	2.5	.0	2.5	0	.0%	.0%	.1%	.0%
Visionics	2.4	.0	1.8	10	.0%	.0%	.0%	.0%
PacSoft	2.4	.0	2.4	0	.0%	.0%	.1%	.0%
Intera Tydac	2.4	.0	2.4	0	.0%	.0%	.1%	.0%
Pasco	2.4	1.3	1.1	32	.0%	.0%	.0%	.0%
Accel Technologies	2.3	.0	2.1	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	2.3	.4	1.9	15	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 1
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Caroline Informatique	2.3	.5	1.6	30	.0%	.0%	.0%	.0%
Facility Mapping Systems	2.2	.0	2.0	0	.0%	.0%	.0%	.0%
Catalpa	2.2	.8	1.1	18	.0%	.0%	.0%	.0%
CADWorks	2.2	.0	1.9	0	.0%	.0%	.0%	.0%
GEOVISION Inc.	2.2	1.3	.5	842	.0%	.0%	.0%	.2%
Secagraphics	2.2	1.5	.7	38	.0%	.0%	.0%	.0%
Generation 5 Technology	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
Lamp Software	2.1	.6	1.4	103	.0%	.0%	.0%	.0%
Shared Resources	2.1	.1	.1	4	.0%	.0%	.0%	.0%
Evolution Computing	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
GeoGraphix	2.0	.0	1.5	0	.0%	.0%	.0%	.0%
Land Innovation	2.0	.0	2.0	0	.0%	.0%	.0%	.0%
Terr-Mar	2.0	.9	1.1	33	.0%	.0%	.0%	.0%
Terra Sciences	2.0	.0	2.0	0	.0%	.0%	.0%	.0%
Royal Digital Systems	1.9	.0	1.7	0	.0%	.0%	.0%	.0%
Sinus Software	1.9	.9	.9	36	.0%	.0%	.0%	.0%
Kork Systems	1.8	.2	1.2	23	.0%	.0%	.0%	.0%
Elstree Computing	1.8	.8	1.0	50	.0%	.0%	.0%	.0%
Macao Systems	1.8	1.0	.7	17	.0%	.0%	.0%	.0%
Ricoh--NO OEM	1.8	.0	1.5	0	.0%	.0%	.0%	.0%
SIMUCAD	1.8	.0	1.7	0	.0%	.0%	.0%	.0%
CAD-UL	1.7	.0	1.7	0	.0%	.0%	.0%	.0%
CAD/CAM Group	1.7	.0	1.7	0	.0%	.0%	.0%	.0%
Omation	1.6	.0	1.6	0	.0%	.0%	.0%	.0%
CIVILSOFT	1.6	.0	1.6	0	.0%	.0%	.0%	.0%
Massteck	1.6	.0	1.6	0	.0%	.0%	.0%	.0%
MEDESIGN	1.5	.4	.5	17	.0%	.0%	.0%	.0%
National Semiconductor	1.5	.3	1.2	11	.0%	.0%	.0%	.0%
Emerald Design Systems	1.5	.7	.6	24	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	1.5	.0	1.5	0	.0%	.0%	.0%	.0%
Phase Three Logic	1.5	.0	1.3	0	.0%	.0%	.0%	.0%
ARKTEC	1.4	.4	1.0	40	.0%	.0%	.0%	.0%
Computational Mechanics	1.4	.0	1.4	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 1
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
FEGS	1.4	.0	1.1	0	.0%	.0%	.0%	.0%
Comshoppe	1.4	.0	1.4	0	.0%	.0%	.0%	.0%
Daniel Geophysical	1.3	.1	1.2	20	.0%	.0%	.0%	.0%
DECAD	1.3	.2	.8	5	.0%	.0%	.0%	.0%
Smallworld Systems	1.3	.5	.8	36	.0%	.0%	.0%	.0%
Engineering Software	1.2	.1	1.1	34	.0%	.0%	.0%	.0%
Integer	1.2	.0	1.0	0	.0%	.0%	.0%	.0%
DAPCO	1.2	.0	.8	0	.0%	.0%	.0%	.0%
GRAPHSOFT	1.2	.0	1.2	0	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	1.2	.0	1.2	0	.0%	.0%	.0%	.0%
A/E Microsystems	1.1	.8	.2	100	.0%	.0%	.0%	.0%
Tanner Research	1.1	.0	1.0	0	.0%	.0%	.0%	.0%
Spectrum Software	1.1	.0	1.1	0	.0%	.0%	.0%	.0%
Mega CADD	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Object Design	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Aucos elektronische Gerate	1.0	.3	.7	100	.0%	.0%	.0%	.0%
Aura CAD/CAM Systems	1.0	.0	.9	0	.0%	.0%	.0%	.0%
Geomath	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Intrinsix	1.0	1.0	.0	10	.0%	.0%	.0%	.0%
Point Control	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Simulation Science	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Cascade Graphics	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Cadisys	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Engineering Systems Corp.	.9	.0	.7	0	.0%	.0%	.0%	.0%
Aptos	.9	.0	.9	0	.0%	.0%	.0%	.0%
Objectivity	.9	.0	.9	0	.0%	.0%	.0%	.0%
Vision 3D	.9	.5	.2	6	.0%	.0%	.0%	.0%
S.T.L.D. s.r.l.	.8	.0	.8	0	.0%	.0%	.0%	.0%
A.I. Systems	.8	.0	.8	0	.0%	.0%	.0%	.0%
Number One Systems	.8	.1	.7	20	.0%	.0%	.0%	.0%
CADMATIC	.8	.1	.5	5	.0%	.0%	.0%	.0%
Caddlink	.8	.0	.8	0	.0%	.0%	.0%	.0%
Rasna Corporation	.8	.0	.8	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 1
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Inca	.7	.0	.7	0	.0%	.0%	.0%	.0%
Maptek	.7	.0	.7	0	.0%	.0%	.0%	.0%
Contract Data Research	.7	.0	.5	0	.0%	.0%	.0%	.0%
Ithaca Software	.6	.0	.6	0	.0%	.0%	.0%	.0%
Dynaware	.6	.0	.6	0	.0%	.0%	.0%	.0%
Masta Corporation	.6	.0	.4	5	.0%	.0%	.0%	.0%
Douglas Electronics	.6	.0	.6	0	.0%	.0%	.0%	.0%
IGC Technology	.6	.0	.6	0	.0%	.0%	.0%	.0%
Uniras	.6	.0	.6	0	.0%	.0%	.0%	.0%
Mc2 Engineering Software	.6	.0	.6	0	.0%	.0%	.0%	.0%
Pelton Engineering	.6	.0	.6	0	.0%	.0%	.0%	.0%
Vamp	.6	.0	.6	0	.0%	.0%	.0%	.0%
ACERI SA	.6	.1	.3	3	.0%	.0%	.0%	.0%
Machinery Sales	.6	.0	.6	0	.0%	.0%	.0%	.0%
CAD-Capture	.5	.0	.1	0	.0%	.0%	.0%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.0%	.0%
CAD Language Systems	.5	.0	.4	0	.0%	.0%	.0%	.0%
Capilano Computing	.5	.0	.5	0	.0%	.0%	.0%	.0%
Imagine That	.5	.0	.5	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.5	.0	.4	0	.0%	.0%	.0%	.0%
Premise	.5	.0	.5	0	.0%	.0%	.0%	.0%
ECOM Associates	.5	.0	.5	3	.0%	.0%	.0%	.0%
PLUS Logic	.4	.0	.4	0	.0%	.0%	.0%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.0%	.0%
LEICA	.4	.0	.3	0	.0%	.0%	.0%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.0%	.0%
Synthesis	.3	.0	.3	0	.0%	.0%	.0%	.0%
Geosoft	.3	.0	.3	0	.0%	.0%	.0%	.0%
Microtel Pacific Research	.3	.0	.2	1	.0%	.0%	.0%	.0%
Kontron Instruments	.2	.1	.1	4	.0%	.0%	.0%	.0%
The Great Softwestern Co.	.2	.0	.2	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 1 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Bobcat Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Instrumatic Espanola	.2	.0	.2	0	.0%	.0%	.0%	.0%
Simutest	.2	.0	.2	0	.0%	.0%	.0%	.0%
ESDU International	.2	.0	.2	0	.0%	.0%	.0%	.0%
TOOL Software	.2	.1	.1	4	.0%	.0%	.0%	.0%
Sierra Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
Dolphin Integration	.1	.0	.1	0	.0%	.0%	.0%	.0%
Other Companies	853.3	831.5	.3	127,294	5.9%	10.4%	.0%	24.2%
All Companies	14,367.2	7,958.6	4,073.3	525,153	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	10,879.9	6,202.4	2,743.5	454,451	75.7%	77.9%	67.4%	86.5%
All Asian-Based Companies	2,047.3	1,246.5	603.2	49,908	14.2%	15.7%	14.8%	9.5%
All European-Based Companies	1,440.0	509.7	726.5	20,794	10.0%	6.4%	17.8%	4.0%
All Hardware Companies	3,949.6	3,466.1	.0	385,032	27.5%	43.6%	.0%	73.3%
All Turnkey & SW Companies	10,417.6	4,492.5	4,073.3	140,120	72.5%	56.4%	100.0%	26.7%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 2
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Intergraph	838.6	468.7	150.7	9,276	11.0%	12.6%	6.2%	6.8%
Computervision	833.0	320.9	225.5	6,540	11.0%	8.7%	9.2%	4.8%
Hewlett-Packard	659.3	470.8	75.9	26,582	8.7%	12.7%	3.1%	19.3%
Sun	474.5	417.6	.0	26,373	6.2%	11.3%	.0%	19.2%
Mentor Graphics	425.2	122.2	178.6	4,214	5.6%	3.3%	7.3%	3.1%
McDonnell Douglas	276.5	143.0	95.1	3,181	3.6%	3.9%	3.9%	2.3%
Siemens	244.4	121.9	85.6	3,244	3.2%	3.3%	3.5%	2.4%
Digital	201.6	143.9	2.9	6,599	2.7%	3.9%	.1%	4.8%
Cadence	185.9	.0	152.1	0	2.4%	.0%	6.2%	.0%
NEC	165.4	92.7	59.6	8,695	2.2%	2.5%	2.4%	6.3%
Fujitsu	162.1	101.9	44.0	3,816	2.1%	2.7%	1.8%	2.8%
Valid	158.5	34.3	90.6	945	2.1%	.9%	3.7%	.7%
IBM	158.3	96.3	33.3	3,899	2.1%	2.6%	1.4%	2.8%
Silicon Graphics	149.6	136.4	.0	3,501	2.0%	3.7%	.0%	2.5%
Hitachi	104.2	50.0	43.7	2,162	1.4%	1.3%	1.8%	1.6%
Schlumberger	100.1	34.3	37.7	855	1.3%	.9%	1.5%	.6%
Dazix	99.8	18.1	39.9	735	1.3%	.5%	1.6%	.5%
Matra Datavision	82.6	37.2	33.1	901	1.1%	1.0%	1.4%	.7%
Control Data	75.9	51.6	12.9	1,777	1.0%	1.4%	.5%	1.3%
Zuken	75.0	33.4	41.6	522	1.0%	.9%	1.7%	.4%
Racal-Redac	74.3	4.1	58.7	380	1.0%	.1%	2.4%	.3%
SDRC	70.0	.0	70.0	0	.9%	.0%	2.9%	.0%
Auto-Trol	67.1	26.8	23.5	789	.9%	.7%	1.0%	.6%
Mitsubishi Electric	67.0	58.6	4.5	666	.9%	1.6%	.2%	.5%
Toshiba--NO OEM	64.5	32.3	25.8	566	.8%	.9%	1.1%	.4%
Nihon Unisys	62.6	41.9	8.1	736	.8%	1.1%	.3%	.5%
Hitachi Zosen Info Systems	58.8	49.9	.6	633	.8%	1.3%	.0%	.5%
Uchida Yoko	55.4	52.6	2.8	880	.7%	1.4%	.1%	.6%
Landmark Graphics	48.5	23.8	14.6	297	.6%	.6%	.6%	.2%
Sharp System Products--NO OEM	48.4	25.2	23.2	301	.6%	.7%	1.0%	.2%
ESRI	40.6	.0	35.3	0	.5%	.0%	1.4%	.0%
STI-Straessle	39.6	9.1	21.8	370	.5%	.2%	.9%	.3%
Tokyo Electron--NO OEM	39.4	13.0	18.9	143	.5%	.4%	.8%	.1%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 2
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
Company	Revenue	Revenue	Revenue	Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Cisigraph	38.9	13.6	13.6	314	.5%	.4%	.6%	.2%
ISICAD	36.8	19.2	11.0	407	.5%	.5%	.5%	.3%
Seiko Instruments--NO OEM	32.4	13.9	15.2	216	.4%	.4%	.6%	.2%
Mitsui Engineering	31.6	22.1	6.3	207	.4%	.6%	.3%	.2%
ItalCad	30.0	14.1	7.2	280	.4%	.4%	.3%	.2%
Mutoh Industries--NO OEM	30.0	14.5	10.1	302	.4%	.4%	.4%	.2%
Gerber Systems	29.5	14.5	9.8	399	.4%	.4%	.4%	.3%
Cimlinc	29.5	5.9	17.7	563	.4%	.2%	.7%	.4%
Unisys	29.3	14.9	10.3	458	.4%	.4%	.4%	.3%
Sumitomo Denko Workstation	28.4	28.4	.0	2,148	.4%	.8%	.0%	1.6%
CADIX	26.9	10.8	13.5	198	.4%	.3%	.6%	.1%
Parametric Technology	26.5	.0	24.3	0	.3%	.0%	1.0%	.0%
Calay	26.1	8.3	15.2	425	.3%	.2%	.6%	.3%
Norsk Data	25.4	14.7	5.1	316	.3%	.4%	.2%	.2%
Zycad	24.3	19.2	.0	204	.3%	.5%	.0%	.1%
Scientific Calc.	23.4	2.8	12.7	76	.3%	.1%	.5%	.1%
ICL	22.9	13.5	7.8	629	.3%	.4%	.3%	.5%
Alias Research	22.8	.0	22.8	0	.3%	.0%	.9%	.0%
Kewill Systems	22.5	6.8	12.4	474	.3%	.2%	.5%	.3%
Ferranti	21.8	8.1	10.0	201	.3%	.2%	.4%	.1%
PAFEC	20.9	.0	20.9	0	.3%	.0%	.9%	.0%
Autodesk	19.7	.0	19.7	0	.3%	.0%	.8%	.0%
PDA Engineering	19.1	.0	19.1	0	.3%	.0%	.8%	.0%
Delcam International	18.8	6.6	9.4	312	.2%	.2%	.4%	.2%
Accugraph	17.3	8.4	7.1	479	.2%	.2%	.3%	.3%
VLSI Technology	17.1	.5	14.2	49	.2%	.0%	.6%	.0%
Century Research Center	16.5	8.7	6.1	95	.2%	.2%	.2%	.1%
Nannesmann PROCAD	15.7	8.0	4.4	218	.2%	.2%	.2%	.2%
ISYKON Software	15.4	7.7	5.4	220	.2%	.2%	.2%	.2%
Toyo Information Systems-NO OEM	15.3	9.6	4.4	182	.2%	.3%	.2%	.1%
ABB Cade International	15.2	8.9	4.6	66	.2%	.2%	.2%	.0%
GeoVision Corp.	14.7	10.4	3.1	195	.2%	.3%	.1%	.1%
Graphtec Engineering	13.9	7.0	6.3	300	.2%	.2%	.3%	.2%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 2
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Hahn & Kolb	13.9	8.3	4.2	190	.2%	.2%	.2%	.1%
ADRA Systems	13.9	6.2	6.2	320	.2%	.2%	.3%	.2%
LSI Logic	13.1	1.3	9.9	34	.2%	.0%	.4%	.0%
Synopsys	12.6	.0	11.3	0	.2%	.0%	.5%	.0%
Ikos Systems	12.6	12.6	.0	57	.2%	.3%	.0%	.0%
Star Informatic	12.1	10.5	3.2	550	.2%	.3%	.1%	.4%
CAD Centre	12.1	.0	6.4	0	.2%	.0%	.3%	.0%
Sony	12.0	10.5	.0	697	.2%	.3%	.0%	.5%
Genasys II	11.9	4.2	7.1	39	.2%	.1%	.3%	.0%
EEsof	11.7	.1	9.8	18	.2%	.0%	.4%	.0%
Viewlogic Systems	11.6	.0	9.8	0	.2%	.0%	.4%	.0%
MacNeal-Schwendler	11.6	.0	11.1	0	.2%	.0%	.5%	.0%
Logic Automation	11.6	.0	11.6	0	.2%	.0%	.5%	.0%
Swanson Analysis	11.6	.0	11.6	0	.2%	.0%	.5%	.0%
Cimatron	11.2	5.0	5.0	330	.1%	.1%	.2%	.2%
CAD Lab	11.0	.0	8.8	0	.1%	.0%	.4%	.0%
ICAD	10.5	.0	8.4	0	.1%	.0%	.3%	.0%
Omron	10.4	9.4	1.0	300	.1%	.3%	.0%	.2%
Silvar-Lisco	10.3	.0	6.6	0	.1%	.0%	.3%	.0%
CADAM	10.2	.0	8.6	0	.1%	.0%	.4%	.0%
Kockums Computer Systems	10.1	2.5	5.6	500	.1%	.1%	.2%	.4%
Laser-Scan	9.7	2.4	4.8	30	.1%	.1%	.2%	.0%
Moss Systems	9.6	.0	8.6	0	.1%	.0%	.4%	.0%
MCS	9.5	.0	8.5	0	.1%	.0%	.3%	.0%
Framasoft	9.5	.0	5.7	0	.1%	.0%	.2%	.0%
Aries Technology	8.8	.0	7.9	0	.1%	.0%	.3%	.0%
Radan Computational	8.8	3.1	4.4	296	.1%	.1%	.2%	.2%
Synercom	8.7	.0	4.0	0	.1%	.0%	.2%	.0%
Teradyne	7.9	.0	6.6	0	.1%	.0%	.3%	.0%
Analogy	7.7	.0	6.9	0	.1%	.0%	.3%	.0%
Albert Nestler	7.4	2.4	3.2	95	.1%	.1%	.1%	.1%
Genrad	7.2	1.4	4.8	64	.1%	.0%	.2%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 2
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
t2 Solutions	7.1	3.6	2.6	136	.1%	.1%	.1%	.1%
Microway	6.7	4.5	2.3	57	.1%	.1%	.1%	.0%
Quickturn Systems	6.5	6.5	.0	50	.1%	.2%	.0%	.0%
Solbourne	6.3	6.2	.0	464	.1%	.2%	.0%	.3%
Spectrum Graphics	6.3	1.9	3.1	58	.1%	.1%	.1%	.0%
Comdisco Systems	6.2	.0	5.6	0	.1%	.0%	.2%	.0%
Ascent Logic Corp	6.0	.0	4.8	0	.1%	.0%	.2%	.0%
Technische Computer Systeme	5.8	1.2	4.6	147	.1%	.0%	.2%	.1%
Wiechers Datentechnik	5.7	4.5	1.1	80	.1%	.1%	.0%	.1%
Seattle Silicon	5.5	.0	3.8	0	.1%	.0%	.2%	.0%
Test Systems Strategies	5.4	.0	4.6	0	.1%	.0%	.2%	.0%
Meta-Software	5.2	.0	5.2	0	.1%	.0%	.2%	.0%
INS Engineering	5.0	3.7	.9	53	.1%	.1%	.0%	.0%
MARC	4.6	.0	4.6	0	.1%	.0%	.2%	.0%
Clemessy	4.4	3.5	.7	4	.1%	.1%	.0%	.0%
Sysscan	4.3	1.9	1.1	29	.1%	.1%	.0%	.0%
ERDAS	4.3	.9	3.2	20	.1%	.0%	.1%	.0%
Mechanical Dynamics	4.2	.0	3.7	0	.1%	.0%	.2%	.0%
ACDS	4.0	.0	3.4	0	.1%	.0%	.1%	.0%
Vantage Analysis Systems	4.0	.0	4.0	0	.1%	.0%	.2%	.0%
debis Systemhaus	4.0	1.0	2.3	127	.1%	.0%	.1%	.1%
AnaCAD	3.9	.0	3.9	0	.1%	.0%	.2%	.0%
Integrated Computer Graphics	3.9	1.9	1.6	424	.1%	.1%	.1%	.3%
Wacom	3.8	.9	2.9	38	.1%	.0%	.1%	.0%
Ontologic	3.8	.0	3.8	0	.1%	.0%	.2%	.0%
Engineering Mechanics	3.7	1.2	2.1	277	.0%	.0%	.1%	.2%
Wisdom Systems	3.5	.0	2.6	0	.0%	.0%	.1%	.0%
Aucotec	3.5	1.2	1.9	55	.0%	.0%	.1%	.0%
Marcus Computer Systeme	3.4	1.8	1.1	105	.0%	.0%	.0%	.1%
rotring euroCAD	3.3	2.2	1.1	96	.0%	.1%	.0%	.1%
Exapt	3.3	1.6	1.1	107	.0%	.0%	.0%	.1%
Sigma Design	3.2	.0	3.1	0	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 2
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					--- Market Share ---			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Complansoft CAD	3.2	1.6	1.6	220	.0%	.0%	.1%	.2%
Quad Design Technology	3.1	.0	2.9	0	.0%	.0%	.1%	.0%
Nemetschek	3.1	1.2	1.9	33	.0%	.0%	.1%	.0%
Dynamic Graphics	3.0	.0	2.6	0	.0%	.0%	.1%	.0%
EPIC Design Technology	3.0	.0	2.7	0	.0%	.0%	.1%	.0%
Ultimap	3.0	1.1	.9	30	.0%	.0%	.0%	.0%
XAO Industrie	3.0	1.1	1.8	108	.0%	.0%	.1%	.1%
Motorola	2.9	.0	2.9	0	.0%	.0%	.1%	.0%
ISKA	2.9	1.3	1.2	53	.0%	.0%	.0%	.0%
Quantic Laboratories	2.9	.0	2.7	0	.0%	.0%	.1%	.0%
Pacific Numerics	2.8	.0	2.8	0	.0%	.0%	.1%	.0%
Scientific & Engineering SW	2.7	.0	2.7	0	.0%	.0%	.1%	.0%
Alper Systems	2.7	1.3	.7	18	.0%	.0%	.0%	.0%
Gable CAD Systems	2.7	1.1	1.3	34	.0%	.0%	.1%	.0%
Fides Industrielle Automation	2.4	.3	2.2	32	.0%	.0%	.1%	.0%
Radian Corporation	2.3	.0	1.4	0	.0%	.0%	.1%	.0%
Catalpa	2.2	.8	1.1	18	.0%	.0%	.0%	.0%
Shared Resources	2.1	.1	.1	4	.0%	.0%	.0%	.0%
Pasco	2.1	1.1	1.0	30	.0%	.0%	.0%	.0%
Land Innovation	2.0	.0	2.0	0	.0%	.0%	.1%	.0%
DCA Softdesk	1.9	.0	1.9	0	.0%	.0%	.1%	.0%
Royal Digital Systems	1.9	.0	1.7	0	.0%	.0%	.1%	.0%
RIB/RZB	1.9	.2	1.5	8	.0%	.0%	.1%	.0%
Sinus Software	1.9	.9	.9	36	.0%	.0%	.0%	.0%
Caroline Informatique	1.8	.4	1.3	25	.0%	.0%	.1%	.0%
CAMTEK	1.8	.0	1.5	0	.0%	.0%	.1%	.0%
Ricoh--NO OEM	1.8	.0	1.5	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	1.7	.2	1.5	7	.0%	.0%	.1%	.0%
CAD/CAM Group	1.7	.0	1.7	0	.0%	.0%	.1%	.0%
GEOVISION Inc.	1.6	.9	.4	623	.0%	.0%	.0%	.5%
Data I/O	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
MEDESIGN	1.5	.4	.5	17	.0%	.0%	.0%	.0%
ACTEL	1.5	.0	1.4	0	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 2
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
SIMUCAD	1.5	.0	1.4	0	.0%	.0%	.1%	.0%
Everex Systems	1.5	1.5	.0	183	.0%	.0%	.0%	.1%
Emerald Design Systems	1.5	.7	.6	24	.0%	.0%	.0%	.0%
Micro Engineering Solutions	1.4	.4	.9	13	.0%	.0%	.0%	.0%
Assigraph	1.4	.0	1.1	11	.0%	.0%	.0%	.0%
Kubota Computer	1.4	.9	.5	238	.0%	.0%	.0%	.2%
National Semiconductor	1.3	.3	1.1	11	.0%	.0%	.0%	.0%
Xilinx	1.3	.0	1.2	0	.0%	.0%	.0%	.0%
DECAD	1.3	.2	.8	4	.0%	.0%	.0%	.0%
Smallworld Systems	1.3	.5	.8	36	.0%	.0%	.0%	.0%
Sophia Systems	1.3	.3	.8	10	.0%	.0%	.0%	.0%
Hakuto	1.3	.9	.4	18	.0%	.0%	.0%	.0%
Bechtel Software	1.2	.0	1.1	0	.0%	.0%	.0%	.0%
Intera Tydac	1.2	.0	1.2	0	.0%	.0%	.0%	.0%
DAPCO	1.2	.0	.8	0	.0%	.0%	.0%	.0%
ETAK	1.2	.1	1.1	1	.0%	.0%	.0%	.0%
Cooper & Chyan Technology	1.2	.0	1.2	0	.0%	.0%	.0%	.0%
Autometric	1.1	.7	.4	8	.0%	.0%	.0%	.0%
Academi Systems	1.1	.1	.9	4	.0%	.0%	.0%	.0%
FEA Limited	1.1	.3	.3	20	.0%	.0%	.0%	.0%
Macao Systems	1.1	.6	.4	11	.0%	.0%	.0%	.0%
Object Design	1.0	.0	1.0	0	.0%	.0%	.0%	.0%
Computer-Aided Design Group	1.0	.0	.7	0	.0%	.0%	.0%	.0%
A/E Microsystems	.9	.6	.2	86	.0%	.0%	.0%	.1%
Objectivity	.9	.0	.9	0	.0%	.0%	.0%	.0%
Geobased Systems	.8	.2	.6	12	.0%	.0%	.0%	.0%
Microsim	.8	.0	.8	0	.0%	.0%	.0%	.0%
Geomath	.8	.0	.8	0	.0%	.0%	.0%	.0%
Simulation Science	.8	.0	.8	0	.0%	.0%	.0%	.0%
Terr-Mar	.8	.4	.4	9	.0%	.0%	.0%	.0%
FEGS	.7	.0	.6	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 2 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
Company	Revenue	Revenue	Revenue	Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Lamp Software	.6	.3	.5	40	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	.5	.0	.5	0	.0%	.0%	.0%	.0%
Infinite Graphics	.5	.0	.5	0	.0%	.0%	.0%	.0%
CAD Language Systems	.5	.0	.4	0	.0%	.0%	.0%	.0%
Geographic Systems (IIS)	.5	.0	.4	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.5	.0	.4	0	.0%	.0%	.0%	.0%
Computational Mechanics	.5	.0	.5	0	.0%	.0%	.0%	.0%
Geographic Systems (WPS)	.5	.0	.4	0	.0%	.0%	.0%	.0%
ARKTEC	.4	.3	.2	18	.0%	.0%	.0%	.0%
Terra Sciences	.4	.0	.4	0	.0%	.0%	.0%	.0%
Whessoe Computing Systems	.4	.0	.4	0	.0%	.0%	.0%	.0%
Phase Three Logic	.4	.0	.4	0	.0%	.0%	.0%	.0%
LEICA	.4	.0	.3	0	.0%	.0%	.0%	.0%
Ithaca Software	.3	.0	.3	0	.0%	.0%	.0%	.0%
Serbi	.3	.0	.3	0	.0%	.0%	.0%	.0%
CADMATIC	.3	.0	.2	2	.0%	.0%	.0%	.0%
Inca	.2	.0	.2	0	.0%	.0%	.0%	.0%
Masta Corporation	.2	.0	.2	1	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Point Control	.1	.0	.1	0	.0%	.0%	.0%	.0%
Sierra Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
CADKEY	.1	.0	.0	3	.0%	.0%	.0%	.0%
Microtel Pacific Research	.1	.0	.0	0	.0%	.0%	.0%	.0%
TOOL Software	.0	.0	.0	1	.0%	.0%	.0%	.0%
Dolphin Integration	.0	.0	.0	0	.0%	.0%	.0%	.0%
ECOM Associates	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	7,595.6	3,706.7	2,441.9	137,423	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	5,488.2	2,654.3	1,640.4	101,178	72.3%	71.6%	67.2%	73.6%
All Asian-Based Companies	1,136.6	694.0	343.5	24,152	15.0%	18.7%	14.1%	17.6%
All European-Based Companies	970.8	358.5	458.0	12,093	12.8%	9.7%	18.8%	8.8%
All Hardware Companies	1,169.6	994.0	.0	56,063	15.4%	26.8%	.0%	40.8%
All Turnkey & SW Companies	6,426.0	2,712.7	2,441.9	81,360	84.6%	73.2%	100.0%	59.2%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 3
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	1,410.3	846.3	310.3	17,305	35.6%	34.3%	41.2%	31.0%
Digital	702.6	512.3	.7	0	17.7%	20.8%	.1%	.0%
Fujitsu	170.0	106.9	46.2	2,877	4.3%	4.3%	6.1%	5.2%
Nihon Unisys	148.4	99.4	19.3	1,164	3.7%	4.0%	2.6%	2.1%
Intergraph	146.0	72.8	23.4	1,309	3.7%	3.0%	3.1%	2.3%
Sun	114.7	95.2	.0	4,319	2.9%	3.9%	.0%	7.7%
Computervision	103.4	42.2	23.5	2,145	2.6%	1.7%	3.1%	3.8%
Control Data	102.4	47.7	11.7	576	2.6%	1.9%	1.5%	1.0%
McDonnell Douglas	76.3	38.9	26.9	1,726	1.9%	1.6%	3.6%	3.1%
NEC	59.6	46.0	8.8	162	1.5%	1.9%	1.2%	.3%
MacNeal-Schwendler	42.0	.0	40.4	0	1.1%	.0%	5.4%	.0%
Schlumberger	41.5	16.2	14.1	636	1.0%	.7%	1.9%	1.1%
Hitachi	33.3	16.0	14.0	2,768	.8%	.6%	1.9%	5.0%
Cadence	25.3	.0	20.9	0	.6%	.0%	2.8%	.0%
Siemens	25.3	14.4	9.6	408	.6%	.6%	1.3%	.7%
Norsk Data	24.3	10.6	3.7	178	.6%	.4%	.5%	.3%
ESRI	24.2	.0	21.3	0	.6%	.0%	2.8%	.0%
Hewlett-Packard	16.1	13.4	.0	809	.4%	.5%	.0%	1.4%
Toshiba--NO OEM	15.2	7.6	6.1	204	.4%	.3%	.8%	.4%
Mitsubishi Electric	13.9	6.6	4.0	205	.4%	.3%	.5%	.4%
Synopsys	13.6	.0	12.3	0	.3%	.0%	1.6%	.0%
Swanson Analysis	10.6	.0	10.6	0	.3%	.0%	1.4%	.0%
CADAM	10.6	.0	9.2	0	.3%	.0%	1.2%	.0%
SDRC	10.5	.0	10.5	0	.3%	.0%	1.4%	.0%
Fides Industrielle Automation	9.8	1.1	8.8	43	.2%	.0%	1.2%	.1%
PDA Engineering	9.4	.0	9.4	0	.2%	.0%	1.2%	.0%
Exapt	9.0	4.4	3.1	104	.2%	.2%	.4%	.2%
Solbourne	8.8	8.8	.0	656	.2%	.4%	.0%	1.2%
Unisys	8.7	4.4	3.1	123	.2%	.2%	.4%	.2%
Sysscan	8.3	3.7	2.2	83	.2%	.1%	.3%	.1%
Teradyne	7.5	.0	6.1	0	.2%	.0%	.8%	.0%
MCS	7.0	.0	6.1	0	.2%	.0%	.8%	.0%
ABB Engineering Automation	7.0	.0	7.0	0	.2%	.0%	.9%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 3
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Zycad	6.1	5.7	.0	46	.2%	.2%	.0%	.1%
GeoVision Corp.	5.7	4.1	1.2	45	.1%	.2%	.2%	.1%
Scientific Calc.	5.2	1.1	4.1	27	.1%	.0%	.5%	.0%
Synercom	5.1	.0	2.4	0	.1%	.0%	.3%	.0%
Sharp System Products--NO OEM	5.0	2.6	2.4	22	.1%	.1%	.3%	.0%
Toyo Information Systems-NO OEM	4.8	2.6	1.5	28	.1%	.1%	.2%	.1%
INS Engineering	4.7	3.4	.8	25	.1%	.1%	.1%	.0%
MARC	4.6	.0	4.6	0	.1%	.0%	.6%	.0%
Geographic Systems (IIS)	4.4	.0	4.0	0	.1%	.0%	.5%	.0%
Cisigraph	4.3	1.6	1.4	86	.1%	.1%	.2%	.2%
Geographic Systems (WPS)	4.2	.0	3.8	0	.1%	.0%	.5%	.0%
Mutoh Industries--NO OEM	4.0	1.6	1.6	8	.1%	.1%	.2%	.0%
Zuken	3.9	1.9	2.1	35	.1%	.1%	.3%	.1%
Seiko Instruments--NO OEM	3.9	1.7	1.3	16	.1%	.1%	.2%	.0%
Computer-Aided Design Group	3.8	.0	2.7	0	.1%	.0%	.4%	.0%
Hitachi Zosen Info Systems	3.8	.0	.0	0	.1%	.0%	.0%	.0%
Sumitomo Denko Workstation	2.8	2.8	.0	132	.1%	.1%	.0%	.2%
Kewill Systems	2.5	.8	1.4	26	.1%	.0%	.2%	.0%
Secagraphics	2.2	1.5	.7	38	.1%	.1%	.1%	.1%
Autometric	1.9	1.2	.7	12	.0%	.0%	.1%	.0%
Mechanical Dynamics	1.8	.0	1.6	0	.0%	.0%	.2%	.0%
Silicon Graphics	1.7	1.4	.0	32	.0%	.1%	.0%	.1%
CIVILSOFT	1.6	.0	1.6	0	.0%	.0%	.2%	.0%
ETAK	1.6	.1	1.5	7	.0%	.0%	.2%	.0%
Bechtel Software	1.6	.0	1.5	0	.0%	.0%	.2%	.0%
LSI Logic	1.5	.1	1.1	3	.0%	.0%	.1%	.0%
VLSI Technology	1.4	.2	1.0	3	.0%	.0%	.1%	.0%
Assigraph	1.4	.0	1.1	11	.0%	.0%	.1%	.0%
EEsof	1.3	.0	1.2	0	.0%	.0%	.2%	.0%
Century Research Center	1.3	.7	.5	7	.0%	.0%	.1%	.0%
Kubota Computer	1.1	.7	.4	109	.0%	.0%	.1%	.2%
Clemessy	1.1	.9	.2	6	.0%	.0%	.0%	.0%
Laser-Scan	1.1	.2	.5	5	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 3
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Framasoft	1.1	.0	.7	0	.0%	.0%	.1%	.0%
Dynamic Graphics	1.0	.0	.9	0	.0%	.0%	.1%	.0%
Daniel Geophysical	1.0	.1	.8	20	.0%	.0%	.1%	.0%
Meta-Software	1.0	.0	.9	0	.0%	.0%	.1%	.0%
Computational Mechanics	.9	.0	.9	0	.0%	.0%	.1%	.0%
Georgia Tech Research Corp.	.9	.0	.9	0	.0%	.0%	.1%	.0%
Genrad	.8	.2	.6	9	.0%	.0%	.1%	.0%
Whessoe Computing Systems	.8	.0	.8	0	.0%	.0%	.1%	.0%
Macao Systems	.7	.4	.3	6	.0%	.0%	.0%	.0%
FEGS	.7	.0	.6	0	.0%	.0%	.1%	.0%
debis Systemhaus	.6	.2	.4	13	.0%	.0%	.0%	.0%
Test Systems Strategies	.6	.0	.6	0	.0%	.0%	.1%	.0%
Data I/O	.6	.0	.6	0	.0%	.0%	.1%	.0%
Silvar-Lisco	.5	.0	.4	0	.0%	.0%	.0%	.0%
Analogy	.4	.0	.4	0	.0%	.0%	.0%	.0%
Radian Corporation	.4	.0	.2	0	.0%	.0%	.0%	.0%
Pasco	.3	.2	.2	2	.0%	.0%	.0%	.0%
Olivetti	.3	.3	.0	7	.0%	.0%	.0%	.0%
FEA Limited	.3	.1	.1	5	.0%	.0%	.0%	.0%
Engineering Systems Corp.	.2	.0	.2	0	.0%	.0%	.0%	.0%
Logic Automation	.2	.0	.2	0	.0%	.0%	.0%	.0%
Microsim	.2	.0	.2	0	.0%	.0%	.0%	.0%
Hochtief	.2	.0	.1	1	.0%	.0%	.0%	.0%
SIMUCAD	.2	.0	.2	0	.0%	.0%	.0%	.0%
Accugraph	.2	.1	.1	14	.0%	.0%	.0%	.0%
A/E Microsystems	.2	.1	.0	8	.0%	.0%	.0%	.0%
Masta Corporation	.2	.0	.1	0	.0%	.0%	.0%	.0%
CADKEY	.1	.1	.0	2	.0%	.0%	.0%	.0%
Lamp Software	.1	.0	.0	3	.0%	.0%	.0%	.0%
DECAD	.0	.0	.0	1	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	1	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 3 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
	Total	Hardware	Software	Wkstns	Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
Other Companies	435.3	413.5	.0	17,194	11.0%	16.8%	.0%	30.8%
All Companies	3,967.0	2,467.0	752.7	55,812	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	3,321.6	2,127.5	542.8	47,065	83.7%	86.2%	72.1%	84.3%
All Asian-Based Companies	476.0	300.7	109.0	7,763	12.0%	12.2%	14.5%	13.9%
All European-Based Companies	169.4	38.7	100.8	984	4.3%	1.6%	13.4%	1.8%
All Hardware Companies	1,300.7	1,057.5	.0	23,135	32.8%	42.9%	.0%	41.5%
All Turnkey & SW Companies	2,666.3	1,409.5	752.7	32,677	67.2%	57.1%	100.0%	58.5%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 4
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	420.5	420.5	.0	70,078	15.0%	23.6%	.0%	21.1%
Apple Computer	218.4	192.2	.0	42,000	7.8%	10.8%	.0%	12.7%
Autodesk	218.1	.0	218.1	0	7.8%	.0%	24.8%	.0%
IBM	208.7	198.3	.0	46,651	7.4%	11.1%	.0%	14.1%
Hewlett-Packard	137.0	109.6	.0	21,018	4.9%	6.1%	.0%	6.3%
NEC	117.4	99.3	8.6	8,840	4.2%	5.6%	1.0%	2.7%
Hitachi	70.8	34.0	29.7	1,470	2.5%	1.9%	3.4%	.4%
Fujitsu	63.3	39.8	17.2	2,085	2.3%	2.2%	2.0%	.6%
CADAM	59.4	35.0	20.7	5,000	2.1%	2.0%	2.4%	1.5%
Hakuto	40.5	27.9	12.5	1,202	1.4%	1.6%	1.4%	.4%
Mutoh Industries--NO OEM	36.5	20.2	14.4	1,315	1.3%	1.1%	1.6%	.4%
Wacom	35.1	6.9	24.3	594	1.3%	.4%	2.8%	.2%
Intergraph	28.8	.0	27.1	0	1.0%	.0%	3.1%	.0%
Nemetschek	27.8	11.1	16.7	467	1.0%	.6%	1.9%	.1%
Investronica SA	27.0	21.6	2.7	1,080	1.0%	1.2%	.3%	.3%
Toshiba--NO OEM	20.4	10.2	8.1	1,453	.7%	.6%	.9%	.4%
Vero International Software	19.2	.0	17.5	0	.7%	.0%	2.0%	.0%
Dell Computer	18.6	18.6	.0	4,650	.7%	1.0%	.0%	1.4%
Ziegler	18.5	.0	18.5	0	.7%	.0%	2.1%	.0%
Computervision	17.6	.8	16.5	163	.6%	.0%	1.9%	.0%
Everex Systems	17.4	17.4	.0	5,540	.6%	1.0%	.0%	1.7%
Viewlogic Systems	15.8	.0	13.3	0	.6%	.0%	1.5%	.0%
CADKEY	15.6	.9	14.7	145	.6%	.1%	1.7%	.0%
Xilinx	15.2	.0	13.7	0	.5%	.0%	1.6%	.0%
Wiechers Datentechnik	14.6	11.7	2.9	414	.5%	.7%	.3%	.1%
Research Machines	14.3	14.3	.0	2,200	.5%	.8%	.0%	.7%
EEsof	13.0	.0	11.7	0	.5%	.0%	1.3%	.0%
Caditron	13.0	6.5	5.2	200	.5%	.4%	.6%	.1%
LPKF	12.3	8.0	3.1	500	.4%	.4%	.4%	.2%
ISICAD	11.2	.0	11.2	0	.4%	.0%	1.3%	.0%
Andor	11.1	2.8	7.9	100	.4%	.2%	.9%	.0%
Design Automation	10.2	.0	10.2	0	.4%	.0%	1.2%	.0%
Altera	10.0	.0	8.5	0	.4%	.0%	1.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 4
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
					Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
Mitsubishi Electric	9.4	6.3	3.3	829	.3%	.4%	.4%	.2%
Orcad	9.2	.0	9.2	0	.3%	.0%	1.0%	.0%
Soft-Tech Software Technologies	9.0	.9	7.2	225	.3%	.1%	.8%	.1%
Data I/O	8.7	.0	8.7	0	.3%	.0%	1.0%	.0%
ACTEL	8.5	.0	7.7	0	.3%	.0%	.9%	.0%
Tebis	8.4	1.3	5.9	42	.3%	.1%	.7%	.0%
Racal-Redac	8.0	.0	7.6	0	.3%	.0%	.9%	.0%
CPU	7.6	.0	6.9	0	.3%	.0%	.8%	.0%
DAT Standard Information system	7.6	.0	7.2	0	.3%	.0%	.8%	.0%
ETAK	7.6	.4	7.2	19	.3%	.0%	.8%	.0%
BATISOFT	7.2	1.1	3.6	230	.3%	.1%	.4%	.1%
Ground Modelling Systems	7.1	4.7	3.5	40	.3%	.3%	.4%	.0%
Aucotec	7.0	2.5	3.9	112	.3%	.1%	.4%	.0%
Geobased Systems	6.9	1.4	5.1	149	.2%	.1%	.6%	.0%
Kloeckner-Moeller	6.8	4.1	2.4	107	.2%	.2%	.3%	.0%
Microsim	6.5	.0	6.1	0	.2%	.0%	.7%	.0%
ESRI	6.4	.0	6.4	0	.2%	.0%	.7%	.0%
DCA Softdesk	6.1	.0	6.1	0	.2%	.0%	.7%	.0%
CNC Software	6.0	.0	6.0	0	.2%	.0%	.7%	.0%
Moda CAD	6.0	1.5	4.2	50	.2%	.1%	.5%	.0%
CAP Electronic Sweet's	5.9	.0	4.8	0	.2%	.0%	.5%	.0%
CAD Software	5.4	.0	4.6	0	.2%	.0%	.5%	.0%
Aspen Technology	5.0	.0	4.5	0	.2%	.0%	.5%	.0%
Strategic Mapping	5.0	.0	5.0	0	.2%	.0%	.6%	.0%
Serbi	4.9	.0	4.9	0	.2%	.0%	.6%	.0%
Cimatron	4.8	2.1	2.1	141	.2%	.1%	.2%	.0%
Micrografx	4.8	.0	4.8	0	.2%	.0%	.5%	.0%
Olivetti	4.7	4.0	.0	793	.2%	.2%	.0%	.2%
Claris	4.7	.0	4.7	0	.2%	.0%	.5%	.0%
Computer Services Consultants	4.5	.0	4.5	0	.2%	.0%	.5%	.0%
RIB/RZB	4.3	.4	3.5	22	.2%	.0%	.4%	.0%
Technovision	4.2	.0	4.2	0	.1%	.0%	.5%	.0%
Algor Interactive Systems	4.2	.0	3.7	0	.1%	.0%	.4%	.0%

(Continued)

©1991 Dataquest Incorporated June--Reproduction Prohibited

TABLE NUMBER: 4
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
ADRA Systems	4.1	.0	3.7	0	.1%	.0%	.4%	.0%
MCS	4.1	.0	3.7	0	.1%	.0%	.4%	.0%
Pathtrace	4.1	1.1	2.7	58	.1%	.1%	.3%	.0%
BETRONEX	4.1	.0	4.1	0	.1%	.0%	.5%	.0%
MapInfo	4.0	.0	3.2	0	.1%	.0%	.4%	.0%
Hochtief	4.0	.6	2.8	35	.1%	.0%	.3%	.0%
Intercad	3.9	2.0	1.1	189	.1%	.1%	.1%	.1%
Microway	3.8	2.6	1.3	38	.1%	.1%	.1%	.0%
International Software Systems	3.8	.0	3.8	0	.1%	.0%	.4%	.0%
Foresight Resources	3.6	.0	3.2	0	.1%	.0%	.4%	.0%
LandCadd	3.5	.0	3.3	0	.1%	.0%	.4%	.0%
American Small Business Comp.	3.5	.0	3.5	0	.1%	.0%	.4%	.0%
Robocom	3.5	.0	3.5	0	.1%	.0%	.4%	.0%
Datagraphic	3.4	1.7	1.4	55	.1%	.1%	.2%	.0%
Teradyne	3.4	.0	2.8	0	.1%	.0%	.3%	.0%
Anilam Electronics	3.2	1.0	1.9	40	.1%	.1%	.2%	.0%
Mitsui Engineering	3.1	2.2	.6	20	.1%	.1%	.1%	.0%
rotring euroCAD	3.1	1.7	1.4	74	.1%	.1%	.2%	.0%
Innovative Data Design	3.0	.0	3.0	0	.1%	.0%	.3%	.0%
ERDAS	2.9	.4	2.3	17	.1%	.0%	.3%	.0%
Cadtronic	2.8	1.6	1.3	84	.1%	.1%	.1%	.0%
Sigma Design	2.8	.0	2.8	0	.1%	.0%	.3%	.0%
Whessoe Computing Systems	2.8	.0	2.8	0	.1%	.0%	.3%	.0%
Superdraft	2.7	1.3	1.3	147	.1%	.1%	.2%	.0%
Engineering Mechanics	2.6	.9	1.5	223	.1%	.1%	.2%	.1%
ALS Design	2.6	.0	2.6	0	.1%	.0%	.3%	.0%
ALDEC	2.5	.0	2.5	0	.1%	.0%	.3%	.0%
Carrier Corporation	2.5	.0	2.5	0	.1%	.0%	.3%	.0%
Visionics	2.4	.0	1.8	10	.1%	.0%	.2%	.0%
PacSoft	2.4	.0	2.4	0	.1%	.0%	.3%	.0%
PAFEC	2.4	.0	2.4	0	.1%	.0%	.3%	.0%
Swanson Analysis	2.4	.0	2.4	0	.1%	.0%	.3%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 4
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Accel Technologies	2.3	.0	2.1	0	.1%	.0%	.2%	.0%
Sophia Systems	2.2	.6	1.5	40	.1%	.0%	.2%	.0%
Sharp System Products--NO OEM	2.2	1.2	1.1	28	.1%	.1%	.1%	.0%
Aries Technology	2.2	.0	2.0	0	.1%	.0%	.2%	.0%
CADWorks	2.2	.0	1.9	0	.1%	.0%	.2%	.0%
Generation 5 Technology	2.1	.0	2.1	0	.1%	.0%	.2%	.0%
Facility Mapping Systems	2.1	.0	1.9	0	.1%	.0%	.2%	.0%
Micro Engineering Solutions	2.1	.6	1.4	31	.1%	.0%	.2%	.0%
Evolution Computing	2.1	.0	2.1	0	.1%	.0%	.2%	.0%
GeoGraphix	2.0	.0	1.5	0	.1%	.0%	.2%	.0%
Infinite Graphics	2.0	.0	2.0	0	.1%	.0%	.2%	.0%
Accugraph	1.9	.1	1.7	7	.1%	.0%	.2%	.0%
Elstree Computing	1.8	.8	1.0	50	.1%	.0%	.1%	.0%
Kork Systems	1.8	.2	1.2	22	.1%	.0%	.1%	.0%
CAD-UL	1.7	.0	1.7	0	.1%	.0%	.2%	.0%
Omation	1.6	.0	1.6	0	.1%	.0%	.2%	.0%
Academi Systems	1.6	.2	1.3	7	.1%	.0%	.1%	.0%
Terra Sciences	1.6	.0	1.6	0	.1%	.0%	.2%	.0%
Massteck	1.6	.0	1.6	0	.1%	.0%	.2%	.0%
Hahn & Kolb	1.5	.9	.5	30	.1%	.1%	.1%	.0%
Schlumberger	1.4	.4	.5	9	.0%	.0%	.1%	.0%
Lamp Software	1.4	.2	.9	61	.0%	.0%	.1%	.0%
Comshoppe	1.4	.0	1.4	0	.0%	.0%	.2%	.0%
FEA Limited	1.3	.3	.3	25	.0%	.0%	.0%	.0%
Genasys II	1.3	.5	.8	7	.0%	.0%	.1%	.0%
Engineering Software	1.2	.1	1.1	34	.0%	.0%	.1%	.0%
Integer	1.2	.0	1.0	0	.0%	.0%	.1%	.0%
Intera Tydac	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
Terr-Mar	1.2	.6	.7	24	.0%	.0%	.1%	.0%
GRAPHSOFT	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
Radian Corporation	1.2	.0	.7	0	.0%	.0%	.1%	.0%
Tanner Research	1.1	.0	1.0	0	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 4
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Spectrum Software	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Phase Three Logic	1.1	.0	1.0	0	.0%	.0%	.1%	.0%
Mega CADD	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Marcus Computer Systeme	1.0	.5	.3	31	.0%	.0%	.0%	.0%
Aucos elektronische Gerate	1.0	.3	.7	100	.0%	.0%	.1%	.0%
Aura CAD/CAM Systems	1.0	.0	.9	0	.0%	.0%	.1%	.0%
Intrinsix	1.0	1.0	.0	10	.0%	.1%	.0%	.0%
ARKTEC	1.0	.2	.8	22	.0%	.0%	.1%	.0%
Cascade Graphics	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Cadisys	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Ikos Systems	1.0	1.0	.0	4	.0%	.1%	.0%	.0%
Aptos	.9	.0	.9	0	.0%	.0%	.1%	.0%
Point Control	.9	.0	.9	0	.0%	.0%	.1%	.0%
Vision 3D	.9	.5	.2	6	.0%	.0%	.0%	.0%
S.T.L.D. s.r.l.	.8	.0	.8	0	.0%	.0%	.1%	.0%
A.I. Systems	.8	.0	.8	0	.0%	.0%	.1%	.0%
Number One Systems	.8	.1	.7	20	.0%	.0%	.1%	.0%
CAMTEK	.8	.0	.6	0	.0%	.0%	.1%	.0%
Caddlink	.8	.0	.8	0	.0%	.0%	.1%	.0%
Rasna Corporation	.8	.0	.8	0	.0%	.0%	.1%	.0%
INS Engineering	.7	.5	.1	16	.0%	.0%	.0%	.0%
Engineering Systems Corp.	.7	.0	.5	0	.0%	.0%	.1%	.0%
Maptek	.7	.0	.7	0	.0%	.0%	.1%	.0%
Contract Data Research	.7	.0	.5	0	.0%	.0%	.1%	.0%
Dynaware	.6	.0	.6	0	.0%	.0%	.1%	.0%
debis Systemhaus	.6	.2	.4	40	.0%	.0%	.0%	.0%
Douglas Electronics	.6	.0	.6	0	.0%	.0%	.1%	.0%
IGC Technology	.6	.0	.6	0	.0%	.0%	.1%	.0%
Uniras	.6	.0	.6	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	.6	.2	.4	8	.0%	.0%	.0%	.0%
Mc2 Engineering Software	.6	.0	.6	0	.0%	.0%	.1%	.0%
Pelton Engineering	.6	.0	.6	0	.0%	.0%	.1%	.0%
GEOVISION Inc.	.6	.3	.1	219	.0%	.0%	.0%	.1%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 4
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Vamp	.6	.0	.6	0	.0%	.0%	.1%	.0%
ACERI SA	.6	.1	.3	3	.0%	.0%	.0%	.0%
Machinery Sales	.6	.0	.6	0	.0%	.0%	.1%	.0%
CAD-Capture	.5	.0	.1	0	.0%	.0%	.0%	.0%
CADMATIC	.5	.0	.3	3	.0%	.0%	.0%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.1%	.0%
Capilano Computing	.5	.0	.5	0	.0%	.0%	.1%	.0%
Imagine That	.5	.0	.5	0	.0%	.0%	.1%	.0%
Premise	.5	.0	.5	0	.0%	.0%	.1%	.0%
Inca	.5	.0	.5	0	.0%	.0%	.1%	.0%
ECOM Associates	.5	.0	.5	3	.0%	.0%	.1%	.0%
Caroline Informatique	.5	.1	.3	5	.0%	.0%	.0%	.0%
CAD Lab	.4	.0	.4	0	.0%	.0%	.0%	.0%
PLUS Logic	.4	.0	.4	0	.0%	.0%	.1%	.0%
Bechtel Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
Digital	.4	.0	.3	0	.0%	.0%	.0%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.0%	.0%
Norsk Data	.4	.2	.1	7	.0%	.0%	.0%	.0%
MacNeal-Schwendler	.4	.0	.4	0	.0%	.0%	.0%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.0%	.0%
Ithaca Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
Daniel Geophysical	.3	.0	.3	0	.0%	.0%	.0%	.0%
Computer-Aided Design Group	.3	.0	.2	0	.0%	.0%	.0%	.0%
Synthesis	.3	.0	.3	0	.0%	.0%	.0%	.0%
Geosoft	.3	.0	.3	0	.0%	.0%	.0%	.0%
Masta Corporation	.3	.0	.2	4	.0%	.0%	.0%	.0%
Genrad	.2	.0	.2	12	.0%	.0%	.0%	.0%
Kontron Instruments	.2	.1	.1	4	.0%	.0%	.0%	.0%
The Great Softwestern Co.	.2	.0	.2	0	.0%	.0%	.0%	.0%
Bobcat Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Instrumatic Espanola	.2	.0	.2	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 4 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Worldwide
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Microtel Pacific Research	.2	.0	.2	1	.0%	.0%	.0%	.0%
Geomath	.2	.0	.2	0	.0%	.0%	.0%	.0%
Simulation Science	.2	.0	.2	0	.0%	.0%	.0%	.0%
Simutest	.2	.0	.2	0	.0%	.0%	.0%	.0%
ESDU International	.2	.0	.2	0	.0%	.0%	.0%	.0%
National Semiconductor	.2	.0	.2	0	.0%	.0%	.0%	.0%
Pacific Numerics	.1	.0	.1	0	.0%	.0%	.0%	.0%
TOOL Software	.1	.0	.1	3	.0%	.0%	.0%	.0%
Radan Computational	.1	.0	.0	4	.0%	.0%	.0%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.0%	.0%
A/E Microsystems	.0	.0	.0	6	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Dolphin Integration	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	418.0	418.0	.3	110,100	14.9%	23.4%	.0%	33.2%
All Companies	2,804.6	1,784.8	878.8	331,917	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	2,070.2	1,420.6	560.3	306,209	73.8%	79.6%	63.8%	92.3%
All Asian-Based Companies	434.7	251.8	150.8	17,992	15.5%	14.1%	17.2%	5.4%
All European-Based Companies	299.8	112.4	167.7	7,716	10.7%	6.3%	19.1%	2.3%
All Hardware Companies	1,479.2	1,414.5	.0	305,835	52.7%	79.3%	.0%	92.1%
All Turnkey & SW Companies	1,325.4	370.4	878.8	26,083	47.3%	20.7%	100.0%	7.9%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 5
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: North America
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
	Total	Hardware	Software	Wkstns	Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
Intergraph	543.1	291.0	107.7	5,674	10.9%	10.9%	7.5%	2.7%
IBM	486.1	313.9	92.9	19,598	9.7%	11.7%	6.5%	9.5%
Digital	436.9	315.2	3.9	3,167	8.8%	11.8%	.3%	1.5%
Sun	298.3	259.6	.0	16,123	6.0%	9.7%	.0%	7.8%
Computervision	269.8	71.9	71.5	1,799	5.4%	2.7%	5.0%	.9%
Hewlett-Packard	255.2	193.3	18.2	16,990	5.1%	7.2%	1.3%	8.2%
Mentor Graphics	205.7	59.7	86.4	2,039	4.1%	2.2%	6.0%	1.0%
McDonnell Douglas	204.2	105.6	66.0	2,486	4.1%	3.9%	4.6%	1.2%
Compaq	197.6	197.6	.0	32,937	4.0%	7.4%	.0%	15.9%
Apple Computer	133.2	117.2	.0	25,620	2.7%	4.4%	.0%	12.4%
Autodesk	126.0	.0	126.0	0	2.5%	.0%	8.8%	.0%
Cadence	116.9	.0	86.8	0	2.3%	.0%	6.0%	.0%
Valid	84.6	12.1	56.4	494	1.7%	.5%	3.9%	.2%
Control Data	70.8	39.4	9.7	930	1.4%	1.5%	.7%	.5%
Schlumberger	57.0	20.3	20.8	597	1.1%	.8%	1.5%	.3%
Auto-Trol	52.1	20.8	18.2	612	1.0%	.8%	1.3%	.3%
Silicon Graphics	51.3	45.1	.0	1,381	1.0%	1.7%	.0%	.7%
ESRI	49.1	.0	43.5	0	1.0%	.0%	3.0%	.0%
Dazix	38.5	7.7	15.4	284	.8%	.3%	1.1%	.1%
SDRC	33.0	.0	33.0	0	.7%	.0%	2.3%	.0%
MacNeal-Schwendler	26.2	.0	25.1	0	.5%	.0%	1.7%	.0%
Landmark Graphics	24.3	11.9	7.3	149	.5%	.4%	.5%	.1%
CADAM	24.1	10.5	11.6	1,500	.5%	.4%	.8%	.7%
Unisys	23.2	11.8	8.1	354	.5%	.4%	.6%	.2%
Racal-Redac	21.9	1.2	17.8	98	.4%	.0%	1.2%	.0%
Viewlogic Systems	20.1	.0	16.9	0	.4%	.0%	1.2%	.0%
Zycad	19.8	16.2	.0	163	.4%	.6%	.0%	.1%
PDA Engineering	18.5	.0	18.5	0	.4%	.0%	1.3%	.0%
Cimlinc	17.7	3.5	10.6	338	.4%	.1%	.7%	.2%
Accugraph	17.5	7.7	7.9	450	.3%	.3%	.6%	.2%
Everex Systems	17.0	17.0	.0	5,151	.3%	.6%	.0%	2.5%
Gerber Systems	16.2	8.0	5.4	210	.3%	.3%	.4%	.1%
MCS	15.9	.0	14.1	0	.3%	.0%	1.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 5
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: North America
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Parametric Technology	15.9	.0	14.6	0	.3%	.0%	1.0%	.0%
Dell Computer	15.8	15.8	.0	3,952	.3%	.6%	.0%	1.9%
Swanson Analysis	15.3	.0	15.3	0	.3%	.0%	1.1%	.0%
EEsof	15.1	.1	13.2	10	.3%	.0%	.9%	.0%
Alias Research	14.8	.0	14.8	0	.3%	.0%	1.0%	.0%
Synopsys	14.4	.0	13.0	0	.3%	.0%	.9%	.0%
CADKEY	13.5	.0	13.5	0	.3%	.0%	.9%	.0%
Scientific Calc.	12.3	1.8	7.3	44	.2%	.1%	.5%	.0%
ISICAD	12.0	4.4	6.1	93	.2%	.2%	.4%	.0%
ADRA Systems	11.7	4.1	6.5	208	.2%	.2%	.5%	.1%
Solbourne	11.0	10.9	.0	813	.2%	.4%	.0%	.4%
Xilinx	10.7	.0	9.7	0	.2%	.0%	.7%	.0%
Teradyne	10.5	.0	8.7	0	.2%	.0%	.6%	.0%
Cisigraph	10.4	3.6	3.6	96	.2%	.1%	.3%	.0%
Matra Datavision	10.3	4.7	4.1	113	.2%	.2%	.3%	.1%
GeoVision Corp.	9.4	6.7	2.0	110	.2%	.2%	.1%	.1%
Calay	9.1	2.9	5.3	149	.2%	.1%	.4%	.1%
VLSI Technology	8.9	.4	7.3	25	.2%	.0%	.5%	.0%
Aries Technology	8.8	.0	7.9	0	.2%	.0%	.6%	.0%
LSI Logic	8.8	.9	6.6	22	.2%	.0%	.5%	.0%
Synercom	8.2	.0	3.8	0	.2%	.0%	.3%	.0%
ACTEL	8.2	.0	7.4	0	.2%	.0%	.5%	.0%
Ikos Systems	8.1	8.1	.0	37	.2%	.3%	.0%	.0%
ICAD	7.9	.0	6.3	0	.2%	.0%	.4%	.0%
ETAK	7.7	.4	7.3	20	.2%	.0%	.5%	.0%
Logic Automation	7.7	.0	7.7	0	.2%	.0%	.5%	.0%
Geobased Systems	6.9	1.4	5.2	145	.1%	.1%	.4%	.1%
DCA Softdesk	6.8	.0	6.8	0	.1%	.0%	.5%	.0%
Ascent Logic Corp	6.0	.0	4.8	0	.1%	.0%	.3%	.0%
Altera	5.8	.0	4.9	0	.1%	.0%	.3%	.0%
ERDAS	5.4	.9	4.2	28	.1%	.0%	.3%	.0%
CAP Electronic Sweet's	5.1	.0	4.0	0	.1%	.0%	.3%	.0%
Microsim	4.9	.0	4.6	0	.1%	.0%	.3%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 5
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: North America
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Computer-Aided Design Group	4.8	.0	3.5	0	.1%	.0%	.2%	.0%
Meta-Software	4.7	.0	4.6	0	.1%	.0%	.3%	.0%
Quickturn Systems	4.6	4.6	.0	35	.1%	.2%	.0%	.0%
Sigma Design	4.5	.0	4.4	0	.1%	.0%	.3%	.0%
Data I/O	4.3	.0	4.3	0	.1%	.0%	.3%	.0%
Comdisco Systems	4.2	.0	3.7	0	.1%	.0%	.3%	.0%
Aspen Technology	4.0	.0	3.6	0	.1%	.0%	.3%	.0%
Zuken	3.9	1.8	2.2	28	.1%	.1%	.2%	.0%
Geographic Systems (IIS)	3.9	.0	3.5	0	.1%	.0%	.2%	.0%
Integrated Computer Graphics	3.9	1.9	1.6	424	.1%	.1%	.1%	.2%
Moda CAD	3.8	1.0	2.7	32	.1%	.0%	.2%	.0%
Genrad	3.7	.7	2.5	39	.1%	.0%	.2%	.0%
Geographic Systems (WPS)	3.7	.0	3.3	0	.1%	.0%	.2%	.0%
Orcad	3.7	.0	3.7	0	.1%	.0%	.3%	.0%
Strategic Mapping	3.7	.0	3.7	0	.1%	.0%	.3%	.0%
Analogy	3.6	.0	3.3	0	.1%	.0%	.2%	.0%
Ontologic	3.6	.0	3.6	0	.1%	.0%	.3%	.0%
CNC Software	3.6	.0	3.6	0	.1%	.0%	.3%	.0%
Test Systems Strategies	3.6	.0	3.1	0	.1%	.0%	.2%	.0%
Algor Interactive Systems	3.5	.0	3.1	0	.1%	.0%	.2%	.0%
LandCadd	3.5	.0	3.3	0	.1%	.0%	.2%	.0%
ACDS	3.4	.0	2.8	0	.1%	.0%	.2%	.0%
MapInfo	3.3	.0	2.7	0	.1%	.0%	.2%	.0%
Seattle Silicon	3.3	.0	2.3	0	.1%	.0%	.2%	.0%
Engineering Mechanics	3.2	1.1	1.8	250	.1%	.0%	.1%	.1%
Quad Design Technology	3.1	.0	2.9	0	.1%	.0%	.2%	.0%
Micrografx	3.1	.0	3.1	0	.1%	.0%	.2%	.0%
American Small Business Comp.	3.1	.0	3.1	0	.1%	.0%	.2%	.0%
Claris	3.0	.0	3.0	0	.1%	.0%	.2%	.0%
Autometric	3.0	2.0	1.1	20	.1%	.1%	.1%	.0%
Ultimap	3.0	1.1	.9	30	.1%	.0%	.1%	.0%
Mechanical Dynamics	3.0	.0	2.7	0	.1%	.0%	.2%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 5
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: North America
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Bechtel Software	2.9	.0	2.7	0	.1%	.0%	.2%	.0%
Innovative Data Design	2.9	.0	2.9	0	.1%	.0%	.2%	.0%
International Software Systems	2.8	.0	2.8	0	.1%	.0%	.2%	.0%
Silvar-Lisco	2.8	.0	1.7	0	.1%	.0%	.1%	.0%
Micro Engineering Solutions	2.8	.8	1.8	35	.1%	.0%	.1%	.0%
Vantage Analysis Systems	2.8	.0	2.8	0	.1%	.0%	.2%	.0%
CAD Software	2.7	.0	2.3	0	.1%	.0%	.2%	.0%
EPIC Design Technology	2.7	.0	2.4	0	.1%	.0%	.2%	.0%
Wisdom Systems	2.7	.0	2.0	0	.1%	.0%	.1%	.0%
Pacific Numerics	2.6	.0	2.6	0	.1%	.0%	.2%	.0%
Infinite Graphics	2.5	.0	2.5	0	.1%	.0%	.2%	.0%
Motorola	2.5	.0	2.5	0	.0%	.0%	.2%	.0%
Visionics	2.4	.0	1.8	10	.0%	.0%	.1%	.0%
PacSoft	2.4	.0	2.4	0	.0%	.0%	.2%	.0%
Dynamic Graphics	2.4	.0	2.0	0	.0%	.0%	.1%	.0%
Intera Tydac	2.4	.0	2.4	0	.0%	.0%	.2%	.0%
Cimatron	2.4	1.1	1.1	71	.0%	.0%	.1%	.0%
Foresight Resources	2.4	.0	2.2	0	.0%	.0%	.1%	.0%
Quantic Laboratories	2.3	.0	2.1	0	.0%	.0%	.1%	.0%
GEOVISION Inc.	2.2	1.3	.5	842	.0%	.0%	.0%	.4%
Secagraphics	2.1	1.5	.6	36	.0%	.1%	.0%	.0%
ABB Engineering Automation	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
Shared Resources	2.1	.1	.1	4	.0%	.0%	.0%	.0%
Land Innovation	2.0	.0	2.0	0	.0%	.0%	.1%	.0%
Radian Corporation	1.9	.0	1.2	0	.0%	.0%	.1%	.0%
Facility Mapping Systems	1.9	.0	1.7	0	.0%	.0%	.1%	.0%
Scientific & Engineering SW	1.9	.0	1.9	0	.0%	.0%	.1%	.0%
ALDEC	1.9	.0	1.9	0	.0%	.0%	.1%	.0%
Genasys II	1.9	.7	1.1	6	.0%	.0%	.1%	.0%
Accel Technologies	1.8	.0	1.7	0	.0%	.0%	.1%	.0%
GeoGraphix	1.8	.0	1.4	0	.0%	.0%	.1%	.0%
LPKF	1.8	1.2	.5	75	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 5
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: North America
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
	Total	Hardware	Software	Wkstns	Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
MARC	1.8	.0	1.8	0	.0%	.0%	.1%	.0%
Evolution Computing	1.8	.0	1.8	0	.0%	.0%	.1%	.0%
Generation 5 Technology	1.8	.0	1.8	0	.0%	.0%	.1%	.0%
CAD/CAM Group	1.7	.0	1.7	0	.0%	.0%	.1%	.0%
Kork Systems	1.7	.2	1.1	21	.0%	.0%	.1%	.0%
CIVILSOFT	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
Royal Digital Systems	1.6	.0	1.5	0	.0%	.0%	.1%	.0%
Laser-Scan	1.5	.4	.7	5	.0%	.0%	.1%	.0%
SIMUCAD	1.5	.0	1.4	0	.0%	.0%	.1%	.0%
Terra Sciences	1.5	.0	1.5	0	.0%	.0%	.1%	.0%
Emerald Design Systems	1.5	.7	.6	24	.0%	.0%	.0%	.0%
Phase Three Logic	1.5	.0	1.3	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	1.4	.3	1.1	9	.0%	.0%	.1%	.0%
Delcam International	1.3	.5	.7	22	.0%	.0%	.0%	.0%
Carrier Corporation	1.3	.0	1.3	0	.0%	.0%	.1%	.0%
Georgia Tech Research Corp.	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
Engineering Software	1.2	.1	1.1	34	.0%	.0%	.1%	.0%
Terr-Mar	1.2	.5	.7	20	.0%	.0%	.0%	.0%
GRAPHSOFT	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
Cooper & Chyan Technology	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
BETRONEX	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
A/E Microsystems	1.1	.8	.2	100	.0%	.0%	.0%	.0%
Massteck	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Investronica SA	1.1	.9	.1	43	.0%	.0%	.0%	.0%
Omation	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Daniel Geophysical	1.1	.0	.9	16	.0%	.0%	.1%	.0%
Geomath	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Intrinsix	1.0	1.0	.0	10	.0%	.0%	.0%	.0%
Spectrum Software	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Cadisys	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
National Semiconductor	.9	.2	.7	7	.0%	.0%	.1%	.0%
CADWorks	.9	.0	.8	0	.0%	.0%	.1%	.0%
Tanner Research	.9	.0	.8	0	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 5
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: North America
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Aura CAD/CAM Systems	.9	.0	.8	0	.0%	.0%	.1%	.0%
Comshoppe	.8	.0	.8	0	.0%	.0%	.1%	.0%
Kockums Computer Systems	.8	.2	.6	40	.0%	.0%	.0%	.0%
Cascade Graphics	.8	.0	.8	0	.0%	.0%	.1%	.0%
Engineering Systems Corp.	.8	.0	.8	0	.0%	.0%	.0%	.0%
Object Design	.8	.0	.8	0	.0%	.0%	.1%	.0%
Pathtrace	.8	.2	.5	10	.0%	.0%	.0%	.0%
Mega CADD	.7	.0	.7	0	.0%	.0%	.1%	.0%
Objectivity	.7	.0	.7	0	.0%	.0%	.1%	.0%
Aptos	.7	.0	.7	0	.0%	.0%	.0%	.0%
Computational Mechanics	.7	.0	.7	0	.0%	.0%	.0%	.0%
A.I. Systems	.7	.0	.7	0	.0%	.0%	.0%	.0%
Caddlink	.7	.0	.7	0	.0%	.0%	.0%	.0%
Maptek	.7	.0	.7	0	.0%	.0%	.0%	.0%
Ground Modelling Systems	.7	.4	.3	4	.0%	.0%	.0%	.0%
Dynaware	.6	.0	.6	0	.0%	.0%	.0%	.0%
Douglas Electronics	.6	.0	.6	0	.0%	.0%	.0%	.0%
IGC Technology	.6	.0	.6	0	.0%	.0%	.0%	.0%
Point Control	.6	.0	.6	0	.0%	.0%	.0%	.0%
Uniras	.6	.0	.6	0	.0%	.0%	.0%	.0%
Pelton Engineering	.6	.0	.6	0	.0%	.0%	.0%	.0%
Vamp	.6	.0	.6	0	.0%	.0%	.0%	.0%
Machinery Sales	.6	.0	.6	0	.0%	.0%	.0%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.0%	.0%
ECOM Associates	.5	.0	.5	3	.0%	.0%	.0%	.0%
Mc2 Engineering Software	.5	.0	.5	0	.0%	.0%	.0%	.0%
Capilano Computing	.5	.0	.5	0	.0%	.0%	.0%	.0%
PLUS Logic	.4	.0	.4	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.4	.0	.4	0	.0%	.0%	.0%	.0%
Academi Systems	.4	.0	.3	2	.0%	.0%	.0%	.0%
Imagine That	.4	.0	.4	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 5 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: North America
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
Company	Revenue	Revenue	Revenue	Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Premise	.4	.0	.4	0	.0%	.0%	.0%	.0%
Moss Systems	.4	.0	.4	0	.0%	.0%	.0%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.0%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.0%	.0%
Ithaca Software	.3	.0	.3	0	.0%	.0%	.0%	.0%
CAD Language Systems	.3	.0	.3	0	.0%	.0%	.0%	.0%
Simulation Science	.3	.0	.3	0	.0%	.0%	.0%	.0%
FEGS	.3	.0	.2	0	.0%	.0%	.0%	.0%
Geosoft	.3	.0	.3	0	.0%	.0%	.0%	.0%
Rasna Corporation	.3	.0	.3	0	.0%	.0%	.0%	.0%
The Great Softwestern Co.	.2	.0	.2	0	.0%	.0%	.0%	.0%
Bobcat Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Simutest	.2	.0	.2	0	.0%	.0%	.0%	.0%
Microtel Pacific Research	.2	.0	.2	1	.0%	.0%	.0%	.0%
MEDESIGN	.2	.1	.1	2	.0%	.0%	.0%	.0%
Synthesis	.1	.0	.1	0	.0%	.0%	.0%	.0%
Vision 3D	.1	.0	.0	0	.0%	.0%	.0%	.0%
Technische Computer Systeme	.1	.0	.1	3	.0%	.0%	.0%	.0%
Sierra Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
Complansoft CAD	.1	.0	.0	4	.0%	.0%	.0%	.0%
Star Informatic	.0	.0	.0	0	.0%	.0%	.0%	.0%
CADMATIC	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	434.6	422.3	.3	59,284	8.7%	15.8%	.0%	28.7%
All Companies	4,992.5	2,674.5	1,436.6	206,610	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	4,900.5	2,655.4	1,377.2	205,845	98.2%	99.3%	95.9%	99.6%
All Asian-Based Companies	3.9	1.8	2.2	28	.1%	.1%	.2%	.0%
All European-Based Companies	88.0	17.4	57.2	737	1.8%	.7%	4.0%	.4%
All Hardware Companies	1,858.8	1,632.5	.0	179,068	37.2%	61.0%	.0%	86.7%
All Turnkey & SW Companies	3,133.7	1,042.0	1,436.6	27,542	62.8%	39.0%	100.0%	13.3%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 6
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: North America
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Intergraph	449.2	251.7	80.7	4,969	17.5%	22.0%	9.5%	10.7%
Sun	241.0	212.1	.0	13,883	9.4%	18.5%	.0%	30.0%
Computervision	231.3	63.4	56.3	1,517	9.0%	5.5%	6.6%	3.3%
Mentor Graphics	205.7	59.7	86.4	2,039	8.0%	5.2%	10.2%	4.4%
Hewlett-Packard	200.4	149.3	18.2	9,294	7.8%	13.0%	2.1%	20.1%
McDonnell Douglas	161.8	83.9	52.0	1,833	6.3%	7.3%	6.1%	4.0%
Cadence	103.5	.0	76.9	0	4.0%	.0%	9.0%	.0%
Digital	98.7	69.3	2.9	3,167	3.9%	6.0%	.3%	6.9%
Valid	84.6	12.1	56.4	494	3.3%	1.1%	6.6%	1.1%
Auto-Trol	52.1	20.8	18.2	612	2.0%	1.8%	2.1%	1.3%
Silicon Graphics	50.3	44.3	.0	1,360	2.0%	3.9%	.0%	2.9%
IBM	42.7	25.9	9.1	1,078	1.7%	2.3%	1.1%	2.3%
Schlumberger	39.9	13.7	15.0	341	1.6%	1.2%	1.8%	.7%
Dazix	38.5	7.7	15.4	284	1.5%	.7%	1.8%	.6%
Control Data	30.0	20.4	5.1	707	1.2%	1.8%	.6%	1.5%
SDRC	28.7	.0	28.7	0	1.1%	.0%	3.4%	.0%
ESRI	28.0	.0	24.4	0	1.1%	.0%	2.9%	.0%
Landmark Graphics	24.3	11.9	7.3	149	.9%	1.0%	.9%	.3%
Racal-Redac	19.1	1.2	15.1	98	.7%	.1%	1.8%	.2%
Unisys	17.9	9.1	6.3	279	.7%	.8%	.7%	.6%
Cimlinc	17.7	3.5	10.6	338	.7%	.3%	1.2%	.7%
Gerber Systems	16.2	8.0	5.4	210	.6%	.7%	.6%	.5%
Parametric Technology	15.9	.0	14.6	0	.6%	.0%	1.7%	.0%
Zycad	15.8	12.5	.0	133	.6%	1.1%	.0%	.3%
Accugraph	15.5	7.6	6.4	431	.6%	.7%	.7%	.9%
Alias Research	14.8	.0	14.8	0	.6%	.0%	1.7%	.0%
PDA Engineering	12.4	.0	12.4	0	.5%	.0%	1.5%	.0%
Autodesk	10.4	.0	10.4	0	.4%	.0%	1.2%	.0%
Matra Datavision	10.3	4.7	4.1	113	.4%	.4%	.5%	.2%
Scientific Calc.	9.9	1.3	5.3	32	.4%	.1%	.6%	.1%
Cisigraph	9.3	3.3	3.3	75	.4%	.3%	.4%	.2%
Calay	9.1	2.9	5.3	149	.4%	.3%	.6%	.3%
ADRA Systems	9.0	4.1	4.1	208	.4%	.4%	.5%	.4%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 6
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: North America
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Viewlogic Systems	8.5	.0	7.1	0	.3%	.0%	.8%	.0%
ISICAD	8.4	4.4	2.5	93	.3%	.4%	.3%	.2%
LSI Logic	7.9	.8	5.9	20	.3%	.1%	.7%	.0%
ICAD	7.9	.0	6.3	0	.3%	.0%	.7%	.0%
VLSI Technology	7.8	.2	6.5	23	.3%	.0%	.8%	.0%
Ikos Systems	7.5	7.5	.0	34	.3%	.7%	.0%	.1%
Logic Automation	7.5	.0	7.5	0	.3%	.0%	.9%	.0%
MCS	7.3	.0	6.5	0	.3%	.0%	.8%	.0%
Swanson Analysis	7.2	.0	7.2	0	.3%	.0%	.8%	.0%
Aries Technology	7.0	.0	6.3	0	.3%	.0%	.7%	.0%
Synopsys	6.9	.0	6.2	0	.3%	.0%	.7%	.0%
EEsof	6.8	.1	5.7	10	.3%	.0%	.7%	.0%
GeoVision Corp.	6.8	4.8	1.4	90	.3%	.4%	.2%	.2%
Ascent Logic Corp	6.0	.0	4.8	0	.2%	.0%	.6%	.0%
Solbourne	5.3	5.2	.0	388	.2%	.5%	.0%	.8%
MacNeal-Schwendler	5.2	.0	5.0	0	.2%	.0%	.6%	.0%
Synercom	5.2	.0	2.4	0	.2%	.0%	.3%	.0%
Quickturn Systems	4.6	4.6	.0	35	.2%	.4%	.0%	.1%
Teradyne	4.4	.0	3.7	0	.2%	.0%	.4%	.0%
Comdisco Systems	4.2	.0	3.7	0	.2%	.0%	.4%	.0%
Meta-Software	3.9	.0	3.9	0	.2%	.0%	.5%	.0%
Integrated Computer Graphics	3.9	1.9	1.6	424	.2%	.2%	.2%	.9%
Zuken	3.7	1.7	2.1	26	.1%	.1%	.2%	.1%
Ontologic	3.6	.0	3.6	0	.1%	.0%	.4%	.0%
Analogy	3.5	.0	3.1	0	.1%	.0%	.4%	.0%
ACDS	3.4	.0	2.8	0	.1%	.0%	.3%	.0%
Seattle Silicon	3.3	.0	2.3	0	.1%	.0%	.3%	.0%
Genrad	3.3	.6	2.2	29	.1%	.1%	.3%	.1%
Test Systems Strategies	3.2	.0	2.8	0	.1%	.0%	.3%	.0%
ERDAS	3.2	.6	2.4	15	.1%	.1%	.3%	.0%
Quad Design Technology	3.1	.0	2.9	0	.1%	.0%	.3%	.0%
CADAM	3.1	.0	2.6	0	.1%	.0%	.3%	.0%
Ultimap	3.0	1.1	.9	30	.1%	.1%	.1%	.1%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 6
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: North America
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Silvar-Lisco	2.8	.0	1.7	0	.1%	.0%	.2%	.0%
Vantage Analysis Systems	2.8	.0	2.8	0	.1%	.0%	.3%	.0%
EPIC Design Technology	2.7	.0	2.4	0	.1%	.0%	.3%	.0%
Wisdom Systems	2.7	.0	2.0	0	.1%	.0%	.2%	.0%
Pacific Numerics	2.5	.0	2.5	0	.1%	.0%	.3%	.0%
Motorola	2.5	.0	2.5	0	.1%	.0%	.3%	.0%
Sigma Design	2.4	.0	2.3	0	.1%	.0%	.3%	.0%
Quantic Laboratories	2.3	.0	2.1	0	.1%	.0%	.3%	.0%
Mechanical Dynamics	2.1	.0	1.9	0	.1%	.0%	.2%	.0%
Shared Resources	2.1	.1	.1	4	.1%	.0%	.0%	.0%
Land Innovation	2.0	.0	2.0	0	.1%	.0%	.2%	.0%
Scientific & Engineering SW	1.9	.0	1.9	0	.1%	.0%	.2%	.0%
Engineering Mechanics	1.8	.6	1.0	139	.1%	.1%	.1%	.3%
Dynamic Graphics	1.8	.0	1.5	0	.1%	.0%	.2%	.0%
Cimatron	1.7	.8	.8	50	.1%	.1%	.1%	.1%
Genasys II	1.7	.6	1.0	5	.1%	.1%	.1%	.0%
CAD/CAM Group	1.7	.0	1.7	0	.1%	.0%	.2%	.0%
DCA Softdesk	1.6	.0	1.6	0	.1%	.0%	.2%	.0%
GEOVISION Inc.	1.6	.9	.4	623	.1%	.1%	.0%	1.3%
Royal Digital Systems	1.6	.0	1.5	0	.1%	.0%	.2%	.0%
Emerald Design Systems	1.5	.7	.6	24	.1%	.1%	.1%	.1%
Everex Systems	1.4	1.4	.0	165	.1%	.1%	.0%	.4%
Laser-Scan	1.4	.3	.7	4	.1%	.0%	.1%	.0%
Delcam International	1.3	.5	.7	22	.1%	.0%	.1%	.0%
SIMUCAD	1.3	.0	1.2	0	.0%	.0%	.1%	.0%
ACTEL	1.2	.0	1.1	0	.0%	.0%	.1%	.0%
Intera Tydac	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
Radian Corporation	1.2	.0	.7	0	.0%	.0%	.1%	.0%
Cooper & Chyan Technology	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
Micro Engineering Solutions	1.1	.3	.7	10	.0%	.0%	.1%	.0%
Autometric	1.1	.7	.4	8	.0%	.1%	.0%	.0%
Bechtel Software	1.1	.0	1.0	0	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 6
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: North America
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Integrated Silicon Systems	1.0	.1	.9	4	.0%	.0%	.1%	.0%
A/E Microsystems	.9	.6	.2	86	.0%	.1%	.0%	.2%
Computer-Aided Design Group	.9	.0	.7	0	.0%	.0%	.1%	.0%
MARC	.9	.0	.9	0	.0%	.0%	.1%	.0%
ETAK	.9	.0	.8	1	.0%	.0%	.1%	.0%
Xilinx	.9	.0	.8	0	.0%	.0%	.1%	.0%
Kockums Computer Systems	.8	.2	.4	40	.0%	.0%	.1%	.1%
Geomath	.8	.0	.8	0	.0%	.0%	.1%	.0%
National Semiconductor	.8	.2	.6	7	.0%	.0%	.1%	.0%
Geobased Systems	.8	.2	.6	11	.0%	.0%	.1%	.0%
Object Design	.8	.0	.8	0	.0%	.0%	.1%	.0%
Objectivity	.7	.0	.7	0	.0%	.0%	.1%	.0%
Data I/O	.7	.0	.7	0	.0%	.0%	.1%	.0%
Microsim	.5	.0	.5	0	.0%	.0%	.1%	.0%
Infinite Graphics	.5	.0	.5	0	.0%	.0%	.1%	.0%
Terr-Mar	.5	.2	.3	6	.0%	.0%	.0%	.0%
Georgia Tech Research Corp.	.4	.0	.4	0	.0%	.0%	.1%	.0%
NCR Microelectronics	.4	.0	.4	0	.0%	.0%	.0%	.0%
Geographic Systems (IIS)	.4	.0	.4	0	.0%	.0%	.0%	.0%
Phase Three Logic	.4	.0	.4	0	.0%	.0%	.0%	.0%
Moss Systems	.4	.0	.4	0	.0%	.0%	.0%	.0%
Geographic Systems (WPS)	.4	.0	.3	0	.0%	.0%	.0%	.0%
CAD Language Systems	.3	.0	.3	0	.0%	.0%	.0%	.0%
Terra Sciences	.3	.0	.3	0	.0%	.0%	.0%	.0%
Simulation Science	.2	.0	.2	0	.0%	.0%	.0%	.0%
Computational Mechanics	.2	.0	.2	0	.0%	.0%	.0%	.0%
MEDESIGN	.2	.1	.1	2	.0%	.0%	.0%	.0%
Ithaca Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
Academi Systems	.2	.0	.1	1	.0%	.0%	.0%	.0%
FEGS	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 6 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: North America
UNITS: Millions of Dollars/Actual Units

Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Market Share: Total Revenue	Market Share: Hardware Revenue	Market Share: Software Revenue	Market Share: Wkstns Shipped
Technische Computer Systeme	.1	.0	.1	3	.0%	.0%	.0%	.0%
Facility Mapping Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Sierra Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
Complansoft CAD	.1	.0	.0	4	.0%	.0%	.0%	.0%
Point Control	.1	.0	.1	0	.0%	.0%	.0%	.0%
Microtel Pacific Research	.0	.0	.0	0	.0%	.0%	.0%	.0%
Star Informatic	.0	.0	.0	0	.0%	.0%	.0%	.0%
ECOM Associates	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	2,564.7	1,146.2	850.2	46,228	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	2,499.4	1,130.7	810.7	45,641	97.5%	98.6%	95.4%	98.7%
All Asian-Based Companies	3.7	1.7	2.1	26	.1%	.1%	.2%	.1%
All European-Based Companies	61.6	13.9	37.4	561	2.4%	1.2%	4.4%	1.2%
All Hardware Companies	523.9	444.3	.0	26,362	20.4%	38.8%	.0%	57.0%
All Turnkey & SW Companies	2,040.8	702.0	850.2	19,866	79.6%	61.2%	100.0%	43.0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 7
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: North America
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	380.8	228.5	83.8	4,524	27.5%	26.1%	35.1%	23.1%
Digital	337.8	245.9	.7	0	24.4%	28.1%	.3%	.0%
Intergraph	78.6	39.3	12.6	705	5.7%	4.5%	5.3%	3.6%
Sun	57.3	47.5	.0	2,240	4.1%	5.4%	.0%	11.4%
McDonnell Douglas	42.5	21.7	14.0	653	3.1%	2.5%	5.8%	3.3%
Control Data	40.8	19.0	4.6	224	3.0%	2.2%	1.9%	1.1%
Computervision	29.9	8.1	7.2	196	2.2%	.9%	3.0%	1.0%
MacNeal-Schwendler	20.7	.0	19.8	0	1.5%	.0%	8.3%	.0%
ESRI	16.7	.0	14.7	0	1.2%	.0%	6.2%	.0%
Schlumberger	16.5	6.4	5.6	253	1.2%	.7%	2.4%	1.3%
Cadence	13.4	.0	9.9	0	1.0%	.0%	4.2%	.0%
Synopsys	7.5	.0	6.7	0	.5%	.0%	2.8%	.0%
Hewlett-Packard	6.8	5.7	.0	340	.5%	.6%	.0%	1.7%
Swanson Analysis	6.6	.0	6.6	0	.5%	.0%	2.8%	.0%
PDA Engineering	6.1	.0	6.1	0	.4%	.0%	2.6%	.0%
Solbourne	5.7	5.7	.0	426	.4%	.6%	.0%	2.2%
MCS	5.4	.0	4.7	0	.4%	.0%	2.0%	.0%
Unisys	5.3	2.7	1.9	75	.4%	.3%	.8%	.4%
SDRC	4.3	.0	4.3	0	.3%	.0%	1.8%	.0%
Teradyne	4.2	.0	3.4	0	.3%	.0%	1.4%	.0%
Zycad	4.0	3.7	.0	30	.3%	.4%	.0%	.2%
Computer-Aided Design Group	3.6	.0	2.5	0	.3%	.0%	1.1%	.0%
Geographic Systems (IIS)	3.5	.0	3.2	0	.3%	.0%	1.3%	.0%
Geographic Systems (WPS)	3.3	.0	3.0	0	.2%	.0%	1.3%	.0%
CADAM	3.2	.0	2.8	0	.2%	.0%	1.2%	.0%
Synercom	3.1	.0	1.4	0	.2%	.0%	.6%	.0%
GeoVision Corp.	2.6	1.9	.6	21	.2%	.2%	.2%	.1%
Scientific Calc.	2.5	.5	1.9	12	.2%	.1%	.8%	.1%
Secagraphics	2.1	1.5	.6	36	.2%	.2%	.3%	.2%
ABB Engineering Automation	2.1	.0	2.1	0	.2%	.0%	.9%	.0%
Autometric	1.9	1.2	.7	12	.1%	.1%	.3%	.1%
CIVILSOFT	1.6	.0	1.6	0	.1%	.0%	.7%	.0%
Bechtel Software	1.4	.0	1.3	0	.1%	.0%	.6%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 7
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: North America
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
					Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
ETAK	1.2	.1	1.1	5	.1%	.0%	.5%	.0%
VLSI Technology	1.1	.1	.8	3	.1%	.0%	.3%	.0%
Cisigraph	1.0	.4	.3	21	.1%	.0%	.1%	.1%
Silicon Graphics	1.0	.9	.0	21	.1%	.1%	.0%	.1%
MARC	.9	.0	.9	0	.1%	.0%	.4%	.0%
Mechanical Dynamics	.9	.0	.8	0	.1%	.0%	.3%	.0%
LSI Logic	.9	.1	.7	2	.1%	.0%	.3%	.0%
Georgia Tech Research Corp.	.8	.0	.8	0	.1%	.0%	.3%	.0%
Daniel Geophysical	.8	.0	.7	16	.1%	.0%	.3%	.1%
EEsof	.8	.0	.7	0	.1%	.0%	.3%	.0%
Meta-Software	.7	.0	.7	0	.1%	.0%	.3%	.0%
Dynamic Graphics	.6	.0	.5	0	.0%	.0%	.2%	.0%
Computational Mechanics	.5	.0	.5	0	.0%	.0%	.2%	.0%
Genrad	.4	.1	.3	4	.0%	.0%	.1%	.0%
Test Systems Strategies	.4	.0	.4	0	.0%	.0%	.2%	.0%
Data I/O	.2	.0	.2	0	.0%	.0%	.1%	.0%
Zuken	.2	.1	.1	2	.0%	.0%	.0%	.0%
Engineering Systems Corp.	.2	.0	.1	0	.0%	.0%	.1%	.0%
Radian Corporation	.2	.0	.1	0	.0%	.0%	.1%	.0%
Accugraph	.2	.1	.1	12	.0%	.0%	.0%	.1%
Analogy	.2	.0	.2	0	.0%	.0%	.1%	.0%
SIMUCAD	.2	.0	.2	0	.0%	.0%	.1%	.0%
A/E Microsystems	.2	.1	.0	8	.0%	.0%	.0%	.0%
Laser-Scan	.2	.0	.1	1	.0%	.0%	.0%	.0%
Logic Automation	.2	.0	.2	0	.0%	.0%	.1%	.0%
Microsim	.2	.0	.1	0	.0%	.0%	.1%	.0%
FEGS	.1	.0	.1	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	1	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 7 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: North America
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	246.5	234.2	.0	9,739	17.8%	26.8%	.0%	49.7%
All Companies	1,382.2	875.5	238.8	19,580	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	1,364.9	874.9	224.7	19,557	98.7%	99.9%	94.1%	99.9%
All Asian-Based Companies	.2	.1	.1	2	.0%	.0%	.0%	.0%
All European-Based Companies	17.1	.4	14.0	21	1.2%	.0%	5.9%	.1%
All Hardware Companies	662.9	544.9	.0	12,812	48.0%	62.2%	.0%	65.4%
All Turnkey & SW Companies	719.3	330.6	238.8	6,768	52.0%	37.8%	100.0%	34.6%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 8
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: North America
UNITS: Millions of Dollars/Actual Units

					--- Market Share ---			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	197.6	197.6	.0	32,937	18.9%	30.3%	.0%	23.4%
Apple Computer	133.2	117.2	.0	25,620	12.7%	18.0%	.0%	18.2%
Autodesk	115.6	.0	115.6	0	11.1%	.0%	33.3%	.0%
IBM	62.6	59.5	.0	13,995	6.0%	9.1%	.0%	9.9%
Hewlett-Packard	48.0	38.4	.0	7,356	4.6%	5.9%	.0%	5.2%
CADAM	17.8	10.5	6.2	1,500	1.7%	1.6%	1.8%	1.1%
Dell Computer	15.8	15.8	.0	3,952	1.5%	2.4%	.0%	2.8%
Everex Systems	15.6	15.6	.0	4,986	1.5%	2.4%	.0%	3.5%
Intergraph	15.3	.0	14.4	0	1.5%	.0%	4.1%	.0%
CADKEY	13.5	.0	13.5	0	1.3%	.0%	3.9%	.0%
Viewlogic Systems	11.6	.0	9.7	0	1.1%	.0%	2.8%	.0%
Xilinx	9.9	.0	8.9	0	.9%	.0%	2.6%	.0%
Computervision	8.6	.4	8.1	86	.8%	.1%	2.3%	.1%
EEsof	7.5	.0	6.8	0	.7%	.0%	2.0%	.0%
ACTEL	7.0	.0	6.3	0	.7%	.0%	1.8%	.0%
Geobased Systems	6.2	1.2	4.6	134	.6%	.2%	1.3%	.1%
Altera	5.8	.0	4.9	0	.6%	.0%	1.4%	.0%
ETAK	5.7	.3	5.4	14	.5%	.0%	1.6%	.0%
DCA Softdesk	5.2	.0	5.2	0	.5%	.0%	1.5%	.0%
CAP Electronic Sweet's	5.1	.0	4.0	0	.5%	.0%	1.2%	.0%
ESRI	4.4	.0	4.4	0	.4%	.0%	1.3%	.0%
Microsim	4.2	.0	3.9	0	.4%	.0%	1.1%	.0%
Aspen Technology	4.0	.0	3.6	0	.4%	.0%	1.0%	.0%
Noda CAD	3.8	1.0	2.7	32	.4%	.1%	.8%	.0%
Orcad	3.7	.0	3.7	0	.4%	.0%	1.1%	.0%
Strategic Mapping	3.7	.0	3.7	0	.4%	.0%	1.1%	.0%
ISICAD	3.6	.0	3.6	0	.3%	.0%	1.0%	.0%
CNC Software	3.6	.0	3.6	0	.3%	.0%	1.0%	.0%
LandCadd	3.5	.0	3.3	0	.3%	.0%	1.0%	.0%
Data I/O	3.5	.0	3.5	0	.3%	.0%	1.0%	.0%
Algor Interactive Systems	3.4	.0	3.0	0	.3%	.0%	.9%	.0%
MapInfo	3.3	.0	2.7	0	.3%	.0%	.8%	.0%
MCS	3.2	.0	2.8	0	.3%	.0%	.8%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 8
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: North America
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Micrografx	3.1	.0	3.1	0	.3%	.0%	.9%	.0%
American Small Business Comp.	3.1	.0	3.1	0	.3%	.0%	.9%	.0%
Claris	3.0	.0	3.0	0	.3%	.0%	.9%	.0%
Innovative Data Design	2.9	.0	2.9	0	.3%	.0%	.8%	.0%
Racal-Redac	2.9	.0	2.7	0	.3%	.0%	.8%	.0%
International Software Systems	2.8	.0	2.8	0	.3%	.0%	.8%	.0%
CAD Software	2.7	.0	2.3	0	.3%	.0%	.7%	.0%
ADRA Systems	2.7	.0	2.4	0	.3%	.0%	.7%	.0%
Visionics	2.4	.0	1.8	10	.2%	.0%	.5%	.0%
PacSoft	2.4	.0	2.4	0	.2%	.0%	.7%	.0%
Foresight Resources	2.4	.0	2.2	0	.2%	.0%	.6%	.0%
ERDAS	2.2	.3	1.7	12	.2%	.0%	.5%	.0%
Sigma Design	2.1	.0	2.1	0	.2%	.0%	.6%	.0%
Infinite Graphics	2.0	.0	2.0	0	.2%	.0%	.6%	.0%
Teradyne	1.9	.0	1.6	0	.2%	.0%	.5%	.0%
ALDEC	1.9	.0	1.9	0	.2%	.0%	.5%	.0%
Accel Technologies	1.8	.0	1.7	0	.2%	.0%	.5%	.0%
GeoGraphix	1.8	.0	1.4	0	.2%	.0%	.4%	.0%
LPKF	1.8	1.2	.5	75	.2%	.2%	.1%	.1%
Facility Mapping Systems	1.8	.0	1.6	0	.2%	.0%	.5%	.0%
Aries Technology	1.8	.0	1.6	0	.2%	.0%	.5%	.0%
Evolution Computing	1.8	.0	1.8	0	.2%	.0%	.5%	.0%
Generation 5 Technology	1.8	.0	1.8	0	.2%	.0%	.5%	.0%
Accugraph	1.7	.1	1.5	6	.2%	.0%	.4%	.0%
Micro Engineering Solutions	1.7	.5	1.1	25	.2%	.1%	.3%	.0%
Kork Systems	1.6	.2	1.1	20	.2%	.0%	.3%	.0%
Swanson Analysis	1.5	.0	1.5	0	.1%	.0%	.4%	.0%
Engineering Mechanics	1.3	.5	.8	111	.1%	.1%	.2%	.1%
Carrier Corporation	1.3	.0	1.3	0	.1%	.0%	.4%	.0%
Engineering Software	1.2	.1	1.1	34	.1%	.0%	.3%	.0%
Intera Tydac	1.2	.0	1.2	0	.1%	.0%	.3%	.0%
Terra Sciences	1.2	.0	1.2	0	.1%	.0%	.3%	.0%
GRAPHSOFT	1.2	.0	1.2	0	.1%	.0%	.3%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 8
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: North America
UNITS: Millions of Dollars/Actual Units

					--------- Market Share ---------			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
BETRONEX	1.1	.0	1.1	0	.1%	.0%	.3%	.0%
Massteck	1.1	.0	1.1	0	.1%	.0%	.3%	.0%
Investronica SA	1.1	.9	.1	43	.1%	.1%	.0%	.0%
Omation	1.1	.0	1.1	0	.1%	.0%	.3%	.0%
Phase Three Logic	1.1	.0	1.0	0	.1%	.0%	.3%	.0%
Intrinsix	1.0	1.0	.0	10	.1%	.2%	.0%	.0%
Spectrum Software	1.0	.0	1.0	0	.1%	.0%	.3%	.0%
Cadisys	1.0	.0	1.0	0	.1%	.0%	.3%	.0%
CADWorks	.9	.0	.8	0	.1%	.0%	.2%	.0%
Tanner Research	.9	.0	.8	0	.1%	.0%	.2%	.0%
Aura CAD/CAM Systems	.9	.0	.8	0	.1%	.0%	.2%	.0%
Comshoppe	.8	.0	.8	0	.1%	.0%	.2%	.0%
Cascade Graphics	.8	.0	.8	0	.1%	.0%	.2%	.0%
Pathtrace	.8	.2	.5	10	.1%	.0%	.1%	.0%
Mega CADD	.7	.0	.7	0	.1%	.0%	.2%	.0%
Terr-Mar	.7	.3	.4	14	.1%	.1%	.1%	.0%
Aptos	.7	.0	.7	0	.1%	.0%	.2%	.0%
Cimatron	.7	.3	.3	21	.1%	.0%	.1%	.0%
A.I. Systems	.7	.0	.7	0	.1%	.0%	.2%	.0%
Caddlink	.7	.0	.7	0	.1%	.0%	.2%	.0%
Maptek	.7	.0	.7	0	.1%	.0%	.2%	.0%
Ground Modelling Systems	.7	.4	.3	4	.1%	.1%	.1%	.0%
Dynaware	.6	.0	.6	0	.1%	.0%	.2%	.0%
Douglas Electronics	.6	.0	.6	0	.1%	.0%	.2%	.0%
IGC Technology	.6	.0	.6	0	.1%	.0%	.2%	.0%
Uniras	.6	.0	.6	0	.1%	.0%	.2%	.0%
Pelton Engineering	.6	.0	.6	0	.1%	.0%	.2%	.0%
Radian Corporation	.6	.0	.4	0	.1%	.0%	.1%	.0%
Engineering Systems Corp.	.6	.0	.4	0	.1%	.0%	.1%	.0%
GEOVISION Inc.	.6	.3	.1	219	.1%	.1%	.0%	.2%
Ikos Systems	.6	.6	.0	3	.1%	.1%	.0%	.0%
Schlumberger	.6	.2	.2	4	.1%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 8
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: North America
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
					Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
Vamp	.6	.0	.6	0	.1%	.0%	.2%	.0%
Machinery Sales	.6	.0	.6	0	.1%	.0%	.2%	.0%
Point Control	.5	.0	.5	0	.1%	.0%	.2%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.1%	.0%
ECOM Associates	.5	.0	.5	3	.0%	.0%	.1%	.0%
Mc2 Engineering Software	.5	.0	.5	0	.0%	.0%	.1%	.0%
Capilano Computing	.5	.0	.5	0	.0%	.0%	.1%	.0%
PLUS Logic	.4	.0	.4	0	.0%	.0%	.1%	.0%
Digital	.4	.0	.3	0	.0%	.0%	.1%	.0%
Imagine That	.4	.0	.4	0	.0%	.0%	.1%	.0%
Premise	.4	.0	.4	0	.0%	.0%	.1%	.0%
Bechtel Software	.4	.0	.4	0	.0%	.0%	.1%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.1%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	.4	.1	.2	5	.0%	.0%	.1%	.0%
Computer-Aided Design Group	.3	.0	.2	0	.0%	.0%	.1%	.0%
Geosoft	.3	.0	.3	0	.0%	.0%	.1%	.0%
Daniel Geophysical	.3	.0	.3	0	.0%	.0%	.1%	.0%
MacNeal-Schwendler	.3	.0	.3	0	.0%	.0%	.1%	.0%
Rasna Corporation	.3	.0	.3	0	.0%	.0%	.1%	.0%
Academi Systems	.2	.0	.2	1	.0%	.0%	.1%	.0%
The Great Softwestern Co.	.2	.0	.2	0	.0%	.0%	.1%	.0%
Bobcat Systems	.2	.0	.2	0	.0%	.0%	.1%	.0%
Geomath	.2	.0	.2	0	.0%	.0%	.1%	.0%
Simutest	.2	.0	.2	0	.0%	.0%	.1%	.0%
Genasys II	.2	.1	.1	1	.0%	.0%	.0%	.0%
Ithaca Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
Microtel Pacific Research	.2	.0	.1	1	.0%	.0%	.0%	.0%
Pacific Numerics	.1	.0	.1	0	.0%	.0%	.0%	.0%
Synthesis	.1	.0	.1	0	.0%	.0%	.0%	.0%
Vision 3D	.1	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 8 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: North America
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
Genrad	.1	.0	.1	6	.0%	.0%	.0%	.0%
National Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
Simulation Science	.1	.0	.1	0	.0%	.0%	.0%	.0%
SINUCAD	.1	.0	.1	0	.0%	.0%	.0%	.0%
A/E Microsystems	.0	.0	.0	6	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
CADMATIC	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	188.1	188.1	.3	49,545	18.0%	28.8%	.1%	35.2%
All Companies	1,045.7	652.9	347.6	140,802	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	1,036.3	649.8	341.8	140,647	99.1%	99.5%	98.3%	99.9%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	9.4	3.1	5.8	155	.9%	.5%	1.7%	.1%
All Hardware Companies	672.1	643.4	.0	139,894	64.3%	98.5%	.0%	99.4%
All Turnkey & SW Companies	373.6	9.5	347.6	908	35.7%	1.5%	100.0%	.6%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 9
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Europe
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
					Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
IBM	651.4	420.6	124.4	26,886	12.5%	15.0%	8.6%	15.0%
Computervision	575.5	244.2	143.6	5,925	11.0%	8.7%	9.9%	3.3%
Hewlett-Packard	409.6	297.6	38.4	24,338	7.9%	10.6%	2.7%	13.6%
Intergraph	368.2	196.0	73.1	3,846	7.1%	7.0%	5.0%	2.1%
Digital	359.8	262.2	.0	2,640	6.9%	9.3%	.0%	1.5%
Siemens	258.4	130.6	91.1	3,499	5.0%	4.6%	6.3%	2.0%
Compaq	197.7	197.7	.0	32,937	3.8%	7.0%	.0%	18.4%
Sun	177.2	154.1	.0	7,448	3.4%	5.5%	.0%	4.2%
McDonnell Douglas	124.9	64.2	48.4	2,099	2.4%	2.3%	3.3%	1.2%
Mentor Graphics	120.7	33.9	50.7	1,196	2.3%	1.2%	3.5%	.7%
Control Data	90.9	50.6	12.5	1,201	1.7%	1.8%	.9%	.7%
Autodesk	80.9	.0	80.9	0	1.6%	.0%	5.6%	.0%
Schlumberger	78.6	27.9	28.7	824	1.5%	1.0%	2.0%	.5%
Matra Datavision	68.1	30.7	27.3	743	1.3%	1.1%	1.9%	.4%
Apple Computer	59.0	51.9	.0	11,340	1.1%	1.8%	.0%	6.3%
Norsk Data	50.0	25.6	8.8	500	1.0%	.9%	.6%	.3%
Dazix	44.9	7.2	18.0	331	.9%	.3%	1.2%	.2%
Racal-Redac	39.7	1.6	32.2	181	.8%	.1%	2.2%	.1%
Valid	39.6	2.7	23.8	204	.8%	.1%	1.6%	.1%
STI-Straessle	39.6	9.1	21.8	370	.8%	.3%	1.5%	.2%
ISICAD	34.3	14.2	15.2	300	.7%	.5%	1.1%	.2%
Silicon Graphics	32.4	28.5	.0	724	.6%	1.0%	.0%	.4%
Cadence	31.3	.0	23.3	0	.6%	.0%	1.6%	.0%
Cisigraph	31.1	10.9	10.8	288	.6%	.4%	.7%	.2%
Nemetschek	30.9	12.3	18.5	500	.6%	.4%	1.3%	.3%
ItalCad	30.0	14.1	7.2	280	.6%	.5%	.5%	.2%
Investronica SA	25.5	20.4	2.6	1,018	.5%	.7%	.2%	.6%
Kewill Systems	25.0	7.5	13.8	500	.5%	.3%	1.0%	.3%
SDRC	24.1	.0	24.1	0	.5%	.0%	1.7%	.0%
ICL	22.9	13.5	7.8	629	.4%	.5%	.5%	.4%
PAFEC	22.9	.0	22.9	0	.4%	.0%	1.6%	.0%
Ferranti	21.8	8.1	10.0	201	.4%	.3%	.7%	.1%
Wiechers Datentechnik	20.3	16.2	4.1	494	.4%	.6%	.3%	.3%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 9
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Europe
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
Company	Revenue	Revenue	Revenue	Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Ziegler	18.4	.0	18.4	0	.4%	.0%	1.3%	.0%
Vero International Software	18.2	.0	16.6	0	.3%	.0%	1.1%	.0%
MacNeal-Schwendler	16.6	.0	15.9	0	.3%	.0%	1.1%	.0%
CADAM	16.0	7.0	7.7	1,000	.3%	.2%	.5%	.6%
Mannesmann PROCAD	15.7	8.0	4.4	218	.3%	.3%	.3%	.1%
ESRI	15.7	.0	13.9	0	.3%	.0%	1.0%	.0%
Hahn & Kolb	15.4	9.3	4.6	220	.3%	.3%	.3%	.1%
ISYKON Software	15.4	7.7	5.4	220	.3%	.3%	.4%	.1%
ABB Cade International	15.2	8.9	4.6	66	.3%	.3%	.3%	.0%
Landmark Graphics	14.6	7.1	4.4	89	.3%	.3%	.3%	.0%
Calay	14.4	4.5	8.3	234	.3%	.2%	.6%	.1%
Research Machines	14.3	14.3	.0	2,200	.3%	.5%	.0%	1.2%
Delcam International	13.1	4.6	6.6	218	.3%	.2%	.5%	.1%
Caditron	13.0	6.5	5.2	200	.2%	.2%	.4%	.1%
Gerber Systems	12.4	6.1	4.1	178	.2%	.2%	.3%	.1%
Exapt	12.3	6.0	4.2	211	.2%	.2%	.3%	.1%
CAD Centre	12.1	.0	6.4	0	.2%	.0%	.4%	.0%
Star Informatic	12.0	10.5	3.1	550	.2%	.4%	.2%	.3%
Auto-Trol	11.8	4.7	4.1	138	.2%	.2%	.3%	.1%
Cimatron	11.6	5.2	5.2	344	.2%	.2%	.4%	.2%
Sysscan	11.6	5.1	3.0	103	.2%	.2%	.2%	.1%
CAD Lab	11.5	.0	9.2	0	.2%	.0%	.6%	.0%
Aucotec	10.5	3.7	5.8	167	.2%	.1%	.4%	.1%
Microway	10.5	7.1	3.5	95	.2%	.3%	.2%	.1%
Cimlinc	10.3	2.1	6.2	197	.2%	.1%	.4%	.1%
Fides Industrielle Automation	10.0	1.2	9.0	75	.2%	.0%	.6%	.0%
LPKF	9.9	6.4	2.5	400	.2%	.2%	.2%	.2%
Unisys	9.9	5.0	3.5	151	.2%	.2%	.2%	.1%
Scientific Calc.	9.5	1.2	5.6	34	.2%	.0%	.4%	.0%
Soft-Tech Software Technologies	9.0	.9	7.2	225	.2%	.0%	.5%	.1%
Radan Computational	8.9	3.1	4.5	300	.2%	.1%	.3%	.2%
PDA Engineering	8.8	.0	8.8	0	.2%	.0%	.6%	.0%
Laser-Scan	8.8	2.2	4.4	29	.2%	.1%	.3%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 9
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Europe
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
	Total	Hardware	Software	Wkstns	Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
Framasoft	8.4	.0	5.1	0	.2%	.0%	.4%	.0%
Tebis	8.4	1.3	5.9	42	.2%	.0%	.4%	.0%
Moss Systems	8.3	.0	7.4	0	.2%	.0%	.5%	.0%
Kockums Computer Systems	8.1	2.0	4.5	400	.2%	.1%	.3%	.2%
EEsof	7.8	.0	6.8	5	.1%	.0%	.5%	.0%
VLSI Technology	7.6	.2	6.3	22	.1%	.0%	.4%	.0%
DAT Standard Information system	7.6	.0	7.2	0	.1%	.0%	.5%	.0%
Albert Nestler	7.4	2.4	3.2	95	.1%	.1%	.2%	.1%
Teradyne	7.3	.0	6.0	0	.1%	.0%	.4%	.0%
t2 Solutions	7.1	3.6	2.6	136	.1%	.1%	.2%	.1%
BATISOFT	7.0	1.1	3.5	225	.1%	.0%	.2%	.1%
Kloeckner-Moeller	6.8	4.1	2.4	107	.1%	.1%	.2%	.1%
Swanson Analysis	6.5	.0	6.5	0	.1%	.0%	.4%	.0%
Ground Modelling Systems	6.4	4.3	3.2	36	.1%	.2%	.2%	.0%
rotring euroCAD	6.4	4.0	2.4	170	.1%	.1%	.2%	.1%
Spectrum Graphics	6.3	1.9	3.1	58	.1%	.1%	.2%	.0%
RIB/RZB	6.2	.6	4.9	30	.1%	.0%	.3%	.0%
Alias Research	5.7	.0	5.7	0	.1%	.0%	.4%	.0%
Technische Computer Systeme	5.4	1.1	4.3	137	.1%	.0%	.3%	.1%
Parametric Technology	5.3	.0	4.9	0	.1%	.0%	.3%	.0%
Clemessy	5.2	4.2	.8	10	.1%	.1%	.1%	.0%
Serbi	5.2	.0	5.2	0	.1%	.0%	.4%	.0%
debis Systemhaus	5.2	1.3	3.1	180	.1%	.0%	.2%	.1%
Synercom	5.1	.0	2.4	0	.1%	.0%	.2%	.0%
Olivetti	5.0	4.2	.0	800	.1%	.1%	.0%	.4%
Zycad	4.6	3.8	.0	38	.1%	.1%	.0%	.0%
Computer Services Consultants	4.5	.0	4.5	0	.1%	.0%	.3%	.0%
Marcus Computer Systeme	4.4	2.3	1.5	137	.1%	.1%	.1%	.1%
Hochtief	4.0	.6	2.8	34	.1%	.0%	.2%	.0%
Synopsys	3.9	.0	3.5	0	.1%	.0%	.2%	.0%
AnaCAD	3.9	.0	3.9	0	.1%	.0%	.3%	.0%
Intercad	3.9	2.0	1.1	189	.1%	.1%	.1%	.1%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 9
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Europe
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
					Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
Genrad	3.7	.7	2.5	39	.1%	.0%	.2%	.0%
Orcad	3.7	.0	3.7	0	.1%	.0%	.3%	.0%
LSI Logic	3.6	.4	2.8	9	.1%	.0%	.2%	.0%
Robocom	3.5	.0	3.5	0	.1%	.0%	.2%	.0%
Datagraphic	3.4	1.7	1.4	55	.1%	.1%	.1%	.0%
MCS	3.3	.0	2.9	0	.1%	.0%	.2%	.0%
Pathtrace	3.3	.9	2.2	46	.1%	.0%	.2%	.0%
Analogy	3.2	.0	2.9	0	.1%	.0%	.2%	.0%
Genasys II	3.2	1.1	1.9	11	.1%	.0%	.1%	.0%
Solbourne	3.2	3.2	.0	237	.1%	.1%	.0%	.1%
Complansoft CAD	3.1	1.5	1.5	216	.1%	.1%	.1%	.1%
Whessoe Computing Systems	3.1	.0	3.1	0	.1%	.0%	.2%	.0%
Viewlogic Systems	3.0	.0	2.5	0	.1%	.0%	.2%	.0%
XAO Industrie	3.0	1.1	1.8	108	.1%	.0%	.1%	.1%
Xilinx	3.0	.0	2.7	0	.1%	.0%	.2%	.0%
Logic Automation	3.0	.0	3.0	0	.1%	.0%	.2%	.0%
ISKA	2.9	1.3	1.2	53	.1%	.0%	.1%	.0%
Silvar-Lisco	2.9	.0	1.8	0	.1%	.0%	.1%	.0%
Cadtronic	2.8	1.6	1.3	84	.1%	.1%	.1%	.0%
Dell Computer	2.8	2.8	.0	698	.1%	.1%	.0%	.4%
Assigraph	2.8	.0	2.2	21	.1%	.0%	.2%	.0%
MARC	2.7	.0	2.7	0	.1%	.0%	.2%	.0%
Ikos Systems	2.7	2.7	.0	12	.1%	.1%	.0%	.0%
Alper Systems	2.7	1.3	.7	18	.1%	.0%	.0%	.0%
Altera	2.6	.0	2.2	0	.0%	.0%	.2%	.0%
ALS Design	2.6	.0	2.6	0	.0%	.0%	.2%	.0%
Gable CAD Systems	2.6	1.0	1.2	32	.0%	.0%	.1%	.0%
CAMTEK	2.5	.0	2.1	0	.0%	.0%	.1%	.0%
FEA Limited	2.5	.6	.6	48	.0%	.0%	.0%	.0%
ADRA Systems	2.5	.9	1.4	45	.0%	.0%	.1%	.0%
Academi Systems	2.3	.2	1.8	9	.0%	.0%	.1%	.0%
Caroline Informatique	2.3	.5	1.6	30	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 9
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					--------- Market Share ---------			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Superdraft	2.3	1.1	1.1	123	.0%	.0%	.1%	.1%
Anilam Electronics	2.2	.7	1.3	28	.0%	.0%	.1%	.0%
Catalpa	2.2	.8	1.1	18	.0%	.0%	.1%	.0%
BETRONEX	2.2	.0	2.2	0	.0%	.0%	.1%	.0%
ABB Engineering Automation	2.1	.0	2.1	0	.0%	.0%	.1%	.0%
ICAD	2.1	.0	1.7	0	.0%	.0%	.1%	.0%
Sinus Software	1.9	.9	.9	36	.0%	.0%	.1%	.0%
Lamp Software	1.8	.5	1.2	88	.0%	.0%	.1%	.0%
Elstree Computing	1.8	.8	1.0	50	.0%	.0%	.1%	.0%
Macao Systems	1.8	1.0	.7	17	.0%	.0%	.0%	.0%
CAD-UL	1.7	.0	1.7	0	.0%	.0%	.1%	.0%
Micrografx	1.7	.0	1.7	0	.0%	.0%	.1%	.0%
Microsim	1.7	.0	1.6	0	.0%	.0%	.1%	.0%
Data I/O	1.6	.0	1.6	0	.0%	.0%	.1%	.0%
ACTEL	1.6	.0	1.4	0	.0%	.0%	.1%	.0%
ETAK	1.5	.1	1.5	4	.0%	.0%	.1%	.0%
CADKEY	1.5	1.0	.5	150	.0%	.0%	.0%	.1%
Moda CAD	1.5	.4	1.0	13	.0%	.0%	.1%	.0%
Everex Systems	1.5	1.5	.0	458	.0%	.1%	.0%	.3%
ARKTEC	1.4	.4	1.0	40	.0%	.0%	.1%	.0%
MEDESIGN	1.4	.4	.5	15	.0%	.0%	.0%	.0%
DECAD	1.3	.2	.8	5	.0%	.0%	.1%	.0%
ERDAS	1.3	.2	1.0	7	.0%	.0%	.1%	.0%
Smallworld Systems	1.3	.5	.8	36	.0%	.0%	.1%	.0%
CAD Software	1.3	.0	1.1	0	.0%	.0%	.1%	.0%
CNC Software	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
Test Systems Strategies	1.2	.0	1.0	0	.0%	.0%	.1%	.0%
DAPCO	1.2	.0	.8	0	.0%	.0%	.1%	.0%
Comdisco Systems	1.2	.0	1.1	0	.0%	.0%	.1%	.0%
FEGS	1.1	.0	.9	0	.0%	.0%	.1%	.0%
Integer	1.1	.0	.9	0	.0%	.0%	.1%	.0%
Foresight Resources	1.1	.0	1.0	0	.0%	.0%	.1%	.0%
Mechanical Dynamics	1.0	.0	.9	0	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 9
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Aucos elektronische Gerate	1.0	.3	.7	100	.0%	.0%	.0%	.1%
Dynamic Graphics	1.0	.0	.9	0	.0%	.0%	.1%	.0%
Vantage Analysis Systems	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Accugraph	1.0	.4	.4	25	.0%	.0%	.0%	.0%
CAP Electronic Sweet's	.9	.0	.7	0	.0%	.0%	.0%	.0%
Aries Technology	.9	.0	.8	0	.0%	.0%	.1%	.0%
S.T.L.D. s.r.l.	.8	.0	.8	0	.0%	.0%	.1%	.0%
Number One Systems	.8	.1	.7	20	.0%	.0%	.1%	.0%
Aspen Technology	.8	.0	.7	0	.0%	.0%	.0%	.0%
Carrier Corporation	.8	.0	.8	0	.0%	.0%	.1%	.0%
Vision 3D	.7	.4	.2	6	.0%	.0%	.0%	.0%
Inca	.7	.0	.7	0	.0%	.0%	.0%	.0%
Computational Mechanics	.7	.0	.7	0	.0%	.0%	.0%	.0%
CADMATIC	.7	.1	.5	4	.0%	.0%	.0%	.0%
CADWorks	.7	.0	.6	0	.0%	.0%	.0%	.0%
Contract Data Research	.7	.0	.5	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.7	.0	.6	0	.0%	.0%	.0%	.0%
Quickturn Systems	.7	.7	.0	5	.0%	.0%	.0%	.0%
Strategic Mapping	.7	.0	.7	0	.0%	.0%	.0%	.0%
Nasta Corporation	.6	.0	.4	5	.0%	.0%	.0%	.0%
Sigma Design	.6	.0	.6	0	.0%	.0%	.0%	.0%
National Semiconductor	.6	.1	.5	4	.0%	.0%	.0%	.0%
ACERI SA	.6	.1	.3	3	.0%	.0%	.0%	.0%
Seattle Silicon	.6	.0	.4	0	.0%	.0%	.0%	.0%
CAD-Capture	.5	.0	.1	0	.0%	.0%	.0%	.0%
Scientific & Engineering SW	.5	.0	.5	0	.0%	.0%	.0%	.0%
Omation	.5	.0	.5	0	.0%	.0%	.0%	.0%
Zuken	.5	.2	.3	4	.0%	.0%	.0%	.0%
Comshoppe	.5	.0	.5	0	.0%	.0%	.0%	.0%
ALDEC	.5	.0	.5	0	.0%	.0%	.0%	.0%
Terra Sciences	.5	.0	.5	0	.0%	.0%	.0%	.0%
Mutoh Industries--NO OEM	.5	.2	.2	11	.0%	.0%	.0%	.0%
Wisdom Systems	.5	.0	.3	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 9
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Europe
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
					Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
ACDS	.4	.0	.3	0	.0%	.0%	.0%	.0%
Massteck	.4	.0	.4	0	.0%	.0%	.0%	.0%
Accel Technologies	.4	.0	.3	0	.0%	.0%	.0%	.0%
LEICA	.4	.0	.3	0	.0%	.0%	.0%	.0%
Micro Engineering Solutions	.4	.1	.2	4	.0%	.0%	.0%	.0%
Motorola	.4	.0	.4	0	.0%	.0%	.0%	.0%
DCA Softdesk	.3	.0	.3	0	.0%	.0%	.0%	.0%
Evolution Computing	.3	.0	.3	0	.0%	.0%	.0%	.0%
Simulation Science	.3	.0	.3	0	.0%	.0%	.0%	.0%
Pacific Numerics	.3	.0	.3	0	.0%	.0%	.0%	.0%
Seiko Instruments--NO OEM	.3	.1	.1	2	.0%	.0%	.0%	.0%
Bechtel Software	.3	.0	.2	0	.0%	.0%	.0%	.0%
American Small Business Comp.	.3	.0	.3	0	.0%	.0%	.0%	.0%
Rasna Corporation	.3	.0	.3	0	.0%	.0%	.0%	.0%
Kontron Instruments	.2	.1	.1	4	.0%	.0%	.0%	.0%
Terr-Mar	.2	.1	.1	4	.0%	.0%	.0%	.0%
Generation 5 Technology	.2	.0	.2	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Instrumatic Espanola	.2	.0	.2	0	.0%	.0%	.0%	.0%
Mega CADD	.2	.0	.2	0	.0%	.0%	.0%	.0%
Cascade Graphics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Daniel Geophysical	.2	.0	.2	3	.0%	.0%	.0%	.0%
Point Control	.2	.0	.2	0	.0%	.0%	.0%	.0%
Meta-Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
Ontologic	.2	.0	.2	0	.0%	.0%	.0%	.0%
ESDU International	.2	.0	.2	0	.0%	.0%	.0%	.0%
Tanner Research	.2	.0	.1	0	.0%	.0%	.0%	.0%
TOOL Software	.2	.1	.1	4	.0%	.0%	.0%	.0%
Aptos	.2	.0	.2	0	.0%	.0%	.0%	.0%
CAD Language Systems	.2	.0	.1	0	.0%	.0%	.0%	.0%
Synthesis	.2	.0	.2	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 9 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Objectivity	.1	.0	.1	0	.0%	.0%	.0%	.0%
A.I. Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.1	.0	.1	1	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Kork Systems	.1	.0	.1	1	.0%	.0%	.0%	.0%
Imagine That	.1	.0	.1	0	.0%	.0%	.0%	.0%
Microtel Pacific Research	.1	.0	.1	0	.0%	.0%	.0%	.0%
GeoGraphix	.1	.0	.1	0	.0%	.0%	.0%	.0%
Object Design	.1	.0	.1	0	.0%	.0%	.0%	.0%
Dolphin Integration	.1	.0	.1	0	.0%	.0%	.0%	.0%
Premise	.1	.0	.1	0	.0%	.0%	.0%	.0%
Caddlink	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	234.9	228.7	.0	33,986	4.5%	8.1%	.0%	19.0%
All Companies	5,211.1	2,812.7	1,448.3	179,208	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	3,942.6	2,335.5	835.1	159,805	75.7%	83.0%	57.7%	89.2%
All Asian-Based Companies	1.3	.6	.6	17	.0%	.0%	.0%	.0%
All European-Based Companies	1,267.3	476.7	612.6	19,386	24.3%	16.9%	42.3%	10.8%
All Hardware Companies	1,410.9	1,222.7	.0	131,074	27.1%	43.5%	.0%	73.1%
All Turnkey & SW Companies	3,800.1	1,590.1	1,448.3	48,134	72.9%	56.5%	100.0%	26.9%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 10
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Computervision	505.5	216.9	122.1	4,055	17.3%	15.7%	13.4%	8.5%
Hewlett-Packard	327.6	231.6	38.4	12,438	11.2%	16.7%	4.2%	26.1%
Intergraph	304.8	169.6	54.8	3,371	10.4%	12.3%	6.0%	7.1%
Siemens	234.2	116.8	81.9	3,108	8.0%	8.4%	9.0%	6.5%
Sun	142.1	125.1	.0	6,364	4.9%	9.0%	.0%	13.4%
Mentor Graphics	120.7	33.9	50.7	1,196	4.1%	2.4%	5.6%	2.5%
McDonnell Douglas	96.0	49.5	37.0	1,110	3.3%	3.6%	4.1%	2.3%
Digital	79.1	57.3	.0	2,640	2.7%	4.1%	.0%	5.5%
Matra Datavision	68.1	30.7	27.3	743	2.3%	2.2%	3.0%	1.6%
IBM	57.3	34.9	12.0	1,486	2.0%	2.5%	1.3%	3.1%
Schlumberger	55.0	18.8	20.7	470	1.9%	1.4%	2.3%	1.0%
Dazix	44.9	7.2	18.0	331	1.5%	.5%	2.0%	.7%
Valid	39.6	2.7	23.8	204	1.4%	.2%	2.6%	.4%
STI-Straessle	39.6	9.1	21.8	370	1.4%	.7%	2.4%	.8%
Control Data	38.7	26.3	6.6	900	1.3%	1.9%	.7%	1.9%
Racal-Redac	34.5	1.6	27.3	181	1.2%	.1%	3.0%	.4%
Silicon Graphics	31.7	27.9	.0	713	1.1%	2.0%	.0%	1.5%
ItalCad	30.0	14.1	7.2	280	1.0%	1.0%	.8%	.6%
Cisigraph	28.0	9.8	9.8	226	1.0%	.7%	1.1%	.5%
Cadence	27.5	.0	20.4	0	.9%	.0%	2.2%	.0%
ISICAD	27.2	14.2	8.2	300	.9%	1.0%	.9%	.6%
Norsk Data	25.4	14.7	5.1	316	.9%	1.1%	.6%	.7%
ICL	22.9	13.5	7.8	629	.8%	1.0%	.9%	1.3%
Kewill Systems	22.5	6.8	12.4	474	.8%	.5%	1.4%	1.0%
Ferranti	21.8	8.1	10.0	201	.7%	.6%	1.1%	.4%
SDRC	21.0	.0	21.0	0	.7%	.0%	2.3%	.0%
PAFEC	20.5	.0	20.5	0	.7%	.0%	2.3%	.0%
Mannesmann PROCAD	15.7	8.0	4.4	218	.5%	.6%	.5%	.5%
ISYKON Software	15.4	7.7	5.4	220	.5%	.6%	.6%	.5%
ABB Cade International	15.2	8.9	4.6	66	.5%	.6%	.5%	.1%
Landmark Graphics	14.6	7.1	4.4	89	.5%	.5%	.5%	.2%
Calay	14.4	4.5	8.3	234	.5%	.3%	.9%	.5%
Hahn & Kolb	13.9	8.3	4.2	190	.5%	.6%	.5%	.4%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 10
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Delcam International	13.1	4.6	6.6	218	.4%	.3%	.7%	.5%
Gerber Systems	12.4	6.1	4.1	178	.4%	.4%	.5%	.4%
CAD Centre	12.1	.0	6.4	0	.4%	.0%	.7%	.0%
Star Informatic	12.0	10.5	3.1	550	.4%	.8%	.3%	1.2%
Auto-Trol	11.8	4.7	4.1	138	.4%	.3%	.5%	.3%
CAD Lab	11.0	.0	8.8	0	.4%	.0%	1.0%	.0%
Cimlinc	10.3	2.1	6.2	197	.4%	.1%	.7%	.4%
ESRI	8.9	.0	7.8	0	.3%	.0%	.9%	.0%
Radan Computational	8.8	3.1	4.4	296	.3%	.2%	.5%	.6%
Moss Systems	8.3	.0	7.4	0	.3%	.0%	.8%	.0%
Cimatron	8.2	3.7	3.7	241	.3%	.3%	.4%	.5%
Kockums Computer Systems	8.1	2.0	4.5	400	.3%	.1%	.5%	.8%
Laser-Scan	7.9	2.0	4.0	25	.3%	.1%	.4%	.1%
Scientific Calc.	7.8	.8	4.3	25	.3%	.1%	.5%	.1%
Unisys	7.6	3.9	2.7	119	.3%	.3%	.3%	.3%
Framasoft	7.6	.0	4.6	0	.3%	.0%	.5%	.0%
VLSI Technology	7.5	.2	6.2	22	.3%	.0%	.7%	.0%
Albert Nestler	7.4	2.4	3.2	95	.3%	.2%	.3%	.2%
t2 Solutions	7.1	3.6	2.6	136	.2%	.3%	.3%	.3%
Microway	6.7	4.5	2.3	57	.2%	.3%	.2%	.1%
Autodesk	6.7	.0	6.7	0	.2%	.0%	.7%	.0%
Spectrum Graphics	6.3	1.9	3.1	58	.2%	.1%	.3%	.1%
PDA Engineering	5.9	.0	5.9	0	.2%	.0%	.6%	.0%
Alias Research	5.7	.0	5.7	0	.2%	.0%	.6%	.0%
Wiechers Datentechnik	5.7	4.5	1.1	80	.2%	.3%	.1%	.2%
Technische Computer Systeme	5.4	1.1	4.3	137	.2%	.1%	.5%	.3%
Parametric Technology	5.3	.0	4.9	0	.2%	.0%	.5%	.0%
Clemessy	4.2	3.4	.6	4	.1%	.2%	.1%	.0%
MacNeal-Schwendler	4.1	.0	3.9	0	.1%	.0%	.4%	.0%
debis Systemhaus	4.0	1.0	2.3	127	.1%	.1%	.3%	.3%
Sysscan	4.0	1.7	1.0	27	.1%	.1%	.1%	.1%
AnaCAD	3.9	.0	3.9	0	.1%	.0%	.4%	.0%
Zycad	3.7	2.9	.0	31	.1%	.2%	.0%	.1%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 10
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
EEsof	3.5	.0	3.0	5	.1%	.0%	.3%	.0%
Aucotec	3.5	1.2	1.9	55	.1%	.1%	.2%	.1%
Marcus Computer Systeme	3.4	1.8	1.1	105	.1%	.1%	.1%	.2%
rotring euroCAD	3.3	2.2	1.1	96	.1%	.2%	.1%	.2%
Exapt	3.3	1.6	1.1	107	.1%	.1%	.1%	.2%
LSI Logic	3.3	.3	2.5	8	.1%	.0%	.3%	.0%
Genrad	3.3	.6	2.2	29	.1%	.0%	.2%	.1%
Synercom	3.2	.0	1.5	0	.1%	.0%	.2%	.0%
Complansoft CAD	3.1	1.5	1.5	216	.1%	.1%	.2%	.5%
Analogy	3.1	.0	2.8	0	.1%	.0%	.3%	.0%
Nemetschek	3.1	1.2	1.9	33	.1%	.1%	.2%	.1%
Teradyne	3.1	.0	2.6	0	.1%	.0%	.3%	.0%
Swanson Analysis	3.0	.0	3.0	0	.1%	.0%	.3%	.0%
XAO Industrie	3.0	1.1	1.8	108	.1%	.1%	.2%	.2%
Genasys II	2.9	1.0	1.8	10	.1%	.1%	.2%	.0%
ISKA	2.9	1.3	1.2	53	.1%	.1%	.1%	.1%
Silvar-Lisco	2.9	.0	1.8	0	.1%	.0%	.2%	.0%
Logic Automation	2.9	.0	2.9	0	.1%	.0%	.3%	.0%
Alper Systems	2.7	1.3	.7	18	.1%	.1%	.1%	.0%
Gable CAD Systems	2.6	1.0	1.2	32	.1%	.1%	.1%	.1%
Ikos Systems	2.5	2.5	.0	11	.1%	.2%	.0%	.0%
Catalpa	2.2	.8	1.1	18	.1%	.1%	.1%	.0%
ICAD	2.1	.0	1.7	0	.1%	.0%	.2%	.0%
CADAM	2.0	.0	1.7	0	.1%	.0%	.2%	.0%
Fides Industrielle Automation	2.0	.2	1.8	32	.1%	.0%	.2%	.1%
ADRA Systems	1.9	.9	.9	45	.1%	.1%	.1%	.1%
Synopsys	1.9	.0	1.7	0	.1%	.0%	.2%	.0%
RIB/RZB	1.9	.2	1.5	8	.1%	.0%	.2%	.0%
Sinus Software	1.9	.9	.9	36	.1%	.1%	.1%	.1%
Caroline Informatique	1.8	.4	1.3	25	.1%	.0%	.1%	.1%
CAMTEK	1.8	.0	1.5	0	.1%	.0%	.2%	.0%
NCS	1.5	.0	1.4	0	.1%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 10
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Assigraph	1.4	.0	1.1	11	.0%	.0%	.1%	.0%
MARC	1.4	.0	1.4	0	.0%	.0%	.2%	.0%
MEDESIGN	1.4	.4	.5	15	.0%	.0%	.1%	.0%
Viewlogic Systems	1.3	.0	1.1	0	.0%	.0%	.1%	.0%
DECAD	1.3	.2	.8	4	.0%	.0%	.1%	.0%
Smallworld Systems	1.3	.5	.8	36	.0%	.0%	.1%	.1%
DAPCO	1.2	.0	.8	0	.0%	.0%	.1%	.0%
Comdisco Systems	1.2	.0	1.1	0	.0%	.0%	.1%	.0%
Test Systems Strategies	1.1	.0	.9	0	.0%	.0%	.1%	.0%
Macao Systems	1.1	.6	.4	11	.0%	.0%	.0%	.0%
FEA Limited	1.0	.3	.3	19	.0%	.0%	.0%	.0%
Vantage Analysis Systems	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Academi Systems	.9	.1	.7	4	.0%	.0%	.1%	.0%
Accugraph	.9	.4	.4	24	.0%	.0%	.0%	.1%
ERDAS	.8	.2	.6	4	.0%	.0%	.1%	.0%
Dynamic Graphics	.8	.0	.6	0	.0%	.0%	.1%	.0%
Mechanical Dynamics	.7	.0	.6	0	.0%	.0%	.1%	.0%
Aries Technology	.7	.0	.6	0	.0%	.0%	.1%	.0%
Quickturn Systems	.7	.7	.0	5	.0%	.0%	.0%	.0%
Solbourne	.6	.6	.0	45	.0%	.0%	.0%	.1%
FEGS	.6	.0	.5	0	.0%	.0%	.1%	.0%
Lamp Software	.6	.3	.4	34	.0%	.0%	.0%	.1%
Seattle Silicon	.6	.0	.4	0	.0%	.0%	.0%	.0%
Scientific & Engineering SW	.5	.0	.5	0	.0%	.0%	.1%	.0%
National Semiconductor	.5	.1	.4	4	.0%	.0%	.0%	.0%
Zuken	.5	.2	.3	4	.0%	.0%	.0%	.0%
Wisdom Systems	.5	.0	.3	0	.0%	.0%	.0%	.0%
ARKTEC	.4	.3	.2	18	.0%	.0%	.0%	.0%
ACDS	.4	.0	.3	0	.0%	.0%	.0%	.0%
LEICA	.4	.0	.3	0	.0%	.0%	.0%	.0%
Motorola	.4	.0	.4	0	.0%	.0%	.0%	.0%
Sigma Design	.3	.0	.3	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 10
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Whessoe Computing Systems	.3	.0	.3	0	.0%	.0%	.0%	.0%
Pacific Numerics	.3	.0	.3	0	.0%	.0%	.0%	.0%
Serbi	.3	.0	.3	0	.0%	.0%	.0%	.0%
Seiko Instruments--NO OEM	.3	.1	.1	2	.0%	.0%	.0%	.0%
ACTEL	.2	.0	.2	0	.0%	.0%	.0%	.0%
CADMATIC	.2	.0	.2	2	.0%	.0%	.0%	.0%
Data I/O	.2	.0	.2	0	.0%	.0%	.0%	.0%
Simulation Science	.2	.0	.2	0	.0%	.0%	.0%	.0%
Xilinx	.2	.0	.2	0	.0%	.0%	.0%	.0%
Computational Mechanics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Inca	.2	.0	.2	0	.0%	.0%	.0%	.0%
Nasta Corporation	.2	.0	.2	1	.0%	.0%	.0%	.0%
Ontologic	.2	.0	.2	0	.0%	.0%	.0%	.0%
Microsim	.2	.0	.2	0	.0%	.0%	.0%	.0%
ETAK	.2	.0	.2	0	.0%	.0%	.0%	.0%
Mutoh Industries--NO OEM	.2	.1	.1	2	.0%	.0%	.0%	.0%
Meta-Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
CAD Language Systems	.2	.0	.1	0	.0%	.0%	.0%	.0%
Micro Engineering Solutions	.1	.0	.1	1	.0%	.0%	.0%	.0%
Objectivity	.1	.0	.1	0	.0%	.0%	.0%	.0%
Bechtel Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Terr-Mar	.1	.0	.1	1	.0%	.0%	.0%	.0%
Terra Sciences	.1	.0	.1	0	.0%	.0%	.0%	.0%
Everex Systems	.1	.1	.0	15	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
CADKEY	.1	.0	.0	3	.0%	.0%	.0%	.0%
DCA Softdesk	.1	.0	.1	0	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Object Design	.1	.0	.1	0	.0%	.0%	.0%	.0%
TOOL Software	.0	.0	.0	1	.0%	.0%	.0%	.0%
Dolphin Integration	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 10 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Algor Interactive Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Microtel Pacific Research	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Point Control	.0	.0	.0	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	2,921.2	1,383.2	911.1	47,598	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	2,069.7	1,051.0	526.9	36,587	70.9%	76.0%	57.8%	76.9%
All Asian-Based Companies	.9	.4	.5	7	.0%	.0%	.1%	.0%
All European-Based Companies	850.5	331.9	383.7	11,005	29.1%	24.0%	42.1%	23.1%
All Hardware Companies	407.2	340.0	.0	17,963	13.9%	24.6%	.0%	37.7%
All Turnkey & SW Companies	2,514.0	1,043.3	911.1	29,635	86.1%	75.4%	100.0%	62.3%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 11
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	510.7	306.4	112.4	6,740	38.7%	37.9%	47.6%	37.1%
Digital	280.7	204.9	.0	0	21.3%	25.3%	.0%	.0%
Computervision	61.8	27.0	13.9	1,793	4.7%	3.3%	5.9%	9.9%
Intergraph	52.9	26.4	8.5	475	4.0%	3.3%	3.6%	2.6%
Control Data	52.3	24.4	6.0	301	4.0%	3.0%	2.5%	1.7%
Sun	35.0	29.1	.0	1,084	2.7%	3.6%	.0%	6.0%
McDonnell Douglas	28.9	14.7	11.4	989	2.2%	1.8%	4.8%	5.4%
Norsk Data	24.3	10.6	3.7	178	1.8%	1.3%	1.5%	1.0%
Siemens	24.2	13.8	9.2	391	1.8%	1.7%	3.9%	2.2%
Schlumberger	22.8	8.9	7.7	350	1.7%	1.1%	3.3%	1.9%
MacNeal-Schwendler	12.5	.0	12.0	0	.9%	.0%	5.1%	.0%
Exapt	9.0	4.4	3.1	104	.7%	.5%	1.3%	.6%
Fides Industrielle Automation	8.0	.9	7.2	43	.6%	.1%	3.0%	.2%
Sysscan	7.7	3.4	2.0	76	.6%	.4%	.8%	.4%
Hewlett-Packard	6.8	5.7	.0	340	.5%	.7%	.0%	1.9%
ESRI	5.3	.0	4.7	0	.4%	.0%	2.0%	.0%
Cadence	3.8	.0	2.8	0	.3%	.0%	1.2%	.0%
SDRC	3.1	.0	3.1	0	.2%	.0%	1.3%	.0%
Cisigraph	3.1	1.1	1.0	62	.2%	.1%	.4%	.3%
Teradyne	2.9	.0	2.4	0	.2%	.0%	1.0%	.0%
PDA Engineering	2.9	.0	2.9	0	.2%	.0%	1.2%	.0%
Swanson Analysis	2.8	.0	2.8	0	.2%	.0%	1.2%	.0%
Solbourne	2.6	2.6	.0	192	.2%	.3%	.0%	1.1%
Kewill Systems	2.5	.8	1.4	26	.2%	.1%	.6%	.1%
Unisys	2.3	1.1	.8	32	.2%	.1%	.3%	.2%
CADAM	2.1	.0	1.8	0	.2%	.0%	.8%	.0%
ABB Engineering Automation	2.1	.0	2.1	0	.2%	.0%	.9%	.0%
Synopsys	2.0	.0	1.8	0	.2%	.0%	.8%	.0%
Synercom	1.9	.0	.9	0	.1%	.0%	.4%	.0%
Scientific Calc.	1.7	.3	1.3	9	.1%	.0%	.6%	.0%
Assigraph	1.4	.0	1.1	11	.1%	.0%	.5%	.1%
MARC	1.4	.0	1.4	0	.1%	.0%	.6%	.0%
MCS	1.1	.0	1.0	0	.1%	.0%	.4%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 11
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Clemessy	1.1	.9	.1	6	.1%	.1%	.1%	.0%
Zycad	.9	.9	.0	7	.1%	.1%	.0%	.0%
Laser-Scan	.9	.2	.4	4	.1%	.0%	.2%	.0%
Framasoft	.9	.0	.5	0	.1%	.0%	.2%	.0%
Macao Systems	.7	.4	.3	6	.1%	.1%	.1%	.0%
Silicon Graphics	.6	.5	.0	11	.0%	.1%	.0%	.1%
Whessoe Computing Systems	.6	.0	.6	0	.0%	.0%	.3%	.0%
debis Systemhaus	.6	.2	.4	13	.0%	.0%	.2%	.1%
FEGS	.5	.0	.4	0	.0%	.0%	.2%	.0%
Computational Mechanics	.5	.0	.5	0	.0%	.0%	.2%	.0%
EEsof	.4	.0	.4	0	.0%	.0%	.1%	.0%
Genrad	.4	.1	.3	4	.0%	.0%	.1%	.0%
LSI Logic	.4	.0	.3	1	.0%	.0%	.1%	.0%
Olivetti	.3	.3	.0	7	.0%	.0%	.0%	.0%
Mechanical Dynamics	.3	.0	.3	0	.0%	.0%	.1%	.0%
Dynamic Graphics	.3	.0	.2	0	.0%	.0%	.1%	.0%
FEA Limited	.3	.1	.1	5	.0%	.0%	.0%	.0%
ETAK	.2	.0	.2	1	.0%	.0%	.1%	.0%
Hochtief	.2	.0	.1	1	.0%	.0%	.1%	.0%
Analogy	.2	.0	.2	0	.0%	.0%	.1%	.0%
Masta Corporation	.2	.0	.1	0	.0%	.0%	.0%	.0%
Daniel Geophysical	.2	.0	.1	3	.0%	.0%	.1%	.0%
Bechtel Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Test Systems Strategies	.1	.0	.1	0	.0%	.0%	.1%	.0%
CADKEY	.1	.1	.0	2	.0%	.0%	.0%	.0%
Data I/O	.1	.0	.1	0	.0%	.0%	.0%	.0%
Lamp Software	.1	.0	.0	2	.0%	.0%	.0%	.0%
VLSI Technology	.1	.0	.0	0	.0%	.0%	.0%	.0%
Logic Automation	.1	.0	.1	0	.0%	.0%	.0%	.0%
Microsim	.1	.0	.1	0	.0%	.0%	.0%	.0%
DECAD	.0	.0	.0	1	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 11 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Europe
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
	Total	Hardware	Software	Wkstns	Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
Seiko Instruments--NO OEM	.0	.0	.0	0	.0%	.0%	.0%	.0%
Zuken	.0	.0	.0	0	.0%	.0%	.0%	.0%
Accugraph	.0	.0	.0	1	.0%	.0%	.0%	.0%
Mutoh Industries--NO OEM	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	124.6	118.3	.0	4,919	9.4%	14.6%	.0%	27.0%
All Companies	1,318.3	808.5	236.2	18,187	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	1,185.5	771.4	164.9	17,252	89.9%	95.4%	69.8%	94.9%
All Asian-Based Companies	.1	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	132.8	37.1	71.3	934	10.1%	4.6%	30.2%	5.1%
All Hardware Companies	461.9	367.9	.0	6,612	35.0%	45.5%	.0%	36.4%
All Turnkey & SW Companies	856.5	440.6	236.2	11,575	65.0%	54.5%	100.0%	63.6%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 12
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	197.7	197.7	.0	32,937	20.3%	31.8%	.0%	29.0%
IBM	83.5	79.3	.0	18,660	8.6%	12.8%	.0%	16.5%
Hewlett-Packard	75.3	60.3	.0	11,560	7.8%	9.7%	.0%	10.2%
Autodesk	74.2	.0	74.2	0	7.6%	.0%	24.6%	.0%
Apple Computer	59.0	51.9	.0	11,340	6.1%	8.4%	.0%	10.0%
Nemetschek	27.8	11.1	16.7	467	2.9%	1.8%	5.5%	.4%
Investronica SA	25.5	20.4	2.6	1,018	2.6%	3.3%	.8%	.9%
Ziegler	18.4	.0	18.4	0	1.9%	.0%	6.1%	.0%
Vero International Software	18.2	.0	16.6	0	1.9%	.0%	5.5%	.0%
Wiechers Datentechnik	14.6	11.7	2.9	414	1.5%	1.9%	1.0%	.4%
Research Machines	14.3	14.3	.0	2,200	1.5%	2.3%	.0%	1.9%
Caditron	13.0	6.5	5.2	200	1.3%	1.0%	1.7%	.2%
CADAM	11.9	7.0	4.2	1,000	1.2%	1.1%	1.4%	.9%
Intergraph	10.5	.0	9.9	0	1.1%	.0%	3.3%	.0%
LPKF	9.9	6.4	2.5	400	1.0%	1.0%	.8%	.4%
Soft-Tech Software Technologies	9.0	.9	7.2	225	.9%	.1%	2.4%	.2%
Tebis	8.4	1.3	5.9	42	.9%	.2%	2.0%	.0%
Computervision	8.1	.4	7.6	77	.8%	.1%	2.5%	.1%
DAT Standard Information system	7.6	.0	7.2	0	.8%	.0%	2.4%	.0%
ISICAD	7.1	.0	7.1	0	.7%	.0%	2.3%	.0%
Aucotec	7.0	2.5	3.9	112	.7%	.4%	1.3%	.1%
BATISOFT	7.0	1.1	3.5	225	.7%	.2%	1.2%	.2%
Kloeckner-Moeller	6.8	4.1	2.4	107	.7%	.7%	.8%	.1%
Ground Modelling Systems	6.4	4.3	3.2	36	.7%	.7%	1.1%	.0%
Racal-Redac	5.2	.0	4.9	0	.5%	.0%	1.6%	.0%
Serbi	4.9	.0	4.9	0	.5%	.0%	1.6%	.0%
Olivetti	4.7	4.0	.0	793	.5%	.6%	.0%	.7%
Computer Services Consultants	4.5	.0	4.5	0	.5%	.0%	1.5%	.0%
RIB/RZB	4.3	.4	3.5	22	.4%	.1%	1.1%	.0%
EEsof	3.9	.0	3.5	0	.4%	.0%	1.2%	.0%
Intercad	3.9	2.0	1.1	189	.4%	.3%	.4%	.2%
Hochtief	3.8	.6	2.7	33	.4%	.1%	.9%	.0%
Microway	3.8	2.6	1.3	38	.4%	.4%	.4%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 12
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Orcad	3.7	.0	3.7	0	.4%	.0%	1.2%	.0%
Robocom	3.5	.0	3.5	0	.4%	.0%	1.2%	.0%
Cimatron	3.5	1.6	1.6	103	.4%	.3%	.5%	.1%
Datagraphic	3.4	1.7	1.4	55	.4%	.3%	.5%	.0%
Pathtrace	3.3	.9	2.2	46	.3%	.1%	.7%	.0%
rotring euroCAD	3.1	1.7	1.4	74	.3%	.3%	.4%	.1%
Cadtronic	2.8	1.6	1.3	84	.3%	.3%	.4%	.1%
Dell Computer	2.8	2.8	.0	698	.3%	.5%	.0%	.6%
Xilinx	2.7	.0	2.5	0	.3%	.0%	.8%	.0%
Altera	2.6	.0	2.2	0	.3%	.0%	.7%	.0%
ALS Design	2.6	.0	2.6	0	.3%	.0%	.9%	.0%
PAFEC	2.4	.0	2.4	0	.2%	.0%	.8%	.0%
Superdraft	2.3	1.1	1.1	123	.2%	.2%	.4%	.1%
Anilam Electronics	2.2	.7	1.3	28	.2%	.1%	.4%	.0%
BETRONEX	2.2	.0	2.2	0	.2%	.0%	.7%	.0%
Whessoe Computing Systems	2.2	.0	2.2	0	.2%	.0%	.7%	.0%
Elstree Computing	1.8	.8	1.0	50	.2%	.1%	.3%	.0%
Viewlogic Systems	1.8	.0	1.5	0	.2%	.0%	.5%	.0%
CAD-UL	1.7	.0	1.7	0	.2%	.0%	.6%	.0%
Micrografx	1.7	.0	1.7	0	.2%	.0%	.6%	.0%
Hahn & Kolb	1.5	.9	.5	30	.2%	.1%	.2%	.0%
Moda CAD	1.5	.4	1.0	13	.2%	.1%	.3%	.0%
Microsim	1.4	.0	1.3	0	.1%	.0%	.4%	.0%
ESRI	1.4	.0	1.4	0	.1%	.0%	.5%	.0%
Academi Systems	1.4	.1	1.1	6	.1%	.0%	.4%	.0%
Everex Systems	1.4	1.4	.0	443	.1%	.2%	.0%	.4%
ACTEL	1.4	.0	1.2	0	.1%	.0%	.4%	.0%
CADKEY	1.4	.9	.4	145	.1%	.1%	.1%	.1%
Teradyne	1.3	.0	1.1	0	.1%	.0%	.4%	.0%
Data I/O	1.3	.0	1.3	0	.1%	.0%	.4%	.0%
FEA Limited	1.3	.3	.3	24	.1%	.0%	.1%	.0%
CAD Software	1.3	.0	1.1	0	.1%	.0%	.4%	.0%
CNC Software	1.2	.0	1.2	0	.1%	.0%	.4%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 12
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Lamp Software	1.2	.2	.7	51	.1%	.0%	.2%	.0%
ETAK	1.1	.1	1.1	3	.1%	.0%	.4%	.0%
Integer	1.1	.0	.9	0	.1%	.0%	.3%	.0%
Foresight Resources	1.1	.0	1.0	0	.1%	.0%	.3%	.0%
Marcus Computer Systeme	1.0	.5	.3	31	.1%	.1%	.1%	.0%
Aucos elektronische Gerate	1.0	.3	.7	100	.1%	.0%	.2%	.1%
ARKTEC	1.0	.2	.8	22	.1%	.0%	.3%	.0%
CAP Electronic Sweet's	.9	.0	.7	0	.1%	.0%	.2%	.0%
S.T.L.D. s.r.l.	.8	.0	.8	0	.1%	.0%	.3%	.0%
Number One Systems	.8	.1	.7	20	.1%	.0%	.2%	.0%
CAMTEK	.8	.0	.6	0	.1%	.0%	.2%	.0%
Schlumberger	.8	.2	.3	5	.1%	.0%	.1%	.0%
Aspen Technology	.8	.0	.7	0	.1%	.0%	.2%	.0%
Carrier Corporation	.8	.0	.8	0	.1%	.0%	.2%	.0%
Vision 3D	.7	.4	.2	6	.1%	.1%	.1%	.0%
CADWorks	.7	.0	.6	0	.1%	.0%	.2%	.0%
Contract Data Research	.7	.0	.5	0	.1%	.0%	.2%	.0%
MCS	.7	.0	.6	0	.1%	.0%	.2%	.0%
Strategic Mapping	.7	.0	.7	0	.1%	.0%	.2%	.0%
Algor Interactive Systems	.6	.0	.6	0	.1%	.0%	.2%	.0%
Swanson Analysis	.6	.0	.6	0	.1%	.0%	.2%	.0%
debis Systemhaus	.6	.2	.4	40	.1%	.0%	.1%	.0%
ADRA Systems	.6	.0	.5	0	.1%	.0%	.2%	.0%
ACERI SA	.6	.1	.3	3	.1%	.0%	.1%	.0%
CAD-Capture	.5	.0	.1	0	.1%	.0%	.0%	.0%
Omation	.5	.0	.5	0	.1%	.0%	.2%	.0%
Comshoppe	.5	.0	.5	0	.1%	.0%	.2%	.0%
ERDAS	.5	.1	.4	3	.1%	.0%	.1%	.0%
ALDEC	.5	.0	.5	0	.1%	.0%	.2%	.0%
Inca	.5	.0	.5	0	.1%	.0%	.2%	.0%
CADMATIC	.5	.0	.3	3	.0%	.0%	.1%	.0%
Caroline Informatique	.5	.1	.3	5	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 12
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					--- Market Share ---			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
CAD Lab	.4	.0	.4	0	.0%	.0%	.1%	.0%
Terra Sciences	.4	.0	.4	0	.0%	.0%	.1%	.0%
Massteck	.4	.0	.4	0	.0%	.0%	.1%	.0%
Norsk Data	.4	.2	.1	7	.0%	.0%	.0%	.0%
Accel Technologies	.4	.0	.3	0	.0%	.0%	.1%	.0%
Genasys II	.3	.1	.2	2	.0%	.0%	.1%	.0%
Evolution Computing	.3	.0	.3	0	.0%	.0%	.1%	.0%
Sigma Design	.3	.0	.3	0	.0%	.0%	.1%	.0%
Masta Corporation	.3	.0	.2	4	.0%	.0%	.1%	.0%
Mutoh Industries--NO OEM	.3	.2	.1	10	.0%	.0%	.0%	.0%
American Small Business Comp.	.3	.0	.3	0	.0%	.0%	.1%	.0%
DCA Softdesk	.3	.0	.3	0	.0%	.0%	.1%	.0%
Rasna Corporation	.3	.0	.3	0	.0%	.0%	.1%	.0%
Kontron Instruments	.2	.1	.1	4	.0%	.0%	.0%	.0%
Generation 5 Technology	.2	.0	.2	0	.0%	.0%	.1%	.0%
Instrumatic Espanola	.2	.0	.2	0	.0%	.0%	.1%	.0%
Facility Mapping Systems	.2	.0	.2	0	.0%	.0%	.1%	.0%
Mega CADD	.2	.0	.2	0	.0%	.0%	.1%	.0%
Micro Engineering Solutions	.2	.1	.1	3	.0%	.0%	.0%	.0%
Cascade Graphics	.2	.0	.2	0	.0%	.0%	.1%	.0%
Ikos Systems	.2	.2	.0	1	.0%	.0%	.0%	.0%
Aries Technology	.2	.0	.2	0	.0%	.0%	.1%	.0%
Point Control	.2	.0	.2	0	.0%	.0%	.1%	.0%
ESDU International	.2	.0	.2	0	.0%	.0%	.1%	.0%
Tanner Research	.2	.0	.1	0	.0%	.0%	.0%	.0%
Aptos	.2	.0	.2	0	.0%	.0%	.0%	.0%
Synthesis	.2	.0	.2	0	.0%	.0%	.0%	.0%
Terr-Mar	.1	.1	.1	3	.0%	.0%	.0%	.0%
TOOL Software	.1	.0	.1	3	.0%	.0%	.0%	.0%
A.I. Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Genrad	.1	.0	.1	6	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 12 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Europe
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Kork Systems	.1	.0	.1	1	.0%	.0%	.0%	.0%
Accugraph	.1	.0	.1	0	.0%	.0%	.0%	.0%
Imagine That	.1	.0	.1	0	.0%	.0%	.0%	.0%
Radan Computational	.1	.0	.0	4	.0%	.0%	.0%	.0%
GeoGraphix	.1	.0	.1	0	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Microtel Pacific Research	.1	.0	.1	0	.0%	.0%	.0%	.0%
National Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
Simulation Science	.1	.0	.1	0	.0%	.0%	.0%	.0%
Daniel Geophysical	.1	.0	.1	0	.0%	.0%	.0%	.0%
Premise	.1	.0	.1	0	.0%	.0%	.0%	.0%
Caddlink	.0	.0	.0	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Dolphin Integration	.0	.0	.0	0	.0%	.0%	.0%	.0%
Pacific Numerics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	110.4	110.4	.0	29,066	11.4%	17.8%	.0%	25.6%
All Companies	971.6	621.0	301.0	113,423	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	687.4	513.1	143.2	105,966	70.7%	82.6%	47.6%	93.4%
All Asian-Based Companies	.3	.2	.1	10	.0%	.0%	.0%	.0%
All European-Based Companies	283.9	107.7	157.7	7,447	29.2%	17.3%	52.4%	6.6%
All Hardware Companies	541.9	514.8	.0	106,498	55.8%	82.9%	.0%	93.9%
All Turnkey & SW Companies	429.7	106.2	301.0	6,924	44.2%	17.1%	100.0%	6.1%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 13
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Asia
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
	Total	Hardware	Software	Wkstns	Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
IBM	582.2	368.1	116.0	18,416	15.1%	16.0%	10.4%	14.4%
Fujitsu	395.4	248.5	107.4	8,778	10.2%	10.8%	9.6%	6.9%
NEC	342.4	238.0	77.0	17,697	8.9%	10.4%	6.9%	13.8%
Nihon Unisys	210.9	141.3	27.4	1,900	5.5%	6.2%	2.4%	1.5%
Hitachi	208.3	100.0	87.5	6,400	5.4%	4.4%	7.8%	5.0%
Hewlett-Packard	133.0	92.3	17.9	6,229	3.4%	4.0%	1.6%	4.9%
Sun	107.2	93.3	.0	6,765	2.8%	4.1%	.0%	5.3%
Toshiba--NO OEM	100.1	50.0	40.0	2,224	2.6%	2.2%	3.6%	1.7%
Computervision	98.8	45.3	47.6	1,063	2.6%	2.0%	4.2%	.8%
Mentor Graphics	98.8	28.7	41.5	979	2.6%	1.2%	3.7%	.8%
Mitsubishi Electric	90.3	71.5	11.8	1,700	2.3%	3.1%	1.1%	1.3%
Digital	81.0	59.1	.0	594	2.1%	2.6%	.0%	.5%
Zuken	74.2	33.2	41.1	524	1.9%	1.4%	3.7%	.4%
Mutoh Industries--NO OEM	70.0	36.1	25.9	1,614	1.8%	1.6%	2.3%	1.3%
Silicon Graphics	67.6	64.2	.0	1,428	1.7%	2.8%	.0%	1.1%
Cadence	63.0	.0	63.0	0	1.6%	.0%	5.6%	.0%
Hitachi Zosen Info Systems	62.5	49.9	.6	633	1.6%	2.2%	.1%	.5%
Sharp System Products--NO OEM	55.6	28.9	26.7	350	1.4%	1.3%	2.4%	.3%
Uchida Yoko	55.4	52.6	2.8	880	1.4%	2.3%	.2%	.7%
Intergraph	42.0	22.4	8.4	439	1.1%	1.0%	.7%	.3%
Hakuto	41.7	28.8	12.9	1,220	1.1%	1.3%	1.2%	1.0%
CADAM	40.1	17.5	19.3	2,500	1.0%	.8%	1.7%	2.0%
Tokyo Electron--NO OEM	39.4	13.0	18.9	143	1.0%	.6%	1.7%	.1%
Wacom	38.9	7.8	27.2	632	1.0%	.3%	2.4%	.5%
Seiko Instruments--NO OEM	36.0	15.5	16.4	230	.9%	.7%	1.5%	.2%
Mitsui Engineering	34.7	24.3	7.0	227	.9%	1.1%	.6%	.2%
Valid	34.3	19.6	10.3	247	.9%	.9%	.9%	.2%
Sumitomo Denko Workstation	31.2	31.2	.0	2,280	.8%	1.4%	.0%	1.8%
Autodesk	28.5	.0	28.5	0	.7%	.0%	2.6%	.0%
CADIX	26.9	10.8	13.5	198	.7%	.5%	1.2%	.2%
Apple Computer	24.0	21.2	.0	4,620	.6%	.9%	.0%	3.6%
SDRC	21.7	.0	21.7	0	.6%	.0%	1.9%	.0%
Racal-Redac	20.7	1.3	16.3	101	.5%	.1%	1.5%	.1%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 13
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Toyo Information Systems-NO OEM	20.1	12.2	5.9	210	.5%	.5%	.5%	.2%
Century Research Center	17.8	9.4	6.6	102	.5%	.4%	.6%	.1%
McDonnell Douglas	16.5	8.6	5.3	237	.4%	.4%	.5%	.2%
Dazix	16.4	3.2	6.5	121	.4%	.1%	.6%	.1%
Graphtec Engineering	13.9	7.0	6.3	300	.4%	.3%	.6%	.2%
Control Data	13.3	7.4	1.8	179	.3%	.3%	.2%	.1%
Compaq	12.6	12.6	.0	2,102	.3%	.6%	.0%	1.6%
Sony	12.0	10.5	.0	697	.3%	.5%	.0%	.5%
Andor	11.1	2.8	7.9	100	.3%	.1%	.7%	.1%
INS Engineering	10.5	7.6	1.8	94	.3%	.3%	.2%	.1%
Omron	10.4	9.4	1.0	300	.3%	.4%	.1%	.2%
MacNeal-Schwendler	10.3	.0	9.9	0	.3%	.0%	.9%	.0%
Design Automation	10.2	.0	10.2	0	.3%	.0%	.9%	.0%
Siemens	9.5	4.8	3.3	128	.2%	.2%	.3%	.1%
Synopsys	7.9	.0	7.1	0	.2%	.0%	.6%	.0%
CPU	7.6	.0	6.9	0	.2%	.0%	.6%	.0%
Schlumberger	7.5	2.7	2.7	78	.2%	.1%	.2%	.1%
Scientific Calc.	6.8	1.0	4.0	24	.2%	.0%	.4%	.0%
Zycad	6.1	5.0	.0	50	.2%	.2%	.0%	.0%
Parametric Technology	5.3	.0	4.9	0	.1%	.0%	.4%	.0%
Silvar-Lisco	5.1	.0	3.6	0	.1%	.0%	.3%	.0%
MARC	4.6	.0	4.6	0	.1%	.0%	.4%	.0%
Unisys	4.6	2.3	1.6	70	.1%	.1%	.1%	.1%
Viewlogic Systems	4.4	.0	3.7	0	.1%	.0%	.3%	.0%
Data I/O	4.3	.0	4.3	0	.1%	.0%	.4%	.0%
ESRI	4.3	.0	3.8	0	.1%	.0%	.3%	.0%
Technovision	4.2	.0	4.2	0	.1%	.0%	.4%	.0%
Matra Datavision	4.1	1.9	1.7	45	.1%	.1%	.1%	.0%
ADRA Systems	3.8	1.3	2.1	67	.1%	.1%	.2%	.1%
Sophia Systems	3.5	.9	2.3	50	.1%	.0%	.2%	.0%
Landmark Graphics	3.4	1.7	1.0	21	.1%	.1%	.1%	.0%
Auto-Trol	3.3	1.3	1.2	39	.1%	.1%	.1%	.0%
Swanson Analysis	2.9	.0	2.9	0	.1%	.0%	.3%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 13
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
EEsof	2.9	.0	2.5	2	.1%	.0%	.2%	.0%
Ikos Systems	2.7	2.7	.0	12	.1%	.1%	.0%	.0%
Calay	2.6	.8	1.5	43	.1%	.0%	.1%	.0%
Kubota Computer	2.5	1.7	.9	347	.1%	.1%	.1%	.3%
Xilinx	2.5	.0	2.2	0	.1%	.0%	.2%	.0%
Delcam International	2.4	.9	1.2	41	.1%	.0%	.1%	.0%
Pasco	2.4	1.3	1.1	32	.1%	.1%	.1%	.0%
Alias Research	2.3	.0	2.3	0	.1%	.0%	.2%	.0%
Fides Industrielle Automation	2.2	.3	2.0	0	.1%	.0%	.2%	.0%
ABB Engineering Automation	2.1	.0	2.1	0	.1%	.0%	.2%	.0%
Framasoft	2.1	.0	1.2	0	.1%	.0%	.1%	.0%
Mechanical Dynamics	2.0	.0	1.8	0	.1%	.0%	.2%	.0%
Cimatron	1.9	.9	.9	57	.0%	.0%	.1%	.0%
Ricoh--NO OEM	1.8	.0	1.5	0	.0%	.0%	.1%	.0%
Cisigraph	1.7	.6	.6	16	.0%	.0%	.1%	.0%
VLSI Technology	1.7	.1	1.4	5	.0%	.0%	.1%	.0%
Seattle Silicon	1.7	.0	1.2	0	.0%	.0%	.1%	.0%
Cimlinc	1.5	.3	.9	28	.0%	.0%	.1%	.0%
LSI Logic	1.5	.1	1.1	4	.0%	.0%	.1%	.0%
MCS	1.5	.0	1.3	0	.0%	.0%	.1%	.0%
ISICAD	1.4	.5	.7	13	.0%	.0%	.1%	.0%
Meta-Software	1.4	.0	1.4	0	.0%	.0%	.1%	.0%
CAD Software	1.4	.0	1.2	0	.0%	.0%	.1%	.0%
Aries Technology	1.3	.0	1.2	0	.0%	.0%	.1%	.0%
Quickturn Systems	1.3	1.3	.0	10	.0%	.1%	.0%	.0%
Kockums Computer Systems	1.2	.3	.7	60	.0%	.0%	.1%	.0%
Test Systems Strategies	1.2	.0	1.0	0	.0%	.0%	.1%	.0%
Logic Automation	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
PDA Engineering	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
Altera	1.1	.0	.9	0	.0%	.0%	.1%	.0%
Sysscan	1.0	.5	.3	9	.0%	.0%	.0%	.0%
Microsim	1.0	.0	.9	0	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 13
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Anilam Electronics	1.0	.3	.6	12	.0%	.0%	.1%	.0%
Moss Systems	1.0	.0	.9	0	.0%	.0%	.1%	.0%
Gerber Systems	.9	.4	.3	11	.0%	.0%	.0%	.0%
Comdisco Systems	.9	.0	.8	0	.0%	.0%	.1%	.0%
Analogy	.8	.0	.7	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	.8	.2	.7	5	.0%	.0%	.1%	.0%
CADKEY	.8	.0	.8	0	.0%	.0%	.1%	.0%
Teradyne	.8	.0	.6	0	.0%	.0%	.1%	.0%
BETRONEX	.7	.0	.7	0	.0%	.0%	.1%	.0%
Mode CAD	.6	.2	.4	5	.0%	.0%	.0%	.0%
Sigma Design	.6	.0	.6	0	.0%	.0%	.1%	.0%
Whessoe Computing Systems	.6	.0	.6	0	.0%	.0%	.1%	.0%
Quantic Laboratories	.6	.0	.5	0	.0%	.0%	.0%	.0%
ICAD	.5	.0	.4	0	.0%	.0%	.0%	.0%
ETAK	.5	.0	.5	1	.0%	.0%	.0%	.0%
Carrier Corporation	.5	.0	.5	0	.0%	.0%	.0%	.0%
LPKF	.5	.3	.1	20	.0%	.0%	.0%	.0%
CNC Software	.5	.0	.5	0	.0%	.0%	.0%	.0%
DCA Softdesk	.5	.0	.5	0	.0%	.0%	.0%	.0%
Genasys II	.5	.2	.3	2	.0%	.0%	.0%	.0%
PAFEC	.5	.0	.5	0	.0%	.0%	.0%	.0%
Terr-Mar	.5	.2	.3	8	.0%	.0%	.0%	.0%
CADWorks	.4	.0	.4	0	.0%	.0%	.0%	.0%
Everex Systems	.4	.4	.0	114	.0%	.0%	.0%	.1%
Accugraph	.4	.2	.2	10	.0%	.0%	.0%	.0%
Wisdom Systems	.4	.0	.3	0	.0%	.0%	.0%	.0%
Micro Engineering Solutions	.4	.1	.2	4	.0%	.0%	.0%	.0%
Lamp Software	.3	.1	.2	15	.0%	.0%	.0%	.0%
EPIC Design Technology	.3	.0	.3	0	.0%	.0%	.0%	.0%
Simulation Science	.3	.0	.3	0	.0%	.0%	.0%	.0%
Technische Computer Systeme	.3	.1	.2	7	.0%	.0%	.0%	.0%
ERDAS	.3	.1	.2	1	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 13
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Investronica SA	.3	.2	.0	11	.0%	.0%	.0%	.0%
Scientific & Engineering SW	.3	.0	.3	0	.0%	.0%	.0%	.0%
SIMUCAD	.3	.0	.3	0	.0%	.0%	.0%	.0%
Aspen Technology	.3	.0	.2	0	.0%	.0%	.0%	.0%
Rasna Corporation	.3	.0	.3	0	.0%	.0%	.0%	.0%
ACDS	.2	.0	.2	0	.0%	.0%	.0%	.0%
Superdraft	.2	.1	.1	12	.0%	.0%	.0%	.0%
Dynamic Graphics	.2	.0	.2	0	.0%	.0%	.0%	.0%
Point Control	.2	.0	.2	0	.0%	.0%	.0%	.0%
Vantage Analysis Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Object Design	.2	.0	.2	0	.0%	.0%	.0%	.0%
GeoGraphix	.1	.0	.1	0	.0%	.0%	.0%	.0%
ALDEC	.1	.0	.1	0	.0%	.0%	.0%	.0%
Gable CAD Systems	.1	.1	.1	2	.0%	.0%	.0%	.0%
Integer	.1	.0	.1	0	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
ACTEL	.1	.0	.1	0	.0%	.0%	.0%	.0%
Foresight Resources	.1	.0	.1	0	.0%	.0%	.0%	.0%
Mega CADD	.1	.0	.1	0	.0%	.0%	.0%	.0%
Motorola	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Daniel Geophysical	.1	.0	.1	1	.0%	.0%	.0%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.0%	.0%
Bechtel Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Tanner Research	.1	.0	.0	0	.0%	.0%	.0%	.0%
Accel Technologies	.1	.0	.0	0	.0%	.0%	.0%	.0%
CAD Language Systems	.1	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.1	.0	.0	0	.0%	.0%	.0%	.0%
Objectivity	.1	.0	.1	0	.0%	.0%	.0%	.0%
Premise	.1	.0	.1	0	.0%	.0%	.0%	.0%
Aptos	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 13 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Asia
UNITS: Millions of Dollars/Actual Units

	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Market Share: Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Company								
Facility Mapping Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.0%	.0%
Omation	.0	.0	.0	0	.0%	.0%	.0%	.0%
Pathtrace	.0	.0	.0	1	.0%	.0%	.0%	.0%
The CAD Group	.0	.0	.0	0	.0%	.0%	.0%	.0%
Imagine That	.0	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
National Semiconductor	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	154.0	151.8	.0	30,977	4.0%	6.6%	.0%	24.2%
All Companies	3,867.2	2,294.5	1,119.1	127,920	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	1,749.0	1,037.3	466.8	77,481	45.2%	45.2%	41.7%	60.6%
All Asian-Based Companies	2,041.9	1,244.0	600.4	49,861	52.8%	54.2%	53.6%	39.0%
All European-Based Companies	76.4	13.2	51.9	578	2.0%	.6%	4.6%	.5%
All Hardware Companies	581.9	524.5	.0	65,667	15.0%	22.9%	.0%	51.3%
All Turnkey & SW Companies	3,285.3	1,770.0	1,119.1	62,253	85.0%	77.1%	100.0%	48.7%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 14
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Asia
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
	Total	Hardware	Software	Wkstns	Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
NEC	165.4	92.7	59.6	8,695	8.4%	8.4%	9.2%	21.1%
Fujitsu	162.1	101.9	44.0	3,816	8.2%	9.2%	6.8%	9.3%
Hewlett-Packard	118.6	80.8	17.9	4,232	6.0%	7.3%	2.8%	10.3%
Hitachi	104.2	50.0	43.7	2,162	5.3%	4.5%	6.8%	5.2%
Mentor Graphics	98.8	28.7	41.5	979	5.0%	2.6%	6.4%	2.4%
Computervision	87.8	38.4	45.0	913	4.4%	3.5%	7.0%	2.2%
Sun	86.0	75.7	.0	5,819	4.3%	6.8%	.0%	14.1%
Zuken	70.5	31.4	39.1	491	3.6%	2.8%	6.0%	1.2%
Silicon Graphics	67.6	64.2	.0	1,428	3.4%	5.8%	.0%	3.5%
Mitsubishi Electric	67.0	58.6	4.5	666	3.4%	5.3%	.7%	1.6%
Toshiba--NO OEM	64.5	32.3	25.8	566	3.3%	2.9%	4.0%	1.4%
Nihon Unisys	62.6	41.9	8.1	736	3.2%	3.8%	1.3%	1.8%
Hitachi Zosen Info Systems	58.8	49.9	.6	633	3.0%	4.5%	.1%	1.5%
Uchida Yoko	55.4	52.6	2.8	880	2.8%	4.8%	.4%	2.1%
Cadence	54.8	.0	54.8	0	2.8%	.0%	8.5%	.0%
IBM	53.5	32.6	11.2	1,215	2.7%	2.9%	1.7%	2.9%
Sharp System Products--NO OEM	48.4	25.2	23.2	301	2.4%	2.3%	3.6%	.7%
Tokyo Electron--NO OEM	39.4	13.0	18.9	143	2.0%	1.2%	2.9%	.3%
Intergraph	34.8	19.5	6.2	385	1.8%	1.8%	1.0%	.9%
Valid	34.3	19.6	10.3	247	1.7%	1.8%	1.6%	.6%
Seiko Instruments--NO OEM	32.1	13.8	15.1	215	1.6%	1.2%	2.3%	.5%
Mitsui Engineering	31.6	22.1	6.3	207	1.6%	2.0%	1.0%	.5%
Mutoh Industries--NO OEM	29.8	14.4	10.0	300	1.5%	1.3%	1.5%	.7%
Sumitomo Denko Workstation	28.4	28.4	.0	2,148	1.4%	2.6%	.0%	5.2%
CADIX	26.9	10.8	13.5	198	1.4%	1.0%	2.1%	.5%
Racal-Redac	20.7	1.3	16.3	101	1.0%	.1%	2.5%	.2%
SDRC	18.9	.0	18.9	0	1.0%	.0%	2.9%	.0%
Digital	17.8	13.0	.0	594	.9%	1.2%	.0%	1.4%
Century Research Center	16.5	8.7	6.1	95	.8%	.8%	.9%	.2%
Dazix	16.4	3.2	6.5	121	.8%	.3%	1.0%	.3%
Toyo Information Systems-NO OEM	15.3	9.6	4.4	182	.8%	.9%	.7%	.4%
Graphtec Engineering	13.9	7.0	6.3	300	.7%	.6%	1.0%	.7%
McDonnell Douglas	13.1	6.8	4.2	175	.7%	.6%	.6%	.4%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 14
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Sony	12.0	10.5	.0	697	.6%	.9%	.0%	1.7%
Omron	10.4	9.4	1.0	300	.5%	.8%	.2%	.7%
Siemens	8.6	4.3	3.0	114	.4%	.4%	.5%	.3%
Control Data	5.9	4.0	1.0	139	.3%	.4%	.2%	.3%
Scientific Calc.	5.7	.7	3.1	18	.3%	.1%	.5%	.0%
Parametric Technology	5.3	.0	4.9	0	.3%	.0%	.8%	.0%
Schlumberger	5.2	1.8	2.0	45	.3%	.2%	.3%	.1%
CADAM	5.1	.0	4.3	0	.3%	.0%	.7%	.0%
INS Engineering	5.0	3.7	.9	53	.3%	.3%	.1%	.1%
Zycad	4.9	3.8	.0	41	.2%	.3%	.0%	.1%
Silvar-Lisco	4.6	.0	3.2	0	.2%	.0%	.5%	.0%
Matra Datavision	4.1	1.9	1.7	45	.2%	.2%	.3%	.1%
Wacom	3.8	.9	2.9	38	.2%	.1%	.4%	.1%
Synopsys	3.8	.0	3.4	0	.2%	.0%	.5%	.0%
Unisys	3.5	1.8	1.2	55	.2%	.2%	.2%	.1%
Landmark Graphics	3.4	1.7	1.0	21	.2%	.1%	.2%	.1%
Auto-Trol	3.3	1.3	1.2	39	.2%	.1%	.2%	.1%
ADRA Systems	2.9	1.3	1.3	67	.1%	.1%	.2%	.2%
Calay	2.6	.8	1.5	43	.1%	.1%	.2%	.1%
Ikos Systems	2.5	2.5	.0	11	.1%	.2%	.0%	.0%
Delcam International	2.4	.9	1.2	41	.1%	.1%	.2%	.1%
ESRI	2.4	.0	2.1	0	.1%	.0%	.3%	.0%
Autodesk	2.4	.0	2.4	0	.1%	.0%	.4%	.0%
Alias Research	2.3	.0	2.3	0	.1%	.0%	.4%	.0%
MARC	2.3	.0	2.3	0	.1%	.0%	.4%	.0%
Pasco	2.1	1.1	1.0	30	.1%	.1%	.1%	.1%
MacNeal-Schwendler	2.1	.0	2.0	0	.1%	.0%	.3%	.0%
Framasoft	1.9	.0	1.1	0	.1%	.0%	.2%	.0%
Viewlogic Systems	1.9	.0	1.6	0	.1%	.0%	.2%	.0%
Ricoh--NO OEM	1.8	.0	1.5	0	.1%	.0%	.2%	.0%
Seattle Silicon	1.7	.0	1.2	0	.1%	.0%	.2%	.0%
Cisigraph	1.6	.6	.6	13	.1%	.0%	.1%	.0%
Cimlinc	1.5	.3	.9	28	.1%	.0%	.1%	.1%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 14
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
VLSI Technology	1.5	.1	1.2	4	.1%	.0%	.2%	.0%
Kubota Computer	1.4	.9	.5	238	.1%	.1%	.1%	.6%
Mechanical Dynamics	1.4	.0	1.2	0	.1%	.0%	.2%	.0%
Swanson Analysis	1.4	.0	1.4	0	.1%	.0%	.2%	.0%
Cimatron	1.3	.6	.6	40	.1%	.1%	.1%	.1%
LSI Logic	1.3	.1	1.0	3	.1%	.0%	.2%	.0%
Quickturn Systems	1.3	1.3	.0	10	.1%	.1%	.0%	.0%
EEsof	1.3	.0	1.1	2	.1%	.0%	.2%	.0%
Sophia Systems	1.3	.3	.8	10	.1%	.0%	.1%	.0%
Hakuto	1.3	.9	.4	18	.1%	.1%	.1%	.0%
Kockums Computer Systems	1.2	.3	.7	60	.1%	.0%	.1%	.1%
Logic Automation	1.2	.0	1.2	0	.1%	.0%	.2%	.0%
Meta-Software	1.2	.0	1.1	0	.1%	.0%	.2%	.0%
Test Systems Strategies	1.1	.0	.9	0	.1%	.0%	.1%	.0%
Aries Technology	1.1	.0	1.0	0	.1%	.0%	.1%	.0%
ISICAD	1.0	.5	.3	13	.1%	.0%	.0%	.0%
Moss Systems	1.0	.0	.9	0	.0%	.0%	.1%	.0%
Gerber Systems	.9	.4	.3	11	.0%	.0%	.0%	.0%
Comdisco Systems	.9	.0	.8	0	.0%	.0%	.1%	.0%
Analogy	.8	.0	.7	0	.0%	.0%	.1%	.0%
PDA Engineering	.8	.0	.8	0	.0%	.0%	.1%	.0%
MCS	.7	.0	.6	0	.0%	.0%	.1%	.0%
Data I/O	.7	.0	.7	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	.6	.1	.5	2	.0%	.0%	.1%	.0%
Quantic Laboratories	.6	.0	.5	0	.0%	.0%	.1%	.0%
ICAD	.5	.0	.4	0	.0%	.0%	.1%	.0%
Fides Industrielle Automation	.4	.1	.4	0	.0%	.0%	.1%	.0%
Genasys II	.4	.2	.3	1	.0%	.0%	.0%	.0%
PAFEC	.4	.0	.4	0	.0%	.0%	.1%	.0%
Wisdom Systems	.4	.0	.3	0	.0%	.0%	.0%	.0%
Accugraph	.3	.2	.1	10	.0%	.0%	.0%	.0%
Sysscan	.3	.2	.1	2	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 14
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Sigma Design	.3	.0	.3	0	.0%	.0%	.0%	.0%
Teradyne	.3	.0	.3	0	.0%	.0%	.0%	.0%
EPIC Design Technology	.3	.0	.3	0	.0%	.0%	.0%	.0%
Technische Computer Systeme	.3	.1	.2	7	.0%	.0%	.0%	.0%
Scientific & Engineering SW	.3	.0	.3	0	.0%	.0%	.0%	.0%
ACDS	.2	.0	.2	0	.0%	.0%	.0%	.0%
Simulation Science	.2	.0	.2	0	.0%	.0%	.0%	.0%
SIMUCAD	.2	.0	.2	0	.0%	.0%	.0%	.0%
Vantage Analysis Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Xilinx	.2	.0	.2	0	.0%	.0%	.0%	.0%
Object Design	.2	.0	.2	0	.0%	.0%	.0%	.0%
Terr-Mar	.2	.1	.1	2	.0%	.0%	.0%	.0%
ERDAS	.2	.0	.1	1	.0%	.0%	.0%	.0%
Dynamic Graphics	.2	.0	.1	0	.0%	.0%	.0%	.0%
Micro Engineering Solutions	.1	.0	.1	1	.0%	.0%	.0%	.0%
Gable CAD Systems	.1	.1	.1	2	.0%	.0%	.0%	.0%
DCA Softdesk	.1	.0	.1	0	.0%	.0%	.0%	.0%
Microsim	.1	.0	.1	0	.0%	.0%	.0%	.0%
Lamp Software	.1	.1	.1	6	.0%	.0%	.0%	.0%
Motorola	.1	.0	.1	0	.0%	.0%	.0%	.0%
ETAK	.1	.0	.1	0	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Whessoe Computing Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
CAD Language Systems	.1	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.1	.0	.0	0	.0%	.0%	.0%	.0%
Objectivity	.1	.0	.1	0	.0%	.0%	.0%	.0%
Everex Systems	.0	.0	.0	4	.0%	.0%	.0%	.0%
ACTEL	.0	.0	.0	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Point Control	.0	.0	.0	0	.0%	.0%	.0%	.0%
National Semiconductor	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 14 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	1,978.5	1,107.4	647.2	41,226	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	792.8	404.6	271.6	16,637	40.1%	36.5%	42.0%	40.4%
All Asian-Based Companies	1,131.8	691.8	340.8	24,118	57.2%	62.5%	52.7%	58.5%
All European-Based Companies	54.0	10.9	34.7	472	2.7%	1.0%	5.4%	1.1%
All Hardware Companies	220.8	195.2	.0	10,742	11.2%	17.6%	.0%	26.1%
All Turnkey & SW Companies	1,757.8	912.1	647.2	30,485	88.8%	82.4%	100.0%	73.9%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 15
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Asia
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
	Total	Hardware	Software	Wkstns	Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
IBM	476.6	286.0	104.8	5,538	41.2%	40.2%	40.3%	33.7%
Fujitsu	170.0	106.9	46.2	2,877	14.7%	15.0%	17.7%	17.5%
Nihon Unisys	148.4	99.4	19.3	1,164	12.8%	14.0%	7.4%	7.1%
Digital	63.1	46.1	.0	0	5.5%	6.5%	.0%	.0%
NEC	59.6	46.0	8.8	162	5.1%	6.5%	3.4%	1.0%
Hitachi	33.3	16.0	14.0	2,768	2.9%	2.2%	5.4%	16.8%
Sun	21.2	17.6	.0	946	1.8%	2.5%	.0%	5.8%
Toshiba--NO OEM	15.2	7.6	6.1	204	1.3%	1.1%	2.3%	1.2%
Mitsubishi Electric	13.9	6.6	4.0	205	1.2%	.9%	1.5%	1.2%
Computervision	10.7	6.9	2.2	150	.9%	1.0%	.8%	.9%
Cadence	8.2	.0	8.2	0	.7%	.0%	3.1%	.0%
MacNeal-Schwendler	8.1	.0	7.8	0	.7%	.0%	3.0%	.0%
Control Data	7.3	3.4	.8	40	.6%	.5%	.3%	.2%
Intergraph	6.0	3.0	1.0	54	.5%	.4%	.4%	.3%
CADAM	5.3	.0	4.6	0	.5%	.0%	1.8%	.0%
Sharp System Products--NO OEM	5.0	2.6	2.4	22	.4%	.4%	.9%	.1%
Toyo Information Systems-NO OEM	4.8	2.6	1.5	28	.4%	.4%	.6%	.2%
INS Engineering	4.7	3.4	.8	25	.4%	.5%	.3%	.2%
Synopsys	4.1	.0	3.7	0	.4%	.0%	1.4%	.0%
Mutoh Industries--NO OEM	3.9	1.6	1.6	8	.3%	.2%	.6%	.0%
Seiko Instruments--NO OEM	3.9	1.7	1.3	15	.3%	.2%	.5%	.1%
Hitachi Zosen Info Systems	3.8	.0	.0	0	.3%	.0%	.0%	.0%
Zuken	3.7	1.8	1.9	33	.3%	.3%	.7%	.2%
McDonnell Douglas	3.4	1.8	1.1	62	.3%	.2%	.4%	.4%
SDRC	2.8	.0	2.8	0	.2%	.0%	1.1%	.0%
Sumitomo Denko Workstation	2.8	2.8	.0	132	.2%	.4%	.0%	.8%
MARC	2.3	.0	2.3	0	.2%	.0%	.9%	.0%
Schlumberger	2.2	.8	.7	33	.2%	.1%	.3%	.2%
Hewlett-Packard	2.1	1.7	.0	105	.2%	.2%	.0%	.6%
ABB Engineering Automation	2.1	.0	2.1	0	.2%	.0%	.8%	.0%
Fides Industrielle Automation	1.8	.2	1.6	0	.2%	.0%	.6%	.0%
ESRI	1.5	.0	1.3	0	.1%	.0%	.5%	.0%
Century Research Center	1.3	.7	.5	7	.1%	.1%	.2%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 15
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Swanson Analysis	1.2	.0	1.2	0	.1%	.0%	.5%	.0%
Zycad	1.2	1.1	.0	9	.1%	.2%	.0%	.1%
Kubota Computer	1.1	.7	.4	109	.1%	.1%	.1%	.7%
Scientific Calc.	1.1	.2	.9	6	.1%	.0%	.3%	.0%
Unisys	1.1	.5	.4	15	.1%	.1%	.1%	.1%
Siemens	.9	.5	.3	14	.1%	.1%	.1%	.1%
Sysscan	.7	.3	.2	7	.1%	.0%	.1%	.0%
Mechanical Dynamics	.6	.0	.5	0	.1%	.0%	.2%	.0%
Silvar-Lisco	.5	.0	.4	0	.0%	.0%	.1%	.0%
MCS	.5	.0	.4	0	.0%	.0%	.2%	.0%
PDA Engineering	.4	.0	.4	0	.0%	.0%	.1%	.0%
Pasco	.3	.2	.2	2	.0%	.0%	.1%	.0%
Teradyne	.3	.0	.2	0	.0%	.0%	.1%	.0%
Data I/O	.2	.0	.2	0	.0%	.0%	.1%	.0%
Framesoft	.2	.0	.1	0	.0%	.0%	.0%	.0%
Meta-Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
VLSI Technology	.2	.0	.2	1	.0%	.0%	.1%	.0%
Cisigraph	.2	.1	.1	3	.0%	.0%	.0%	.0%
LSI Logic	.2	.0	.1	0	.0%	.0%	.0%	.0%
EEsof	.1	.0	.1	0	.0%	.0%	.0%	.0%
Test Systems Strategies	.1	.0	.1	0	.0%	.0%	.0%	.0%
Whessoe Computing Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
ETAK	.1	.0	.1	0	.0%	.0%	.0%	.0%
Daniel Geophysical	.1	.0	.0	1	.0%	.0%	.0%	.0%
Dynamic Graphics	.1	.0	.0	0	.0%	.0%	.0%	.0%
Analogy	.0	.0	.0	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Microsim	.0	.0	.0	0	.0%	.0%	.0%	.0%
SIMUCAD	.0	.0	.0	0	.0%	.0%	.0%	.0%
Logic Automation	.0	.0	.0	0	.0%	.0%	.0%	.0%
Lamp Software	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 15 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Asia
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
	Total	Hardware	Software	Wkstns	Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
Other Companies	42.8	40.6	.0	1,690	3.7%	5.7%	.0%	10.3%
All Companies	1,157.6	711.4	260.3	16,436	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	663.5	409.8	136.7	8,650	57.3%	57.6%	52.5%	52.6%
All Asian-Based Companies	475.7	300.6	108.9	7,761	41.1%	42.2%	41.8%	47.2%
All European-Based Companies	18.4	1.1	14.8	25	1.6%	.2%	5.7%	.2%
All Hardware Companies	130.8	106.9	.0	2,750	11.3%	15.0%	.0%	16.7%
All Turnkey & SW Companies	1,026.7	604.6	260.3	13,686	88.7%	85.0%	100.0%	83.3%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 16
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
NEC	117.4	99.3	8.6	8,840	16.1%	20.9%	4.1%	12.6%
Hitachi	70.8	34.0	29.7	1,470	9.7%	7.1%	14.1%	2.1%
Fujitsu	63.3	39.8	17.2	2,085	8.7%	8.4%	8.1%	3.0%
IBM	52.2	49.6	.0	11,663	7.1%	10.4%	.0%	16.6%
Hakuto	40.5	27.9	12.5	1,202	5.5%	5.9%	5.9%	1.7%
Mutoh Industries--NO OEM	36.2	20.1	14.3	1,306	5.0%	4.2%	6.7%	1.9%
Wacom	35.1	6.9	24.3	594	4.8%	1.5%	11.5%	.8%
CADAM	29.7	17.5	10.4	2,500	4.1%	3.7%	4.9%	3.6%
Autodesk	26.2	.0	26.2	0	3.6%	.0%	12.4%	.0%
Apple Computer	24.0	21.2	.0	4,620	3.3%	4.4%	.0%	6.6%
Toshiba--NO OEM	20.4	10.2	8.1	1,453	2.8%	2.1%	3.8%	2.1%
Compaq	12.6	12.6	.0	2,102	1.7%	2.7%	.0%	3.0%
Hewlett-Packard	12.3	9.8	.0	1,892	1.7%	2.1%	.0%	2.7%
Andor	11.1	2.8	7.9	100	1.5%	.6%	3.7%	.1%
Design Automation	10.2	.0	10.2	0	1.4%	.0%	4.8%	.0%
Mitsubishi Electric	9.4	6.3	3.3	829	1.3%	1.3%	1.6%	1.2%
CPU	7.6	.0	6.9	0	1.0%	.0%	3.3%	.0%
Technovision	4.2	.0	4.2	0	.6%	.0%	2.0%	.0%
Data I/O	3.5	.0	3.5	0	.5%	.0%	1.6%	.0%
Mitsui Engineering	3.1	2.2	.6	20	.4%	.5%	.3%	.0%
Viewlogic Systems	2.5	.0	2.1	0	.3%	.0%	1.0%	.0%
Xilinx	2.3	.0	2.1	0	.3%	.0%	1.0%	.0%
Sophia Systems	2.2	.6	1.5	40	.3%	.1%	.7%	.1%
Sharp System Products--NO OEM	2.2	1.2	1.1	28	.3%	.2%	.5%	.0%
EEsof	1.4	.0	1.3	0	.2%	.0%	.6%	.0%
CAD Software	1.4	.0	1.2	0	.2%	.0%	.5%	.0%
Intergraph	1.2	.0	1.1	0	.2%	.0%	.5%	.0%
Altera	1.1	.0	.9	0	.2%	.0%	.4%	.0%
Anilam Electronics	1.0	.3	.6	12	.1%	.1%	.3%	.0%
ADRA Systems	.9	.0	.8	0	.1%	.0%	.4%	.0%
Microsim	.8	.0	.8	0	.1%	.0%	.4%	.0%
CADKEY	.8	.0	.8	0	.1%	.0%	.4%	.0%
INS Engineering	.7	.5	.1	16	.1%	.1%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 16
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
BETRONEX	.7	.0	.7	0	.1%	.0%	.3%	.0%
Moda CAD	.6	.2	.4	5	.1%	.0%	.2%	.0%
Cimatron	.6	.3	.3	17	.1%	.1%	.1%	.0%
Carrier Corporation	.5	.0	.5	0	.1%	.0%	.2%	.0%
LPKF	.5	.3	.1	20	.1%	.1%	.1%	.0%
CNC Software	.5	.0	.5	0	.1%	.0%	.2%	.0%
CADWorks	.4	.0	.4	0	.1%	.0%	.2%	.0%
ISICAD	.4	.0	.4	0	.1%	.0%	.2%	.0%
Whessoe Computing Systems	.4	.0	.4	0	.1%	.0%	.2%	.0%
ESRI	.4	.0	.4	0	.1%	.0%	.2%	.0%
ETAK	.4	.0	.4	1	.1%	.0%	.2%	.0%
DCA Softdesk	.4	.0	.4	0	.1%	.0%	.2%	.0%
Everex Systems	.4	.4	.0	111	.0%	.1%	.0%	.2%
Computervision	.4	.0	.3	0	.0%	.0%	.2%	.0%
MCS	.3	.0	.3	0	.0%	.0%	.1%	.0%
Sigma Design	.3	.0	.3	0	.0%	.0%	.1%	.0%
Swanson Analysis	.3	.0	.3	0	.0%	.0%	.1%	.0%
Terr-Mar	.3	.1	.2	5	.0%	.0%	.1%	.0%
Investronica SA	.3	.2	.0	11	.0%	.0%	.0%	.0%
Aries Technology	.3	.0	.2	0	.0%	.0%	.1%	.0%
Aspen Technology	.3	.0	.2	0	.0%	.0%	.1%	.0%
Rasna Corporation	.3	.0	.3	0	.0%	.0%	.1%	.0%
Lamp Software	.2	.0	.1	9	.0%	.0%	.1%	.0%
Micro Engineering Solutions	.2	.1	.1	3	.0%	.0%	.1%	.0%
Superdraft	.2	.1	.1	12	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.2	.1	.1	3	.0%	.0%	.1%	.0%
Ikos Systems	.2	.2	.0	1	.0%	.0%	.0%	.0%
Point Control	.2	.0	.2	0	.0%	.0%	.1%	.0%
GeoGraphix	.1	.0	.1	0	.0%	.0%	.1%	.0%
Teradyne	.1	.0	.1	0	.0%	.0%	.1%	.0%
ALDEC	.1	.0	.1	0	.0%	.0%	.1%	.0%
Integer	.1	.0	.1	0	.0%	.0%	.0%	.0%
ERDAS	.1	.0	.1	1	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 16
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Asia
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Foresight Resources	.1	.0	.1	0	.0%	.0%	.0%	.0%
MacNeal-Schwendler	.1	.0	.1	0	.0%	.0%	.0%	.0%
Mega CADD	.1	.0	.1	0	.0%	.0%	.0%	.0%
ACTEL	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Schlumberger	.1	.0	.0	0	.0%	.0%	.0%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Simulation Science	.1	.0	.1	0	.0%	.0%	.0%	.0%
Tanner Research	.1	.0	.0	0	.0%	.0%	.0%	.0%
Accel Technologies	.1	.0	.0	0	.0%	.0%	.0%	.0%
Genasys II	.1	.0	.0	0	.0%	.0%	.0%	.0%
PAFEC	.1	.0	.1	0	.0%	.0%	.0%	.0%
Premise	.1	.0	.1	0	.0%	.0%	.0%	.0%
Aptos	.0	.0	.0	0	.0%	.0%	.0%	.0%
Facility Mapping Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.0%	.0%
Omation	.0	.0	.0	0	.0%	.0%	.0%	.0%
Pathtrace	.0	.0	.0	1	.0%	.0%	.0%	.0%
The CAD Group	.0	.0	.0	0	.0%	.0%	.0%	.0%
Accugraph	.0	.0	.0	0	.0%	.0%	.0%	.0%
Daniel Geophysical	.0	.0	.0	0	.0%	.0%	.0%	.0%
Imagine That	.0	.0	.0	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
SIMUCAD	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 16 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Asia
UNITS: Millions of Dollars/Actual Units

	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Market Share Total Revenue	Market Share Hardware Revenue	Market Share Software Revenue	Market Share Wkstns Shipped
Company								
Other Companies	111.2	111.2	.0	29,287	15.2%	23.4%	.0%	41.7%
All Companies	731.1	475.7	211.6	70,257	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	292.8	222.9	58.4	52,194	40.0%	46.8%	27.6%	74.3%
All Asian-Based Companies	434.4	251.7	150.7	17,982	59.4%	52.9%	71.2%	25.6%
All European-Based Companies	4.0	1.2	2.5	81	.5%	.3%	1.2%	.1%
All Hardware Companies	230.3	222.4	.0	52,175	31.5%	46.7%	.0%	74.3%
All Turnkey & SW Companies	500.8	253.3	211.6	18,082	68.5%	53.3%	100.0%	25.7%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 17
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Rest of World
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Intergraph	60.0	32.1	12.0	626	20.2%	18.1%	17.3%	5.5%
IBM	57.5	38.2	10.3	2,955	19.4%	21.6%	14.9%	25.9%
Digital	27.0	19.7	.0	198	9.1%	11.1%	.0%	1.7%
Hewlett-Packard	14.5	10.7	1.4	853	4.9%	6.0%	2.0%	7.5%
Compaq	12.6	12.6	.0	2,102	4.3%	7.1%	.0%	18.4%
GeoVision Corp.	11.0	7.8	2.3	130	3.7%	4.4%	3.3%	1.1%
Computervision	9.9	2.6	2.8	61	3.4%	1.4%	4.0%	.5%
Genasys II	7.6	2.7	4.6	26	2.6%	1.5%	6.6%	.2%
McDonnell Douglas	7.0	3.6	2.3	86	2.4%	2.1%	3.3%	.7%
Sun	6.6	5.7	.0	357	2.2%	3.2%	.0%	3.1%
Landmark Graphics	6.3	3.1	1.9	39	2.1%	1.7%	2.7%	.3%
Control Data	3.3	1.8	.5	42	1.1%	1.0%	.7%	.4%
Engineering Mechanics	3.2	1.1	1.8	250	1.1%	.6%	2.6%	2.2%
Autodesk	2.4	.0	2.4	0	.8%	.0%	3.4%	.0%
Apple Computer	2.2	1.9	.0	420	.7%	1.1%	.0%	3.7%
ESRI	2.1	.0	1.9	0	.7%	.0%	2.7%	.0%
Radian Corporation	1.9	.0	1.2	0	.7%	.0%	1.7%	.0%
Siemens	1.9	.9	.7	26	.6%	.5%	1.0%	.2%
Delcam International	1.9	.7	.9	31	.6%	.4%	1.4%	.3%
Orcad	1.8	.0	1.8	0	.6%	.0%	2.7%	.0%
Claris	1.6	.0	1.6	0	.6%	.0%	2.4%	.0%
SDRC	1.6	.0	1.6	0	.5%	.0%	2.3%	.0%
MacNeal-Schwendler	1.0	.0	1.0	0	.3%	.0%	1.4%	.0%
Geographic Systems (IIS)	1.0	.0	.9	0	.3%	.0%	1.3%	.0%
Vero International Software	1.0	.0	.9	0	.3%	.0%	1.3%	.0%
International Software Systems	.9	.0	.9	0	.3%	.0%	1.4%	.0%
Solbourne	.9	.9	.0	70	.3%	.5%	.0%	.6%
Geographic Systems (WPS)	.9	.0	.8	0	.3%	.0%	1.2%	.0%
Genrad	.8	.2	.6	9	.3%	.1%	.8%	.1%
Geobased Systems	.8	.2	.6	16	.3%	.1%	.8%	.1%
CNC Software	.7	.0	.7	0	.2%	.0%	1.0%	.0%
LSI Logic	.7	.1	.6	2	.2%	.0%	.8%	.0%
ABB Engineering Automation	.7	.0	.7	0	.2%	.0%	1.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 17
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Rest of World
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
					Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
MapInfo	.7	.0	.5	0	.2%	.0%	.6%	.0%
Strategic Mapping	.7	.0	.7	0	.2%	.0%	.9%	.0%
Accugraph	.6	.3	.2	15	.2%	.1%	.3%	.1%
Data I/O	.5	.0	.5	0	.2%	.0%	.6%	.0%
ETAK	.5	.0	.5	1	.2%	.0%	.7%	.0%
Altera	.5	.0	.4	0	.2%	.0%	.6%	.0%
Laser-Scan	.4	.1	.2	1	.1%	.1%	.3%	.0%
Synercom	.4	.0	.2	0	.1%	.0%	.3%	.0%
Analogy	.4	.0	.4	0	.1%	.0%	.5%	.0%
DCA Softdesk	.4	.0	.4	0	.1%	.0%	.6%	.0%
Dynamic Graphics	.4	.0	.4	0	.1%	.0%	.5%	.0%
Unisys	.4	.2	.1	6	.1%	.1%	.2%	.1%
VLSI Technology	.4	.0	.3	1	.1%	.0%	.4%	.0%
Xilinx	.3	.0	.3	0	.1%	.0%	.4%	.0%
Computer-Aided Design Group	.3	.0	.2	0	.1%	.0%	.3%	.0%
Whessoe Computing Systems	.3	.0	.3	0	.1%	.0%	.4%	.0%
Sigma Design	.3	.0	.3	0	.1%	.0%	.4%	.0%
Clemessy	.3	.2	.0	1	.1%	.1%	.1%	.0%
Royal Digital Systems	.3	.0	.2	0	.1%	.0%	.3%	.0%
EEsof	.3	.0	.2	0	.1%	.0%	.3%	.0%
ISICAD	.3	.1	.1	2	.1%	.1%	.2%	.0%
CADWorks	.2	.0	.2	0	.1%	.0%	.3%	.0%
ERDAS	.2	.0	.2	1	.1%	.0%	.2%	.0%
Georgia Tech Research Corp.	.2	.0	.2	0	.1%	.0%	.3%	.0%
Hochtief	.2	.0	.2	2	.1%	.0%	.2%	.0%
Superdraft	.2	.1	.1	12	.1%	.1%	.1%	.1%
Zuken	.2	.1	.1	2	.1%	.0%	.2%	.0%
Investronica SA	.2	.2	.0	8	.1%	.1%	.0%	.1%
Teradyne	.2	.0	.2	0	.1%	.0%	.2%	.0%
Aura CAD/CAM Systems	.2	.0	.1	0	.1%	.0%	.2%	.0%
Engineering Systems Corp.	.2	.0	.1	0	.1%	.0%	.2%	.0%
Generation 5 Technology	.2	.0	.2	0	.1%	.0%	.2%	.0%
BATISOFT	.1	.0	.1	5	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 17
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Rest of World
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
FEA Limited	.1	.0	.0	3	.0%	.0%	.0%	.0%
BETRONEX	.1	.0	.1	0	.0%	.0%	.2%	.0%
LPKF	.1	.1	.0	5	.0%	.0%	.0%	.0%
ACTEL	.1	.0	.1	0	.0%	.0%	.1%	.0%
CAD Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Innovative Data Design	.1	.0	.1	0	.0%	.0%	.2%	.0%
Mc2 Engineering Software	.1	.0	.1	0	.0%	.0%	.2%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.1%	.0%
Simulation Science	.1	.0	.1	0	.0%	.0%	.1%	.0%
Spectrum Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Star Informatic	.1	.0	.0	0	.0%	.0%	.0%	.0%
Terr-Mar	.1	.1	.1	2	.0%	.0%	.1%	.0%
CADMATIC	.1	.0	.1	1	.0%	.0%	.1%	.0%
Secagraphics	.1	.1	.0	2	.0%	.0%	.0%	.0%
Ziegler	.1	.0	.1	0	.0%	.0%	.1%	.0%
Facility Mapping Systems	.1	.0	.1	0	.0%	.0%	.1%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Moda CAD	.1	.0	.0	1	.0%	.0%	.1%	.0%
Accel Technologies	.1	.0	.0	0	.0%	.0%	.1%	.0%
Algor Interactive Systems	.0	.0	.0	0	.0%	.0%	.1%	.0%
Caddlink	.0	.0	.0	0	.0%	.0%	.1%	.0%
Capilano Computing	.0	.0	.0	0	.0%	.0%	.1%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.1%	.0%
Pathtrace	.0	.0	.0	1	.0%	.0%	.0%	.0%
Comshoppe	.0	.0	.0	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Fides Industrielle Automation	.0	.0	.0	0	.0%	.0%	.0%	.0%
Foresight Resources	.0	.0	.0	0	.0%	.0%	.0%	.0%
Vision 3D	.0	.0	.0	0	.0%	.0%	.0%	.0%
ESDU International	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 17 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: All Platforms
REGION: Rest of World
UNITS: Millions of Dollars/Actual Units

	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Market Share Total Revenue	Market Share Hardware Revenue	Market Share Software Revenue	Market Share Wkstns Shipped
Company								
Other Companies	29.8	28.7	.0	3,048	10.0%	16.2%	.0%	26.7%
All Companies	296.3	176.8	69.3	11,415	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	287.8	174.3	64.5	11,320	97.1%	98.6%	93.0%	99.2%
All Asian-Based Companies	.2	.1	.1	2	.1%	.0%	.2%	.0%
All European-Based Companies	8.4	2.3	4.8	93	2.8%	1.3%	6.9%	.8%
All Hardware Companies	97.9	86.4	.0	9,224	33.0%	48.9%	.0%	80.8%
All Turnkey & SW Companies	198.5	90.4	69.3	2,191	67.0%	51.1%	100.0%	19.2%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 18
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Rest of World
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Intergraph	49.8	27.9	9.0	551	38.0%	39.9%	26.8%	23.3%
Hewlett-Packard	12.7	9.2	1.4	618	9.6%	13.1%	4.3%	26.1%
Computervision	8.4	2.3	2.1	55	6.4%	3.3%	6.2%	2.3%
GeoVision Corp.	7.9	5.6	1.7	105	6.0%	8.1%	5.0%	4.4%
Genasys *II*	6.9	2.4	4.1	23	5.2%	3.4%	12.3%	1.0%
Landmark Graphics	6.3	3.1	1.9	39	4.8%	4.4%	5.7%	1.6%
Digital	5.9	4.3	.0	198	4.5%	6.2%	.0%	8.4%
McDonnell Douglas	5.6	2.9	1.8	63	4.2%	4.1%	5.4%	2.7%
Sun	5.4	4.7	.0	307	4.1%	6.7%	.0%	13.0%
IBM	4.7	2.9	1.0	120	3.6%	4.1%	3.0%	5.1%
Delcam International	1.9	.7	.9	31	1.4%	.9%	2.8%	1.3%
Engineering Mechanics	1.8	.6	1.0	139	1.4%	.9%	3.1%	5.8%
Siemens	1.7	.8	.6	23	1.3%	1.2%	1.9%	1.0%
SDRC	1.4	.0	1.4	0	1.1%	.0%	4.2%	.0%
Control Data	1.3	.9	.2	32	1.0%	1.3%	.7%	1.3%
ESRI	1.2	.0	1.1	0	.9%	.0%	3.2%	.0%
Radian Corporation	1.2	.0	.7	0	.9%	.0%	2.1%	.0%
Genrad	.7	.1	.5	6	.5%	.2%	1.4%	.3%
LSI Logic	.7	.1	.5	2	.5%	.1%	1.5%	.1%
Accugraph	.5	.3	.2	14	.4%	.4%	.6%	.6%
Solbourne	.4	.4	.0	32	.3%	.6%	.0%	1.3%
Laser-Scan	.4	.1	.2	1	.3%	.1%	.6%	.1%
Analogy	.4	.0	.4	0	.3%	.0%	1.0%	.0%
VLSI Technology	.3	.0	.3	1	.2%	.0%	.8%	.0%
Dynamic Graphics	.3	.0	.3	0	.2%	.0%	.8%	.0%
Unisys	.3	.2	.1	5	.2%	.2%	.3%	.2%
Royal Digital Systems	.3	.0	.2	0	.2%	.0%	.7%	.0%
Synercom	.3	.0	.1	0	.2%	.0%	.4%	.0%
Clemessy	.2	.2	.0	0	.2%	.3%	.1%	.0%
MacNeal-Schwendler	.2	.0	.2	0	.2%	.0%	.6%	.0%
Zuken	.2	.1	.1	1	.2%	.1%	.3%	.1%
Autodesk	.2	.0	.2	0	.1%	.0%	.6%	.0%
ISICAD	.2	.1	.1	2	.1%	.1%	.1%	.1%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 18 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Technical Workstation
REGION: Rest of World
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
Company	Revenue	Revenue	Revenue	Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Sigma Design	.2	.0	.2	0	.1%	.0%	.5%	.0%
ERDAS	.1	.0	.1	1	.1%	.0%	.3%	.0%
EEsof	.1	.0	.1	0	.1%	.0%	.3%	.0%
DCA Softdesk	.1	.0	.1	0	.1%	.0%	.3%	.0%
Geographic Systems (IIS)	.1	.0	.1	0	.1%	.0%	.3%	.0%
Star Informatic	.1	.0	.0	0	.1%	.1%	.1%	.0%
Geographic Systems (WPS)	.1	.0	.1	0	.1%	.0%	.2%	.0%
Data I/O	.1	.0	.1	0	.1%	.0%	.2%	.0%
Geobased Systems	.1	.0	.1	1	.1%	.0%	.2%	.1%
Georgia Tech Research Corp.	.1	.0	.1	0	.1%	.0%	.2%	.0%
Simulation Science	.1	.0	.1	0	.1%	.0%	.2%	.0%
Teradyne	.1	.0	.1	0	.1%	.0%	.2%	.0%
Computer-Aided Design Group	.1	.0	.0	0	.0%	.0%	.1%	.0%
ETAK	.1	.0	.1	0	.0%	.0%	.1%	.0%
FEA Limited	.1	.0	.0	1	.0%	.0%	.0%	.0%
Terr-Mar	.0	.0	.0	0	.0%	.0%	.1%	.0%
CADMATIC	.0	.0	.0	0	.0%	.0%	.1%	.0%
Whessoe Computing Systems	.0	.0	.0	0	.0%	.0%	.1%	.0%
Xilinx	.0	.0	.0	0	.0%	.0%	.1%	.0%
ACTEL	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	131.2	69.9	33.4	2,371	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	126.3	68.0	31.1	2,313	96.2%	97.3%	93.1%	97.6%
All Asian-Based Companies	.2	.1	.1	1	.2%	.1%	.3%	.1%
All European-Based Companies	4.8	1.8	2.2	57	3.6%	2.6%	6.6%	2.4%
All Hardware Companies	17.8	14.6	.0	996	13.6%	20.8%	.0%	42.0%
All Turnkey & SW Companies	113.4	55.3	33.4	1,375	86.4%	79.2%	100.0%	58.0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 19
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Rest of World
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	42.3	25.4	9.3	503	38.9%	35.5%	53.8%	31.2%
Digital	21.1	15.4	.0	0	19.3%	21.5%	.0%	.0%
Intergraph	8.4	4.2	1.3	75	7.7%	5.8%	7.7%	4.7%
GeoVision Corp.	3.1	2.2	.7	25	2.8%	3.1%	3.8%	1.5%
Control Data	2.0	.9	.2	11	1.8%	1.3%	1.3%	.7%
McDonnell Douglas	1.5	.8	.5	22	1.3%	1.0%	2.8%	1.4%
Sun	1.3	1.1	.0	50	1.2%	1.5%	.0%	3.1%
Computervision	1.0	.3	.2	6	.9%	.4%	1.3%	.4%
Geographic Systems (IIS)	.9	.0	.8	0	.8%	.0%	4.6%	.0%
Geographic Systems (WPS)	.8	.0	.8	0	.8%	.0%	4.3%	.0%
MacNeal-Schwendler	.8	.0	.8	0	.7%	.0%	4.5%	.0%
ESRI	.7	.0	.6	0	.7%	.0%	3.7%	.0%
ABB Engineering Automation	.7	.0	.7	0	.6%	.0%	4.0%	.0%
Solbourne	.5	.5	.0	39	.5%	.7%	.0%	2.4%
Newlett-Packard	.5	.4	.0	24	.4%	.5%	.0%	1.5%
Computer-Aided Design Group	.2	.0	.2	0	.2%	.0%	.9%	.0%
SDRC	.2	.0	.2	0	.2%	.0%	1.2%	.0%
Radian Corporation	.2	.0	.1	0	.2%	.0%	.7%	.0%
Siemens	.2	.1	.1	3	.2%	.1%	.4%	.2%
Synercom	.2	.0	.1	0	.1%	.0%	.4%	.0%
Georgia Tech Research Corp.	.1	.0	.1	0	.1%	.0%	.8%	.0%
Dynamic Graphics	.1	.0	.1	0	.1%	.0%	.5%	.0%
Secagraphics	.1	.1	.0	2	.1%	.1%	.2%	.1%
Unisys	.1	.0	.0	1	.1%	.1%	.2%	.1%
ETAK	.1	.0	.1	0	.1%	.0%	.4%	.0%
Genrad	.1	.0	.1	1	.1%	.0%	.3%	.1%
Teradyne	.1	.0	.1	0	.1%	.0%	.3%	.0%
LSI Logic	.1	.0	.1	0	.1%	.0%	.3%	.0%
Clemessy	.1	.0	.0	0	.1%	.1%	.1%	.0%
Whessoe Computing Systems	.1	.0	.1	0	.1%	.0%	.3%	.0%
VLSI Technology	.1	.0	.0	0	.0%	.0%	.2%	.0%
Engineering Systems Corp.	.0	.0	.0	0	.0%	.0%	.2%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 19 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Host/Server
REGION: Rest of World
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Laser-Scan	.0	.0	.0	0	.0%	.0%	.1%	.0%
Data I/O	.0	.0	.0	0	.0%	.0%	.2%	.0%
Analogy	.0	.0	.0	0	.0%	.0%	.1%	.0%
Fides Industrielle Automation	.0	.0	.0	0	.0%	.0%	.1%	.0%
Accugraph	.0	.0	.0	0	.0%	.0%	.0%	.0%
EEsof	.0	.0	.0	0	.0%	.0%	.1%	.0%
FEA Limited	.0	.0	.0	0	.0%	.0%	.0%	.0%
Hochtief	.0	.0	.0	0	.0%	.0%	.1%	.0%
Zuken	.0	.0	.0	0	.0%	.0%	.1%	.0%
Other Companies	21.4	20.3	.0	846	19.7%	28.4%	.0%	52.6%
All Companies	108.9	71.6	17.3	1,609	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	107.8	71.4	16.5	1,605	98.9%	99.8%	95.1%	99.8%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.1%	.0%
All European-Based Companies	1.1	.1	.8	4	1.0%	.2%	4.8%	.2%
All Hardware Companies	45.1	37.9	.0	961	41.4%	52.9%	.0%	59.7%
All Turnkey & SW Companies	63.8	33.7	17.3	648	58.6%	47.1%	100.0%	40.3%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 20
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Rest of World
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	12.6	12.6	.0	2,102	22.5%	35.8%	.0%	28.3%
IBM	10.4	9.9	.0	2,333	18.6%	28.1%	.0%	31.4%
Apple Computer	2.2	1.9	.0	420	3.9%	5.5%	.0%	5.6%
Autodesk	2.2	.0	2.2	0	3.9%	.0%	11.7%	.0%
Orcad	1.8	.0	1.8	0	3.3%	.0%	9.9%	.0%
Intergraph	1.8	.0	1.7	0	3.2%	.0%	9.0%	.0%
Claris	1.6	.0	1.6	0	2.9%	.0%	8.8%	.0%
Hewlett-Packard	1.4	1.1	.0	210	2.4%	3.1%	.0%	2.8%
Engineering Mechanics	1.3	.5	.8	111	2.3%	1.3%	4.0%	1.5%
Vero International Software	1.0	.0	.9	0	1.7%	.0%	4.7%	.0%
International Software Systems	.9	.0	.9	0	1.7%	.0%	5.0%	.0%
Genasys II	.8	.3	.5	4	1.4%	.8%	2.5%	.1%
CNC Software	.7	.0	.7	0	1.3%	.0%	3.9%	.0%
Geobased Systems	.7	.1	.5	15	1.2%	.4%	2.7%	.2%
MapInfo	.7	.0	.5	0	1.2%	.0%	2.9%	.0%
Strategic Mapping	.7	.0	.7	0	1.2%	.0%	3.5%	.0%
Radian Corporation	.6	.0	.4	0	1.0%	.0%	1.9%	.0%
Computervision	.5	.0	.5	0	.9%	.0%	2.7%	.0%
Altera	.5	.0	.4	0	.9%	.0%	2.3%	.0%
Data I/O	.4	.0	.4	0	.8%	.0%	2.3%	.0%
ETAK	.4	.0	.4	1	.7%	.1%	1.9%	.0%
DCA Softdesk	.3	.0	.3	0	.5%	.0%	1.6%	.0%
Xilinx	.3	.0	.3	0	.5%	.0%	1.5%	.0%
CADWorks	.2	.0	.2	0	.4%	.0%	1.0%	.0%
Whessoe Computing Systems	.2	.0	.2	0	.4%	.0%	1.2%	.0%
Superdraft	.2	.1	.1	12	.4%	.3%	.5%	.2%
Hochtief	.2	.0	.1	2	.4%	.1%	.8%	.0%
ESRI	.2	.0	.2	0	.3%	.0%	1.0%	.0%
Investronica SA	.2	.2	.0	8	.3%	.4%	.1%	.1%
Aura CAD/CAM Systems	.2	.0	.1	0	.3%	.0%	.7%	.0%
Generation 5 Technology	.2	.0	.2	0	.3%	.0%	.8%	.0%
BATISOFT	.1	.0	.1	5	.2%	.1%	.4%	.1%
Sigma Design	.1	.0	.1	0	.2%	.0%	.8%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 20
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Rest of World
UNITS: Millions of Dollars/Actual Units

					Market Share			
Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
EEsof	.1	.0	.1	0	.2%	.0%	.6%	.0%
BETRONEX	.1	.0	.1	0	.2%	.0%	.6%	.0%
LPKF	.1	.1	.0	5	.2%	.2%	.2%	.1%
CAD Software	.1	.0	.1	0	.2%	.0%	.5%	.0%
Engineering Systems Corp.	.1	.0	.1	0	.2%	.0%	.4%	.0%
Innovative Data Design	.1	.0	.1	0	.2%	.0%	.6%	.0%
Mc2 Engineering Software	.1	.0	.1	0	.2%	.0%	.6%	.0%
American Small Business Comp.	.1	.0	.1	0	.2%	.0%	.5%	.0%
Spectrum Software	.1	.0	.1	0	.2%	.0%	.5%	.0%
ACTEL	.1	.0	.1	0	.2%	.0%	.4%	.0%
ERDAS	.1	.0	.1	1	.2%	.1%	.4%	.0%
Ziegler	.1	.0	.1	0	.2%	.0%	.5%	.0%
ISICAD	.1	.0	.1	0	.1%	.0%	.4%	.0%
FEA Limited	.1	.0	.0	1	.1%	.0%	.1%	.0%
CADMATIC	.1	.0	.0	0	.1%	.0%	.2%	.0%
Facility Mapping Systems	.1	.0	.1	0	.1%	.0%	.3%	.0%
Ithaca Software	.1	.0	.1	0	.1%	.0%	.3%	.0%
Moda CAD	.1	.0	.0	1	.1%	.0%	.2%	.0%
Terr-Mar	.1	.0	.0	1	.1%	.1%	.2%	.0%
Accel Technologies	.1	.0	.0	0	.1%	.0%	.2%	.0%
Accugraph	.1	.0	.0	0	.1%	.0%	.2%	.0%
Algor Interactive Systems	.0	.0	.0	0	.1%	.0%	.2%	.0%
Caddlink	.0	.0	.0	0	.1%	.0%	.2%	.0%
Capilano Computing	.0	.0	.0	0	.1%	.0%	.2%	.0%
Masstack	.0	.0	.0	0	.1%	.0%	.2%	.0%
Pathtrace	.0	.0	.0	1	.1%	.0%	.2%	.0%
Comshoppe	.0	.0	.0	0	.1%	.0%	.2%	.0%
Kork Systems	.0	.0	.0	0	.1%	.0%	.1%	.0%
Teradyne	.0	.0	.0	0	.1%	.0%	.2%	.0%
Computer-Aided Design Group	.0	.0	.0	0	.0%	.0%	.1%	.0%
Foresight Resources	.0	.0	.0	0	.0%	.0%	.1%	.0%
Genrad	.0	.0	.0	1	.0%	.0%	.1%	.0%

(Continued)

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 20 (Continued)
TITLE: 1990 Final Market Share Estimates
APPLICATION: All Applications
PLATFORM: Personal Computer
REGION: Rest of World
UNITS: Millions of Dollars/Actual Units

	Total	Hardware	Software	Wkstns	Market Share			
	Total	Hardware	Software	Wkstns	Total	Hardware	Software	Wkstns
Company	Revenue	Revenue	Revenue	Shipped	Revenue	Revenue	Revenue	Shipped
Simulation Science	.0	.0	.0	0	.0%	.0%	.1%	.0%
Vision 3D	.0	.0	.0	0	.0%	.0%	.0%	.0%
ESDU International	.0	.0	.0	0	.0%	.0%	.1%	.0%
MacNeal-Schwendler	.0	.0	.0	0	.0%	.0%	.1%	.0%
Other Companies	8.4	8.4	.0	2,202	14.9%	23.7%	.0%	29.6%
All Companies	56.2	35.3	18.6	7,435	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	53.8	34.9	16.9	7,402	95.6%	98.9%	90.7%	99.6%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	2.5	.4	1.7	33	4.4%	1.1%	9.3%	.4%
All Hardware Companies	35.0	34.0	.0	7,267	62.2%	96.2%	.0%	97.7%
All Turnkey & SW Companies	21.2	1.3	18.6	168	37.8%	3.8%	100.0%	2.3%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

Dataquest

Dataquest Research and Sales Offices:

Dataquest Incorporated
1290 Ridder Park Drive
San Jose, California 95131-2398
Phone: (408) 437-8000
Telex: 171973
Fax: (408) 437-0292

Technology Products Group
Phone: (800) 624-3280

Dataquest Incorporated
Ledgeway/Dataquest
The Corporate Center
550 Cochituate Road
Framingham, MA 01701
Phone: (508) 370-5555
Fax: (508) 370-6262

Dataquest Incorporated
Invitational Computer Conferences Division
3151 Airway Avenue, C-2
Costa Mesa, California 92626
Phone: (714) 957-0171
Telex: 5101002189 ICCDQ
Fax: (714) 957-0903

Dataquest Australia
Suite 1, Century Plaza
80 Berry Street
North Sydney, NSW 2060
Australia
Phone: (02) 959 4544
Telex: 25468
Fax: (02) 929 0635

Dataquest GmbH
Kronstadter Strasse 9
8000 Munich 80
West Germany
Phone: 011 49 89 93 09 09 0
Fax: 49 89 930 3277

Dataquest Europe Limited
Roussel House, Broadwater Park
Denham, Uxbridge, Middx UB9 5HP
England
Phone: 0895-835050
Telex: 266195
Fax: 0895 835260/1/2

Dataquest Europe SA
Tour Gallièni 2
36, avenue du Général-de-Gaulle
93175 Bagnolet Cedex
France
Phone: (1) 48 97 31 00
Telex: 233 263
Fax: (1) 48 97 34 00

Dataquest Hong Kong
Rm. 401, Connaught Comm. Bldg.
185 Wanchai Rd.
Wanchai, Hong Kong
Phone: 8387336
Telex: 80587
Fax: 5722375

Dataquest Israel
59 Mishmar Ha'yarden Street
Tel Aviv, Israel 69865
or
P.O. Box 18198
Tel Aviv, Israel
Phone: 52 913937
Telex: 341118
Fax: 52 32865

Dataquest Japan Limited
Shinkawa Sanko Building
1-3-17 Shinkawa, Chuo-ku
Tokyo 104 Japan
Phone: (03) 5566-0411
Fax: (03) 5566-0425

Dataquest Korea
Daeheung Bldg. 1105
648-23 Yeoksam-dong
Kangnam-gu
Seoul, Korea 135
Phone: (02) 556-4166
Fax: (02) 552-2661

Dataquest Singapore
4012 Ang Mo Kio Industrial Park 1
Ave. 10, #03-10 to #03-12
Singapore 2056
Phone: 4597181
Telex: 38257
Fax: 4563129

Dataquest Taiwan
Room 801/8th Floor
Ever Spring Building
147, Sect. 2, Chien Kuo N. Rd.
Taipei, Taiwan R.O.C. 104
Phone: (02) 501-7960
Telex: 27459
Fax: (02) 505-4265

Dataquest West Germany
In der Schneithohl 17
6242 Kronberg 2
West Germany
Phone: 06173/61685
Telex: 418089
Fax: 06173/67901

0010914

Company History

Source: Dataquest

CAD/CAM/CAE

ataquest

Company History

Source: Dataquest

Published by Dataquest Incorporated

The content of this report represents our interpretation and analysis of information generally available to the public or released by knowledgeable individuals in the subject industry, but is not guaranteed as to accuracy or completeness. It does not contain material provided to us in confidence by our clients.

Printed in the United States of America. All rights reserved. No part of this publication may be reproduced, stored in retrieval systems, or transmitted, in any form or by any means—mechanical, electronic, photocopying, duplicating, microfilming, videotape, or otherwise—without the prior permission of the publisher.

© 1991 Dataquest Incorporated
June 1991

Company History

Table of Contents

Company History 1

Market Database Methodology 1

List of Tables

Table	Page
Table 1 ABB Cade International All Applications	3
Table 2 ABB Cade International Electronic CAE	4
Table 3 ABB Cade International PCB/Hybrid/MCM	5
Table 4 Accugraph All Applications	6
Table 5 Accugraph Mechanical	7
Table 6 Accugraph AEC	8
Table 7 Accugraph GIS/Mapping	9
Table 8 ADRA Systems All Applications	10
Table 9 ADRA Systems Mechanical	11
Table 10 Alias Research All Applications	12
Table 11 Alias Research Mechanical	13
Table 12 Apple Computer All Applications	14
Table 13 Apple Computer Mechanical	15
Table 14 Apple Computer AEC	16
Table 15 Apple Computer GIS/Mapping	17
Table 16 Apple Computer Electronic CAE	18
Table 17 Apple Computer PCB/Hybrid/MCM	19
Table 18 Auto-Trol All Applications	20
Table 19 Auto-Trol Mechanical	21
Table 20 Auto-Trol AEC	22
Table 21 Auto-Trol GIS/Mapping	23
Table 22 Autodesk All Applications	24
Table 23 Autodesk Mechanical	25
Table 24 Autodesk AEC	26
Table 25 Autodesk GIS/Mapping	27
Table 26 Autodesk Electronic CAE	28
Table 27 Autodesk PCB/Hybrid/MCM	29
Table 28 CADAM All Applications	30
Table 29 CADAM Mechanical	31
Table 30 CADAM AEC	32
Table 31 CADAM PCB/Hybrid/MCM	33
Table 32 Cadence All Applications	34
Table 33 Cadence Electronic CAE	35
Table 34 Cadence IC Layout	36
Table 35 Cadence PCB/Hybrid/MCM	37
Table 36 CADIX All Applications	38
Table 37 CADIX Mechanical	39
Table 38 CADIX GIS/Mapping	40
Table 39 CADIX PCB/Hybrid/MCM	41
Table 40 CADKEY All Applications	42
Table 41 CADKEY Mechanical	43
Table 42 CADKEY AEC	44
Table 43 Calay All Applications	45
Table 44 Calay Electronic CAE	46
Table 45 Calay PCB/Hybrid/MCM	47
Table 46 Century Research Center All Applications	48
Table 47 Century Research Center Mechanical	49
Table 48 Century Research Center AEC	50
Table 49 Century Research Center GIS/Mapping	51
Table 50 Century Research Center Electronic CAE	52
Table 51 Century Research Center PCB/Hybrid/MCM	53
Table 52 Cimatron All Applications	54
Table 53 Cimatron Mechanical	55
Table 54 Cimlinc All Applications	56
Table 55 Cimlinc Mechanical	57
Table 56 Cisigraph All Applications	58
Table 57 Cisigraph Mechanical	59
Table 58 Compaq All Applications	60
Table 59 Compaq Mechanical	61
Table 60 Compaq AEC	62
Table 61 Compaq GIS/Mapping	63
Table 62 Compaq Electronic CAE	64
Table 63 Compaq PCB/Hybrid/MCM	65
Table 64 Computervision All Applications	66

Table	Page
Table 65 Computervision Mechanical	67
Table 66 Computervision AEC	68
Table 67 Computervision GIS/Mapping	69
Table 68 Computervision Electronic CAE	70
Table 69 Computervision PCB/Hybrid/MCM	71
Table 70 Control Data All Applications	72
Table 71 Control Data Mechanical	73
Table 72 Control Data AEC	74
Table 73 Control Data GIS/Mapping	75
Table 74 Dazix All Applications	76
Table 75 Dazix Electronic CAE	77
Table 76 Dazix PCB/Hybrid/MCM	78
Table 77 Delcam International All Applications	79
Table 78 Delcam International Mechanical	80
Table 79 Dell Computer All Applications	81
Table 80 Dell Computer Mechanical	82
Table 81 Dell Computer AEC	83
Table 82 Dell Computer GIS/Mapping	84
Table 83 Dell Computer Electronic CAE	85
Table 84 Dell Computer PCB/Hybrid/MCM	86
Table 85 Digital All Applications	87
Table 86 Digital Mechanical	88
Table 87 Digital AEC	89
Table 88 Digital GIS/Mapping	90
Table 89 Digital Electronic CAE	91
Table 90 Digital IC Layout	92
Table 91 Digital PCB/Hybrid/MCM	93
Table 92 EEsof All Applications	94
Table 93 EEsof Electronic CAE	95
Table 94 ESRI All Applications	96
Table 95 ESRI GIS/Mapping	97
Table 96 Everex Systems All Applications	98
Table 97 Everex Systems Mechanical	99
Table 98 Everex Systems AEC	100
Table 99 Everex Systems GIS/Mapping	101
Table 100 Everex Systems Electronic CAE	102
Table 101 Everex Systems IC Layout	103
Table 102 Everex Systems PCB/Hybrid/MCM	104
Table 103 Ferranti All Applications	105
Table 104 Ferranti Mechanical	106
Table 105 Fujitsu All Applications	107
Table 106 Fujitsu Mechanical	108
Table 107 Fujitsu AEC	109
Table 108 Fujitsu GIS/Mapping	110
Table 109 Fujitsu Electronic CAE	111
Table 110 Fujitsu IC Layout	112
Table 111 Fujitsu PCB/Hybrid/MCM	113
Table 112 GeoVision Corp. All Applications	114
Table 113 GeoVision Corp. GIS/Mapping	115
Table 114 Gerber Systems All Applications	116
Table 115 Gerber Systems Mechanical	117
Table 116 Hahn & Kolb All Applications	118
Table 117 Hahn & Kolb Mechanical	119
Table 118 Hakuto All Applications	120
Table 119 Hakuto Mechanical	121
Table 120 Hewlett-Packard All Applications	122
Table 121 Hewlett-Packard Mechanical	123
Table 122 Hewlett-Packard AEC	124
Table 123 Hewlett-Packard GIS/Mapping	125
Table 124 Hewlett-Packard Electronic CAE	126
Table 125 Hewlett-Packard IC Layout	127
Table 126 Hewlett-Packard PCB/Hybrid/MCM	128
Table 127 Hitachi All Applications	129
Table 128 Hitachi Mechanical	130
Table 129 Hitachi AEC	131
Table 130 Hitachi GIS/Mapping	132
Table 131 Hitachi PCB/Hybrid/MCM	133
Table 132 Hitachi Zosen Info Systems All Applications	134
Table 133 Hitachi Zosen Info Systems Mechanical	135
Table 134 Hitachi Zosen Info Systems AEC	136
Table 135 IBM All Applications	137
Table 136 IBM Mechanical	138
Table 137 IBM AEC	139
Table 138 IBM GIS/Mapping	140
Table 139 IBM Electronic CAE	141
Table 140 IBM PCB/Hybrid/MCM	142

©1991 Dataquest Incorporated June—Reproduction Prohibited

Table	Page
Table 141 ICL All Applications	143
Table 142 ICL Mechanical	144
Table 143 ICL GIS/Mapping	145
Table 144 ICL PCB/Hybrid/MCM	146
Table 145 Intergraph All Applications	147
Table 146 Intergraph Mechanical	148
Table 147 Intergraph AEC	149
Table 148 Intergraph GIS/Mapping	150
Table 149 Intergraph Electronic CAE	151
Table 150 Intergraph PCB/Hybrid/MCM	152
Table 151 Investronica SA All Applications	153
Table 152 Investronica SA Mechanical	154
Table 153 ISICAD All Applications	155
Table 154 ISICAD Mechanical	156
Table 155 ISICAD AEC	157
Table 156 ISYKON Software All Applications	158
Table 157 ISYKON Software Mechanical	159
Table 158 ItalCad All Applications	160
Table 159 ItalCad Mechanical	161
Table 160 ItalCad AEC	162
Table 161 ItalCad GIS/Mapping	163
Table 162 Kewill Systems All Applications	164
Table 163 Kewill Systems Mechanical	165
Table 164 Kewill Systems AEC	166
Table 165 Landmark Graphics All Applications	167
Table 166 Landmark Graphics GIS/Mapping	168
Table 167 MacNeal-Schwendler All Applications	169
Table 168 MacNeal-Schwendler Mechanical	170
Table 169 MacNeal-Schwendler Electronic CAE	171
Table 170 Mannesmann PROCAD All Applications	172
Table 171 Mannesmann PROCAD Mechanical	173
Table 172 Matra Datavision All Applications	174
Table 173 Matra Datavision Mechanical	175
Table 174 McDonnell Douglas All Applications	176
Table 175 McDonnell Douglas Mechanical	177
Table 176 McDonnell Douglas AEC	178
Table 177 McDonnell Douglas GIS/Mapping	179
Table 178 MCS All Applications	180
Table 179 MCS Mechanical	181
Table 180 Mentor Graphics All Applications	182
Table 181 Mentor Graphics Mechanical	183
Table 182 Mentor Graphics Electronic CAE	184
Table 183 Mentor Graphics IC Layout	185
Table 184 Mentor Graphics PCB/Hybrid/MCM	186
Table 185 Mitsubishi Electric All Applications	187
Table 186 Mitsubishi Electric Mechanical	188
Table 187 Mitsubishi Electric AEC	189
Table 188 Mitsubishi Electric GIS/Mapping	190
Table 189 Mitsui Engineering All Applications	191
Table 190 Mitsui Engineering Mechanical	192
Table 191 Mitsui Engineering AEC	193
Table 192 Mitsui Engineering GIS/Mapping	194
Table 193 Mutoh Industries—NO OEM All Applications	195
Table 194 Mutoh Industries—NO OEM Mechanical	196
Table 195 Mutoh Industries—NO OEM AEC	197
Table 196 Mutoh Industries—NO OEM GIS/Mapping	198
Table 197 NEC All Applications	199
Table 198 NEC Mechanical	200
Table 199 NEC AEC	201
Table 200 NEC GIS/Mapping	202
Table 201 NEC Electronic CAE	203
Table 202 NEC IC Layout	204
Table 203 NEC PCB/Hybrid/MCM	205
Table 204 Nemetschek All Applications	206
Table 205 Nemetschek AEC	207
Table 206 Nihon Unisys All Applications	208
Table 207 Nihon Unisys Mechanical	209

©1991 Dataquest Incorporated June—Reproduction Prohibited

Table	Page
Table 208 Nihon Unisys AEC	210
Table 209 Norsk Data All Applications	211
Table 210 Norsk Data Mechanical	212
Table 211 Norsk Data AEC	213
Table 212 Norsk Data GIS/Mapping	214
Table 213 PAFEC All Applications	215
Table 214 PAFEC Mechanical	216
Table 215 PAFEC AEC	217
Table 216 PAFEC GIS/Mapping	218
Table 217 Parametric Technology All Applications	219
Table 218 Parametric Technology Mechanical	220
Table 219 PDA Engineering All Applications	221
Table 220 PDA Engineering Mechanical	222
Table 221 Racal-Redac All Applications	223
Table 222 Racal-Redac Electronic CAE	224
Table 223 Racal-Redac PCB/Hybrid/MCM	225
Table 224 Schlumberger All Applications	226
Table 225 Schlumberger Mechanical	227
Table 226 Schlumberger PCB/Hybrid/MCM	228
Table 227 Scientific Calc. All Applications	229
Table 228 Scientific Calc. Electronic CAE	230
Table 229 Scientific Calc. PCB/Hybrid/MCM	231
Table 230 SDRC All Applications	232
Table 231 SDRC Mechanical	233
Table 232 Seiko Instruments—NO OEM All Applications	234
Table 233 Seiko Instruments—NO OEM IC Layout	235
Table 234 Seiko Instruments—NO OEM PCB/Hybrid/MCM	236
Table 235 Sharp System Products—NO OEM All Applications	237
Table 236 Sharp System Products—NO OEM Mechanical	238
Table 237 Sharp System Products—NO OEM PCB/Hybrid/MCM	239
Table 238 Siemens All Applications	240
Table 239 Siemens Mechanical	241
Table 240 Siemens AEC	242
Table 241 Siemens GIS/Mapping	243
Table 242 Siemens Electronic CAE	244
Table 243 Siemens PCB/Hybrid/MCM	245
Table 244 Silicon Graphics All Applications	246
Table 245 Silicon Graphics Mechanical	247
Table 246 Silicon Graphics AEC	248
Table 247 Silicon Graphics GIS/Mapping	249
Table 248 Solbourne All Applications	250
Table 249 Solbourne Mechanical	251
Table 250 Solbourne AEC	252
Table 251 Solbourne GIS/Mapping	253
Table 252 Solbourne Electronic CAE	254
Table 253 Solbourne IC Layout	255
Table 254 Solbourne PCB/Hybrid/MCM	256
Table 255 STI-Straessle All Applications	257
Table 256 STI-Straessle Mechanical	258
Table 257 STI-Straessle GIS/Mapping	259
Table 258 Sumitomo Denko Workstation All Applications	260
Table 259 Sumitomo Denko Workstation Mechanical	261
Table 260 Sumitomo Denko Workstation AEC	262
Table 261 Sun All Applications	263
Table 262 Sun Mechanical	264
Table 263 Sun AEC	265
Table 264 Sun GIS/Mapping	266
Table 265 Sun Electronic CAE	267
Table 266 Sun IC Layout	268
Table 267 Sun PCB/Hybrid/MCM	269
Table 268 Swanson Analysis All Applications	270
Table 269 Swanson Analysis Mechanical	271
Table 270 Synercom All Applications	272
Table 271 Synercom GIS/Mapping	273
Table 272 Synopsys All Applications	274
Table 273 Synopsys Electronic CAE	275
Table 274 Teradyne All Applications	276
Table 275 Teradyne Electronic CAE	277
Table 276 Tokyo Electron—NO OEM All Applications	278

©1991 Dataquest Incorporated June—Reproduction Prohibited

Table	Page
Table 277 Tokyo Electron—NO OEM Mechanical	279
Table 278 Tokyo Electron—NO OEM Electronic CAE	280
Table 279 Tokyo Electron—NO OEM PCB/Hybrid/MCM	281
Table 280 Toshiba—NO OEM All Applications	282
Table 281 Toshiba—NO OEM Mechanical	283
Table 282 Toshiba—NO OEM AEC	284
Table 283 Toshiba—NO OEM GIS/Mapping	285
Table 284 Toshiba—NO OEM PCB/Hybrid/MCM	286
Table 285 Toyo Information Systems—NO OEM All Applications	287
Table 286 Toyo Information Systems—NO OEM Mechanical	288
Table 287 Toyo Information Systems—NO OEM AEC	289
Table 288 Uchida Yoko All Applications	290
Table 289 Uchida Yoko AEC	291
Table 290 Uchida Yoko GIS/Mapping	292
Table 291 Uchida Yoko PCB/Hybrid/MCM	293
Table 292 Unisys All Applications	294
Table 293 Unisys Mechanical	295
Table 294 Valid All Applications	296
Table 295 Valid Electronic CAE	297
Table 296 Valid IC Layout	298
Table 297 Valid PCB/Hybrid/MCM	299
Table 298 Vero International Software All Applications	300
Table 299 Vero International Software Mechanical	301
Table 300 Viewlogic Systems All Applications	302
Table 301 Viewlogic Systems Electronic CAE	303
Table 302 VLSI Technology All Applications	304
Table 303 VLSI Technology Electronic CAE	305
Table 304 VLSI Technology IC Layout	306
Table 305 Wacom All Applications	307
Table 306 Wacom Mechanical	308
Table 307 Wacom Electronic CAE	309
Table 308 Wiechers Datentechnik All Applications	310
Table 309 Wiechers Datentechnik Mechanical	311
Table 310 Xilinx All Applications	312
Table 311 Xilinx Electronic CAE	313
Table 312 Ziegler All Applications	314
Table 313 Ziegler Mechanical	315
Table 314 Ziegler AEC	316
Table 315 Ziegler GIS/Mapping	317
Table 316 Ziegler Electronic CAE	318
Table 317 Ziegler PCB/Hybrid/MCM	319
Table 318 Zuken All Applications	320
Table 319 Zuken Mechanical	321
Table 320 Zuken Electronic CAE	322
Table 321 Zuken PCB/Hybrid/MCM	323
Table 322 Zycad All Applications	324
Table 323 Zycad Electronic CAE	325

©1991 Dataquest Incorporated June—Reproduction Prohibited

©1991 Dataquest Incorporated June—Reproduction Prohibited

Company History

Company History

The following is a description of the information reported in the *Company History* books:

- *Source*—Five-year historical information on all companies with more than $15 million in worldwide revenue
- Europe—Four-year historical information on all European-based companies and all other companies with more than $15 million in worldwide revenue
- Asia—Four-year historical information on all Asian-based companies and all other companies with more than $15 million in worldwide revenue

Market Database Methodology

Dataquest's CAD/CAM/CAE industry service is committed to consistently delivering to clients the most accurate data available on the CAD/CAM/CAE industry, both in terms of market history and forecast. Our annual delivery schedule is designed to meet that commitment, as follows:

- First quarter (January 31): We will provide complete preliminary market share tables for the year just completed. Historical database is opened for changes for a six-month period.
- Second quarter (March 31): We provide complete preliminary forecast tables, including a new five-year forecast period.
- Third quarter (July 1): We send complete final updated market share tables based on additional data collection and analysis over the previous six months as well as company history tables. At this point, the market share database is frozen and will not be changed until the end of the year. For the next six months, supplementary market data will be based on this final market data.
- Fourth quarter (October 1): We provide complete final forecast tables, taking into consideration changes in the market during the previous six months.

Since January, when the preliminary market share numbers were published, over 35 new companies have been added to the market share database. This brings the total number of companies recognized in the CAD/CAM/CAE market to 430. The market share numbers also have been rechecked and verified for all vendors worldwide. Year-end 1990 financial results released this past spring have also been checked and incorporated into the final numbers.

Additionally, a number of companies significantly improved or made changes to their reporting methods during this past update cycle. These changes have been incorporated into this update. Dataquest's policy is to continually update its market information for any year, based on any new data received, in order to arrive at the most accurate market representation possible.

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 1
TITLE: Company History
COMPANY: ABB Cade International
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	6.9	8.0	13.6	15.2	NA
CPU Shipments	NA	20	23	53	66	NA
Workstation Shipments	NA	20	23	53	66	NA
Workstations Shipped To-Date	NA	20	43	96	162	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	6.9	8.0	13.6	15.2	NA
CPU Shipments	NA	20	23	53	66	NA
Workstation Shipments	NA	20	23	53	66	NA
Workstations Shipped To-Date	NA	20	43	96	162	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	6.9	8.0	13.6	15.2	NA
CPU Shipments	NA	20	23	53	66	NA
Workstation Shipments	NA	20	23	53	66	NA
Workstations Shipped To-Date	NA	20	43	96	162	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 2
TITLE: Company History
COMPANY: ABB Cade International
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	9.5	10.6	NA
CPU Shipments	NA	NA	NA	37	46	NA
Workstation Shipments	NA	NA	NA	37	46	NA
Workstations Shipped To-Date	NA	NA	NA	37	83	NA
North America						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Europe						
Total Revenue	NA	NA	NA	9.5	10.6	NA
CPU Shipments	NA	NA	NA	37	46	NA
Workstation Shipments	NA	NA	NA	37	46	NA
Workstations Shipped To-Date	NA	NA	NA	37	83	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	9.5	10.6	NA
CPU Shipments	NA	NA	NA	37	46	NA
Workstation Shipments	NA	NA	NA	37	46	NA
Workstations Shipped To-Date	NA	NA	NA	37	83	NA
Host/Server						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 3
TITLE: Company History
COMPANY: ABB Cade International
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	4.1	5.1	4.1	4.6	NA
CPU Shipments	NA	8	9	16	20	NA
Workstation Shipments	NA	8	9	16	20	NA
Workstations Shipped To-Date	NA	8	17	33	53	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	4.1	5.1	4.1	4.6	NA
CPU Shipments	NA	8	9	16	20	NA
Workstation Shipments	NA	8	9	16	20	NA
Workstations Shipped To-Date	NA	8	17	33	53	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	4.1	5.1	4.1	4.6	NA
CPU Shipments	NA	8	9	16	20	NA
Workstation Shipments	NA	8	9	16	20	NA
Workstations Shipped To-Date	NA	8	17	33	53	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 4
TITLE: Company History
COMPANY: Accugraph
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.8	10.4	14.0	15.5	19.4	22%
CPU Shipments	60	256	361	383	489	69%
Workstation Shipments	66	320	379	450	500	66%
Workstations Shipped To-Date	66	386	765	1,215	1,715	126%
North America						
Total Revenue	8.3	9.8	13.3	14.0	17.5	21%
CPU Shipments	57	239	343	345	440	67%
Workstation Shipments	62	299	360	405	450	64%
Workstations Shipped To-Date	62	361	721	1,126	1,576	124%
Europe						
Total Revenue	.1	.6	.7	1.1	1.0	110%
CPU Shipments	0	16	18	27	24	200%
Workstation Shipments	0	20	19	32	25	195%
Workstations Shipped To-Date	0	21	40	71	96	313%
Asia						
Total Revenue	.4	.0	.0	.5	.4	-4%
CPU Shipments	3	1	0	11	10	34%
Workstation Shipments	3	1	0	13	10	32%
Workstations Shipped To-Date	3	4	4	18	28	71%
Rest of World						
Total Revenue	.0	.0	.0	.0	.6	NA
CPU Shipments	0	0	0	0	15	NA
Workstation Shipments	0	0	0	0	15	NA
Workstations Shipped To-Date	0	0	0	0	15	NA
Technical Workstation						
Total Revenue	.0	7.9	11.4	13.2	17.3	NA
CPU Shipments	0	173	308	326	479	NA
Workstation Shipments	0	173	308	326	479	NA
Workstations Shipped To-Date	0	173	481	807	1,286	NA
Host/Server						
Total Revenue	1.6	1.3	1.3	.8	.2	-40%
CPU Shipments	2	32	7	19	3	12%
Workstation Shipments	8	96	25	86	14	16%
Workstations Shipped To-Date	8	103	128	214	228	133%
Personal Computer						
Total Revenue	7.2	1.3	1.3	1.5	1.9	-28%
CPU Shipments	58	52	46	38	7	-42%
Workstation Shipments	58	52	46	38	7	-42%
Workstations Shipped To-Date	58	110	156	194	201	36%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 5
TITLE: Company History
COMPANY: Accugraph
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.8	3.5	4.2	3.6	1.4	-37%
CPU Shipments	60	97	112	88	34	-13%
Workstation Shipments	66	119	119	104	35	-15%
Workstations Shipped To-Date	66	185	304	407	442	61%
North America						
Total Revenue	8.3	2.8	3.5	3.2	1.2	-38%
CPU Shipments	57	79	95	79	31	-14%
Workstation Shipments	62	98	100	93	32	-16%
Workstations Shipped To-Date	62	160	260	353	384	58%
Europe						
Total Revenue	.1	.6	.7	.2	.1	9%
CPU Shipments	0	16	18	6	2	55%
Workstation Shipments	0	20	19	7	2	52%
Workstations Shipped To-Date	0	21	40	47	49	248%
Asia						
Total Revenue	.4	.0	.0	.1	.0	-54%
CPU Shipments	3	1	0	3	1	-31%
Workstation Shipments	3	1	0	3	1	-32%
Workstations Shipped To-Date	3	4	4	8	8	26%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	1	NA
Workstation Shipments	0	0	0	0	1	NA
Workstations Shipped To-Date	0	0	0	0	1	NA
Technical Workstation						
Total Revenue	.0	2.0	2.6	3.0	1.2	NA
CPU Shipments	0	43	71	75	34	NA
Workstation Shipments	0	43	71	75	34	NA
Workstations Shipped To-Date	0	43	114	189	222	NA
Host/Server						
Total Revenue	1.6	.5	.5	.2	.0	-72%
CPU Shipments	2	11	2	4	0	-42%
Workstation Shipments	8	33	8	20	1	-40%
Workstations Shipped To-Date	8	41	49	69	70	74%
Personal Computer						
Total Revenue	7.2	1.0	1.1	.4	.1	-63%
CPU Shipments	58	43	39	9	0	-70%
Workstation Shipments	58	43	39	9	0	-70%
Workstations Shipped To-Date	58	101	140	149	150	27%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 6
TITLE: Company History
COMPANY: Accugraph
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	7.0	9.8	11.6	17.5	NA
CPU Shipments	NA	159	249	287	440	NA
Workstation Shipments	NA	201	260	337	450	NA
Workstations Shipped To-Date	NA	201	461	799	1,249	NA
North America						
Total Revenue	NA	7.0	9.8	10.5	15.7	NA
CPU Shipments	NA	159	249	259	396	NA
Workstation Shipments	NA	201	260	304	405	NA
Workstations Shipped To-Date	NA	201	461	765	1,170	NA
Europe						
Total Revenue	NA	.0	.0	.8	.9	NA
CPU Shipments	NA	0	0	20	22	NA
Workstation Shipments	NA	0	0	24	23	NA
Workstations Shipped To-Date	NA	0	0	24	46	NA
Asia						
Total Revenue	NA	.0	.0	.4	.3	NA
CPU Shipments	NA	0	0	9	9	NA
Workstation Shipments	NA	0	0	10	9	NA
Workstations Shipped To-Date	NA	0	0	10	19	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.5	NA
CPU Shipments	NA	0	0	0	13	NA
Workstation Shipments	NA	0	0	0	14	NA
Workstations Shipped To-Date	NA	0	0	0	14	NA
Technical Workstation						
Total Revenue	NA	5.9	8.7	9.9	15.5	NA
CPU Shipments	NA	130	237	244	431	NA
Workstation Shipments	NA	130	237	244	431	NA
Workstations Shipped To-Date	NA	130	367	612	1,043	NA
Host/Server						
Total Revenue	NA	.8	.9	.6	.2	NA
CPU Shipments	NA	21	5	14	3	NA
Workstation Shipments	NA	62	16	65	12	NA
Workstations Shipped To-Date	NA	62	78	143	156	NA
Personal Computer						
Total Revenue	NA	.2	.2	1.2	1.7	NA
CPU Shipments	NA	9	7	29	6	NA
Workstation Shipments	NA	9	7	29	6	NA
Workstations Shipped To-Date	NA	9	15	44	50	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 7
TITLE: Company History
COMPANY: Accugraph
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	.3	.6	NA
CPU Shipments	NA	NA	NA	8	15	NA
Workstation Shipments	NA	NA	NA	9	15	NA
Workstations Shipped To-Date	NA	NA	NA	9	24	NA
North America						
Total Revenue	NA	NA	NA	.3	.5	NA
CPU Shipments	NA	NA	NA	7	13	NA
Workstation Shipments	NA	NA	NA	8	14	NA
Workstations Shipped To-Date	NA	NA	NA	8	22	NA
Europe						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	1	1	NA
Workstation Shipments	NA	NA	NA	1	1	NA
Workstations Shipped To-Date	NA	NA	NA	1	1	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	1	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	.3	.5	NA
CPU Shipments	NA	NA	NA	7	14	NA
Workstation Shipments	NA	NA	NA	7	14	NA
Workstations Shipped To-Date	NA	NA	NA	7	21	NA
Host/Server						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	2	0	NA
Workstations Shipped To-Date	NA	NA	NA	2	2	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.1	NA
CPU Shipments	NA	NA	NA	1	0	NA
Workstation Shipments	NA	NA	NA	1	0	NA
Workstations Shipped To-Date	NA	NA	NA	1	1	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 8
TITLE: Company History
COMPANY: ADRA Systems
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	9.6	12.0	15.0	18.0	NA
CPU Shipments	NA	153	205	267	320	NA
Workstation Shipments	NA	153	205	267	320	NA
Workstations Shipped To-Date	NA	153	358	625	945	NA
North America						
Total Revenue	NA	6.2	7.8	9.8	11.7	NA
CPU Shipments	NA	99	133	174	208	NA
Workstation Shipments	NA	99	133	174	208	NA
Workstations Shipped To-Date	NA	99	233	406	614	NA
Europe						
Total Revenue	NA	1.3	1.7	2.1	2.5	NA
CPU Shipments	NA	21	29	37	45	NA
Workstation Shipments	NA	21	29	37	45	NA
Workstations Shipped To-Date	NA	21	50	88	132	NA
Asia						
Total Revenue	NA	2.0	2.5	3.2	3.8	NA
CPU Shipments	NA	32	43	56	67	NA
Workstation Shipments	NA	32	43	56	67	NA
Workstations Shipped To-Date	NA	32	75	131	198	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	7.4	9.2	11.6	13.9	NA
CPU Shipments	NA	153	205	267	320	NA
Workstation Shipments	NA	153	205	267	320	NA
Workstations Shipped To-Date	NA	153	358	625	945	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	2.2	2.8	3.4	4.1	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 9
TITLE: Company History
COMPANY: ADRA Systems
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	9.6	12.0	15.0	18.0	NA
CPU Shipments	NA	153	205	267	320	NA
Workstation Shipments	NA	153	205	267	320	NA
Workstations Shipped To-Date	NA	153	358	625	945	NA
North America						
Total Revenue	NA	6.2	7.8	9.8	11.7	NA
CPU Shipments	NA	99	133	174	208	NA
Workstation Shipments	NA	99	133	174	208	NA
Workstations Shipped To-Date	NA	99	233	406	614	NA
Europe						
Total Revenue	NA	1.3	1.7	2.1	2.5	NA
CPU Shipments	NA	21	29	37	45	NA
Workstation Shipments	NA	21	29	37	45	NA
Workstations Shipped To-Date	NA	21	50	88	132	NA
Asia						
Total Revenue	NA	2.0	2.5	3.2	3.8	NA
CPU Shipments	NA	32	43	56	67	NA
Workstation Shipments	NA	32	43	56	67	NA
Workstations Shipped To-Date	NA	32	75	131	198	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	7.4	9.2	11.6	13.9	NA
CPU Shipments	NA	153	205	267	320	NA
Workstation Shipments	NA	153	205	267	320	NA
Workstations Shipped To-Date	NA	153	358	625	945	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	2.2	2.8	3.4	4.1	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 10
TITLE: Company History
COMPANY: Alias Research
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	8.5	9.6	12.0	22.8	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
North America						
Total Revenue	NA	5.5	6.2	7.8	14.8	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	2.1	2.4	3.0	5.7	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	.9	1.0	1.2	2.3	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	8.5	9.6	12.0	22.8	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 11
TITLE: Company History
COMPANY: Alias Research
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	8.5	9.6	12.0	22.8	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
North America						
Total Revenue	NA	5.5	6.2	7.8	14.8	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	2.1	2.4	3.0	5.7	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	.9	1.0	1.2	2.3	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	8.5	9.6	12.0	22.8	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 12
TITLE: Company History
COMPANY: Apple Computer
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	44.0	88.0	150.0	208.0	218.4	49%
CPU Shipments	15,796	31,592	35,000	40,000	42,000	28%
Workstation Shipments	15,796	31,592	35,000	40,000	42,000	28%
Workstations Shipped To-Date	15,796	47,388	82,388	122,388	164,388	80%
North America						
Total Revenue	32.1	64.3	112.7	147.7	133.2	43%
CPU Shipments	11,531	23,062	26,292	28,400	25,620	22%
Workstation Shipments	11,531	23,062	26,292	28,400	25,620	22%
Workstations Shipped To-Date	11,531	34,593	60,885	89,285	114,905	78%
Europe						
Total Revenue	7.5	15.0	23.5	49.9	59.0	68%
CPU Shipments	2,685	5,371	5,471	9,600	11,340	43%
Workstation Shipments	2,685	5,371	5,471	9,600	11,340	43%
Workstations Shipped To-Date	2,685	8,056	13,526	23,127	34,466	89%
Asia						
Total Revenue	3.1	6.2	11.5	8.3	24.0	67%
CPU Shipments	1,106	2,211	2,671	1,600	4,620	43%
Workstation Shipments	1,106	2,211	2,671	1,600	4,620	43%
Workstations Shipped To-Date	1,106	3,317	5,988	7,588	12,208	82%
Rest of World						
Total Revenue	1.3	2.6	2.4	2.1	2.2	13%
CPU Shipments	474	948	567	400	420	-3%
Workstation Shipments	474	948	567	400	420	-3%
Workstations Shipped To-Date	474	1,422	1,989	2,389	2,809	56%
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	44.0	88.0	150.0	208.0	218.4	49%
CPU Shipments	15,796	31,592	35,000	40,000	42,000	28%
Workstation Shipments	15,796	31,592	35,000	40,000	42,000	28%
Workstations Shipped To-Date	15,796	47,388	82,388	122,388	164,388	80%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 13
TITLE: Company History
COMPANY: Apple Computer
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	23.3	46.6	66.0	85.3	89.6	40%
CPU Shipments	8,372	16,744	15,400	16,400	17,220	20%
Workstation Shipments	8,372	16,744	15,400	16,400	17,220	20%
Workstations Shipped To-Date	8,372	25,116	40,516	56,916	74,136	73%
North America						
Total Revenue	17.0	34.1	47.5	60.6	54.6	34%
CPU Shipments	6,111	12,223	11,088	11,644	10,504	14%
Workstation Shipments	6,111	12,223	11,088	11,644	10,504	14%
Workstations Shipped To-Date	6,111	18,334	29,422	41,066	51,571	70%
Europe						
Total Revenue	4.0	7.9	13.2	20.5	24.2	57%
CPU Shipments	1,423	2,846	3,080	3,936	4,649	34%
Workstation Shipments	1,423	2,846	3,080	3,936	4,649	34%
Workstations Shipped To-Date	1,423	4,270	7,350	11,286	15,935	83%
Asia						
Total Revenue	1.6	3.3	5.3	3.4	9.9	57%
CPU Shipments	586	1,172	1,232	656	1,894	34%
Workstation Shipments	586	1,172	1,232	656	1,894	34%
Workstations Shipped To-Date	586	1,758	2,990	3,646	5,540	75%
Rest of World						
Total Revenue	.7	1.4	.0	.9	.9	6%
CPU Shipments	251	502	0	164	172	-9%
Workstation Shipments	251	502	0	164	172	-9%
Workstations Shipped To-Date	251	753	753	917	1,090	44%
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	23.3	46.6	66.0	85.3	89.6	40%
CPU Shipments	8,372	16,744	15,400	16,400	17,220	20%
Workstation Shipments	8,372	16,744	15,400	16,400	17,220	20%
Workstations Shipped To-Date	8,372	25,116	40,516	56,916	74,136	73%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 14
TITLE: Company History
COMPANY: Apple Computer
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	9.7	31.7	55.5	83.2	87.4	73%
CPU Shipments	3,475	11,373	12,950	16,000	16,800	48%
Workstation Shipments	3,475	11,373	12,950	16,000	16,800	48%
Workstations Shipped To-Date	3,475	14,848	27,798	43,798	60,598	104%
North America						
Total Revenue	7.1	23.1	43.9	59.1	53.3	66%
CPU Shipments	2,537	8,302	10,231	11,360	10,248	42%
Workstation Shipments	2,537	8,302	10,231	11,360	10,248	42%
Workstations Shipped To-Date	2,537	10,839	21,070	32,430	42,678	103%
Europe						
Total Revenue	1.7	5.4	5.6	20.0	23.6	94%
CPU Shipments	591	1,933	1,295	3,840	4,536	66%
Workstation Shipments	591	1,933	1,295	3,840	4,536	66%
Workstations Shipped To-Date	591	2,524	3,819	7,659	12,195	113%
Asia						
Total Revenue	.7	2.2	4.4	3.3	9.6	94%
CPU Shipments	243	796	1,036	640	1,848	66%
Workstation Shipments	243	796	1,036	640	1,848	66%
Workstations Shipped To-Date	243	1,039	2,075	2,715	4,563	108%
Rest of World						
Total Revenue	.3	1.0	1.7	.8	.9	32%
CPU Shipments	104	341	389	160	168	13%
Workstation Shipments	104	341	389	160	168	13%
Workstations Shipped To-Date	104	445	834	994	1,162	83%
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	9.7	31.7	55.5	83.2	87.4	73%
CPU Shipments	3,475	11,373	12,950	16,000	16,800	48%
Workstation Shipments	3,475	11,373	12,950	16,000	16,800	48%
Workstations Shipped To-Date	3,475	14,848	27,798	43,798	60,598	104%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 15
TITLE: Company History
COMPANY: Apple Computer
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	2.2	2.6	15.0	22.9	24.0	82%
CPU Shipments	790	948	3,500	4,400	4,620	56%
Workstation Shipments	790	948	3,500	4,400	4,620	56%
Workstations Shipped To-Date	790	1,738	5,238	9,638	14,258	106%
North America						
Total Revenue	1.6	1.9	11.3	16.2	14.7	74%
CPU Shipments	577	692	2,625	3,124	2,818	49%
Workstation Shipments	577	692	2,625	3,124	2,818	49%
Workstations Shipped To-Date	577	1,268	3,893	7,017	9,836	103%
Europe						
Total Revenue	.4	.5	2.6	5.5	6.5	104%
CPU Shipments	134	161	595	1,056	1,247	75%
Workstation Shipments	134	161	595	1,056	1,247	75%
Workstations Shipped To-Date	134	295	890	1,946	3,194	121%
Asia						
Total Revenue	.2	.2	.9	.9	2.6	105%
CPU Shipments	55	66	210	176	508	74%
Workstation Shipments	55	66	210	176	508	74%
Workstations Shipped To-Date	55	122	332	508	1,016	107%
Rest of World						
Total Revenue	.1	.1	.3	.2	.2	36%
CPU Shipments	24	28	70	44	46	18%
Workstation Shipments	24	28	70	44	46	18%
Workstations Shipped To-Date	24	52	122	166	212	73%
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	2.2	2.6	15.0	22.9	24.0	82%
CPU Shipments	790	948	3,500	4,400	4,620	56%
Workstation Shipments	790	948	3,500	4,400	4,620	56%
Workstations Shipped To-Date	790	1,738	5,238	9,638	14,258	106%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 16
TITLE: Company History
COMPANY: Apple Computer
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	5.3	2.6	6.0	8.3	8.7	13%
CPU Shipments	1,896	948	1,400	1,600	1,680	-3%
Workstation Shipments	1,896	948	1,400	1,600	1,680	-3%
Workstations Shipped To-Date	1,896	2,843	4,243	5,843	7,523	41%
North America						
Total Revenue	3.9	1.9	4.7	5.9	5.3	8%
CPU Shipments	1,384	692	1,106	1,136	1,025	-7%
Workstation Shipments	1,384	692	1,106	1,136	1,025	-7%
Workstations Shipped To-Date	1,384	2,076	3,182	4,318	5,342	40%
Europe						
Total Revenue	.9	.5	.7	2.0	2.4	27%
CPU Shipments	322	161	168	384	454	9%
Workstation Shipments	322	161	168	384	454	9%
Workstations Shipped To-Date	322	483	651	1,035	1,489	47%
Asia						
Total Revenue	.4	.2	.3	.3	1.0	27%
CPU Shipments	133	66	70	64	185	9%
Workstation Shipments	133	66	70	64	185	9%
Workstations Shipped To-Date	133	199	269	333	518	41%
Rest of World						
Total Revenue	.2	.1	.2	.1	.1	-13%
CPU Shipments	57	28	56	16	17	-26%
Workstation Shipments	57	28	56	16	17	-26%
Workstations Shipped To-Date	57	85	141	157	174	32%
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	5.3	2.6	6.0	8.3	8.7	13%
CPU Shipments	1,896	948	1,400	1,600	1,680	-3%
Workstation Shipments	1,896	948	1,400	1,600	1,680	-3%
Workstations Shipped To-Date	1,896	2,843	4,243	5,843	7,523	41%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 17
TITLE: Company History
COMPANY: Apple Computer
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.5	4.4	7.5	8.3	8.7	25%
CPU Shipments	1,264	1,580	1,750	1,600	1,680	7%
Workstation Shipments	1,264	1,580	1,750	1,600	1,680	7%
Workstations Shipped To-Date	1,264	2,843	4,593	6,193	7,873	58%
North America						
Total Revenue	2.6	3.2	5.3	5.9	5.3	20%
CPU Shipments	922	1,153	1,243	1,136	1,025	3%
Workstation Shipments	922	1,153	1,243	1,136	1,025	3%
Workstations Shipped To-Date	922	2,076	3,318	4,454	5,479	56%
Europe						
Total Revenue	.6	.8	1.4	2.0	2.4	41%
CPU Shipments	215	269	333	384	454	21%
Workstation Shipments	215	269	333	384	454	21%
Workstations Shipped To-Date	215	483	816	1,200	1,653	67%
Asia						
Total Revenue	.3	.3	.5	.3	1.0	40%
CPU Shipments	88	111	123	64	185	20%
Workstation Shipments	88	111	123	64	185	20%
Workstations Shipped To-Date	88	199	322	386	570	59%
Rest of World						
Total Revenue	.1	.1	.2	.1	.1	-5%
CPU Shipments	38	47	53	16	17	-18%
Workstation Shipments	38	47	53	16	17	-18%
Workstations Shipped To-Date	38	85	138	154	171	46%
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	3.5	4.4	7.5	8.3	8.7	25%
CPU Shipments	1,264	1,580	1,750	1,600	1,680	7%
Workstation Shipments	1,264	1,580	1,750	1,600	1,680	7%
Workstations Shipped To-Date	1,264	2,843	4,593	6,193	7,873	58%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 18
TITLE: Company History
COMPANY: Auto-Trol
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	62.3	73.1	67.6	66.8	67.1	2%
CPU Shipments	702	721	698	696	789	3%
Workstation Shipments	702	724	698	696	789	3%
Workstations Shipped To-Date	3,938	4,662	5,360	6,056	6,845	15%
North America						
Total Revenue	59.1	57.9	52.3	55.4	52.1	-3%
CPU Shipments	665	553	540	577	612	-2%
Workstation Shipments	665	553	540	577	612	-2%
Workstations Shipped To-Date	3,398	3,951	4,491	5,069	5,681	14%
Europe						
Total Revenue	2.0	9.4	8.8	7.5	11.8	55%
CPU Shipments	23	112	91	78	138	56%
Workstation Shipments	23	116	91	78	138	56%
Workstations Shipped To-Date	169	285	376	454	592	37%
Asia						
Total Revenue	.6	.7	1.0	.0	3.3	52%
CPU Shipments	7	7	10	0	39	53%
Workstation Shipments	7	7	10	0	39	53%
Workstations Shipped To-Date	11	18	28	28	66	57%
Rest of World						
Total Revenue	.6	5.1	5.5	4.0	.0	-100%
CPU Shipments	7	49	57	41	0	-100%
Workstation Shipments	7	49	57	41	0	-100%
Workstations Shipped To-Date	359	408	465	506	506	9%
Technical Workstation						
Total Revenue	62.3	73.1	67.6	66.8	67.1	2%
CPU Shipments	702	719	698	696	789	3%
Workstation Shipments	702	719	698	696	789	3%
Workstations Shipped To-Date	1,729	2,448	3,146	3,842	4,631	28%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	2	0	0	0	NA
Workstation Shipments	0	6	0	0	0	NA
Workstations Shipped To-Date	2,209	2,215	2,215	2,215	2,215	0%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 19
TITLE: Company History
COMPANY: Auto-Trol
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	31.2	47.5	40.5	41.4	31.5	0%
CPU Shipments	351	468	419	432	371	1%
Workstation Shipments	351	471	419	432	371	1%
Workstations Shipped To-Date	1,029	1,500	1,919	2,351	2,721	28%
North America						
Total Revenue	29.5	37.6	31.2	32.3	21.5	-8%
CPU Shipments	332	359	322	337	253	-7%
Workstation Shipments	332	359	322	337	253	-7%
Workstations Shipped To-Date	859	1,218	1,541	1,877	2,130	25%
Europe						
Total Revenue	1.0	6.1	5.3	7.5	8.4	69%
CPU Shipments	12	73	54	78	99	71%
Workstation Shipments	12	75	54	78	99	71%
Workstations Shipped To-Date	56	132	186	264	362	59%
Asia						
Total Revenue	.3	.5	.4	.0	1.6	52%
CPU Shipments	4	5	4	0	19	53%
Workstation Shipments	4	5	4	0	19	53%
Workstations Shipped To-Date	4	8	12	12	31	73%
Rest of World						
Total Revenue	.3	3.3	3.7	1.7	.0	-100%
CPU Shipments	4	32	38	17	0	-100%
Workstation Shipments	4	32	38	17	0	-100%
Workstations Shipped To-Date	111	142	180	197	197	16%
Technical Workstation						
Total Revenue	31.2	47.5	40.5	41.4	31.5	0%
CPU Shipments	351	467	419	432	371	1%
Workstation Shipments	351	467	419	432	371	1%
Workstations Shipped To-Date	462	929	1,348	1,779	2,150	47%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	1	0	0	0	NA
Workstation Shipments	0	4	0	0	0	NA
Workstations Shipped To-Date	568	571	571	571	571	0%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 20
TITLE: Company History
COMPANY: Auto-Trol
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	31.2	25.6	27.0	25.4	31.5	0%
CPU Shipments	351	252	279	264	371	1%
Workstation Shipments	351	254	279	264	371	1%
Workstations Shipped To-Date	2,529	2,782	3,061	3,326	3,697	10%
North America						
Total Revenue	29.5	20.3	21.1	23.1	26.5	-3%
CPU Shipments	332	193	218	241	312	-2%
Workstation Shipments	332	193	218	241	312	-2%
Workstations Shipped To-Date	2,218	2,411	2,629	2,870	3,182	9%
Europe						
Total Revenue	1.0	3.3	3.5	.0	3.4	35%
CPU Shipments	12	39	36	0	39	36%
Workstation Shipments	12	41	36	0	39	36%
Workstations Shipped To-Date	113	154	190	190	229	19%
Asia						
Total Revenue	.3	.3	.5	.0	1.6	52%
CPU Shipments	4	2	6	0	19	53%
Workstation Shipments	4	2	6	0	19	53%
Workstations Shipped To-Date	8	10	16	16	35	47%
Rest of World						
Total Revenue	.3	1.8	1.9	2.3	.0	-100%
CPU Shipments	4	17	20	24	0	-100%
Workstation Shipments	4	17	20	24	0	-100%
Workstations Shipped To-Date	190	207	227	251	251	7%
Technical Workstation						
Total Revenue	31.2	25.6	27.0	25.4	31.5	0%
CPU Shipments	351	252	279	264	371	1%
Workstation Shipments	351	252	279	264	371	1%
Workstations Shipped To-Date	1,262	1,514	1,793	2,058	2,429	18%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	1	0	0	0	NA
Workstation Shipments	0	2	0	0	0	NA
Workstations Shipped To-Date	1,266	1,268	1,268	1,268	1,268	0%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 21
TITLE: Company History
COMPANY: Auto-Trol
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	NA	4.0	NA
CPU Shipments	NA	NA	NA	NA	47	NA
Workstation Shipments	NA	NA	NA	NA	47	NA
Workstations Shipped To-Date	NA	NA	NA	NA	263	NA
North America						
Total Revenue	NA	NA	NA	NA	4.0	NA
CPU Shipments	NA	NA	NA	NA	47	NA
Workstation Shipments	NA	NA	NA	NA	47	NA
Workstations Shipped To-Date	NA	NA	NA	NA	230	NA
Europe						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA
Asia						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA
Rest of World						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	34	NA
Technical Workstation						
Total Revenue	NA	NA	NA	NA	4.0	NA
CPU Shipments	NA	NA	NA	NA	47	NA
Workstation Shipments	NA	NA	NA	NA	47	NA
Workstations Shipped To-Date	NA	NA	NA	NA	52	NA
Host/Server						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	211	NA
Personal Computer						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 22
TITLE: Company History
COMPANY: Autodesk
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	47.2	77.1	117.3	178.6	237.8	50%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	30.8	50.0	70.8	99.7	126.0	42%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	10.6	21.3	38.2	56.5	80.9	66%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	3.0	5.4	7.7	20.7	28.5	76%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	2.8	.5	.7	1.7	2.4	-4%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.3	.8	5.9	12.0	19.7	182%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	46.9	76.3	111.5	166.6	218.1	47%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 23
TITLE: Company History
COMPANY: Autodesk
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	18.1	28.6	48.1	73.0	90.4	49%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	11.3	17.2	28.9	40.7	47.9	43%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	3.9	9.5	15.9	23.2	30.7	67%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	1.8	2.0	3.4	8.5	10.8	57%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	1.1	.0	.0	.7	.9	-4%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.1	.3	2.4	4.9	9.0	266%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	18.0	28.3	45.7	68.1	81.3	46%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 24
TITLE: Company History
COMPANY: Autodesk
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	24.7	28.6	46.9	73.6	104.7	43%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	16.4	17.2	28.2	41.2	55.5	36%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	5.6	9.2	15.0	23.2	35.6	59%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	1.2	2.0	3.3	8.5	12.6	80%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	1.5	.3	.5	.7	1.0	-9%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.2	.3	2.4	4.9	7.3	138%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	24.5	28.3	44.6	68.7	97.3	41%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 25
TITLE: Company History
COMPANY: Autodesk
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	2.6	5.7	10.6	16.1	23.8	73%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	1.9	3.9	7.3	9.0	12.6	62%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.6	1.5	2.7	5.1	8.1	90%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.0	.2	.4	1.9	2.9	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.2	.1	.1	.2	.2	9%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.5	1.1	1.7	202%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	2.6	5.7	10.0	15.1	22.1	70%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 26
TITLE: Company History
COMPANY: Autodesk
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	3.5	13.9	16.7	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
North America						
Total Revenue	NA	NA	.0	7.6	8.8	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	3.5	4.5	5.7	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Asia						
Total Revenue	NA	NA	.0	1.6	2.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Rest of World						
Total Revenue	NA	NA	.0	.1	.2	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	.2	1.0	1.5	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Host/Server						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Personal Computer						
Total Revenue	NA	NA	3.4	12.9	15.2	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 27
TITLE: Company History
COMPANY: Autodesk
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1.8	8.5	7.0	1.9	2.4	8%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	1.2	6.6	5.5	1.1	1.3	1%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.4	1.2	1.0	.6	.8	17%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.0	.6	.5	.2	.3	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.1	.1	.1	.0	.0	-35%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.1	.3	.1	.2	100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.8	8.4	6.7	1.8	2.2	6%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 28
TITLE: Company History
COMPANY: CADAM
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	26.9	33.1	57.5	64.8	80.2	31%
CPU Shipments	58	47	908	3,052	5,000	204%
Workstation Shipments	80	113	942	3,052	5,000	181%
Workstations Shipped To-Date	80	193	1,135	4,187	9,187	227%
North America						
Total Revenue	16.5	14.5	19.1	19.4	24.1	10%
CPU Shipments	34	18	272	916	1,500	159%
Workstation Shipments	43	44	282	916	1,500	142%
Workstations Shipped To-Date	43	87	370	1,286	2,786	183%
Europe						
Total Revenue	6.1	11.2	13.3	13.0	16.0	28%
CPU Shipments	14	14	182	610	1,000	191%
Workstation Shipments	20	34	188	610	1,000	165%
Workstations Shipped To-Date	20	54	243	853	1,853	209%
Asia						
Total Revenue	3.5	6.6	24.5	32.4	40.1	84%
CPU Shipments	9	14	454	1,526	2,500	307%
Workstation Shipments	14	34	471	1,526	2,500	264%
Workstations Shipped To-Date	14	48	519	2,045	4,545	322%
Rest of World						
Total Revenue	.9	.8	.6	.0	.0	-100%
CPU Shipments	2	0	0	0	0	-100%
Workstation Shipments	2	1	0	0	0	-100%
Workstations Shipped To-Date	2	3	3	3	3	12%
Technical Workstation						
Total Revenue	.0	.3	4.4	6.6	10.2	329%
CPU Shipments	0	1	0	0	0	-100%
Workstation Shipments	0	1	0	0	0	-100%
Workstations Shipped To-Date	0	1	1	1	1	38%
Host/Server						
Total Revenue	12.0	15.8	14.4	11.9	10.6	-3%
CPU Shipments	7	7	4	0	0	-100%
Workstation Shipments	29	73	38	0	0	-100%
Workstations Shipped To-Date	29	102	139	139	139	48%
Personal Computer						
Total Revenue	14.9	17.0	38.6	46.3	59.4	41%
CPU Shipments	51	39	904	3,052	5,000	215%
Workstation Shipments	51	39	904	3,052	5,000	215%
Workstations Shipped To-Date	51	90	994	4,046	9,046	265%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 29
TITLE: Company History
COMPANY: CADAM
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	6.6	8.7	32.3	48.6	60.1	74%
CPU Shipments	33	28	699	2,289	3,750	227%
Workstation Shipments	47	66	725	2,289	3,750	199%
Workstations Shipped To-Date	47	113	838	3,127	6,877	249%
North America						
Total Revenue	3.0	3.4	8.8	14.6	18.0	57%
CPU Shipments	15	11	210	687	1,125	195%
Workstation Shipments	21	26	218	687	1,125	170%
Workstations Shipped To-Date	21	47	264	951	2,076	215%
Europe						
Total Revenue	1.9	2.6	5.7	9.7	12.0	58%
CPU Shipments	10	8	140	458	750	198%
Workstation Shipments	14	20	145	458	750	172%
Workstations Shipped To-Date	14	33	178	636	1,386	218%
Asia						
Total Revenue	1.6	2.6	17.7	24.3	30.1	109%
CPU Shipments	8	8	349	1,144	1,875	293%
Workstation Shipments	11	20	363	1,144	1,875	260%
Workstations Shipped To-Date	11	31	394	1,538	3,413	318%
Rest of World						
Total Revenue	.1	.1	.1	.0	.0	-100%
CPU Shipments	0	0	0	0	0	-100%
Workstation Shipments	1	1	0	0	0	-100%
Workstations Shipped To-Date	1	1	1	1	1	18%
Technical Workstation						
Total Revenue	.0	.2	3.4	5.5	8.5	310%
CPU Shipments	0	0	0	0	0	-100%
Workstation Shipments	0	0	0	0	0	-100%
Workstations Shipped To-Date	0	1	1	1	1	26%
Host/Server						
Total Revenue	5.6	7.8	11.1	9.6	8.5	11%
CPU Shipments	5	4	3	0	0	-100%
Workstation Shipments	18	43	29	0	0	-100%
Workstations Shipped To-Date	18	61	90	90	90	49%
Personal Computer						
Total Revenue	1.0	.7	17.7	33.5	43.2	160%
CPU Shipments	28	23	696	2,289	3,750	241%
Workstation Shipments	28	23	696	2,289	3,750	241%
Workstations Shipped To-Date	28	51	747	3,036	6,786	295%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 30
TITLE: Company History
COMPANY: CADAM
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.3	4.2	6.3	9.7	12.1	38%
CPU Shipments	3	20	136	458	750	312%
Workstation Shipments	10	47	141	458	750	191%
Workstations Shipped To-Date	10	57	199	656	1,406	241%
North America						
Total Revenue	1.5	1.7	1.7	2.9	3.6	25%
CPU Shipments	1	8	41	137	225	272%
Workstation Shipments	5	18	42	137	225	163%
Workstations Shipped To-Date	5	23	65	203	428	209%
Europe						
Total Revenue	1.0	1.3	1.1	1.9	2.4	26%
CPU Shipments	1	6	27	92	150	275%
Workstation Shipments	3	14	28	92	150	165%
Workstations Shipped To-Date	3	17	45	137	287	212%
Asia						
Total Revenue	.8	1.3	3.4	4.9	6.0	66%
CPU Shipments	1	6	68	229	375	396%
Workstation Shipments	2	14	71	229	375	250%
Workstations Shipped To-Date	2	17	87	316	691	308%
Rest of World						
Total Revenue	.1	.0	.0	.0	.0	-100%
CPU Shipments	0	0	0	0	0	-100%
Workstation Shipments	0	0	0	0	0	-100%
Workstations Shipped To-Date	0	1	1	1	1	42%
Technical Workstation						
Total Revenue	.0	.1	.7	1.1	1.7	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	3.3	3.8	2.2	1.9	1.7	-15%
CPU Shipments	3	3	1	0	0	-100%
Workstation Shipments	10	30	6	0	0	-100%
Workstations Shipped To-Date	10	41	46	46	46	45%
Personal Computer						
Total Revenue	.0	.4	3.5	6.7	8.7	NA
CPU Shipments	0	16	136	458	750	NA
Workstation Shipments	0	16	136	458	750	NA
Workstations Shipped To-Date	0	16	152	610	1,360	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 31
TITLE: Company History
COMPANY: CADAM
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	13.8	19.8	18.9	6.5	8.0	-13%
CPU Shipments	17	0	73	305	500	134%
Workstation Shipments	17	0	75	305	500	134%
Workstations Shipped To-Date	17	17	92	397	897	171%
North America						
Total Revenue	9.4	9.3	8.6	2.0	2.4	-29%
CPU Shipments	12	0	22	92	150	86%
Workstation Shipments	12	0	23	92	150	86%
Workstations Shipped To-Date	12	12	35	127	277	117%
Europe						
Total Revenue	2.7	7.2	6.5	1.3	1.6	-12%
CPU Shipments	3	0	15	61	100	145%
Workstation Shipments	3	0	15	61	100	145%
Workstations Shipped To-Date	3	3	18	79	179	183%
Asia						
Total Revenue	1.0	2.7	3.4	3.2	4.0	40%
CPU Shipments	0	0	36	153	250	383%
Workstation Shipments	0	0	38	153	250	383%
Workstations Shipped To-Date	0	0	38	191	441	456%
Rest of World						
Total Revenue	.6	.7	.5	.0	.0	-100%
CPU Shipments	1	0	0	0	0	-100%
Workstation Shipments	1	0	0	0	0	-100%
Workstations Shipped To-Date	1	1	1	1	1	0%
Technical Workstation						
Total Revenue	.0	.0	.4	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	3.1	4.2	1.1	.4	.5	-38%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	3	0	0	NA
Workstations Shipped To-Date	0	0	3	3	3	NA
Personal Computer						
Total Revenue	10.7	15.6	17.5	6.1	7.6	-8%
CPU Shipments	17	0	72	305	500	134%
Workstation Shipments	17	0	72	305	500	134%
Workstations Shipped To-Date	17	17	89	394	894	171%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 32
TITLE: Company History
COMPANY: Cadence
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	14.7	37.9	61.7	133.1	211.2	95%
CPU Shipments	18	10	0	0	0	-100%
Workstation Shipments	18	10	0	0	0	-100%
Workstations Shipped To-Date	48	58	58	58	58	5%
North America						
Total Revenue	10.0	22.7	33.9	76.6	116.9	85%
CPU Shipments	12	5	0	0	0	-100%
Workstation Shipments	12	5	0	0	0	-100%
Workstations Shipped To-Date	36	41	41	41	41	3%
Europe						
Total Revenue	3.0	7.3	9.3	12.9	31.3	79%
CPU Shipments	5	2	0	0	0	-100%
Workstation Shipments	5	2	0	0	0	-100%
Workstations Shipped To-Date	8	10	10	10	10	6%
Asia						
Total Revenue	1.8	7.9	18.5	43.6	63.0	145%
CPU Shipments	2	3	0	0	0	-100%
Workstation Shipments	2	3	0	0	0	-100%
Workstations Shipped To-Date	5	8	8	8	8	13%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	9.0	36.8	49.4	105.6	185.9	113%
CPU Shipments	18	10	0	0	0	-100%
Workstation Shipments	18	10	0	0	0	-100%
Workstations Shipped To-Date	48	58	58	58	58	5%
Host/Server						
Total Revenue	5.7	1.1	12.3	27.5	25.3	45%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 33
TITLE: Company History
COMPANY: Cadence
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	.2	.0	9.0	49.4	86.3	335%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	.1	.0	5.0	33.9	57.0	349%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.1	.0	1.4	4.5	12.8	237%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.0	.0	2.7	11.0	16.4	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	7.2	40.9	79.2	693%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.2	.0	1.8	8.4	7.0	138%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 34
TITLE: Company History
COMPANY: Cadence
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	14.5	37.6	51.5	83.7	120.9	70%
CPU Shipments	18	10	0	0	0	-100%
Workstation Shipments	18	10	0	0	0	-100%
Workstations Shipped To-Date	48	58	58	58	58	5%
North America						
Total Revenue	9.8	22.5	28.3	42.7	56.7	55%
CPU Shipments	12	5	0	0	0	-100%
Workstation Shipments	12	5	0	0	0	-100%
Workstetions Shipped To-Date	36	41	41	41	41	3%
Europe						
Total Revenue	2.9	7.2	7.7	8.4	17.9	57%
CPU Shipments	5	2	0	0	0	-100%
Workstation Shipments	5	2	0	0	0	-100%
Workstations Shipped To-Date	8	10	10	10	10	6%
Asia						
Total Revenue	1.8	7.9	15.4	32.6	46.4	127%
CPU Shipments	2	3	0	0	0	-100%
Workstation Shipments	2	3	0	0	0	-100%
Workstations Shipped To-Date	5	8	8	8	8	13%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	9.0	36.6	41.2	64.6	103.2	84%
CPU Shipments	18	10	0	0	0	-100%
Workstation Shipments	18	10	0	0	0	-100%
Workstations Shipped To-Date	48	58	58	58	58	5%
Host/Server						
Total Revenue	5.5	1.1	10.3	19.1	17.7	34%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 35
TITLE: Company History
COMPANY: Cadence
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	.3	1.2	NA	4.1	NA
CPU Shipments	NA	0	0	NA	0	NA
Workstation Shipments	NA	0	0	NA	0	NA
Workstations Shipped To-Date	NA	0	0	NA	0	NA
North America						
Total Revenue	NA	.2	.7	NA	3.2	NA
CPU Shipments	NA	0	0	NA	0	NA
Workstation Shipments	NA	0	0	NA	0	NA
Workstations Shipped To-Date	NA	0	0	NA	0	NA
Europe						
Total Revenue	NA	.1	.2	NA	.6	NA
CPU Shipments	NA	0	0	NA	0	NA
Workstation Shipments	NA	0	0	NA	0	NA
Workstations Shipped To-Date	NA	0	0	NA	0	NA
Asia						
Total Revenue	NA	.0	.4	NA	.3	NA
CPU Shipments	NA	0	0	NA	0	NA
Workstation Shipments	NA	0	0	NA	0	NA
Workstations Shipped To-Date	NA	0	0	NA	0	NA
Rest of World						
Total Revenue	NA	.0	.0	NA	.0	NA
CPU Shipments	NA	0	0	NA	0	NA
Workstation Shipments	NA	0	0	NA	0	NA
Workstations Shipped To-Date	NA	0	0	NA	0	NA
Technical Workstation						
Total Revenue	NA	.3	1.0	NA	3.5	NA
CPU Shipments	NA	0	0	NA	0	NA
Workstation Shipments	NA	0	0	NA	0	NA
Workstations Shipped To-Date	NA	0	0	NA	0	NA
Host/Server						
Total Revenue	NA	.0	.3	NA	.6	NA
CPU Shipments	NA	0	0	NA	0	NA
Workstation Shipments	NA	0	0	NA	0	NA
Workstations Shipped To-Date	NA	0	0	NA	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	NA	.0	NA
CPU Shipments	NA	0	0	NA	0	NA
Workstation Shipments	NA	0	0	NA	0	NA
Workstations Shipped To-Date	NA	0	0	NA	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 36
TITLE: Company History
COMPANY: CADIX
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	15.2	18.0	21.6	26.9	NA
CPU Shipments	NA	100	125	150	198	NA
Workstation Shipments	NA	100	125	150	198	NA
Workstations Shipped To-Date	NA	100	225	375	573	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	15.2	18.0	21.6	26.9	NA
CPU Shipments	NA	100	125	150	198	NA
Workstation Shipments	NA	100	125	150	198	NA
Workstations Shipped To-Date	NA	100	225	375	573	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	15.2	18.0	21.6	26.9	NA
CPU Shipments	NA	100	125	150	198	NA
Workstation Shipments	NA	100	125	150	198	NA
Workstations Shipped To-Date	NA	100	225	375	573	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 37
TITLE: Company History
COMPANY: CADIX
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	1.5	1.8	2.2	2.7	NA
CPU Shipments	NA	10	13	15	20	NA
Workstation Shipments	NA	10	13	15	20	NA
Workstations Shipped To-Date	NA	10	23	38	57	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	1.5	1.8	2.2	2.7	NA
CPU Shipments	NA	10	13	15	20	NA
Workstation Shipments	NA	10	13	15	20	NA
Workstations Shipped To-Date	NA	10	23	38	57	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	1.5	1.8	2.2	2.7	NA
CPU Shipments	NA	10	13	15	20	NA
Workstation Shipments	NA	10	13	15	20	NA
Workstations Shipped To-Date	NA	10	23	38	57	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 38
TITLE: Company History
COMPANY: CADIX
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	3.0	3.6	4.3	5.4	NA
CPU Shipments	NA	20	25	30	40	NA
Workstation Shipments	NA	20	25	30	40	NA
Workstations Shipped To-Date	NA	20	45	75	115	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	3.0	3.6	4.3	5.4	NA
CPU Shipments	NA	20	25	30	40	NA
Workstation Shipments	NA	20	25	30	40	NA
Workstations Shipped To-Date	NA	20	45	75	115	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	3.0	3.6	4.3	5.4	NA
CPU Shipments	NA	20	25	30	40	NA
Workstation Shipments	NA	20	25	30	40	NA
Workstations Shipped To-Date	NA	20	45	75	115	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 39
TITLE: Company History
COMPANY: CADIX
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	10.7	12.6	15.1	18.9	NA
CPU Shipments	NA	70	88	105	139	NA
Workstation Shipments	NA	70	88	105	139	NA
Workstations Shipped To-Date	NA	70	158	263	401	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	10.7	12.6	15.1	18.9	NA
CPU Shipments	NA	70	88	105	139	NA
Workstation Shipments	NA	70	88	105	139	NA
Workstations Shipped To-Date	NA	70	158	263	401	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	10.7	12.6	15.1	18.9	NA
CPU Shipments	NA	70	88	105	139	NA
Workstation Shipments	NA	70	88	105	139	NA
Workstations Shipped To-Date	NA	70	158	263	401	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 40
TITLE: Company History
COMPANY: CADKEY
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.5	6.8	10.3	14.5	15.8	46%
CPU Shipments	0	0	0	0	150	NA
Workstation Shipments	0	0	0	0	150	NA
Workstations Shipped To-Date	0	0	0	0	150	NA
North America						
Total Revenue	2.8	5.4	8.1	14.5	13.5	48%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.5	1.0	1.8	.0	1.5	30%
CPU Shipments	0	0	0	0	150	NA
Workstation Shipments	0	0	0	0	150	NA
Workstations Shipped To-Date	0	0	0	0	150	NA
Asia						
Total Revenue	.2	.3	.4	.0	.8	45%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.1	NA
CPU Shipments	0	0	0	0	3	NA
Workstation Shipments	0	0	0	0	3	NA
Workstations Shipped To-Date	0	0	0	0	3	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.1	NA
CPU Shipments	0	0	0	0	2	NA
Workstation Shipments	0	0	0	0	2	NA
Workstations Shipped To-Date	0	0	0	0	2	NA
Personal Computer						
Total Revenue	3.5	6.8	10.3	14.5	15.6	45%
CPU Shipments	0	0	0	0	145	NA
Workstation Shipments	0	0	0	0	145	NA
Workstations Shipped To-Date	0	0	0	0	145	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 41
TITLE: Company History
COMPANY: CADKEY
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.5	6.8	10.3	13.9	15.2	44%
CPU Shipments	0	0	0	0	150	NA
Workstation Shipments	0	0	0	0	150	NA
Workstations Shipped To-Date	0	0	0	0	150	NA
North America						
Total Revenue	2.8	5.4	8.1	13.9	13.0	47%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.5	1.0	1.8	.0	1.5	30%
CPU Shipments	0	0	0	0	150	NA
Workstation Shipments	0	0	0	0	150	NA
Workstations Shipped To-Date	0	0	0	0	150	NA
Asia						
Total Revenue	.2	.3	.4	.0	.8	43%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.1	NA
CPU Shipments	0	0	0	0	3	NA
Workstation Shipments	0	0	0	0	3	NA
Workstations Shipped To-Date	0	0	0	0	3	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.1	NA
CPU Shipments	0	0	0	0	2	NA
Workstation Shipments	0	0	0	0	2	NA
Workstations Shipped To-Date	0	0	0	0	2	NA
Personal Computer						
Total Revenue	3.5	6.8	10.3	13.9	15.1	44%
CPU Shipments	0	0	0	0	145	NA
Workstation Shipments	0	0	0	0	145	NA
Workstations Shipped To-Date	0	0	0	0	145	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 42
TITLE: Company History
COMPANY: CADKEY
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	.6	.6	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
North America						
Total Revenue	NA	NA	NA	.6	.5	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Europe						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Host/Server						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Personal Computer						
Total Revenue	NA	NA	NA	.6	.6	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 43
TITLE: Company History
COMPANY: Calay
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	30.0	27.2	21.0	24.5	26.1	-3%
CPU Shipments	240	230	240	226	425	15%
Workstation Shipments	240	230	240	226	425	15%
Workstations Shipped To-Date	436	666	906	1,132	1,557	37%
North America						
Total Revenue	14.5	12.1	11.6	8.6	9.1	-11%
CPU Shipments	124	111	127	71	149	5%
Workstation Shipments	124	111	127	71	149	5%
Workstations Shipped To-Date	250	361	489	560	709	30%
Europe						
Total Revenue	13.7	13.6	9.0	13.5	14.4	1%
CPU Shipments	100	105	108	134	234	24%
Workstation Shipments	100	105	108	134	234	24%
Workstations Shipped To-Date	170	275	383	517	751	45%
Asia						
Total Revenue	1.5	1.3	.4	2.5	2.6	15%
CPU Shipments	13	12	5	20	43	35%
Workstation Shipments	13	12	5	20	43	35%
Workstations Shipped To-Date	13	24	29	49	92	64%
Rest of World						
Total Revenue	.3	.3	.0	.0	.0	-100%
CPU Shipments	3	2	0	0	0	-100%
Workstation Shipments	3	2	0	0	0	-100%
Workstations Shipped To-Date	3	5	5	5	5	17%
Technical Workstation						
Total Revenue	30.0	27.2	21.0	24.5	26.1	-3%
CPU Shipments	240	230	240	226	425	15%
Workstation Shipments	240	230	240	226	425	15%
Workstations Shipped To-Date	390	621	861	1,086	1,511	40%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	45	45	45	45	45	0%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 44
TITLE: Company History
COMPANY: Calay
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	NA	5.2	NA
CPU Shipments	NA	NA	NA	NA	85	NA
Workstation Shipments	NA	NA	NA	NA	85	NA
Workstations Shipped To-Date	NA	NA	NA	NA	85	NA
North America						
Total Revenue	NA	NA	NA	NA	1.8	NA
CPU Shipments	NA	NA	NA	NA	30	NA
Workstation Shipments	NA	NA	NA	NA	30	NA
Workstations Shipped To-Date	NA	NA	NA	NA	30	NA
Europe						
Total Revenue	NA	NA	NA	NA	2.9	NA
CPU Shipments	NA	NA	NA	NA	47	NA
Workstation Shipments	NA	NA	NA	NA	47	NA
Workstations Shipped To-Date	NA	NA	NA	NA	47	NA
Asia						
Total Revenue	NA	NA	NA	NA	.5	NA
CPU Shipments	NA	NA	NA	NA	9	NA
Workstation Shipments	NA	NA	NA	NA	9	NA
Workstations Shipped To-Date	NA	NA	NA	NA	9	NA
Rest of World						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	NA	5.2	NA
CPU Shipments	NA	NA	NA	NA	85	NA
Workstation Shipments	NA	NA	NA	NA	85	NA
Workstations Shipped To-Date	NA	NA	NA	NA	85	NA
Host/Server						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA
Personal Computer						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 45
TITLE: Company History
COMPANY: Calay
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	30.0	27.2	21.0	24.5	20.9	-9%
CPU Shipments	240	230	240	226	340	9%
Workstation Shipments	240	230	240	226	340	9%
Workstations Shipped To-Date	436	666	906	1,132	1,472	36%
North America						
Total Revenue	14.5	12.1	11.6	8.6	7.3	-16%
CPU Shipments	124	111	127	71	119	-1%
Workstation Shipments	124	111	127	71	119	-1%
Workstations Shipped To-Date	250	361	489	560	679	28%
Europe						
Total Revenue	13.7	13.6	9.0	13.5	11.5	-4%
CPU Shipments	100	105	108	134	187	17%
Workstation Shipments	100	105	108	134	187	17%
Workstations Shipped To-Date	170	275	383	517	704	43%
Asia						
Total Revenue	1.5	1.3	.4	2.5	2.1	9%
CPU Shipments	13	12	5	20	34	28%
Workstation Shipments	13	12	5	20	34	28%
Workstations Shipped To-Date	13	24	29	49	83	60%
Rest of World						
Total Revenue	.3	.3	.0	.0	.0	-100%
CPU Shipments	3	2	0	0	0	-100%
Workstation Shipments	3	2	0	0	0	-100%
Workstations Shipped To-Date	3	5	5	5	5	17%
Technical Workstation						
Total Revenue	30.0	27.2	21.0	24.5	20.9	-9%
CPU Shipments	240	230	240	226	340	9%
Workstation Shipments	240	230	240	226	340	9%
Workstations Shipped To-Date	390	621	861	1,086	1,426	38%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	45	45	45	45	45	0%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 46
TITLE: Company History
COMPANY: Century Research Center
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	7.2	10.0	10.0	13.4	17.8	25%
CPU Shipments	45	72	47	71	102	23%
Workstation Shipments	60	90	47	71	102	14%
Workstations Shipped To-Date	60	150	197	268	370	58%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	7.2	10.0	10.0	13.4	17.8	25%
CPU Shipments	45	72	47	71	102	23%
Workstation Shipments	60	90	47	71	102	14%
Workstations Shipped To-Date	60	150	197	268	370	58%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	7.0	8.5	11.8	16.5	NA
CPU Shipments	0	63	47	71	95	NA
Workstation Shipments	0	63	47	71	95	NA
Workstations Shipped To-Date	0	63	110	181	276	NA
Host/Server						
Total Revenue	5.4	3.0	1.5	1.5	1.3	-30%
CPU Shipments	5	9	0	0	7	10%
Workstation Shipments	20	27	0	0	7	-22%
Workstations Shipped To-Date	20	47	47	47	54	29%
Personal Computer						
Total Revenue	1.8	.0	.0	.0	.0	-100%
CPU Shipments	40	0	0	0	0	-100%
Workstation Shipments	40	0	0	0	0	-100%
Workstations Shipped To-Date	40	40	40	40	40	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 47
TITLE: Company History
COMPANY: Century Research Center
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	2.3	2.6	2.7	NA
CPU Shipments	NA	NA	4	6	15	NA
Workstation Shipments	NA	NA	4	6	15	NA
Workstations Shipped To-Date	NA	NA	4	10	26	NA
North America						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Asia						
Total Revenue	NA	NA	2.3	2.6	2.7	NA
CPU Shipments	NA	NA	4	6	15	NA
Workstation Shipments	NA	NA	4	6	15	NA
Workstations Shipped To-Date	NA	NA	4	10	26	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	.8	1.0	1.4	NA
CPU Shipments	NA	NA	4	6	8	NA
Workstation Shipments	NA	NA	4	6	8	NA
Workstations Shipped To-Date	NA	NA	4	10	18	NA
Host/Server						
Total Revenue	NA	NA	1.5	1.5	1.3	NA
CPU Shipments	NA	NA	0	0	7	NA
Workstation Shipments	NA	NA	0	0	7	NA
Workstations Shipped To-Date	NA	NA	0	0	7	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 48
TITLE: Company History
COMPANY: Century Research Center
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	5.4	7.0	4.6	6.5	8.5	12%
CPU Shipments	5	50	26	39	49	77%
Workstation Shipments	20	63	26	39	49	25%
Workstations Shipped To-Date	20	83	109	147	196	77%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	5.4	7.0	4.6	6.5	8.5	12%
CPU Shipments	5	50	26	39	49	77%
Workstation Shipments	20	63	26	39	49	25%
Workstations Shipped To-Date	20	83	109	147	196	77%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	4.9	4.6	6.5	8.5	NA
CPU Shipments	0	44	26	39	49	NA
Workstation Shipments	0	44	26	39	49	NA
Workstations Shipped To-Date	0	44	70	109	158	NA
Host/Server						
Total Revenue	5.4	2.1	.0	.0	.0	-100%
CPU Shipments	5	6	0	0	0	-100%
Workstation Shipments	20	19	0	0	0	-100%
Workstations Shipped To-Date	20	39	39	39	39	18%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 49
TITLE: Company History
COMPANY: Century Research Center
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	1.5	2.3	3.9	NA
CPU Shipments	NA	NA	8	14	22	NA
Workstation Shipments	NA	NA	8	14	22	NA
Workstations Shipped To-Date	NA	NA	8	22	45	NA
North America						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Asia						
Total Revenue	NA	NA	1.5	2.3	3.9	NA
CPU Shipments	NA	NA	8	14	22	NA
Workstation Shipments	NA	NA	8	14	22	NA
Workstations Shipped To-Date	NA	NA	8	22	45	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	1.5	2.3	3.9	NA
CPU Shipments	NA	NA	8	14	22	NA
Workstation Shipments	NA	NA	8	14	22	NA
Workstations Shipped To-Date	NA	NA	8	22	45	NA
Host/Server						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 50
TITLE: Company History
COMPANY: Century Research Center
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	1.0	.8	1.0	1.4	NA
CPU Shipments	NA	7	4	6	8	NA
Workstation Shipments	NA	9	4	6	8	NA
Workstations Shipped To-Date	NA	9	13	20	28	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	1.0	.8	1.0	1.4	NA
CPU Shipments	NA	7	4	6	8	NA
Workstation Shipments	NA	9	4	6	8	NA
Workstations Shipped To-Date	NA	9	13	20	28	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.7	.8	1.0	1.4	NA
CPU Shipments	NA	6	4	6	8	NA
Workstation Shipments	NA	6	4	6	8	NA
Workstations Shipped To-Date	NA	6	11	17	25	NA
Host/Server						
Total Revenue	NA	.3	.0	.0	.0	NA
CPU Shipments	NA	1	0	0	0	NA
Workstation Shipments	NA	3	0	0	0	NA
Workstations Shipped To-Date	NA	3	3	3	3	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 51
TITLE: Company History
COMPANY: Century Research Center
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1.8	2.0	.8	1.0	1.2	-9%
CPU Shipments	40	14	4	6	7	-35%
Workstation Shipments	40	18	4	6	7	-35%
Workstations Shipped To-Date	40	58	63	69	76	17%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	1.8	2.0	.8	1.0	1.2	-9%
CPU Shipments	40	14	4	6	7	-35%
Workstation Shipments	40	18	4	6	7	-35%
Workstations Shipped To-Date	40	58	63	69	76	17%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	1.4	.8	1.0	1.2	NA
CPU Shipments	0	13	4	6	7	NA
Workstation Shipments	0	13	4	6	7	NA
Workstations Shipped To-Date	0	13	17	23	30	NA
Host/Server						
Total Revenue	.0	.6	.0	.0	.0	NA
CPU Shipments	0	2	0	0	0	NA
Workstation Shipments	0	5	0	0	0	NA
Workstations Shipped To-Date	0	5	5	5	5	NA
Personal Computer						
Total Revenue	1.8	.0	.0	.0	.0	-100%
CPU Shipments	40	0	0	0	0	-100%
Workstation Shipments	40	0	0	0	0	-100%
Workstations Shipped To-Date	40	40	40	40	40	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 52
TITLE: Company History
COMPANY: Cimatron
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.8	10.7	13.3	14.4	15.9	16%
CPU Shipments	228	278	340	331	471	20%
Workstation Shipments	228	278	340	331	471	20%
Workstations Shipped To-Date	228	506	846	1,177	1,648	64%
North America						
Total Revenue	.0	.0	.0	1.6	2.4	NA
CPU Shipments	0	0	0	0	71	NA
Workstation Shipments	0	0	0	0	71	NA
Workstations Shipped To-Date	0	0	0	0	71	NA
Europe						
Total Revenue	8.8	10.7	13.3	11.1	11.6	7%
CPU Shipments	228	278	340	331	344	11%
Workstation Shipments	228	278	340	331	344	11%
Workstations Shipped To-Date	228	506	846	1,177	1,521	61%
Asia						
Total Revenue	.0	.0	.0	1.4	1.9	NA
CPU Shipments	0	0	0	0	57	NA
Workstation Shipments	0	0	0	0	57	NA
Workstations Shipped To-Date	0	0	0	0	57	NA
Rest of World						
Total Revenue	.0	.0	.0	.3	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	7.9	9.6	12.0	13.0	11.2	9%
CPU Shipments	205	250	306	298	330	13%
Workstation Shipments	205	250	306	298	330	13%
Workstations Shipped To-Date	205	455	761	1,059	1,390	61%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.9	1.1	1.3	1.4	4.8	52%
CPU Shipments	23	28	34	33	141	58%
Workstation Shipments	23	28	34	33	141	58%
Workstations Shipped To-Date	23	51	85	118	258	84%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 53
TITLE: Company History
COMPANY: Cimatron
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.8	10.7	13.3	14.4	15.9	16%
CPU Shipments	228	278	340	331	471	20%
Workstation Shipments	228	278	340	331	471	20%
Workstations Shipped To-Date	228	506	846	1,177	1,648	64%
North America						
Total Revenue	.0	.0	.0	1.6	2.4	NA
CPU Shipments	0	0	0	0	71	NA
Workstation Shipments	0	0	0	0	71	NA
Workstations Shipped To-Date	0	0	0	0	71	NA
Europe						
Total Revenue	8.8	10.7	13.3	11.1	11.6	7%
CPU Shipments	228	278	340	331	344	11%
Workstation Shipments	228	278	340	331	344	11%
Workstations Shipped To-Date	228	506	846	1,177	1,521	61%
Asia						
Total Revenue	.0	.0	.0	1.4	1.9	NA
CPU Shipments	0	0	0	0	57	NA
Workstation Shipments	0	0	0	0	57	NA
Workstations Shipped To-Date	0	0	0	0	57	NA
Rest of World						
Total Revenue	.0	.0	.0	.3	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	7.9	9.6	12.0	13.0	11.2	9%
CPU Shipments	205	250	306	298	330	13%
Workstation Shipments	205	250	306	298	330	13%
Workstations Shipped To-Date	205	455	761	1,059	1,390	61%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.9	1.1	1.3	1.4	4.8	52%
CPU Shipments	23	28	34	33	141	58%
Workstation Shipments	23	28	34	33	141	58%
Workstations Shipped To-Date	23	51	85	118	258	84%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 54
TITLE: Company History
COMPANY: Cimlinc
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	35.0	35.2	35.1	30.3	29.5	-4%
CPU Shipments	858	917	1,091	757	563	-10%
Workstation Shipments	858	917	1,091	757	563	-10%
Workstations Shipped To-Date	1,255	2,172	3,263	4,020	4,583	38%
North America						
Total Revenue	29.8	25.2	20.4	18.2	17.7	-12%
CPU Shipments	729	775	576	454	338	-18%
Workstation Shipments	729	775	576	454	338	-18%
Workstations Shipped To-Date	1,107	1,881	2,458	2,912	3,250	31%
Europe						
Total Revenue	5.3	10.0	14.6	12.1	10.3	18%
CPU Shipments	129	142	371	303	197	11%
Workstation Shipments	129	142	371	303	197	11%
Workstations Shipped To-Date	149	291	662	965	1,162	67%
Asia						
Total Revenue	.0	.0	.0	.0	1.5	NA
CPU Shipments	0	0	0	0	28	NA
Workstation Shipments	0	0	0	0	28	NA
Workstations Shipped To-Date	0	0	0	0	28	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	144	0	0	NA
Workstation Shipments	0	0	144	0	0	NA
Workstations Shipped To-Date	0	0	144	144	144	NA
Technical Workstation						
Total Revenue	35.0	35.2	35.1	30.3	29.5	-4%
CPU Shipments	858	917	1,091	757	563	-10%
Workstation Shipments	858	917	1,091	757	563	-10%
Workstations Shipped To-Date	1,255	2,172	3,263	4,020	4,583	38%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 55
TITLE: Company History
COMPANY: Cimlinc
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	35.0	35.2	34.0	30.3	29.5	-4%
CPU Shipments	858	917	988	757	563	-10%
Workstation Shipments	858	917	988	757	563	-10%
Workstations Shipped To-Date	1,255	2,172	3,160	3,917	4,480	37%
North America						
Total Revenue	29.8	25.2	19.8	18.2	17.7	-12%
CPU Shipments	729	775	559	454	338	-18%
Workstation Shipments	729	775	559	454	338	-18%
Workstations Shipped To-Date	1,107	1,881	2,440	2,894	3,232	31%
Europe						
Total Revenue	5.3	10.0	14.2	12.1	10.3	18%
CPU Shipments	129	142	360	303	197	11%
Workstation Shipments	129	142	360	303	197	11%
Workstations Shipped To-Date	149	291	651	954	1,151	67%
Asia						
Total Revenue	.0	.0	.0	.0	1.5	NA
CPU Shipments	0	0	0	0	28	NA
Workstation Shipments	0	0	0	0	28	NA
Workstations Shipped To-Date	0	0	0	0	28	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	69	0	0	NA
Workstation Shipments	0	0	69	0	0	NA
Workstations Shipped To-Date	0	0	69	69	69	NA
Technical Workstation						
Total Revenue	35.0	35.2	34.0	30.3	29.5	-4%
CPU Shipments	858	917	988	757	563	-10%
Workstation Shipments	858	917	988	757	563	-10%
Workstations Shipped To-Date	1,255	2,172	3,160	3,917	4,480	37%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 56
TITLE: Company History
COMPANY: Cisigraph
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	21.0	24.0	20.8	34.5	43.2	20%
CPU Shipments	397	231	141	385	343	-4%
Workstation Shipments	397	850	400	385	400	0%
Workstations Shipped To-Date	397	1,247	1,647	2,032	2,431	57%
North America						
Total Revenue	.0	.7	.8	3.8	10.4	NA
CPU Shipments	0	7	0	42	82	NA
Workstation Shipments	0	25	0	42	96	NA
Workstations Shipped To-Date	0	25	25	67	163	NA
Europe						
Total Revenue	21.0	23.3	20.0	29.3	31.1	10%
CPU Shipments	397	224	141	327	247	-11%
Workstation Shipments	397	824	400	327	288	-8%
Workstations Shipped To-Date	397	1,221	1,621	1,949	2,237	54%
Asia						
Total Revenue	.0	.0	.0	1.4	1.7	NA
CPU Shipments	0	0	0	15	14	NA
Workstation Shipments	0	0	0	15	16	NA
Workstations Shipped To-Date	0	0	0	15	31	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	21.0	2.4	6.1	31.1	38.9	17%
CPU Shipments	397	36	67	374	314	-6%
Workstation Shipments	397	36	67	374	314	-6%
Workstations Shipped To-Date	397	433	500	874	1,189	32%
Host/Server						
Total Revenue	.0	20.4	14.7	3.5	4.3	NA
CPU Shipments	0	155	74	11	29	NA
Workstation Shipments	0	774	333	11	86	NA
Workstations Shipped To-Date	0	774	1,107	1,118	1,203	NA
Personal Computer						
Total Revenue	.0	1.2	.0	.0	.0	NA
CPU Shipments	0	39	0	0	0	NA
Workstation Shipments	0	39	0	0	0	NA
Workstations Shipped To-Date	0	39	39	39	39	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 57
TITLE: Company History
COMPANY: Cisigraph
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	21.0	24.0	20.8	34.5	43.2	20%
CPU Shipments	397	231	141	385	343	-4%
Workstation Shipments	397	850	400	385	400	0%
Workstations Shipped To-Date	397	1,247	1,647	2,032	2,431	57%
North America						
Total Revenue	.0	.7	.8	3.8	10.4	NA
CPU Shipments	0	7	0	42	82	NA
Workstation Shipments	0	25	0	42	96	NA
Workstations Shipped To-Date	0	25	25	67	163	NA
Europe						
Total Revenue	21.0	23.3	20.0	29.3	31.1	10%
CPU Shipments	397	224	141	327	247	-11%
Workstation Shipments	397	824	400	327	288	-8%
Workstations Shipped To-Date	397	1,221	1,621	1,949	2,237	54%
Asia						
Total Revenue	.0	.0	.0	1.4	1.7	NA
CPU Shipments	0	0	0	15	14	NA
Workstation Shipments	0	0	0	15	16	NA
Workstations Shipped To-Date	0	0	0	15	31	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	21.0	2.4	6.1	31.1	38.9	17%
CPU Shipments	397	36	67	374	314	-6%
Workstation Shipments	397	36	67	374	314	-6%
Workstations Shipped To-Date	397	433	500	874	1,189	32%
Host/Server						
Total Revenue	.0	20.4	14.7	3.5	4.3	NA
CPU Shipments	0	155	74	11	29	NA
Workstation Shipments	0	774	333	11	86	NA
Workstations Shipped To-Date	0	774	1,107	1,118	1,203	NA
Personal Computer						
Total Revenue	.0	1.2	.0	.0	.0	NA
CPU Shipments	0	39	0	0	0	NA
Workstation Shipments	0	39	0	0	0	NA
Workstations Shipped To-Date	0	39	39	39	39	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 58
TITLE: Company History
COMPANY: Compaq
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	33.0	197.4	250.0	347.5	420.5	89%
CPU Shipments	10,000	49,995	47,392	57,916	70,078	63%
Workstation Shipments	10,000	49,995	47,392	57,916	70,078	63%
Workstations Shipped To-Date	10,000	59,995	107,387	165,303	235,381	120%
North America						
Total Revenue	23.1	95.2	175.9	191.1	197.6	71%
CPU Shipments	7,000	26,740	33,200	31,854	32,937	47%
Workstation Shipments	7,000	26,740	33,200	31,854	32,937	47%
Workstations Shipped To-Date	7,000	33,740	66,940	98,794	131,730	108%
Europe						
Total Revenue	8.3	95.4	61.4	139.0	197.7	121%
CPU Shipments	2,500	21,345	11,795	23,166	32,937	91%
Workstation Shipments	2,500	21,345	11,795	23,166	32,937	91%
Workstations Shipped To-Date	2,500	23,845	35,639	58,806	91,742	146%
Asia						
Total Revenue	1.7	6.8	12.7	7.0	12.6	66%
CPU Shipments	500	1,910	2,397	1,158	2,102	43%
Workstation Shipments	500	1,910	2,397	1,158	2,102	43%
Workstations Shipped To-Date	500	2,410	4,807	5,966	8,068	100%
Rest of World						
Total Revenue	.0	.0	.0	10.4	12.6	NA
CPU Shipments	0	0	0	1,738	2,102	NA
Workstation Shipments	0	0	0	1,738	2,102	NA
Workstations Shipped To-Date	0	0	0	1,738	3,840	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	33.0	197.4	250.0	347.5	420.5	89%
CPU Shipments	10,000	49,995	47,392	57,916	70,078	63%
Workstation Shipments	10,000	49,995	47,392	57,916	70,078	63%
Workstations Shipped To-Date	10,000	59,995	107,387	165,303	235,381	120%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 59
TITLE: Company History
COMPANY: Compaq
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1.7	88.9	85.0	124.4	150.6	209%
CPU Shipments	500	23,110	16,113	20,734	25,088	166%
Workstation Shipments	500	23,110	16,113	20,734	25,088	166%
Workstations Shipped To-Date	500	23,610	39,723	60,457	85,545	262%
North America						
Total Revenue	1.2	47.6	59.9	68.4	70.8	179%
CPU Shipments	350	13,370	11,301	11,404	11,791	141%
Workstation Shipments	350	13,370	11,301	11,404	11,791	141%
Workstations Shipped To-Date	350	13,720	25,021	36,424	48,216	243%
Europe						
Total Revenue	.4	37.9	20.9	49.8	70.8	262%
CPU Shipments	125	8,785	4,010	8,294	11,791	212%
Workstation Shipments	125	8,785	4,010	8,294	11,791	212%
Workstations Shipped To-Date	125	8,910	12,920	21,214	33,005	303%
Asia						
Total Revenue	.1	3.4	4.3	2.5	4.5	174%
CPU Shipments	25	955	802	415	753	134%
Workstation Shipments	25	955	802	415	753	134%
Workstations Shipped To-Date	25	980	1,782	2,197	2,950	230%
Rest of World						
Total Revenue	.0	.0	.0	3.7	4.5	NA
CPU Shipments	0	0	0	622	753	NA
Workstation Shipments	0	0	0	622	753	NA
Workstations Shipped To-Date	0	0	0	622	1,375	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.7	88.9	85.0	124.4	150.6	209%
CPU Shipments	500	23,110	16,113	20,734	25,088	166%
Workstation Shipments	500	23,110	16,113	20,734	25,088	166%
Workstations Shipped To-Date	500	23,610	39,723	60,457	85,545	262%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 60
TITLE: Company History
COMPANY: Compaq
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	24.8	51.2	42.5	76.8	93.0	39%
CPU Shipments	7,500	13,465	8,057	12,799	15,487	20%
Workstation Shipments	7,500	13,465	8,057	12,799	15,487	20%
Workstations Shipped To-Date	7,500	20,965	29,022	41,821	57,308	66%
North America						
Total Revenue	17.3	28.6	29.5	42.2	43.7	26%
CPU Shipments	5,250	8,022	5,570	7,040	7,279	9%
Workstation Shipments	5,250	8,022	5,570	7,040	7,279	9%
Workstations Shipped To-Date	5,250	13,272	18,842	25,882	33,161	59%
Europe						
Total Revenue	6.2	20.6	10.4	30.7	43.7	63%
CPU Shipments	1,875	4,870	2,005	5,120	7,279	40%
Workstation Shipments	1,875	4,870	2,005	5,120	7,279	40%
Workstations Shipped To-Date	1,875	6,745	8,750	13,870	21,149	83%
Asia						
Total Revenue	1.2	2.0	2.6	1.5	2.8	22%
CPU Shipments	375	573	481	256	465	6%
Workstation Shipments	375	573	481	256	465	6%
Workstations Shipped To-Date	375	948	1,429	1,685	2,150	55%
Rest of World						
Total Revenue	.0	.0	.0	2.3	2.8	NA
CPU Shipments	0	0	0	384	465	NA
Workstation Shipments	0	0	0	384	465	NA
Workstations Shipped To-Date	0	0	0	384	849	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	24.8	51.2	42.5	76.8	93.0	39%
CPU Shipments	7,500	13,465	8,057	12,799	15,487	20%
Workstation Shipments	7,500	13,465	8,057	12,799	15,487	20%
Workstations Shipped To-Date	7,500	20,965	29,022	41,821	57,308	66%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 61
TITLE: Company History
COMPANY: Compaq
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	6.1	25.0	50.2	60.8	NA
CPU Shipments	NA	1,179	4,739	8,369	10,126	NA
Workstation Shipments	NA	1,179	4,739	8,369	10,126	NA
Workstations Shipped To-Date	NA	1,179	5,919	14,288	24,414	NA
North America						
Total Revenue	NA	.0	17.4	27.6	28.6	NA
CPU Shipments	NA	0	3,277	4,603	4,759	NA
Workstation Shipments	NA	0	3,277	4,603	4,759	NA
Workstations Shipped To-Date	NA	0	3,277	7,879	12,639	NA
Europe						
Total Revenue	NA	6.1	6.1	20.1	28.6	NA
CPU Shipments	NA	1,179	1,179	3,348	4,759	NA
Workstation Shipments	NA	1,179	1,179	3,348	4,759	NA
Workstations Shipped To-Date	NA	1,179	2,359	5,706	10,466	NA
Asia						
Total Revenue	NA	.0	1.5	1.0	1.8	NA
CPU Shipments	NA	0	283	167	304	NA
Workstation Shipments	NA	0	283	167	304	NA
Workstations Shipped To-Date	NA	0	283	451	754	NA
Rest of World						
Total Revenue	NA	.0	.0	1.5	1.8	NA
CPU Shipments	NA	0	0	251	304	NA
Workstation Shipments	NA	0	0	251	304	NA
Workstations Shipped To-Date	NA	0	0	251	555	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	6.1	25.0	50.2	60.8	NA
CPU Shipments	NA	1,179	4,739	8,369	10,126	NA
Workstation Shipments	NA	1,179	4,739	8,369	10,126	NA
Workstations Shipped To-Date	NA	1,179	5,919	14,288	24,414	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 62
TITLE: Company History
COMPANY: Compaq
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.3	25.9	50.0	67.8	82.0	123%
CPU Shipments	1,000	6,179	9,478	11,294	13,665	92%
Workstation Shipments	1,000	6,179	9,478	11,294	13,665	92%
Workstations Shipped To-Date	1,000	7,179	16,657	27,951	41,616	154%
North America						
Total Revenue	2.3	9.5	35.7	37.3	38.5	102%
CPU Shipments	700	2,674	6,742	6,211	6,423	74%
Workstation Shipments	700	2,674	6,742	6,211	6,423	74%
Workstations Shipped To-Date	700	3,374	10,116	16,327	22,750	139%
Europe						
Total Revenue	.8	15.7	12.3	27.1	38.5	161%
CPU Shipments	250	3,314	2,359	4,517	6,423	125%
Workstation Shipments	250	3,314	2,359	4,517	6,423	125%
Workstations Shipped To-Date	250	3,564	5,923	10,440	16,863	187%
Asia						
Total Revenue	.2	.7	2.0	1.4	2.5	95%
CPU Shipments	50	191	378	226	410	69%
Workstation Shipments	50	191	378	226	410	69%
Workstations Shipped To-Date	50	241	619	844	1,254	124%
Rest of World						
Total Revenue	.0	.0	.0	2.0	2.5	NA
CPU Shipments	0	0	0	339	410	NA
Workstation Shipments	0	0	0	339	410	NA
Workstations Shipped To-Date	0	0	0	339	749	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	3.3	25.9	50.0	67.8	82.0	123%
CPU Shipments	1,000	6,179	9,478	11,294	13,665	92%
Workstation Shipments	1,000	6,179	9,478	11,294	13,665	92%
Workstations Shipped To-Date	1,000	7,179	16,657	27,951	41,616	154%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 63
TITLE: Company History
COMPANY: Compaq
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.3	24.6	45.0	28.3	34.3	79%
CPU Shipments	1,000	5,943	8,531	4,720	5,711	55%
Workstation Shipments	1,000	5,943	8,531	4,720	5,711	55%
Workstations Shipped To-Date	1,000	6,943	15,474	20,194	25,905	126%
North America						
Total Revenue	2.3	9.5	31.7	15.6	16.1	63%
CPU Shipments	700	2,674	5,983	2,596	2,684	40%
Workstation Shipments	700	2,674	5,983	2,596	2,684	40%
Workstations Shipped To-Date	700	3,374	9,357	11,953	14,637	114%
Europe						
Total Revenue	.8	14.4	11.0	11.3	16.1	110%
CPU Shipments	250	3,078	2,123	1,888	2,684	81%
Workstation Shipments	250	3,078	2,123	1,888	2,684	81%
Workstations Shipped To-Date	250	3,328	5,451	7,339	10,023	152%
Asia						
Total Revenue	.2	.7	2.3	.6	1.0	57%
CPU Shipments	50	191	425	94	171	36%
Workstation Shipments	50	191	425	94	171	36%
Workstations Shipped To-Date	50	241	666	760	931	108%
Rest of World						
Total Revenue	.0	.0	.0	.9	1.0	NA
CPU Shipments	0	0	0	142	171	NA
Workstation Shipments	0	0	0	142	171	NA
Workstations Shipped To-Date	0	0	0	142	313	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	3.3	24.6	45.0	28.3	34.3	79%
CPU Shipments	1,000	5,943	8,531	4,720	5,711	55%
Workstation Shipments	1,000	5,943	8,531	4,720	5,711	55%
Workstations Shipped To-Date	1,000	6,943	15,474	20,194	25,905	126%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 64
TITLE: Company History
COMPANY: Computervision
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	655.5	753.6	760.5	817.4	954.1	10%
CPU Shipments	2,868	4,183	4,587	5,472	7,129	26%
Workstation Shipments	4,795	5,708	5,802	6,928	8,848	17%
Workstations Shipped To-Date	33,915	39,622	45,425	52,352	61,200	16%
North America						
Total Revenue	314.8	305.3	291.0	249.5	269.8	-4%
CPU Shipments	1,198	1,586	1,695	1,426	1,652	8%
Workstation Shipments	2,218	2,494	2,282	1,570	1,799	-5%
Workstations Shipped To-Date	21,251	23,745	26,026	27,597	29,396	8%
Europe						
Total Revenue	280.6	382.3	382.2	471.7	575.5	20%
CPU Shipments	1,451	2,284	2,352	3,287	4,458	32%
Workstation Shipments	2,224	2,769	2,869	4,475	5,925	28%
Workstations Shipped To-Date	6,379	9,147	12,016	16,492	22,416	37%
Asia						
Total Revenue	50.4	54.4	78.4	87.7	98.8	18%
CPU Shipments	186	257	492	708	963	51%
Workstation Shipments	284	343	586	826	1,063	39%
Workstations Shipped To-Date	1,820	2,163	2,749	3,575	4,638	26%
Rest of World						
Total Revenue	9.8	11.6	8.9	8.6	9.9	0%
CPU Shipments	33	56	48	51	57	14%
Workstation Shipments	70	102	66	56	61	-3%
Workstations Shipped To-Date	4,465	4,567	4,633	4,689	4,750	2%
Technical Workstation						
Total Revenue	153.6	367.3	448.9	694.2	833.0	53%
CPU Shipments	1,340	3,227	3,867	4,844	6,540	49%
Workstation Shipments	1,340	3,227	3,867	4,844	6,540	49%
Workstations Shipped To-Date	2,669	5,897	9,764	14,608	21,148	68%
Host/Server						
Total Revenue	463.9	357.3	285.4	103.9	103.4	-31%
CPU Shipments	739	672	581	353	426	-13%
Workstation Shipments	2,667	2,197	1,797	1,808	2,145	-5%
Workstations Shipped To-Date	28,824	31,022	32,818	34,627	36,771	6%
Personal Computer						
Total Revenue	37.9	29.1	26.2	19.3	17.6	-17%
CPU Shipments	788	283	139	275	163	-33%
Workstation Shipments	788	283	139	275	163	-33%
Workstations Shipped To-Date	2,421	2,704	2,843	3,118	3,281	8%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 65
TITLE: Company History
COMPANY: Computervision
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	535.6	582.1	597.3	677.9	782.2	10%
CPU Shipments	2,172	3,121	3,574	4,535	5,872	28%
Workstation Shipments	3,852	4,417	4,585	5,788	7,361	18%
Workstations Shipped To-Date	23,083	27,500	32,085	37,873	45,234	18%
North America						
Total Revenue	258.1	238.9	229.7	198.8	189.1	-7%
CPU Shipments	875	1,227	1,347	1,143	1,157	7%
Workstation Shipments	1,769	2,003	1,834	1,252	1,244	-8%
Workstations Shipped To-Date	14,713	16,717	18,551	19,803	21,047	9%
Europe						
Total Revenue	227.0	293.8	298.5	409.7	505.8	22%
CPU Shipments	1,107	1,671	1,803	2,848	3,911	37%
Workstation Shipments	1,784	2,077	2,233	3,901	5,208	31%
Workstations Shipped To-Date	5,025	7,102	9,335	13,236	18,444	38%
Asia						
Total Revenue	42.3	40.2	62.3	62.3	79.2	17%
CPU Shipments	165	179	387	501	759	46%
Workstation Shipments	242	252	466	589	859	37%
Workstations Shipped To-Date	1,277	1,528	1,994	2,584	3,443	28%
Rest of World						
Total Revenue	8.1	9.2	6.8	7.1	8.1	0%
CPU Shipments	25	45	37	42	46	16%
Workstation Shipments	57	85	51	46	50	-3%
Workstations Shipped To-Date	2,068	2,153	2,205	2,251	2,301	3%
Technical Workstation						
Total Revenue	100.4	265.7	344.0	576.3	683.5	62%
CPU Shipments	867	2,366	2,992	4,014	5,374	58%
Workstation Shipments	867	2,366	2,992	4,014	5,374	58%
Workstations Shipped To-Date	1,787	4,152	7,144	11,158	16,532	74%
Host/Server						
Total Revenue	405.4	299.1	237.0	86.1	84.6	-32%
CPU Shipments	647	569	484	301	369	-13%
Workstation Shipments	2,327	1,865	1,495	1,554	1,857	-5%
Workstations Shipped To-Date	19,204	21,069	22,564	24,118	25,975	8%
Personal Computer						
Total Revenue	29.7	17.3	16.3	15.5	14.1	-17%
CPU Shipments	657	187	98	220	130	-33%
Workstation Shipments	657	187	98	220	130	-33%
Workstations Shipped To-Date	2,093	2,279	2,377	2,597	2,727	7%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 66
TITLE: Company History
COMPANY: Computervision
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	60.3	112.5	103.5	63.7	84.1	9%
CPU Shipments	190	587	582	431	610	34%
Workstation Shipments	385	798	757	549	728	17%
Workstations Shipped To-Date	4,200	4,998	5,755	6,304	7,032	14%
North America						
Total Revenue	31.5	46.4	40.4	27.8	44.1	9%
CPU Shipments	91	220	208	161	265	30%
Workstation Shipments	202	348	293	182	295	10%
Workstations Shipped To-Date	2,644	2,992	3,284	3,466	3,761	9%
Europe						
Total Revenue	24.5	59.8	51.1	20.3	24.3	-0%
CPU Shipments	87	336	303	149	188	21%
Workstation Shipments	165	408	377	216	275	14%
Workstations Shipped To-Date	638	1,046	1,423	1,640	1,914	32%
Asia						
Total Revenue	3.3	4.5	10.7	14.9	14.8	46%
CPU Shipments	9	24	64	116	153	103%
Workstation Shipments	12	29	77	146	153	90%
Workstations Shipped To-Date	300	329	407	552	705	24%
Rest of World						
Total Revenue	1.0	1.8	1.3	.7	.9	-3%
CPU Shipments	3	7	7	5	5	14%
Workstation Shipments	7	13	9	5	5	-6%
Workstations Shipped To-Date	618	631	641	646	651	1%
Technical Workstation						
Total Revenue	11.0	52.9	57.0	49.1	70.4	59%
CPU Shipments	88	453	481	345	548	58%
Workstation Shipments	88	453	481	345	548	58%
Workstations Shipped To-Date	191	645	1,126	1,471	2,018	80%
Host/Server						
Total Revenue	45.4	54.1	41.4	10.8	10.1	-31%
CPU Shipments	74	94	83	32	30	-20%
Workstation Shipments	269	305	257	149	148	-14%
Workstations Shipped To-Date	3,792	4,097	4,354	4,503	4,651	5%
Personal Computer						
Total Revenue	3.9	5.5	5.1	3.9	3.5	-2%
CPU Shipments	28	40	18	55	33	4%
Workstation Shipments	28	40	18	55	33	4%
Workstations Shipped To-Date	217	257	275	330	363	14%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 67
TITLE: Company History
COMPANY: Computervision
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	10.1	10.1	16.0	23.9	31.6	33%
CPU Shipments	38	58	95	133	211	54%
Workstation Shipments	62	69	122	213	316	50%
Workstations Shipped To-Date	1,233	1,302	1,424	1,637	1,953	12%
North America						
Total Revenue	4.3	2.7	6.7	12.1	20.0	47%
CPU Shipments	16	12	36	57	121	66%
Workstation Shipments	27	13	50	72	149	54%
Workstations Shipped To-Date	664	678	728	800	949	9%
Europe						
Total Revenue	4.9	3.3	7.7	11.6	11.4	24%
CPU Shipments	19	24	49	74	88	46%
Workstation Shipments	32	29	59	139	165	51%
Workstations Shipped To-Date	84	114	173	312	477	54%
Asia						
Total Revenue	.8	4.0	1.4	.0	.0	-100%
CPU Shipments	2	22	10	0	0	-100%
Workstation Shipments	3	26	11	0	0	-100%
Workstations Shipped To-Date	20	47	58	58	58	30%
Rest of World						
Total Revenue	.1	.1	.2	.2	.3	36%
CPU Shipments	0	0	1	1	2	51%
Workstation Shipments	1	0	2	1	2	40%
Workstations Shipped To-Date	464	464	466	467	470	0%
Technical Workstation						
Total Revenue	2.4	6.4	9.5	17.2	23.3	76%
CPU Shipments	21	48	81	113	184	72%
Workstation Shipments	21	48	81	113	184	72%
Workstations Shipped To-Date	25	74	155	268	452	106%
Host/Server						
Total Revenue	7.2	2.7	5.9	6.7	8.3	4%
CPU Shipments	8	6	13	20	27	34%
Workstation Shipments	33	18	39	100	132	42%
Workstations Shipped To-Date	1,192	1,210	1,248	1,348	1,480	6%
Personal Computer						
Total Revenue	.5	1.0	.6	.0	.0	-100%
CPU Shipments	8	3	2	0	0	-100%
Workstation Shipments	8	3	2	0	0	-100%
Workstations Shipped To-Date	16	19	21	21	21	6%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 68
TITLE: Company History
COMPANY: Computervision
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	14.8	11.4	9.5	16.0	18.8	6%
CPU Shipments	175	98	77	106	139	-6%
Workstation Shipments	175	98	77	110	145	-5%
Workstations Shipped To-Date	420	518	595	705	850	19%
North America						
Total Revenue	6.2	4.7	3.3	6.6	7.3	4%
CPU Shipments	68	32	26	39	47	-9%
Workstation Shipments	68	32	26	39	48	-8%
Workstations Shipped To-Date	313	345	372	411	459	10%
Europe						
Total Revenue	7.2	6.4	6.2	9.3	11.3	12%
CPU Shipments	101	65	50	66	90	-3%
Workstation Shipments	101	65	50	70	96	-1%
Workstations Shipped To-Date	101	166	216	286	382	39%
Asia						
Total Revenue	1.2	.1	.0	.0	.0	-100%
CPU Shipments	4	0	0	0	0	-100%
Workstation Shipments	4	0	0	0	0	-100%
Workstations Shipped To-Date	4	4	4	4	4	0%
Rest of World						
Total Revenue	.2	.2	.1	.2	.2	5%
CPU Shipments	2	1	1	1	1	-7%
Workstation Shipments	2	1	1	1	1	-6%
Workstations Shipped To-Date	2	3	3	4	6	36%
Technical Workstation						
Total Revenue	12.1	9.5	8.8	15.7	18.4	11%
CPU Shipments	106	83	71	105	137	7%
Workstation Shipments	106	83	71	105	137	7%
Workstations Shipped To-Date	350	433	504	608	746	21%
Host/Server						
Total Revenue	.0	.0	.0	.3	.4	NA
CPU Shipments	0	0	0	1	1	NA
Workstation Shipments	0	0	0	5	8	NA
Workstations Shipped To-Date	0	0	0	5	13	NA
Personal Computer						
Total Revenue	2.7	1.8	.8	.0	.0	-100%
CPU Shipments	70	16	6	0	0	-100%
Workstation Shipments	70	16	6	0	0	-100%
Workstations Shipped To-Date	70	85	91	91	91	7%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 69
TITLE: Company History
COMPANY: Computervision
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	34.7	37.3	33.4	35.9	37.4	2%
CPU Shipments	293	319	258	268	297	0%
Workstation Shipments	321	325	262	268	297	-2%
Workstations Shipped To-Date	4,170	4,495	4,757	5,025	5,322	6%
North America						
Total Revenue	14.6	12.4	10.4	4.3	9.4	-10%
CPU Shipments	147	96	78	26	62	-19%
Workstation Shipments	152	97	79	26	62	-20%
Workstations Shipped To-Date	2,493	2,590	2,668	2,694	2,756	3%
Europe						
Total Revenue	17.0	19.0	18.6	20.8	22.7	8%
CPU Shipments	136	189	147	149	182	8%
Workstation Shipments	142	190	149	149	182	6%
Workstations Shipped To-Date	482	671	820	970	1,152	24%
Asia						
Total Revenue	2.8	5.6	4.0	10.5	4.9	15%
CPU Shipments	6	31	31	91	51	72%
Workstation Shipments	23	37	31	91	51	21%
Workstations Shipped To-Date	169	206	237	328	379	22%
Rest of World						
Total Revenue	.3	.4	.4	.4	.4	3%
CPU Shipments	4	3	3	2	2	-8%
Workstation Shipments	4	3	3	2	2	-9%
Workstations Shipped To-Date	1,026	1,029	1,031	1,033	1,036	0%
Technical Workstation						
Total Revenue	27.7	32.8	29.7	35.9	37.4	8%
CPU Shipments	258	277	241	268	297	4%
Workstation Shipments	258	277	241	268	297	4%
Workstations Shipped To-Date	271	548	789	1,057	1,354	50%
Host/Server						
Total Revenue	6.0	1.4	1.0	.0	.0	-100%
CPU Shipments	10	3	2	0	0	-100%
Workstation Shipments	38	9	5	0	0	-100%
Workstations Shipped To-Date	3,875	3,884	3,889	3,889	3,889	0%
Personal Computer						
Total Revenue	1.0	3.2	2.7	.0	.0	-100%
CPU Shipments	25	38	15	0	0	-100%
Workstation Shipments	25	38	15	0	0	-100%
Workstations Shipped To-Date	25	63	78	78	78	34%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 70
TITLE: Company History
COMPANY: Control Data
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	174.8	189.0	170.0	183.7	178.2	0%
CPU Shipments	138	748	1,163	1,239	1,837	91%
Workstation Shipments	1,229	1,450	1,904	1,960	2,353	18%
Workstations Shipped To-Date	3,000	4,450	6,354	8,314	10,667	37%
North America						
Total Revenue	94.0	122.7	59.5	71.6	70.8	-7%
CPU Shipments	56	426	486	483	730	90%
Workstation Shipments	392	797	703	764	930	24%
Workstations Shipped To-Date	1,832	2,629	3,333	4,097	5,027	29%
Europe						
Total Revenue	60.0	59.5	93.4	93.7	90.9	11%
CPU Shipments	58	279	538	632	931	100%
Workstation Shipments	640	566	1,000	1,000	1,201	17%
Workstations Shipped To-Date	833	1,399	2,399	3,399	4,600	53%
Asia						
Total Revenue	14.4	5.7	8.5	11.0	13.3	-2%
CPU Shipments	16	36	69	74	143	74%
Workstation Shipments	147	72	100	118	179	5%
Workstations Shipped To-Date	247	320	420	538	717	31%
Rest of World						
Total Revenue	6.4	1.1	8.5	7.4	3.3	-15%
CPU Shipments	7	7	69	50	33	46%
Workstation Shipments	49	15	100	78	42	-4%
Workstations Shipped To-Date	87	102	202	281	323	39%
Technical Workstation						
Total Revenue	.0	14.9	45.2	62.4	75.9	NA
CPU Shipments	0	265	873	1,155	1,777	NA
Workstation Shipments	0	265	873	1,155	1,777	NA
Workstations Shipped To-Date	146	411	1,284	2,440	4,217	132%
Host/Server						
Total Revenue	174.3	169.5	123.0	121.2	102.4	-12%
CPU Shipments	138	113	210	84	60	-19%
Workstation Shipments	1,229	815	952	805	576	-17%
Workstations Shipped To-Date	2,758	3,573	4,524	5,329	5,905	21%
Personal Computer						
Total Revenue	.5	4.6	1.8	.0	.0	-100%
CPU Shipments	0	370	80	0	0	NA
Workstation Shipments	0	370	80	0	0	NA
Workstations Shipped To-Date	96	466	546	546	546	54%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 71
TITLE: Company History
COMPANY: Control Data
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	142.8	162.3	147.9	174.5	168.4	4%
CPU Shipments	114	360	1,012	1,177	1,656	95%
Workstation Shipments	1,040	1,066	1,657	1,862	2,160	20%
Workstations Shipped To-Date	2,389	3,454	5,111	6,973	9,134	40%
North America						
Total Revenue	72.1	103.3	51.8	68.1	67.3	-2%
CPU Shipments	44	209	423	459	667	97%
Workstation Shipments	314	587	612	726	864	29%
Workstations Shipped To-Date	1,359	1,946	2,557	3,283	4,147	32%
Europe						
Total Revenue	54.3	52.6	81.3	89.0	85.9	12%
CPU Shipments	52	131	468	600	839	100%
Workstation Shipments	569	415	870	950	1,103	18%
Workstations Shipped To-Date	762	1,177	2,047	2,997	4,100	52%
Asia						
Total Revenue	11.4	5.3	7.4	10.5	11.8	1%
CPU Shipments	12	17	60	71	117	76%
Workstation Shipments	118	53	87	112	152	7%
Workstations Shipped To-Date	200	253	340	452	604	32%
Rest of World						
Total Revenue	5.0	1.1	7.4	7.0	3.3	-10%
CPU Shipments	6	3	60	47	33	55%
Workstation Shipments	39	11	87	74	42	2%
Workstations Shipped To-Date	68	79	166	241	283	43%
Technical Workstation						
Total Revenue	.0	13.8	39.3	59.3	68.3	NA
CPU Shipments	0	255	759	1,097	1,597	NA
Workstation Shipments	0	255	759	1,097	1,597	NA
Workstations Shipped To-Date	0	255	1,014	2,112	3,709	NA
Host/Server						
Total Revenue	142.4	148.5	107.1	115.2	100.1	-8%
CPU Shipments	114	105	183	80	59	-15%
Workstation Shipments	1,040	811	828	765	563	-14%
Workstations Shipped To-Date	2,389	3,199	4,027	4,792	5,355	22%
Personal Computer						
Total Revenue	.4	.0	1.5	.0	.0	-100%
CPU Shipments	0	0	70	0	0	NA
Workstation Shipments	0	0	70	0	0	NA
Workstations Shipped To-Date	0	0	70	70	70	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 72
TITLE: Company History
COMPANY: Control Data
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	5.8	4.9	3.4	3.7	3.9	-10%
CPU Shipments	4	12	23	25	39	77%
Workstation Shipments	29	10	38	39	50	14%
Workstations Shipped To-Date	140	150	188	228	278	19%
North America						
Total Revenue	4.7	3.6	1.2	1.4	1.3	-28%
CPU Shipments	3	7	10	10	13	46%
Workstation Shipments	20	5	14	15	17	-4%
Workstations Shipped To-Date	119	124	138	154	170	9%
Europe						
Total Revenue	.0	1.2	1.9	1.9	2.0	NA
CPU Shipments	0	4	11	13	21	NA
Workstation Shipments	0	4	20	20	27	NA
Workstations Shipped To-Date	0	4	24	44	71	NA
Asia						
Total Revenue	.7	.1	.2	.2	.5	-8%
CPU Shipments	1	0	1	1	5	59%
Workstation Shipments	7	0	2	2	7	-3%
Workstations Shipped To-Date	15	15	17	20	26	15%
Rest of World						
Total Revenue	.3	.0	.2	.2	.0	-100%
CPU Shipments	0	0	1	1	0	-100%
Workstation Shipments	2	0	2	2	0	-100%
Workstations Shipped To-Date	6	6	8	10	10	12%
Technical Workstation						
Total Revenue	.0	1.1	.9	1.2	1.6	NA
CPU Shipments	0	10	17	23	37	NA
Workstation Shipments	0	10	17	23	37	NA
Workstations Shipped To-Date	0	10	28	51	88	NA
Host/Server						
Total Revenue	5.7	3.8	2.5	2.4	2.3	-20%
CPU Shipments	4	2	4	2	1	-24%
Workstation Shipments	29	0	19	16	13	-19%
Workstations Shipped To-Date	44	44	63	79	92	20%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	-100%
CPU Shipments	0	0	2	0	0	NA
Workstation Shipments	0	0	2	0	0	NA
Workstations Shipped To-Date	96	96	98	98	98	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 73
TITLE: Company History
COMPANY: Control Data
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	5.5	6.0	NA
CPU Shipments	NA	NA	NA	37	143	NA
Workstation Shipments	NA	NA	NA	59	143	NA
Workstations Shipped To-Date	NA	NA	NA	59	202	NA
North America						
Total Revenue	NA	NA	NA	2.2	2.1	NA
CPU Shipments	NA	NA	NA	15	50	NA
Workstation Shipments	NA	NA	NA	23	50	NA
Workstations Shipped To-Date	NA	NA	NA	23	73	NA
Europe						
Total Revenue	NA	NA	NA	2.8	3.0	NA
CPU Shipments	NA	NA	NA	19	71	NA
Workstation Shipments	NA	NA	NA	30	71	NA
Workstations Shipped To-Date	NA	NA	NA	30	101	NA
Asia						
Total Revenue	NA	NA	NA	.3	.9	NA
CPU Shipments	NA	NA	NA	2	21	NA
Workstation Shipments	NA	NA	NA	4	21	NA
Workstations Shipped To-Date	NA	NA	NA	4	25	NA
Rest of World						
Total Revenue	NA	NA	NA	.2	.0	NA
CPU Shipments	NA	NA	NA	1	0	NA
Workstation Shipments	NA	NA	NA	2	0	NA
Workstations Shipped To-Date	NA	NA	NA	2	2	NA
Technical Workstation						
Total Revenue	NA	NA	NA	1.9	6.0	NA
CPU Shipments	NA	NA	NA	35	143	NA
Workstation Shipments	NA	NA	NA	35	143	NA
Workstations Shipped To-Date	NA	NA	NA	35	177	NA
Host/Server						
Total Revenue	NA	NA	NA	3.6	.0	NA
CPU Shipments	NA	NA	NA	3	0	NA
Workstation Shipments	NA	NA	NA	24	0	NA
Workstations Shipped To-Date	NA	NA	NA	24	24	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 74
TITLE: Company History
COMPANY: Dazix
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	124.0	152.1	208.0	153.7	99.8	-5%
CPU Shipments	1,624	1,130	1,277	1,476	735	-18%
Workstation Shipments	1,624	1,216	1,277	1,476	735	-18%
Workstations Shipped To-Date	5,670	6,887	8,164	9,640	10,375	16%
North America						
Total Revenue	62.9	63.1	89.3	67.6	38.5	-12%
CPU Shipments	840	615	334	645	284	-24%
Workstation Shipments	840	631	334	645	284	-24%
Workstations Shipped To-Date	3,745	4,376	4,710	5,355	5,639	11%
Europe						
Total Revenue	47.5	53.9	79.7	55.3	44.9	-1%
CPU Shipments	630	292	712	551	331	-15%
Workstation Shipments	630	334	712	551	331	-15%
Workstations Shipped To-Date	1,358	1,691	2,404	2,954	3,285	25%
Asia						
Total Revenue	13.5	33.3	39.0	30.7	16.4	5%
CPU Shipments	155	210	231	280	121	-6%
Workstation Shipments	155	238	231	280	121	-6%
Workstations Shipped To-Date	531	769	999	1,279	1,400	27%
Rest of World						
Total Revenue	.0	1.8	.0	.0	.0	NA
CPU Shipments	0	13	0	0	0	NA
Workstation Shipments	0	14	0	0	0	NA
Workstations Shipped To-Date	37	51	51	51	51	8%
Technical Workstation						
Total Revenue	65.5	102.9	178.4	153.7	99.8	11%
CPU Shipments	736	791	1,185	1,476	735	-0%
Workstation Shipments	736	791	1,185	1,476	735	-0%
Workstations Shipped To-Date	4,084	4,876	6,061	7,537	8,272	19%
Host/Server						
Total Revenue	9.3	23.0	14.9	.0	.0	-100%
CPU Shipments	0	86	92	0	0	NA
Workstation Shipments	0	172	92	0	0	NA
Workstations Shipped To-Date	37	209	301	301	301	69%
Personal Computer						
Total Revenue	49.2	26.2	14.7	.0	.0	-100%
CPU Shipments	888	253	0	0	0	-100%
Workstation Shipments	888	253	0	0	0	-100%
Workstations Shipped To-Date	1,549	1,802	1,802	1,802	1,802	4%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 75
TITLE: Company History
COMPANY: Dazix
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	96.7	124.9	125.1	122.9	64.9	-9%
CPU Shipments	1,391	995	756	1,185	478	-23%
Workstation Shipments	1,391	1,079	756	1,185	478	-23%
Workstations Shipped To-Date	4,943	6,021	6,777	7,962	8,440	14%
North America						
Total Revenue	51.3	55.4	49.2	63.3	26.5	-15%
CPU Shipments	735	569	110	604	196	-28%
Workstation Shipments	735	582	110	604	196	-28%
Workstations Shipped To-Date	3,298	3,880	3,990	4,594	4,790	10%
Europe						
Total Revenue	35.8	42.6	50.2	44.3	26.9	-7%
CPU Shipments	525	248	485	441	198	-22%
Workstation Shipments	525	290	485	441	198	-22%
Workstations Shipped To-Date	1,154	1,444	1,928	2,369	2,567	22%
Asia						
Total Revenue	9.6	25.1	25.7	15.4	11.5	4%
CPU Shipments	131	165	161	140	84	-10%
Workstation Shipments	131	193	161	140	84	-10%
Workstations Shipped To-Date	455	647	808	948	1,032	23%
Rest of World						
Total Revenue	.0	1.8	.0	.0	.0	NA
CPU Shipments	0	13	0	0	0	NA
Workstation Shipments	0	14	0	0	0	NA
Workstations Shipped To-Date	37	51	51	51	51	8%
Technical Workstation						
Total Revenue	41.6	83.3	111.6	122.9	64.9	12%
CPU Shipments	503	696	725	1,185	478	-1%
Workstation Shipments	503	696	725	1,185	478	-1%
Workstations Shipped To-Date	3,382	4,078	4,803	5,988	6,467	18%
Host/Server						
Total Revenue	7.6	20.4	5.4	.0	.0	-100%
CPU Shipments	0	83	30	0	0	NA
Workstation Shipments	0	167	30	0	0	NA
Workstations Shipped To-Date	37	204	235	235	235	59%
Personal Computer						
Total Revenue	47.5	21.2	8.1	.0	.0	-100%
CPU Shipments	888	215	0	0	0	-100%
Workstation Shipments	888	215	0	0	0	-100%
Workstations Shipped To-Date	1,524	1,739	1,739	1,739	1,739	3%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 76
TITLE: Company History
COMPANY: Dazix
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	15.2	15.5	75.3	30.7	34.8	23%
CPU Shipments	143	75	488	291	257	16%
Workstation Shipments	143	77	488	291	257	16%
Workstations Shipped To-Date	143	219	707	999	1,255	72%
North America						
Total Revenue	6.5	5.3	39.7	4.3	12.0	16%
CPU Shipments	64	34	224	41	88	8%
Workstation Shipments	64	36	224	41	88	8%
Workstations Shipped To-Date	64	100	324	365	453	63%
Europe						
Total Revenue	6.5	6.7	26.9	11.1	18.0	29%
CPU Shipments	64	29	210	110	132	20%
Workstation Shipments	64	29	210	110	132	20%
Workstations Shipped To-Date	64	93	304	414	546	71%
Asia						
Total Revenue	2.1	3.5	8.8	15.4	4.9	23%
CPU Shipments	14	11	54	140	36	26%
Workstation Shipments	14	11	54	140	36	26%
Workstations Shipped To-Date	14	26	80	220	256	106%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	13.4	10.8	59.2	30.7	34.8	27%
CPU Shipments	143	47	427	291	257	16%
Workstation Shipments	143	47	427	291	257	16%
Workstations Shipped To-Date	143	189	616	907	1,164	69%
Host/Server						
Total Revenue	.9	1.5	9.5	.0	.0	-100%
CPU Shipments	0	2	61	0	0	NA
Workstation Shipments	0	4	61	0	0	NA
Workstations Shipped To-Date	0	4	65	65	65	NA
Personal Computer						
Total Revenue	.9	3.1	6.6	.0	.0	-100%
CPU Shipments	0	26	0	0	0	NA
Workstation Shipments	0	26	0	0	0	NA
Workstations Shipped To-Date	0	26	26	26	26	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 77
TITLE: Company History
COMPANY: Delcam International
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	9.8	12.7	15.0	18.8	NA
CPU Shipments	NA	153	207	245	312	NA
Workstation Shipments	NA	153	207	245	312	NA
Workstations Shipped To-Date	NA	153	360	605	917	NA
North America						
Total Revenue	NA	.7	.9	1.1	1.3	NA
CPU Shipments	NA	11	14	17	22	NA
Workstation Shipments	NA	11	14	17	22	NA
Workstations Shipped To-Date	NA	11	25	42	64	NA
Europe						
Total Revenue	NA	6.9	8.9	10.5	13.1	NA
CPU Shipments	NA	107	145	172	218	NA
Workstation Shipments	NA	107	145	172	218	NA
Workstations Shipped To-Date	NA	107	252	424	642	NA
Asia						
Total Revenue	NA	1.3	1.7	2.0	2.4	NA
CPU Shipments	NA	20	27	32	41	NA
Workstation Shipments	NA	20	27	32	41	NA
Workstations Shipped To-Date	NA	20	47	79	119	NA
Rest of World						
Total Revenue	NA	1.0	1.3	1.5	1.9	NA
CPU Shipments	NA	15	21	25	31	NA
Workstation Shipments	NA	15	21	25	31	NA
Workstations Shipped To-Date	NA	15	36	61	92	NA
Technical Workstation						
Total Revenue	NA	9.8	12.7	15.0	18.8	NA
CPU Shipments	NA	153	207	245	312	NA
Workstation Shipments	NA	153	207	245	312	NA
Workstations Shipped To-Date	NA	153	360	605	917	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 78
TITLE: Company History
COMPANY: Delcam International
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	9.8	12.7	15.0	18.8	NA
CPU Shipments	NA	153	207	245	312	NA
Workstation Shipments	NA	153	207	245	312	NA
Workstations Shipped To-Date	NA	153	360	605	917	NA
North America						
Total Revenue	NA	.7	.9	1.1	1.3	NA
CPU Shipments	NA	11	14	17	22	NA
Workstation Shipments	NA	11	14	17	22	NA
Workstations Shipped To-Date	NA	11	25	42	64	NA
Europe						
Total Revenue	NA	6.9	8.9	10.5	13.1	NA
CPU Shipments	NA	107	145	172	218	NA
Workstation Shipments	NA	107	145	172	218	NA
Workstations Shipped To-Date	NA	107	252	424	642	NA
Asia						
Total Revenue	NA	1.3	1.7	2.0	2.4	NA
CPU Shipments	NA	20	27	32	41	NA
Workstation Shipments	NA	20	27	32	41	NA
Workstations Shipped To-Date	NA	20	47	79	119	NA
Rest of World						
Total Revenue	NA	1.0	1.3	1.5	1.9	NA
CPU Shipments	NA	15	21	25	31	NA
Workstation Shipments	NA	15	21	25	31	NA
Workstations Shipped To-Date	NA	15	36	61	92	NA
Technical Workstation						
Total Revenue	NA	9.8	12.7	15.0	18.8	NA
CPU Shipments	NA	153	207	245	312	NA
Workstation Shipments	NA	153	207	245	312	NA
Workstations Shipped To-Date	NA	153	360	605	917	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 79
TITLE: Company History
COMPANY: Dell Computer
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	10.9	12.9	15.5	18.6	NA
CPU Shipments	NA	3,250	3,550	3,875	4,650	NA
Workstation Shipments	NA	3,250	3,550	3,875	4,650	NA
Workstations Shipped To-Date	NA	3,250	6,800	10,675	15,325	NA
North America						
Total Revenue	NA	10.4	12.3	14.7	15.8	NA
CPU Shipments	NA	3,088	3,372	3,681	3,952	NA
Workstation Shipments	NA	3,088	3,372	3,681	3,952	NA
Workstations Shipped To-Date	NA	3,088	6,460	10,141	14,094	NA
Europe						
Total Revenue	NA	.5	.7	.8	2.8	NA
CPU Shipments	NA	163	178	194	698	NA
Workstation Shipments	NA	163	178	194	698	NA
Workstations Shipped To-Date	NA	163	340	534	1,231	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	10.9	12.9	15.5	18.6	NA
CPU Shipments	NA	3,250	3,550	3,875	4,650	NA
Workstation Shipments	NA	3,250	3,550	3,875	4,650	NA
Workstations Shipped To-Date	NA	3,250	6,800	10,675	15,325	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 80
TITLE: Company History
COMPANY: Dell Computer
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	4.5	5.3	6.4	7.6	NA
CPU Shipments	NA	1,332	1,455	1,589	1,907	NA
Workstation Shipments	NA	1,332	1,455	1,589	1,907	NA
Workstations Shipped To-Date	NA	1,332	2,788	4,377	6,283	NA
North America						
Total Revenue	NA	4.3	5.0	6.0	6.5	NA
CPU Shipments	NA	1,266	1,383	1,509	1,621	NA
Workstation Shipments	NA	1,266	1,383	1,509	1,621	NA
Workstations Shipped To-Date	NA	1,266	2,649	4,158	5,778	NA
Europe						
Total Revenue	NA	.2	.3	.3	1.1	NA
CPU Shipments	NA	67	73	79	286	NA
Workstation Shipments	NA	67	73	79	286	NA
Workstations Shipped To-Date	NA	67	139	219	505	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	4.5	5.3	6.4	7.6	NA
CPU Shipments	NA	1,332	1,455	1,589	1,907	NA
Workstation Shipments	NA	1,332	1,455	1,589	1,907	NA
Workstations Shipped To-Date	NA	1,332	2,788	4,377	6,283	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 81
TITLE: Company History
COMPANY: Dell Computer
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	4.3	5.0	6.0	7.4	NA
CPU Shipments	NA	1,268	1,385	1,511	1,860	NA
Workstation Shipments	NA	1,268	1,385	1,511	1,860	NA
Workstations Shipped To-Date	NA	1,268	2,652	4,163	6,023	NA
North America						
Total Revenue	NA	4.0	4.8	5.7	6.3	NA
CPU Shipments	NA	1,204	1,315	1,436	1,581	NA
Workstation Shipments	NA	1,204	1,315	1,436	1,581	NA
Workstations Shipped To-Date	NA	1,204	2,519	3,955	5,536	NA
Europe						
Total Revenue	NA	.2	.3	.3	1.1	NA
CPU Shipments	NA	63	69	76	279	NA
Workstation Shipments	NA	63	69	76	279	NA
Workstations Shipped To-Date	NA	63	133	208	487	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	4.3	5.0	6.0	7.4	NA
CPU Shipments	NA	1,268	1,385	1,511	1,860	NA
Workstation Shipments	NA	1,268	1,385	1,511	1,860	NA
Workstations Shipped To-Date	NA	1,268	2,652	4,163	6,023	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 82
TITLE: Company History
COMPANY: Dell Computer
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	.8	.9	1.1	1.3	NA
CPU Shipments	NA	228	249	271	326	NA
Workstation Shipments	NA	228	249	271	326	NA
Workstations Shipped To-Date	NA	228	476	747	1,073	NA
North America						
Total Revenue	NA	.7	.9	1.0	1.1	NA
CPU Shipments	NA	216	236	258	277	NA
Workstation Shipments	NA	216	236	258	277	NA
Workstations Shipped To-Date	NA	216	452	710	987	NA
Europe						
Total Revenue	NA	.0	.1	.1	.2	NA
CPU Shipments	NA	11	12	14	49	NA
Workstation Shipments	NA	11	12	14	49	NA
Workstations Shipped To-Date	NA	11	24	37	86	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.8	.9	1.1	1.3	NA
CPU Shipments	NA	228	249	271	326	NA
Workstation Shipments	NA	228	249	271	326	NA
Workstations Shipped To-Date	NA	228	476	747	1,073	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 83
TITLE: Company History
COMPANY: Dell Computer
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	.8	.9	1.1	1.1	NA
CPU Shipments	NA	228	249	271	279	NA
Workstation Shipments	NA	228	249	271	279	NA
Workstations Shipped To-Date	NA	228	476	747	1,026	NA
North America						
Total Revenue	NA	.7	.9	1.0	1.0	NA
CPU Shipments	NA	216	236	258	237	NA
Workstation Shipments	NA	216	236	258	237	NA
Workstations Shipped To-Date	NA	216	452	710	947	NA
Europe						
Total Revenue	NA	.0	.1	.1	.2	NA
CPU Shipments	NA	11	12	14	42	NA
Workstation Shipments	NA	11	12	14	42	NA
Workstations Shipped To-Date	NA	11	24	37	79	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.8	.9	1.1	1.1	NA
CPU Shipments	NA	228	249	271	279	NA
Workstation Shipments	NA	228	249	271	279	NA
Workstations Shipped To-Date	NA	228	476	747	1,026	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 84
TITLE: Company History
COMPANY: Dell Computer
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	.7	.8	.9	1.1	NA
CPU Shipments	NA	195	213	233	279	NA
Workstation Shipments	NA	195	213	233	279	NA
Workstations Shipped To-Date	NA	195	408	641	920	NA
North America						
Total Revenue	NA	.6	.7	.9	1.0	NA
CPU Shipments	NA	185	202	221	237	NA
Workstation Shipments	NA	185	202	221	237	NA
Workstations Shipped To-Date	NA	185	388	608	846	NA
Europe						
Total Revenue	NA	.0	.0	.1	.2	NA
CPU Shipments	NA	10	11	12	42	NA
Workstation Shipments	NA	10	11	12	42	NA
Workstations Shipped To-Date	NA	10	20	32	74	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.7	.8	.9	1.1	NA
CPU Shipments	NA	195	213	233	279	NA
Workstation Shipments	NA	195	213	233	279	NA
Workstations Shipped To-Date	NA	195	408	641	920	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 85
TITLE: Company History
COMPANY: Digital
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	941.8	949.7	810.0	899.6	904.6	-1%
CPU Shipments	6,801	8,884	6,650	10,500	10,500	11%
Workstation Shipments	2,547	4,301	1,670	6,530	6,599	27%
Workstations Shipped To-Date	3,075	7,376	9,045	15,575	22,174	64%
North America						
Total Revenue	527.5	475.0	388.8	431.8	436.9	-5%
CPU Shipments	4,354	4,960	3,192	5,040	5,040	4%
Workstation Shipments	1,630	2,345	801	3,134	3,167	18%
Workstations Shipped To-Date	1,990	4,335	5,136	8,270	11,438	55%
Europe						
Total Revenue	188.4	237.5	324.0	359.8	359.8	18%
CPU Shipments	582	1,962	2,660	4,200	4,200	64%
Workstation Shipments	218	927	668	2,612	2,640	87%
Workstations Shipped To-Date	267	1,194	1,862	4,474	7,113	127%
Asia						
Total Revenue	141.0	189.6	72.9	81.0	81.0	-13%
CPU Shipments	1,167	1,570	598	945	945	-5%
Workstation Shipments	437	845	150	588	594	8%
Workstations Shipped To-Date	543	1,388	1,539	2,126	2,720	50%
Rest of World						
Total Revenue	84.8	47.5	24.3	27.0	27.0	-25%
CPU Shipments	698	392	200	315	315	-18%
Workstation Shipments	262	183	50	196	198	-7%
Workstations Shipped To-Date	275	459	509	704	902	35%
Technical Workstation						
Total Revenue	108.2	123.6	81.0	197.8	201.6	17%
CPU Shipments	2,547	4,301	1,670	6,530	6,599	27%
Workstation Shipments	2,547	4,301	1,670	6,530	6,599	27%
Workstations Shipped To-Date	3,075	7,376	9,045	15,575	22,174	64%
Host/Server						
Total Revenue	833.6	826.1	729.0	701.8	702.6	-4%
CPU Shipments	4,254	4,583	4,980	3,970	3,901	-2%
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.4	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 86
TITLE: Company History
COMPANY: Digital
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	546.9	623.5	437.4	485.5	485.5	-3%
CPU Shipments	3,915	5,852	3,591	5,497	5,494	9%
Workstation Shipments	1,381	2,834	902	3,319	3,354	25%
Workstations Shipped To-Date	1,645	4,479	5,381	8,699	12,053	65%
North America						
Total Revenue	306.3	321.7	209.9	233.0	233.0	-7%
CPU Shipments	2,521	3,359	1,724	2,638	2,637	1%
Workstation Shipments	897	1,588	433	1,593	1,610	16%
Workstations Shipped To-Date	1,076	2,664	3,097	4,690	6,300	56%
Europe						
Total Revenue	109.4	142.5	175.0	194.2	194.2	15%
CPU Shipments	337	1,177	1,436	2,199	2,198	60%
Workstation Shipments	120	556	361	1,327	1,342	83%
Workstations Shipped To-Date	144	701	1,061	2,389	3,730	125%
Asia						
Total Revenue	81.9	127.1	39.4	43.7	43.7	-15%
CPU Shipments	652	1,050	323	495	494	-7%
Workstation Shipments	221	566	81	299	302	8%
Workstations Shipped To-Date	274	839	921	1,219	1,521	54%
Rest of World						
Total Revenue	49.2	32.2	13.1	14.6	14.6	-26%
CPU Shipments	405	266	108	165	165	-20%
Workstation Shipments	144	124	27	100	101	-9%
Workstations Shipped To-Date	151	275	302	401	502	35%
Technical Workstation						
Total Revenue	54.7	81.1	43.7	100.6	100.5	16%
CPU Shipments	1,381	2,834	902	3,319	3,354	25%
Workstation Shipments	1,381	2,834	902	3,319	3,354	25%
Workstations Shipped To-Date	1,645	4,479	5,381	8,699	12,053	65%
Host/Server						
Total Revenue	492.2	542.4	393.7	385.0	385.0	-6%
CPU Shipments	2,534	3,018	2,689	2,178	2,140	-4%
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 87
TITLE: Company History
COMPANY: Digital
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	130.9	74.7	89.1	98.9	89.9	-9%
CPU Shipments	936	699	731	1,120	1,017	2%
Workstation Shipments	330	339	184	676	621	17%
Workstations Shipped To-Date	409	748	932	1,608	2,229	53%
North America						
Total Revenue	73.3	37.5	42.8	47.5	43.2	-12%
CPU Shipments	603	392	351	537	488	-5%
Workstation Shipments	214	185	88	324	298	9%
Workstations Shipped To-Date	268	454	542	866	1,164	44%
Europe						
Total Revenue	26.2	16.6	35.6	39.6	35.9	8%
CPU Shipments	81	137	293	448	407	50%
Workstation Shipments	29	65	73	270	248	71%
Workstations Shipped To-Date	36	101	174	445	693	109%
Asia						
Total Revenue	19.6	16.8	8.0	8.9	8.1	-20%
CPU Shipments	156	139	66	101	92	-12%
Workstation Shipments	52	75	17	61	56	2%
Workstations Shipped To-Date	68	143	159	220	276	42%
Rest of World						
Total Revenue	11.8	3.8	2.7	3.0	2.7	-31%
CPU Shipments	97	31	22	34	31	-25%
Workstation Shipments	34	14	6	20	19	-14%
Workstations Shipped To-Date	36	51	56	77	95	27%
Technical Workstation						
Total Revenue	13.1	9.7	8.9	20.5	18.6	9%
CPU Shipments	330	339	184	676	621	17%
Workstation Shipments	330	339	184	676	621	17%
Workstations Shipped To-Date	409	748	932	1,608	2,229	53%
Host/Server						
Total Revenue	117.8	65.0	80.2	78.4	71.3	-12%
CPU Shipments	606	360	548	444	396	-10%
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 88
TITLE: Company History
COMPANY: Digital
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	50.8	77.8	81.0	89.9	98.9	18%
CPU Shipments	363	721	665	1,018	1,119	32%
Workstation Shipments	128	349	167	615	683	52%
Workstations Shipped To-Date	138	487	654	1,269	1,952	94%
North America						
Total Revenue	28.4	36.2	38.9	43.2	47.5	14%
CPU Shipments	234	377	319	489	537	23%
Workstation Shipments	83	178	80	295	328	41%
Workstations Shipped To-Date	90	269	349	644	972	81%
Europe						
Total Revenue	10.2	23.8	32.4	36.0	39.6	40%
CPU Shipments	31	196	266	407	448	94%
Workstation Shipments	11	93	67	246	273	122%
Workstations Shipped To-Date	12	105	172	418	691	175%
Asia						
Total Revenue	7.6	14.2	7.3	8.1	8.9	4%
CPU Shipments	60	118	60	92	101	14%
Workstation Shipments	20	63	15	55	61	32%
Workstations Shipped To-Date	22	85	100	156	217	77%
Rest of World						
Total Revenue	4.6	3.6	2.4	2.7	3.0	-10%
CPU Shipments	38	30	20	31	34	-3%
Workstation Shipments	13	14	5	18	21	11%
Workstations Shipped To-Date	14	28	33	51	72	51%
Technical Workstation						
Total Revenue	5.1	10.1	8.1	18.6	20.5	42%
CPU Shipments	128	349	167	615	683	52%
Workstation Shipments	128	349	167	615	683	52%
Workstations Shipped To-Date	138	487	654	1,269	1,952	94%
Host/Server						
Total Revenue	45.7	67.6	72.9	71.3	78.4	14%
CPU Shipments	235	373	498	403	436	17%
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 89
TITLE: Company History
COMPANY: Digital
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	129.2	112.1	97.2	90.1	92.6	-8%
CPU Shipments	964	1,042	798	1,146	1,148	4%
Workstation Shipments	470	503	200	768	776	13%
Workstations Shipped To-Date	575	1,078	1,279	2,047	2,823	49%
North America						
Total Revenue	72.4	51.6	46.7	43.3	45.8	-11%
CPU Shipments	595	539	383	550	551	-2%
Workstation Shipments	282	255	96	369	373	7%
Workstations Shipped To-Date	354	609	705	1,074	1,447	42%
Europe						
Total Revenue	25.9	35.6	38.9	36.0	36.0	9%
CPU Shipments	80	294	319	459	459	55%
Workstation Shipments	38	139	80	307	311	69%
Workstations Shipped To-Date	48	187	267	574	884	108%
Asia						
Total Revenue	19.3	19.7	8.8	8.1	8.1	-20%
CPU Shipments	194	166	72	103	103	-15%
Workstation Shipments	104	89	18	69	70	-10%
Workstations Shipped To-Date	125	215	233	302	372	31%
Rest of World						
Total Revenue	11.6	5.2	2.9	2.7	2.7	-31%
CPU Shipments	94	43	24	34	34	-22%
Workstation Shipments	45	20	6	23	23	-15%
Workstations Shipped To-Date	48	68	74	97	120	26%
Technical Workstation						
Total Revenue	25.9	14.6	9.7	23.3	25.2	-1%
CPU Shipments	470	503	200	768	776	13%
Workstation Shipments	470	503	200	768	776	13%
Workstations Shipped To-Date	575	1,078	1,279	2,047	2,823	49%
Host/Server						
Total Revenue	103.3	97.5	87.5	66.8	67.3	-10%
CPU Shipments	494	539	598	378	372	-7%
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.2	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 90
TITLE: Company History
COMPANY: Digital
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	32.3	22.0	40.5	36.0	36.0	3%
CPU Shipments	200	202	333	459	459	23%
Workstation Shipments	42	98	83	307	311	65%
Workstations Shipped To-Date	68	166	250	557	868	89%
North America						
Total Revenue	18.2	9.6	19.4	17.3	17.3	-1%
CPU Shipments	128	100	160	220	220	15%
Workstation Shipments	27	47	40	147	149	54%
Workstations Shipped To-Date	45	92	132	279	429	76%
Europe						
Total Revenue	6.5	7.1	16.2	14.4	14.4	22%
CPU Shipments	17	59	133	183	184	81%
Workstation Shipments	3	28	33	123	124	145%
Workstations Shipped To-Date	6	34	67	190	314	170%
Asia						
Total Revenue	4.8	4.3	3.7	3.3	3.2	-9%
CPU Shipments	34	35	30	41	41	5%
Workstation Shipments	8	19	7	28	28	37%
Workstations Shipped To-Date	13	32	40	67	95	65%
Rest of World						
Total Revenue	2.9	1.0	1.2	1.1	1.1	-22%
CPU Shipments	21	8	10	14	14	-10%
Workstation Shipments	4	4	3	9	9	22%
Workstations Shipped To-Date	5	9	11	20	30	57%
Technical Workstation						
Total Revenue	1.7	2.9	4.1	9.3	9.3	54%
CPU Shipments	42	98	83	307	311	65%
Workstation Shipments	42	98	83	307	311	65%
Workstations Shipped To-Date	68	166	250	557	868	89%
Host/Server						
Total Revenue	30.7	19.1	36.5	26.7	26.7	-3%
CPU Shipments	158	104	249	151	149	-1%
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 91
TITLE: Company History
COMPANY: Digital
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	51.8	39.6	64.8	99.1	101.7	18%
CPU Shipments	423	367	532	1,261	1,263	31%
Workstation Shipments	196	178	134	845	854	44%
Workstations Shipped To-Date	239	417	550	1,395	2,249	75%
North America						
Total Revenue	29.0	18.4	31.1	47.6	50.1	15%
CPU Shipments	272	192	255	605	606	22%
Workstation Shipments	127	91	64	406	410	34%
Workstations Shipped To-Date	156	247	311	717	1,126	64%
Europe						
Total Revenue	10.3	11.9	25.9	39.7	39.6	40%
CPU Shipments	36	98	213	504	505	93%
Workstation Shipments	17	46	53	338	342	112%
Workstations Shipped To-Date	21	67	121	459	800	149%
Asia						
Total Revenue	7.8	7.5	5.9	8.9	8.9	4%
CPU Shipments	71	62	48	113	114	13%
Workstation Shipments	32	33	12	76	77	24%
Workstations Shipped To-Date	41	74	86	162	239	55%
Rest of World						
Total Revenue	4.7	1.8	1.9	3.0	3.0	-11%
CPU Shipments	44	15	16	38	38	-4%
Workstation Shipments	20	7	4	25	26	6%
Workstations Shipped To-Date	22	29	33	58	84	40%
Technical Workstation						
Total Revenue	7.8	5.2	6.5	25.6	27.5	37%
CPU Shipments	196	178	134	845	854	44%
Workstation Shipments	196	178	134	845	854	44%
Workstations Shipped To-Date	239	417	550	1,395	2,249	75%
Host/Server						
Total Revenue	44.0	34.5	58.3	73.5	74.0	14%
CPU Shipments	226	190	398	416	409	16%
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.2	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 92
TITLE: Company History
COMPANY: EEsof
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.5	8.5	11.3	18.0	26.0	55%
CPU Shipments	0	0	11	14	18	NA
Workstation Shipments	0	0	11	14	18	NA
Workstations Shipped To-Date	0	0	11	25	43	NA
North America						
Total Revenue	4.5	6.8	7.4	10.4	15.1	35%
CPU Shipments	0	0	7	8	10	NA
Workstation Shipments	0	0	7	8	10	NA
Workstations Shipped To-Date	0	0	7	15	26	NA
Europe						
Total Revenue	.0	1.3	2.8	5.4	7.8	NA
CPU Shipments	0	0	3	4	5	NA
Workstation Shipments	0	0	3	4	5	NA
Workstations Shipped To-Date	0	0	3	7	12	NA
Asia						
Total Revenue	.0	.4	1.1	2.0	2.9	NA
CPU Shipments	0	0	1	2	2	NA
Workstation Shipments	0	0	1	2	2	NA
Workstations Shipped To-Date	0	0	1	3	5	NA
Rest of World						
Total Revenue	.0	.0	.0	.2	.3	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	1.4	2.6	2.8	5.9	11.7	72%
CPU Shipments	0	0	3	3	18	NA
Workstation Shipments	0	0	3	3	18	NA
Workstations Shipped To-Date	0	0	3	6	24	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	1.3	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	3.2	6.0	8.5	12.1	13.0	43%
CPU Shipments	0	0	8	11	0	NA
Workstation Shipments	0	0	8	11	0	NA
Workstations Shipped To-Date	0	0	8	19	19	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 93
TITLE: Company History
COMPANY: EEsof
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.5	8.5	11.3	18.0	26.0	55%
CPU Shipments	0	0	11	14	18	NA
Workstation Shipments	0	0	11	14	18	NA
Workstations Shipped To-Date	0	0	11	25	43	NA
North America						
Total Revenue	4.5	6.8	7.4	10.4	15.1	35%
CPU Shipments	0	0	7	8	10	NA
Workstation Shipments	0	0	7	8	10	NA
Workstations Shipped To-Date	0	0	7	15	26	NA
Europe						
Total Revenue	.0	1.3	2.8	5.4	7.8	NA
CPU Shipments	0	0	3	4	5	NA
Workstation Shipments	0	0	3	4	5	NA
Workstations Shipped To-Date	0	0	3	7	12	NA
Asia						
Total Revenue	.0	.4	1.1	2.0	2.9	NA
CPU Shipments	0	0	1	2	2	NA
Workstation Shipments	0	0	1	2	2	NA
Workstations Shipped To-Date	0	0	1	3	5	NA
Rest of World						
Total Revenue	.0	.0	.0	.2	.3	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	1.4	2.6	2.8	5.9	11.7	72%
CPU Shipments	0	0	3	3	18	NA
Workstation Shipments	0	0	3	3	18	NA
Workstations Shipped To-Date	0	0	3	6	24	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	1.3	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	3.2	6.0	8.5	12.1	13.0	43%
CPU Shipments	0	0	8	11	0	NA
Workstation Shipments	0	0	8	11	0	NA
Workstations Shipped To-Date	0	0	8	19	19	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 94
TITLE: Company History
COMPANY: ESRI
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	15.0	22.1	43.0	53.2	71.2	48%
CPU Shipments	15	15	26	0	0	-100%
Workstation Shipments	60	53	44	0	0	-100%
Workstations Shipped To-Date	0	53	97	97	97	NA
North America						
Total Revenue	15.0	22.1	33.5	37.8	49.1	35%
CPU Shipments	15	15	21	0	0	-100%
Workstation Shipments	60	53	35	0	0	-100%
Workstations Shipped To-Date	0	53	88	88	88	NA
Europe						
Total Revenue	.0	.0	7.1	11.2	15.7	NA
CPU Shipments	0	0	4	0	0	NA
Workstation Shipments	0	0	7	0	0	NA
Workstations Shipped To-Date	0	0	7	7	7	NA
Asia						
Total Revenue	.0	.0	1.9	3.2	4.3	NA
CPU Shipments	0	0	1	0	0	NA
Workstation Shipments	0	0	2	0	0	NA
Workstations Shipped To-Date	0	0	2	2	2	NA
Rest of World						
Total Revenue	.0	.0	.5	1.1	2.1	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.2	9.7	20.8	40.6	NA
CPU Shipments	0	2	20	0	0	NA
Workstation Shipments	0	2	20	0	0	NA
Workstations Shipped To-Date	0	2	22	22	22	NA
Host/Server						
Total Revenue	15.0	20.1	27.3	28.2	24.2	13%
CPU Shipments	15	13	6	0	0	-100%
Workstation Shipments	60	51	24	0	0	-100%
Workstations Shipped To-Date	0	51	75	75	75	NA
Personal Computer						
Total Revenue	.0	1.8	6.0	4.3	6.4	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 95
TITLE: Company History
COMPANY: ESRI
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	15.0	22.1	43.0	53.2	71.2	48%
CPU Shipments	15	15	26	0	0	-100%
Workstation Shipments	60	53	44	0	0	-100%
Workstations Shipped To-Date	0	53	97	97	97	NA
North America						
Total Revenue	15.0	22.1	33.5	37.8	49.1	35%
CPU Shipments	15	15	21	0	0	-100%
Workstation Shipments	60	53	35	0	0	-100%
Workstations Shipped To-Date	0	53	88	88	88	NA
Europe						
Total Revenue	.0	.0	7.1	11.2	15.7	NA
CPU Shipments	0	0	4	0	0	NA
Workstation Shipments	0	0	7	0	0	NA
Workstations Shipped To-Date	0	0	7	7	7	NA
Asia						
Total Revenue	.0	.0	1.9	3.2	4.3	NA
CPU Shipments	0	0	1	0	0	NA
Workstation Shipments	0	0	2	0	0	NA
Workstations Shipped To-Date	0	0	2	2	2	NA
Rest of World						
Total Revenue	.0	.0	.5	1.1	2.1	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.2	9.7	20.8	40.6	NA
CPU Shipments	0	2	20	0	0	NA
Workstation Shipments	0	2	20	0	0	NA
Workstations Shipped To-Date	0	2	22	22	22	NA
Host/Server						
Total Revenue	15.0	20.1	27.3	28.2	24.2	13%
CPU Shipments	15	13	6	0	0	-100%
Workstation Shipments	60	51	24	0	0	-100%
Workstations Shipped To-Date	0	51	75	75	75	NA
Personal Computer						
Total Revenue	.0	1.8	6.0	4.3	6.4	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 96
TITLE: Company History
COMPANY: Everex Systems
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	2.5	13.5	16.4	18.8	NA
CPU Shipments	NA	1,249	6,750	4,848	5,723	NA
Workstation Shipments	NA	1,249	6,750	4,848	5,723	NA
Workstations Shipped To-Date	NA	1,249	7,999	12,847	18,570	NA
North America						
Total Revenue	NA	2.1	11.5	14.8	17.0	NA
CPU Shipments	NA	1,062	5,737	4,365	5,151	NA
Workstation Shipments	NA	1,062	5,737	4,365	5,151	NA
Workstations Shipped To-Date	NA	1,062	6,799	11,164	16,315	NA
Europe						
Total Revenue	NA	.4	2.0	1.3	1.5	NA
CPU Shipments	NA	187	1,013	386	458	NA
Workstation Shipments	NA	187	1,013	386	458	NA
Workstations Shipped To-Date	NA	187	1,200	1,586	2,044	NA
Asia						
Total Revenue	NA	.0	.0	.3	.4	NA
CPU Shipments	NA	0	0	97	114	NA
Workstation Shipments	NA	0	0	97	114	NA
Workstations Shipped To-Date	NA	0	0	97	211	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.8	1.5	NA
CPU Shipments	NA	0	0	93	183	NA
Workstation Shipments	NA	0	0	93	183	NA
Workstations Shipped To-Date	NA	0	0	93	277	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	2.5	13.5	15.6	17.4	NA
CPU Shipments	NA	1,249	6,750	4,755	5,540	NA
Workstation Shipments	NA	1,249	6,750	4,755	5,540	NA
Workstations Shipped To-Date	NA	1,249	7,999	12,754	18,294	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 97
TITLE: Company History
COMPANY: Everex Systems
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	1.5	8.1	4.4	4.7	NA
CPU Shipments	NA	749	4,050	1,307	1,431	NA
Workstation Shipments	NA	749	4,050	1,307	1,431	NA
Workstations Shipped To-Date	NA	749	4,799	6,106	7,537	NA
North America						
Total Revenue	NA	1.3	6.9	4.0	4.2	NA
CPU Shipments	NA	637	3,442	1,179	1,288	NA
Workstation Shipments	NA	637	3,442	1,179	1,288	NA
Workstations Shipped To-Date	NA	637	4,079	5,258	6,545	NA
Europe						
Total Revenue	NA	.2	1.2	.3	.4	NA
CPU Shipments	NA	112	607	103	114	NA
Workstation Shipments	NA	112	607	103	114	NA
Workstations Shipped To-Date	NA	112	720	823	937	NA
Asia						
Total Revenue	NA	.0	.0	.1	.1	NA
CPU Shipments	NA	0	0	26	29	NA
Workstation Shipments	NA	0	0	26	29	NA
Workstations Shipped To-Date	NA	0	0	26	55	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.2	.4	NA
CPU Shipments	NA	0	0	24	46	NA
Workstation Shipments	NA	0	0	24	46	NA
Workstations Shipped To-Date	NA	0	0	24	70	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	1.5	8.1	4.2	4.3	NA
CPU Shipments	NA	749	4,050	1,284	1,385	NA
Workstation Shipments	NA	749	4,050	1,284	1,385	NA
Workstations Shipped To-Date	NA	749	4,799	6,083	7,468	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 98
TITLE: Company History
COMPANY: Everex Systems
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	.9	4.7	6.2	7.0	NA
CPU Shipments	NA	437	2,362	1,843	2,118	NA
Workstation Shipments	NA	437	2,362	1,843	2,118	NA
Workstations Shipped To-Date	NA	437	2,799	4,642	6,760	NA
North America						
Total Revenue	NA	.7	4.0	5.6	6.3	NA
CPU Shipments	NA	372	2,008	1,659	1,906	NA
Workstation Shipments	NA	372	2,008	1,659	1,906	NA
Workstations Shipped To-Date	NA	372	2,379	4,038	5,944	NA
Europe						
Total Revenue	NA	.1	.7	.5	.6	NA
CPU Shipments	NA	65	354	147	169	NA
Workstation Shipments	NA	65	354	147	169	NA
Workstations Shipped To-Date	NA	65	420	567	737	NA
Asia						
Total Revenue	NA	.0	.0	.1	.1	NA
CPU Shipments	NA	0	0	37	42	NA
Workstation Shipments	NA	0	0	37	42	NA
Workstations Shipped To-Date	NA	0	0	37	79	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.3	.6	NA
CPU Shipments	NA	0	0	36	68	NA
Workstation Shipments	NA	0	0	36	68	NA
Workstations Shipped To-Date	NA	0	0	36	104	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.9	4.7	5.9	6.4	NA
CPU Shipments	NA	437	2,362	1,807	2,050	NA
Workstation Shipments	NA	437	2,362	1,807	2,050	NA
Workstations Shipped To-Date	NA	437	2,799	4,606	6,656	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 99
TITLE: Company History
COMPANY: Everex Systems
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	1.0	1.0	NA
CPU Shipments	NA	NA	NA	291	286	NA
Workstation Shipments	NA	NA	NA	291	286	NA
Workstations Shipped To-Date	NA	NA	NA	291	577	NA
North America						
Total Revenue	NA	NA	NA	.9	.9	NA
CPU Shipments	NA	NA	NA	262	258	NA
Workstation Shipments	NA	NA	NA	262	258	NA
Workstations Shipped To-Date	NA	NA	NA	262	519	NA
Europe						
Total Revenue	NA	NA	NA	.1	.1	NA
CPU Shipments	NA	NA	NA	23	23	NA
Workstation Shipments	NA	NA	NA	23	23	NA
Workstations Shipped To-Date	NA	NA	NA	23	46	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	6	6	NA
Workstation Shipments	NA	NA	NA	6	6	NA
Workstations Shipped To-Date	NA	NA	NA	6	12	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	.0	.1	NA
CPU Shipments	NA	NA	NA	6	9	NA
Workstation Shipments	NA	NA	NA	6	9	NA
Workstations Shipped To-Date	NA	NA	NA	6	15	NA
Host/Server						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Personal Computer						
Total Revenue	NA	NA	NA	.9	.9	NA
CPU Shipments	NA	NA	NA	285	277	NA
Workstation Shipments	NA	NA	NA	285	277	NA
Workstations Shipped To-Date	NA	NA	NA	285	562	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 100
TITLE: Company History
COMPANY: Everex Systems
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	.1	.4	2.5	3.6	NA
CPU Shipments	NA	37	202	728	1,087	NA
Workstation Shipments	NA	37	202	728	1,087	NA
Workstations Shipped To-Date	NA	37	240	967	2,055	NA
North America						
Total Revenue	NA	.1	.3	2.2	3.2	NA
CPU Shipments	NA	32	172	655	979	NA
Workstation Shipments	NA	32	172	655	979	NA
Workstations Shipped To-Date	NA	32	204	859	1,837	NA
Europe						
Total Revenue	NA	.0	.1	.2	.3	NA
CPU Shipments	NA	5	31	58	87	NA
Workstation Shipments	NA	5	31	58	87	NA
Workstations Shipped To-Date	NA	5	36	94	181	NA
Asia						
Total Revenue	NA	.0	.0	.1	.1	NA
CPU Shipments	NA	0	0	15	22	NA
Workstation Shipments	NA	0	0	15	22	NA
Workstations Shipped To-Date	NA	0	0	15	36	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.1	.3	NA
CPU Shipments	NA	0	0	14	35	NA
Workstation Shipments	NA	0	0	14	35	NA
Workstations Shipped To-Date	NA	0	0	14	49	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.1	.4	2.3	3.3	NA
CPU Shipments	NA	37	202	713	1,053	NA
Workstation Shipments	NA	37	202	713	1,053	NA
Workstations Shipped To-Date	NA	37	240	953	2,006	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 101
TITLE: Company History
COMPANY: Everex Systems
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	.7	1.0	NA
CPU Shipments	NA	NA	NA	194	286	NA
Workstation Shipments	NA	NA	NA	194	286	NA
Workstations Shipped To-Date	NA	NA	NA	194	480	NA
North America						
Total Revenue	NA	NA	NA	.6	.9	NA
CPU Shipments	NA	NA	NA	175	258	NA
Workstation Shipments	NA	NA	NA	175	258	NA
Workstations Shipped To-Date	NA	NA	NA	175	432	NA
Europe						
Total Revenue	NA	NA	NA	.1	.1	NA
CPU Shipments	NA	NA	NA	16	23	NA
Workstation Shipments	NA	NA	NA	16	23	NA
Workstations Shipped To-Date	NA	NA	NA	16	38	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	4	6	NA
Workstation Shipments	NA	NA	NA	4	6	NA
Workstations Shipped To-Date	NA	NA	NA	4	10	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	.0	.1	NA
CPU Shipments	NA	NA	NA	4	9	NA
Workstation Shipments	NA	NA	NA	4	9	NA
Workstations Shipped To-Date	NA	NA	NA	4	13	NA
Host/Server						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Personal Computer						
Total Revenue	NA	NA	NA	.6	.9	NA
CPU Shipments	NA	NA	NA	190	277	NA
Workstation Shipments	NA	NA	NA	190	277	NA
Workstations Shipped To-Date	NA	NA	NA	190	467	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 102
TITLE: Company History
COMPANY: Everex Systems
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	.1	.3	1.6	1.7	NA
CPU Shipments	NA	25	135	485	515	NA
Workstation Shipments	NA	25	135	485	515	NA
Workstations Shipped To-Date	NA	25	161	646	1,161	NA
North America						
Total Revenue	NA	.0	.2	1.5	1.5	NA
CPU Shipments	NA	21	115	437	464	NA
Workstation Shipments	NA	21	115	437	464	NA
Workstations Shipped To-Date	NA	21	136	573	1,037	NA
Europe						
Total Revenue	NA	.0	.0	.1	.1	NA
CPU Shipments	NA	4	21	39	41	NA
Workstation Shipments	NA	4	21	39	41	NA
Workstations Shipped To-Date	NA	4	25	63	105	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	10	10	NA
Workstation Shipments	NA	0	0	10	10	NA
Workstations Shipped To-Date	NA	0	0	10	20	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.1	.1	NA
CPU Shipments	NA	0	0	10	17	NA
Workstation Shipments	NA	0	0	10	17	NA
Workstations Shipped To-Date	NA	0	0	10	26	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.1	.3	1.6	1.6	NA
CPU Shipments	NA	25	135	475	499	NA
Workstation Shipments	NA	25	135	475	499	NA
Workstations Shipped To-Date	NA	25	161	636	1,135	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 103
TITLE: Company History
COMPANY: Ferranti
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	31.2	32.3	31.1	22.3	21.8	-9%
CPU Shipments	40	46	52	182	201	50%
Workstation Shipments	239	275	266	182	201	-4%
Workstations Shipped To-Date	332	607	874	1,056	1,257	39%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	5	5	5	5	5	0%
Europe						
Total Revenue	31.2	32.3	31.1	22.3	21.8	-9%
CPU Shipments	40	46	52	182	201	50%
Workstation Shipments	239	275	266	182	201	-4%
Workstations Shipped To-Date	327	602	869	1,051	1,252	40%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.6	.6	.8	22.3	21.8	143%
CPU Shipments	7	8	11	182	201	132%
Workstation Shipments	7	8	11	182	201	132%
Workstations Shipped To-Date	21	29	40	222	423	112%
Host/Server						
Total Revenue	30.5	31.6	30.3	.0	.0	-100%
CPU Shipments	33	38	41	0	0	-100%
Workstation Shipments	232	267	255	0	0	-100%
Workstations Shipped To-Date	311	578	833	833	833	28%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 104
TITLE: Company History
COMPANY: Ferranti
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	31.2	32.3	31.1	22.3	21.8	-9%
CPU Shipments	40	46	52	182	201	50%
Workstation Shipments	239	275	266	182	201	-4%
Workstations Shipped To-Date	330	605	871	1,053	1,254	40%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	2	2	2	2	2	0%
Europe						
Total Revenue	31.2	32.3	31.1	22.3	21.8	-9%
CPU Shipments	40	46	52	182	201	50%
Workstation Shipments	239	275	266	182	201	-4%
Workstations Shipped To-Date	327	602	869	1,051	1,252	40%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.6	.6	.8	22.3	21.8	143%
CPU Shipments	7	8	11	182	201	132%
Workstation Shipments	7	8	11	182	201	132%
Workstations Shipped To-Date	21	29	40	222	423	113%
Host/Server						
Total Revenue	30.5	31.6	30.3	.0	.0	-100%
CPU Shipments	33	38	41	0	0	-100%
Workstation Shipments	232	267	255	0	0	-100%
Workstations Shipped To-Date	309	576	831	831	831	28%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 105
TITLE: Company History
COMPANY: Fujitsu
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	132.0	158.0	269.0	311.8	395.4	32%
CPU Shipments	521	474	2,604	5,543	8,778	103%
Workstation Shipments	1,230	2,360	2,975	6,983	8,778	63%
Workstations Shipped To-Date	2,072	4,432	7,407	14,390	23,168	83%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	132.0	158.0	269.0	305.9	395.4	32%
CPU Shipments	521	474	2,604	5,438	8,778	103%
Workstation Shipments	1,230	2,360	2,975	6,850	8,778	63%
Workstations Shipped To-Date	2,072	4,432	7,407	14,257	23,035	83%
Rest of World						
Total Revenue	.0	.0	.0	5.9	.0	NA
CPU Shipments	0	0	0	105	0	NA
Workstation Shipments	0	0	0	133	0	NA
Workstations Shipped To-Date	0	0	0	133	133	NA
Technical Workstation						
Total Revenue	.0	2.0	76.1	124.7	162.1	NA
CPU Shipments	0	0	532	2,989	3,816	NA
Workstation Shipments	0	0	532	2,989	3,816	NA
Workstations Shipped To-Date	0	0	532	3,521	7,337	NA
Host/Server						
Total Revenue	126.1	143.6	148.4	140.3	170.0	8%
CPU Shipments	191	474	41	222	2,877	97%
Workstation Shipments	900	2,360	413	1,662	2,877	34%
Workstations Shipped To-Date	1,541	3,901	4,314	5,975	8,852	55%
Personal Computer						
Total Revenue	5.9	12.4	44.5	46.8	63.3	81%
CPU Shipments	330	0	2,031	2,332	2,085	59%
Workstation Shipments	330	0	2,031	2,332	2,085	59%
Workstations Shipped To-Date	531	531	2,561	4,894	6,979	90%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 106
TITLE: Company History
COMPANY: Fujitsu
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	66.0	71.1	107.6	124.7	162.1	25%
CPU Shipments	395	179	1,151	2,217	3,599	74%
Workstation Shipments	816	1,252	1,297	2,793	3,599	45%
Workstations Shipped To-Date	1,383	2,635	3,931	6,724	10,323	65%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	66.0	71.1	107.6	122.4	162.1	25%
CPU Shipments	395	179	1,151	2,175	3,599	74%
Workstation Shipments	816	1,252	1,297	2,740	3,599	45%
Workstations Shipped To-Date	1,383	2,635	3,931	6,671	10,270	65%
Rest of World						
Total Revenue	.0	.0	.0	2.4	.0	NA
CPU Shipments	0	0	0	42	0	NA
Workstation Shipments	0	0	0	53	0	NA
Workstations Shipped To-Date	0	0	0	53	53	NA
Technical Workstation						
Total Revenue	.0	.7	29.1	49.9	66.5	NA
CPU Shipments	0	0	203	1,196	1,565	NA
Workstation Shipments	0	0	203	1,196	1,565	NA
Workstations Shipped To-Date	0	0	203	1,399	2,963	NA
Host/Server						
Total Revenue	60.7	64.7	58.1	56.1	69.7	4%
CPU Shipments	95	179	16	89	1,179	88%
Workstation Shipments	516	1,252	162	665	1,179	23%
Workstations Shipped To-Date	882	2,134	2,295	2,960	4,140	47%
Personal Computer						
Total Revenue	5.3	5.7	20.4	18.7	25.9	49%
CPU Shipments	300	0	932	933	855	30%
Workstation Shipments	300	0	932	933	855	30%
Workstations Shipped To-Date	501	501	1,433	2,366	3,220	59%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 107
TITLE: Company History
COMPANY: Fujitsu
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	38.3	34.8	80.7	93.5	122.6	34%
CPU Shipments	57	107	863	1,663	2,721	163%
Workstation Shipments	228	400	972	2,095	2,721	86%
Workstations Shipped To-Date	331	732	1,704	3,799	6,520	111%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	38.3	34.8	80.7	91.8	122.6	34%
CPU Shipments	57	107	863	1,631	2,721	163%
Workstation Shipments	228	400	972	2,055	2,721	86%
Workstations Shipped To-Date	331	732	1,704	3,759	6,480	110%
Rest of World						
Total Revenue	.0	.0	.0	1.8	.0	NA
CPU Shipments	0	0	0	32	0	NA
Workstation Shipments	0	0	0	40	0	NA
Workstations Shipped To-Date	0	0	0	40	40	NA
Technical Workstation						
Total Revenue	.0	.7	21.8	37.4	50.3	NA
CPU Shipments	0	0	152	897	1,183	NA
Workstation Shipments	0	0	152	897	1,183	NA
Workstations Shipped To-Date	0	0	152	1,049	2,232	NA
Host/Server						
Total Revenue	38.3	28.5	43.6	42.1	52.7	8%
CPU Shipments	57	107	12	66	892	99%
Workstation Shipments	228	400	121	499	892	41%
Workstations Shipped To-Date	331	732	853	1,351	2,243	61%
Personal Computer						
Total Revenue	.0	5.6	15.3	14.0	19.6	NA
CPU Shipments	0	0	699	700	646	NA
Workstation Shipments	0	0	699	700	646	NA
Workstations Shipped To-Date	0	0	699	1,399	2,045	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 108
TITLE: Company History
COMPANY: Fujitsu
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	7.9	14.2	26.9	31.2	43.5	53%
CPU Shipments	12	53	288	554	966	200%
Workstation Shipments	48	200	324	698	966	112%
Workstations Shipped To-Date	102	302	626	1,324	2,290	118%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	7.9	14.2	26.9	30.6	43.5	53%
CPU Shipments	12	53	288	544	966	200%
Workstation Shipments	48	200	324	685	966	112%
Workstations Shipped To-Date	102	302	626	1,311	2,277	117%
Rest of World						
Total Revenue	.0	.0	.0	.6	.0	NA
CPU Shipments	0	0	0	11	0	NA
Workstation Shipments	0	0	0	13	0	NA
Workstations Shipped To-Date	0	0	0	13	13	NA
Technical Workstation						
Total Revenue	.0	.0	7.3	12.5	17.8	NA
CPU Shipments	0	0	51	299	420	NA
Workstation Shipments	0	0	51	299	420	NA
Workstations Shipped To-Date	0	0	51	350	769	NA
Host/Server						
Total Revenue	7.9	14.2	14.5	14.0	18.7	24%
CPU Shipments	12	53	4	22	316	127%
Workstation Shipments	48	200	40	166	316	60%
Workstations Shipped To-Date	102	302	342	508	825	69%
Personal Computer						
Total Revenue	.0	.0	5.1	4.7	7.0	NA
CPU Shipments	0	0	233	233	229	NA
Workstation Shipments	0	0	233	233	229	NA
Workstations Shipped To-Date	0	0	233	466	696	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 109
TITLE: Company History
COMPANY: Fujitsu
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	6.6	15.8	10.8	24.9	27.7	43%
CPU Shipments	38	53	115	443	614	101%
Workstation Shipments	62	197	130	559	614	77%
Workstations Shipped To-Date	98	295	425	984	1,598	101%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	6.6	15.8	10.8	24.5	27.7	43%
CPU Shipments	38	53	115	435	614	101%
Workstation Shipments	62	197	130	548	614	77%
Workstations Shipped To-Date	98	295	425	973	1,588	101%
Rest of World						
Total Revenue	.0	.0	.0	.5	.0	NA
CPU Shipments	0	0	0	8	0	NA
Workstation Shipments	0	0	0	11	0	NA
Workstations Shipped To-Date	0	0	0	11	11	NA
Technical Workstation						
Total Revenue	.0	.6	2.9	10.0	11.4	NA
CPU Shipments	0	0	20	239	267	NA
Workstation Shipments	0	0	20	239	267	NA
Workstations Shipped To-Date	0	0	20	259	527	NA
Host/Server						
Total Revenue	5.9	14.1	5.8	11.2	11.9	19%
CPU Shipments	8	53	2	18	201	124%
Workstation Shipments	32	197	16	133	201	58%
Workstations Shipped To-Date	68	266	282	415	616	73%
Personal Computer						
Total Revenue	.7	1.1	2.0	3.7	4.4	61%
CPU Shipments	30	0	93	187	146	49%
Workstation Shipments	30	0	93	187	146	49%
Workstations Shipped To-Date	30	30	123	310	456	97%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 110
TITLE: Company History
COMPANY: Fujitsu
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.0	7.9	5.4	12.5	11.9	32%
CPU Shipments	5	30	100	222	263	169%
Workstation Shipments	20	111	100	279	263	90%
Workstations Shipped To-Date	50	161	261	540	804	100%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	4.0	7.9	5.4	12.2	11.9	32%
CPU Shipments	5	30	100	218	263	169%
Workstation Shipments	20	111	100	274	263	90%
Workstations Shipped To-Date	50	161	261	535	798	100%
Rest of World						
Total Revenue	.0	.0	.0	.2	.0	NA
CPU Shipments	0	0	0	4	0	NA
Workstation Shipments	0	0	0	5	0	NA
Workstations Shipped To-Date	0	0	0	5	5	NA
Technical Workstation						
Total Revenue	.0	.0	3.8	5.0	4.9	NA
CPU Shipments	0	0	26	120	114	NA
Workstation Shipments	0	0	26	120	114	NA
Workstations Shipped To-Date	0	0	26	146	260	NA
Host/Server						
Total Revenue	4.0	7.9	.0	5.6	5.1	7%
CPU Shipments	5	30	0	9	86	104%
Workstation Shipments	20	111	0	66	86	44%
Workstations Shipped To-Date	50	161	161	227	314	58%
Personal Computer						
Total Revenue	.0	.0	1.6	1.9	1.9	NA
CPU Shipments	0	0	74	93	63	NA
Workstation Shipments	0	0	74	93	63	NA
Workstations Shipped To-Date	0	0	74	167	229	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 111
TITLE: Company History
COMPANY: Fujitsu
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	9.2	14.2	37.7	24.9	27.7	32%
CPU Shipments	14	53	86	443	614	157%
Workstation Shipments	56	200	152	559	614	82%
Workstations Shipped To-Date	108	307	460	1,018	1,633	97%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	9.2	14.2	37.7	24.5	27.7	32%
CPU Shipments	14	53	86	435	614	157%
Workstation Shipments	56	200	152	548	614	82%
Workstations Shipped To-Date	108	307	460	1,008	1,622	97%
Rest of World						
Total Revenue	.0	.0	.0	.5	.0	NA
CPU Shipments	0	0	0	8	0	NA
Workstation Shipments	0	0	0	11	0	NA
Workstations Shipped To-Date	0	0	0	11	11	NA
Technical Workstation						
Total Revenue	.0	.0	11.3	10.0	11.4	NA
CPU Shipments	0	0	79	239	267	NA
Workstation Shipments	0	0	79	239	267	NA
Workstations Shipped To-Date	0	0	79	318	585	NA
Host/Server						
Total Revenue	9.2	14.2	26.4	11.2	11.9	7%
CPU Shipments	14	53	7	18	201	95%
Workstation Shipments	56	200	73	133	201	38%
Workstations Shipped To-Date	108	307	381	514	715	61%
Personal Computer						
Total Revenue	.0	.0	.0	3.7	4.4	NA
CPU Shipments	0	0	0	187	146	NA
Workstation Shipments	0	0	0	187	146	NA
Workstations Shipped To-Date	0	0	0	187	333	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 112
TITLE: Company History
COMPANY: GeoVision Corp.
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	5.5	10.6	13.3	14.9	20.4	39%
CPU Shipments	10	67	111	141	240	123%
Workstation Shipments	39	100	151	176	240	58%
Workstations Shipped To-Date	39	139	290	466	706	106%
North America						
Total Revenue	2.8	5.3	6.7	7.4	9.4	36%
CPU Shipments	9	34	56	70	110	85%
Workstation Shipments	38	50	76	88	110	31%
Workstations Shipped To-Date	38	88	163	251	362	76%
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.3	.5	.8	.0	.0	-100%
CPU Shipments	0	3	6	0	0	NA
Workstation Shipments	0	5	9	0	0	NA
Workstations Shipped To-Date	0	5	14	14	14	NA
Rest of World						
Total Revenue	2.5	4.8	5.9	7.6	11.0	45%
CPU Shipments	0	30	49	71	130	360%
Workstation Shipments	1	45	67	88	130	224%
Workstations Shipped To-Date	1	46	113	201	330	310%
Technical Workstation						
Total Revenue	2.8	5.3	8.1	10.4	14.7	52%
CPU Shipments	0	57	100	131	195	NA
Workstation Shipments	0	57	100	131	195	NA
Workstations Shipped To-Date	0	57	156	287	481	NA
Host/Server						
Total Revenue	2.8	5.3	5.2	4.5	5.7	20%
CPU Shipments	10	10	11	10	45	47%
Workstation Shipments	39	43	52	45	45	4%
Workstations Shipped To-Date	39	82	134	179	225	55%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 113
TITLE: Company History
COMPANY: GeoVision Corp.
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	5.5	10.6	13.3	14.9	20.4	39%
CPU Shipments	10	67	111	141	240	123%
Workstation Shipments	39	100	151	176	240	58%
Workstations Shipped To-Date	39	139	290	466	706	106%
North America						
Total Revenue	2.8	5.3	6.7	7.4	9.4	36%
CPU Shipments	9	34	56	70	110	85%
Workstation Shipments	38	50	76	88	110	31%
Workstations Shipped To-Date	38	88	163	251	362	76%
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.3	.5	.8	.0	.0	-100%
CPU Shipments	0	3	6	0	0	NA
Workstation Shipments	0	5	9	0	0	NA
Workstations Shipped To-Date	0	5	14	14	14	NA
Rest of World						
Total Revenue	2.5	4.8	5.9	7.6	11.0	45%
CPU Shipments	0	30	49	71	130	360%
Workstation Shipments	1	45	67	88	130	224%
Workstations Shipped To-Date	1	46	113	201	330	310%
Technical Workstation						
Total Revenue	2.8	5.3	8.1	10.4	14.7	52%
CPU Shipments	0	57	100	131	195	NA
Workstation Shipments	0	57	100	131	195	NA
Workstations Shipped To-Date	0	57	156	287	481	NA
Host/Server						
Total Revenue	2.8	5.3	5.2	4.5	5.7	20%
CPU Shipments	10	10	11	10	45	47%
Workstation Shipments	39	43	52	45	45	4%
Workstations Shipped To-Date	39	82	134	179	225	55%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 114
TITLE: Company History
COMPANY: Gerber Systems
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	19.0	21.0	26.8	27.6	29.5	12%
CPU Shipments	224	320	364	414	399	16%
Workstation Shipments	224	320	364	414	399	16%
Workstations Shipped To-Date	1,551	1,871	2,235	2,649	3,048	18%
North America						
Total Revenue	13.5	12.2	15.5	15.5	16.2	5%
CPU Shipments	159	186	191	236	210	7%
Workstation Shipments	159	186	191	236	210	7%
Workstations Shipped To-Date	1,334	1,519	1,710	1,947	2,157	13%
Europe						
Total Revenue	3.6	4.2	5.4	6.1	12.4	36%
CPU Shipments	43	64	86	85	178	43%
Workstation Shipments	43	64	86	85	178	43%
Workstations Shipped To-Date	128	192	278	363	541	43%
Asia						
Total Revenue	1.5	4.2	5.1	5.0	.9	-13%
CPU Shipments	18	64	77	76	11	-11%
Workstation Shipments	18	64	77	76	11	-11%
Workstations Shipped To-Date	56	120	197	273	284	50%
Rest of World						
Total Revenue	.4	.4	.8	1.1	.0	-100%
CPU Shipments	4	6	10	17	0	-100%
Workstation Shipments	4	6	10	17	0	-100%
Workstations Shipped To-Date	33	40	50	66	66	19%
Technical Workstation						
Total Revenue	19.0	21.0	26.8	27.6	29.5	12%
CPU Shipments	224	320	364	414	399	16%
Workstation Shipments	224	320	364	414	399	16%
Workstations Shipped To-Date	645	965	1,329	1,743	2,142	35%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	906	906	906	906	906	0%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 115
TITLE: Company History
COMPANY: Gerber Systems
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	19.0	21.0	26.8	27.6	29.5	12%
CPU Shipments	224	320	364	414	399	16%
Workstation Shipments	224	320	364	414	399	16%
Workstations Shipped To-Date	1,551	1,871	2,235	2,649	3,048	18%
North America						
Total Revenue	13.5	12.2	15.5	15.5	16.2	5%
CPU Shipments	159	186	191	236	210	7%
Workstation Shipments	159	186	191	236	210	7%
Workstations Shipped To-Date	1,334	1,519	1,710	1,947	2,157	13%
Europe						
Total Revenue	3.6	4.2	5.4	6.1	12.4	36%
CPU Shipments	43	64	86	85	178	43%
Workstation Shipments	43	64	86	85	178	43%
Workstations Shipped To-Date	128	192	278	363	541	43%
Asia						
Total Revenue	1.5	4.2	5.1	5.0	.9	-13%
CPU Shipments	18	64	77	76	11	-11%
Workstation Shipments	18	64	77	76	11	-11%
Workstations Shipped To-Date	56	120	197	273	284	50%
Rest of World						
Total Revenue	.4	.4	.8	1.1	.0	-100%
CPU Shipments	4	6	10	17	0	-100%
Workstation Shipments	4	6	10	17	0	-100%
Workstations Shipped To-Date	33	40	50	66	66	19%
Technical Workstation						
Total Revenue	19.0	21.0	26.8	27.6	29.5	12%
CPU Shipments	224	320	364	414	399	16%
Workstation Shipments	224	320	364	414	399	16%
Workstations Shipped To-Date	645	965	1,329	1,743	2,142	35%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	906	906	906	906	906	0%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 116
TITLE: Company History
COMPANY: Hahn & Kolb
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	9.8	12.2	14.6	15.4	NA
CPU Shipments	NA	150	175	210	220	NA
Workstation Shipments	NA	150	175	210	220	NA
Workstations Shipped To-Date	NA	150	325	535	755	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	9.8	12.2	14.6	15.4	NA
CPU Shipments	NA	150	175	210	220	NA
Workstation Shipments	NA	150	175	210	220	NA
Workstations Shipped To-Date	NA	150	325	535	755	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	8.8	10.9	13.1	13.9	NA
CPU Shipments	NA	135	158	189	190	NA
Workstation Shipments	NA	135	158	189	190	NA
Workstations Shipped To-Date	NA	135	293	482	672	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	1.0	1.2	1.5	1.5	NA
CPU Shipments	NA	15	18	21	30	NA
Workstation Shipments	NA	15	18	21	30	NA
Workstations Shipped To-Date	NA	15	33	54	83	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 117
TITLE: Company History
COMPANY: Hahn & Kolb
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	9.8	12.2	14.6	15.4	NA
CPU Shipments	NA	150	175	210	220	NA
Workstation Shipments	NA	150	175	210	220	NA
Workstations Shipped To-Date	NA	150	325	535	755	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	9.8	12.2	14.6	15.4	NA
CPU Shipments	NA	150	175	210	220	NA
Workstation Shipments	NA	150	175	210	220	NA
Workstations Shipped To-Date	NA	150	325	535	755	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	8.8	10.9	13.1	13.9	NA
CPU Shipments	NA	135	158	189	190	NA
Workstation Shipments	NA	135	158	189	190	NA
Workstations Shipped To-Date	NA	135	293	482	672	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	1.0	1.2	1.5	1.5	NA
CPU Shipments	NA	15	18	21	30	NA
Workstation Shipments	NA	15	18	21	30	NA
Workstations Shipped To-Date	NA	15	33	54	83	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 118
TITLE: Company History
COMPANY: Hakuto
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	9.0	14.0	27.0	36.0	41.7	47%
CPU Shipments	275	385	300	880	1,220	45%
Workstation Shipments	275	385	300	880	1,220	45%
Workstations Shipped To-Date	375	760	1,060	1,940	3,160	70%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	9.0	14.0	27.0	36.0	41.7	47%
CPU Shipments	275	385	300	880	1,220	45%
Workstation Shipments	275	385	300	880	1,220	45%
Workstations Shipped To-Date	375	760	1,060	1,940	3,160	70%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	1.3	.8	.4	1.3	NA
CPU Shipments	0	9	3	5	18	NA
Workstation Shipments	0	9	3	5	18	NA
Workstations Shipped To-Date	0	9	12	17	34	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	9.0	12.7	26.2	35.6	40.5	46%
CPU Shipments	275	376	298	875	1,202	45%
Workstation Shipments	275	376	298	875	1,202	45%
Workstations Shipped To-Date	375	751	1,048	1,923	3,126	70%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 119
TITLE: Company History
COMPANY: Hakuto
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	7.7	12.6	24.3	36.0	41.7	53%
CPU Shipments	234	347	270	880	1,220	51%
Workstation Shipments	234	347	270	880	1,220	51%
Workstations Shipped To-Date	324	670	940	1,820	3,040	75%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	7.7	12.6	24.3	36.0	41.7	53%
CPU Shipments	234	347	270	880	1,220	51%
Workstation Shipments	234	347	270	880	1,220	51%
Workstations Shipped To-Date	324	670	940	1,820	3,040	75%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	1.1	.7	.4	1.3	NA
CPU Shipments	0	8	2	5	18	NA
Workstation Shipments	0	8	2	5	18	NA
Workstations Shipped To-Date	0	8	10	15	33	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	7.7	11.5	23.6	35.6	40.5	52%
CPU Shipments	234	338	268	875	1,202	51%
Workstation Shipments	234	338	268	875	1,202	51%
Workstations Shipped To-Date	324	662	930	1,805	3,007	75%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 120
TITLE: Company History
COMPANY: Hewlett-Packard
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	131.9	158.1	355.6	739.8	812.4	58%
CPU Shipments	2,732	3,530	16,257	43,959	48,409	105%
Workstation Shipments	2,732	3,530	16,257	43,959	48,409	105%
Workstations Shipped To-Date	4,133	7,663	23,920	67,879	116,288	130%
North America						
Total Revenue	47.0	47.4	117.3	234.2	255.2	53%
CPU Shipments	1,020	1,031	7,627	15,507	16,990	102%
Workstation Shipments	1,020	1,031	7,627	15,507	16,990	102%
Workstations Shipped To-Date	2,209	3,241	10,868	26,374	43,364	110%
Europe						
Total Revenue	66.6	64.8	159.3	368.5	409.6	57%
CPU Shipments	1,447	1,852	6,144	21,459	24,338	103%
Workstation Shipments	1,447	1,852	6,144	21,459	24,338	103%
Workstations Shipped To-Date	1,712	3,564	9,709	31,167	55,505	139%
Asia						
Total Revenue	14.4	41.1	72.1	122.8	133.0	74%
CPU Shipments	179	543	2,331	6,163	6,229	143%
Workstation Shipments	179	543	2,331	6,163	6,229	143%
Workstations Shipped To-Date	108	651	2,982	9,145	15,374	245%
Rest of World						
Total Revenue	4.0	4.7	6.8	14.3	14.5	38%
CPU Shipments	86	103	155	831	853	77%
Workstation Shipments	86	103	155	831	853	77%
Workstations Shipped To-Date	104	207	362	1,193	2,045	111%
Technical Workstation						
Total Revenue	131.9	158.1	310.6	612.9	659.3	50%
CPU Shipments	2,732	3,530	7,549	26,179	26,582	77%
Workstation Shipments	2,732	3,530	7,549	26,179	26,582	77%
Workstations Shipped To-Date	4,108	7,638	15,187	41,366	67,947	102%
Host/Server						
Total Revenue	.0	.0	.0	18.0	16.1	NA
CPU Shipments	0	0	0	913	809	NA
Workstation Shipments	0	0	0	913	809	NA
Workstations Shipped To-Date	25	25	25	938	1,747	188%
Personal Computer						
Total Revenue	.0	.0	45.1	108.9	137.0	NA
CPU Shipments	0	0	8,708	16,868	21,018	NA
Workstation Shipments	0	0	8,708	16,868	21,018	NA
Workstations Shipped To-Date	0	0	8,708	25,575	46,594	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 121
TITLE: Company History
COMPANY: Hewlett-Packard
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	100.1	117.6	228.4	441.5	503.9	50%
CPU Shipments	2,086	2,725	8,657	22,479	25,746	87%
Workstation Shipments	2,086	2,725	8,657	22,479	25,746	87%
Workstations Shipped To-Date	2,342	5,067	13,723	36,203	61,948	127%
North America						
Total Revenue	36.2	36.5	70.7	139.8	133.7	39%
CPU Shipments	785	794	3,860	7,781	8,275	80%
Workstation Shipments	785	794	3,860	7,781	8,275	80%
Workstations Shipped To-Date	1,175	1,969	5,829	13,610	21,885	108%
Europe						
Total Revenue	51.3	49.9	106.7	228.6	263.4	51%
CPU Shipments	1,114	1,487	3,399	11,255	13,286	86%
Workstation Shipments	1,114	1,487	3,399	11,255	13,286	86%
Workstations Shipped To-Date	1,049	2,536	5,935	17,190	30,476	132%
Asia						
Total Revenue	9.6	27.6	45.7	64.8	97.6	78%
CPU Shipments	120	364	1,286	3,038	3,742	136%
Workstation Shipments	120	364	1,286	3,038	3,742	136%
Workstations Shipped To-Date	70	434	1,719	4,758	8,500	232%
Rest of World						
Total Revenue	3.1	3.7	5.3	8.4	9.2	32%
CPU Shipments	66	79	112	406	442	61%
Workstation Shipments	66	79	112	406	442	61%
Workstations Shipped To-Date	48	128	240	646	1,087	118%
Technical Workstation						
Total Revenue	100.1	117.6	207.6	379.2	426.4	44%
CPU Shipments	2,086	2,725	4,651	13,533	14,501	62%
Workstation Shipments	2,086	2,725	4,651	13,533	14,501	62%
Workstations Shipped To-Date	2,316	5,041	9,692	23,226	37,726	101%
Host/Server						
Total Revenue	.0	.0	.0	6.8	6.3	NA
CPU Shipments	0	0	0	344	316	NA
Workstation Shipments	0	0	0	344	316	NA
Workstations Shipped To-Date	25	25	25	369	685	128%
Personal Computer						
Total Revenue	.0	.0	20.7	55.6	71.2	NA
CPU Shipments	0	0	4,005	8,603	10,930	NA
Workstation Shipments	0	0	4,005	8,603	10,930	NA
Workstations Shipped To-Date	0	0	4,005	12,608	23,538	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 122
TITLE: Company History
COMPANY: Hewlett-Packard
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	34.4	77.7	90.7	NA
CPU Shipments	NA	NA	2,983	6,891	8,001	NA
Workstation Shipments	NA	NA	2,983	6,891	8,001	NA
Workstations Shipped To-Date	NA	NA	3,402	10,293	18,294	NA
North America						
Total Revenue	NA	NA	17.2	28.7	33.1	NA
CPU Shipments	NA	NA	1,698	2,545	2,923	NA
Workstation Shipments	NA	NA	1,698	2,545	2,923	NA
Workstations Shipped To-Date	NA	NA	1,897	4,442	7,365	NA
Europe						
Total Revenue	NA	NA	13.9	40.1	47.4	NA
CPU Shipments	NA	NA	1,029	3,544	4,173	NA
Workstation Shipments	NA	NA	1,029	3,544	4,173	NA
Workstations Shipped To-Date	NA	NA	1,239	4,783	8,956	NA
Asia						
Total Revenue	NA	NA	3.4	7.8	8.9	NA
CPU Shipments	NA	NA	257	695	790	NA
Workstation Shipments	NA	NA	257	695	790	NA
Workstations Shipped To-Date	NA	NA	257	952	1,742	NA
Rest of World						
Total Revenue	NA	NA	.0	1.2	1.3	NA
CPU Shipments	NA	NA	0	107	115	NA
Workstation Shipments	NA	NA	0	107	115	NA
Workstations Shipped To-Date	NA	NA	9	116	231	NA
Technical Workstation						
Total Revenue	NA	NA	22.3	48.4	54.5	NA
CPU Shipments	NA	NA	632	2,568	2,650	NA
Workstation Shipments	NA	NA	632	2,568	2,650	NA
Workstations Shipped To-Date	NA	NA	1,051	3,619	6,268	NA
Host/Server						
Total Revenue	NA	NA	.0	2.1	1.9	NA
CPU Shipments	NA	NA	0	106	97	NA
Workstation Shipments	NA	NA	0	106	97	NA
Workstations Shipped To-Date	NA	NA	0	106	203	NA
Personal Computer						
Total Revenue	NA	NA	12.2	27.2	34.2	NA
CPU Shipments	NA	NA	2,351	4,217	5,255	NA
Workstation Shipments	NA	NA	2,351	4,217	5,255	NA
Workstations Shipped To-Date	NA	NA	2,351	6,568	11,823	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 123
TITLE: Company History
COMPANY: Hewlett-Packard
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	3.8	4.0	7.4	NA
CPU Shipments	NA	NA	331	358	646	NA
Workstation Shipments	NA	NA	331	358	646	NA
Workstations Shipped To-Date	NA	NA	331	690	1,336	NA
North America						
Total Revenue	NA	NA	1.9	1.5	2.7	NA
CPU Shipments	NA	NA	189	137	236	NA
Workstation Shipments	NA	NA	189	137	236	NA
Workstations Shipped To-Date	NA	NA	189	325	561	NA
Europe						
Total Revenue	NA	NA	1.5	2.0	3.9	NA
CPU Shipments	NA	NA	114	177	336	NA
Workstation Shipments	NA	NA	114	177	336	NA
Workstations Shipped To-Date	NA	NA	114	291	627	NA
Asia						
Total Revenue	NA	NA	.4	.4	.7	NA
CPU Shipments	NA	NA	29	38	64	NA
Workstation Shipments	NA	NA	29	38	64	NA
Workstations Shipped To-Date	NA	NA	29	67	131	NA
Rest of World						
Total Revenue	NA	NA	.0	.1	.1	NA
CPU Shipments	NA	NA	0	7	9	NA
Workstation Shipments	NA	NA	0	7	9	NA
Workstations Shipped To-Date	NA	NA	0	7	16	NA
Technical Workstation						
Total Revenue	NA	NA	2.5	2.7	4.5	NA
CPU Shipments	NA	NA	70	181	217	NA
Workstation Shipments	NA	NA	70	181	217	NA
Workstations Shipped To-Date	NA	NA	70	251	468	NA
Host/Server						
Total Revenue	NA	NA	.0	.2	.2	NA
CPU Shipments	NA	NA	0	9	8	NA
Workstation Shipments	NA	NA	0	9	8	NA
Workstations Shipped To-Date	NA	NA	0	9	17	NA
Personal Computer						
Total Revenue	NA	NA	1.3	1.1	2.7	NA
CPU Shipments	NA	NA	261	169	420	NA
Workstation Shipments	NA	NA	261	169	420	NA
Workstations Shipped To-Date	NA	NA	261	430	850	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 124
TITLE: Company History
COMPANY: Hewlett-Packard
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	13.8	17.5	41.8	150.5	151.5	82%
CPU Shipments	280	363	2,317	10,287	10,398	147%
Workstation Shipments	280	363	2,317	10,287	10,398	147%
Workstations Shipped To-Date	282	646	2,963	13,250	23,648	203%
North America						
Total Revenue	4.7	4.7	13.6	41.4	61.6	90%
CPU Shipments	102	103	1,019	3,535	4,070	151%
Workstation Shipments	102	103	1,019	3,535	4,070	151%
Workstations Shipped To-Date	104	207	1,226	4,760	8,830	204%
Europe						
Total Revenue	6.7	6.5	17.5	67.0	67.6	79%
CPU Shipments	145	174	868	4,738	4,921	141%
Workstation Shipments	145	174	868	4,738	4,921	141%
Workstations Shipped To-Date	172	346	1,215	5,952	10,873	182%
Asia						
Total Revenue	2.0	5.8	10.0	39.0	19.9	77%
CPU Shipments	25	76	407	1,806	1,216	164%
Workstation Shipments	25	76	407	1,806	1,216	164%
Workstations Shipped To-Date	0	76	483	2,289	3,505	NA
Rest of World						
Total Revenue	.4	.5	.7	3.1	2.5	58%
CPU Shipments	9	10	23	208	192	117%
Workstation Shipments	9	10	23	208	192	117%
Workstations Shipped To-Date	6	16	40	248	439	193%
Technical Workstation						
Total Revenue	13.8	17.5	35.9	122.3	120.0	72%
CPU Shipments	280	363	1,185	6,467	6,057	116%
Workstation Shipments	280	363	1,185	6,467	6,057	116%
Workstations Shipped To-Date	282	646	1,831	8,298	14,355	167%
Host/Server						
Total Revenue	.0	.0	.0	5.2	4.8	NA
CPU Shipments	0	0	0	264	243	NA
Workstation Shipments	0	0	0	264	243	NA
Workstations Shipped To-Date	0	0	0	264	507	NA
Personal Computer						
Total Revenue	.0	.0	5.9	23.0	26.7	NA
CPU Shipments	0	0	1,132	3,556	4,099	NA
Workstation Shipments	0	0	1,132	3,556	4,099	NA
Workstations Shipped To-Date	0	0	1,132	4,688	8,786	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June--Reproduction Prohibited

TABLE NUMBER: 125
TITLE: Company History
COMPANY: Hewlett-Packard
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1.5	2.0	4.1	13.9	12.9	72%
CPU Shipments	29	35	156	1,258	1,167	152%
Workstation Shipments	29	35	156	1,258	1,167	152%
Workstations Shipped To-Date	11	46	202	1,460	2,627	295%
North America						
Total Revenue	.5	.5	1.2	5.8	5.4	84%
CPU Shipments	10	10	72	528	490	163%
Workstation Shipments	10	10	72	528	490	163%
Workstations Shipped To-Date	4	14	86	615	1,105	311%
Europe						
Total Revenue	.7	.7	1.6	5.8	5.4	69%
CPU Shipments	14	13	55	530	490	141%
Workstation Shipments	14	13	55	530	490	141%
Workstations Shipped To-Date	7	20	75	605	1,095	258%
Asia						
Total Revenue	.3	.8	1.3	1.8	1.7	55%
CPU Shipments	4	11	28	162	152	155%
Workstation Shipments	4	11	28	162	152	155%
Workstations Shipped To-Date	0	11	39	201	353	NA
Rest of World						
Total Revenue	.0	.1	.1	.4	.4	77%
CPU Shipments	1	1	1	38	35	153%
Workstation Shipments	1	1	1	38	35	153%
Workstations Shipped To-Date	0	1	2	40	75	321%
Technical Workstation						
Total Revenue	1.5	2.0	3.7	12.2	11.6	68%
CPU Shipments	29	35	69	1,174	1,102	148%
Workstation Shipments	29	35	69	1,174	1,102	148%
Workstations Shipped To-Date	11	46	115	1,289	2,391	286%
Host/Server						
Total Revenue	.0	.0	.0	1.7	1.3	NA
CPU Shipments	0	0	0	85	65	NA
Workstation Shipments	0	0	0	85	65	NA
Workstations Shipped To-Date	0	0	0	85	149	NA
Personal Computer						
Total Revenue	.0	.0	.5	.0	.0	NA
CPU Shipments	0	0	87	0	0	NA
Workstation Shipments	0	0	87	0	0	NA
Workstations Shipped To-Date	0	0	87	87	87	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 126
TITLE: Company History
COMPANY: Hewlett-Packard
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	16.5	21.0	43.1	52.2	46.0	29%
CPU Shipments	337	406	1,812	2,686	2,451	64%
Workstation Shipments	337	406	1,812	2,686	2,451	64%
Workstations Shipped To-Date	1,080	1,486	3,298	5,984	8,435	67%
North America						
Total Revenue	5.6	5.7	12.8	17.0	18.7	35%
CPU Shipments	122	124	790	982	995	69%
Workstation Shipments	122	124	790	982	995	69%
Workstations Shipped To-Date	727	851	1,641	2,622	3,617	49%
Europe						
Total Revenue	8.0	7.8	18.1	25.0	22.0	29%
CPU Shipments	174	178	679	1,216	1,131	60%
Workstation Shipments	174	178	679	1,216	1,131	60%
Workstations Shipped To-Date	274	451	1,131	2,347	3,478	89%
Asia						
Total Revenue	2.4	7.0	11.4	9.0	4.2	15%
CPU Shipments	30	92	325	423	265	72%
Workstation Shipments	30	92	325	423	265	72%
Workstations Shipped To-Date	38	130	455	878	1,143	134%
Rest of World						
Total Revenue	.5	.6	.8	1.2	1.0	22%
CPU Shipments	10	12	19	65	60	55%
Workstation Shipments	10	12	19	65	60	55%
Workstations Shipped To-Date	41	53	71	137	196	48%
Technical Workstation						
Total Revenue	16.5	21.0	38.6	48.0	42.3	26%
CPU Shipments	337	406	942	2,256	2,055	57%
Workstation Shipments	337	406	942	2,256	2,055	57%
Workstations Shipped To-Date	1,080	1,486	2,427	4,684	6,739	58%
Host/Server						
Total Revenue	.0	.0	.0	2.1	1.6	NA
CPU Shipments	0	0	0	106	81	NA
Workstation Shipments	0	0	0	106	81	NA
Workstations Shipped To-Date	0	0	0	106	187	NA
Personal Computer						
Total Revenue	.0	.0	4.5	2.1	2.0	NA
CPU Shipments	0	0	871	324	315	NA
Workstation Shipments	0	0	871	324	315	NA
Workstations Shipped To-Date	0	0	871	1,195	1,510	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 127
TITLE: Company History
COMPANY: Hitachi
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	103.6	124.0	154.0	180.0	208.3	19%
CPU Shipments	1,367	1,766	1,042	4,647	4,324	33%
Workstation Shipments	1,588	2,110	1,500	4,800	6,400	42%
Workstations Shipped To-Date	2,839	4,949	6,449	11,249	17,649	58%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	103.6	124.0	154.0	180.0	208.3	19%
CPU Shipments	1,367	1,766	1,042	4,647	4,324	33%
Workstation Shipments	1,588	2,110	1,500	4,800	6,400	42%
Workstations Shipped To-Date	2,839	4,949	6,449	11,249	17,649	58%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	6.0	30.8	81.0	104.2	NA
CPU Shipments	0	110	300	1,529	2,162	NA
Workstation Shipments	0	110	300	1,529	2,162	NA
Workstations Shipped To-Date	0	110	410	1,939	4,101	NA
Host/Server						
Total Revenue	62.9	59.1	84.7	37.8	33.3	-15%
CPU Shipments	74	55	42	51	692	75%
Workstation Shipments	295	399	500	204	2,768	75%
Workstations Shipped To-Date	545	944	1,444	1,648	4,415	69%
Personal Computer						
Total Revenue	40.7	58.9	38.5	61.2	70.8	15%
CPU Shipments	1,293	1,601	700	3,067	1,470	3%
Workstation Shipments	1,293	1,601	700	3,067	1,470	3%
Workstations Shipped To-Date	2,294	3,895	4,595	7,663	9,133	41%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 128
TITLE: Company History
COMPANY: Hitachi
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	81.8	98.5	115.5	135.0	156.2	18%
CPU Shipments	1,173	1,240	781	3,880	3,243	29%
Workstation Shipments	1,342	1,554	1,125	3,962	4,800	38%
Workstations Shipped To-Date	2,424	3,979	5,104	9,066	13,866	55%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	81.8	98.5	115.5	135.0	156.2	18%
CPU Shipments	1,173	1,240	781	3,880	3,243	29%
Workstation Shipments	1,342	1,554	1,125	3,962	4,800	38%
Workstations Shipped To-Date	2,424	3,979	5,104	9,066	13,866	55%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	2.9	23.1	60.8	78.1	NA
CPU Shipments	0	53	225	1,147	1,622	NA
Workstation Shipments	0	53	225	1,147	1,622	NA
Workstations Shipped To-Date	0	53	278	1,424	3,046	NA
Host/Server						
Total Revenue	46.7	53.5	63.5	20.3	25.0	-14%
CPU Shipments	56	45	31	27	519	74%
Workstation Shipments	225	359	375	109	2,076	74%
Workstations Shipped To-Date	414	773	1,148	1,258	3,333	68%
Personal Computer						
Total Revenue	35.2	42.1	28.9	54.0	53.1	11%
CPU Shipments	1,117	1,143	525	2,707	1,103	-0%
Workstation Shipments	1,117	1,143	525	2,707	1,103	-0%
Workstations Shipped To-Date	2,010	3,153	3,678	6,384	7,487	39%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 129
TITLE: Company History
COMPANY: Hitachi
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.3	11.8	23.1	18.0	20.8	26%
CPU Shipments	179	311	156	517	432	25%
Workstation Shipments	189	311	225	528	640	36%
Workstations Shipped To-Date	312	622	847	1,376	2,016	59%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	8.3	11.8	23.1	18.0	20.8	26%
CPU Shipments	179	311	156	517	432	25%
Workstation Shipments	189	311	225	528	640	36%
Workstations Shipped To-Date	312	622	847	1,376	2,016	59%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	1.2	4.6	8.1	10.4	NA
CPU Shipments	0	22	45	153	216	NA
Workstation Shipments	0	22	45	153	216	NA
Workstations Shipped To-Date	0	22	67	220	436	NA
Host/Server						
Total Revenue	2.7	.0	12.7	2.7	3.3	5%
CPU Shipments	3	0	6	4	69	118%
Workstation Shipments	12	0	75	15	277	118%
Workstations Shipped To-Date	28	28	103	117	394	94%
Personal Computer						
Total Revenue	5.6	10.6	5.8	7.2	7.1	6%
CPU Shipments	176	289	105	361	147	-4%
Workstation Shipments	176	289	105	361	147	-4%
Workstations Shipped To-Date	284	573	678	1,039	1,186	43%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 130
TITLE: Company History
COMPANY: Hitachi
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	7.7	18.0	20.8	NA
CPU Shipments	NA	NA	52	166	432	NA
Workstation Shipments	NA	NA	75	206	640	NA
Workstations Shipped To-Date	NA	NA	75	281	921	NA
North America						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Asia						
Total Revenue	NA	NA	7.7	18.0	20.8	NA
CPU Shipments	NA	NA	52	166	432	NA
Workstation Shipments	NA	NA	75	206	640	NA
Workstations Shipped To-Date	NA	NA	75	281	921	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	1.5	8.1	10.4	NA
CPU Shipments	NA	NA	15	153	216	NA
Workstation Shipments	NA	NA	15	153	216	NA
Workstations Shipped To-Date	NA	NA	15	168	384	NA
Host/Server						
Total Revenue	NA	NA	4.2	9.9	3.3	NA
CPU Shipments	NA	NA	2	13	69	NA
Workstation Shipments	NA	NA	25	53	277	NA
Workstations Shipped To-Date	NA	NA	25	78	355	NA
Personal Computer						
Total Revenue	NA	NA	1.9	.0	7.1	NA
CPU Shipments	NA	NA	35	0	147	NA
Workstation Shipments	NA	NA	35	0	147	NA
Workstations Shipped To-Date	NA	NA	35	35	182	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 131
TITLE: Company History
COMPANY: Hitachi
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.3	12.4	7.7	9.0	10.4	6%
CPU Shipments	9	191	52	83	216	120%
Workstation Shipments	37	221	75	103	320	72%
Workstations Shipped To-Date	67	288	363	466	786	85%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	8.3	12.4	7.7	9.0	10.4	6%
CPU Shipments	9	191	52	83	216	120%
Workstation Shipments	37	221	75	103	320	72%
Workstations Shipped To-Date	67	288	363	466	786	85%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.6	1.5	4.1	5.2	NA
CPU Shipments	0	11	15	76	108	NA
Workstation Shipments	0	11	15	76	108	NA
Workstations Shipped To-Date	0	11	26	102	211	NA
Host/Server						
Total Revenue	8.3	5.6	4.2	5.0	1.7	-33%
CPU Shipments	9	10	2	7	35	39%
Workstation Shipments	37	40	25	27	138	39%
Workstations Shipped To-Date	67	107	132	159	297	45%
Personal Computer						
Total Revenue	.0	6.3	1.9	.0	3.5	NA
CPU Shipments	0	170	35	0	74	NA
Workstation Shipments	0	170	35	0	74	NA
Workstations Shipped To-Date	0	170	205	205	278	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 132
TITLE: Company History
COMPANY: Hitachi Zosen Info Systems
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	33.5	63.0	77.0	82.7	62.5	17%
CPU Shipments	265	532	869	742	633	24%
Workstation Shipments	490	580	932	750	633	7%
Workstations Shipped To-Date	493	1,073	2,004	2,754	3,387	62%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	33.5	63.0	77.0	82.7	62.5	17%
CPU Shipments	265	532	869	742	633	24%
Workstation Shipments	490	580	932	750	633	7%
Workstations Shipped To-Date	493	1,073	2,004	2,754	3,387	62%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	2.4	49.1	69.4	81.9	58.8	123%
CPU Shipments	20	385	697	740	633	137%
Workstation Shipments	20	385	697	740	633	137%
Workstations Shipped To-Date	20	405	1,102	1,842	2,474	233%
Host/Server						
Total Revenue	22.2	11.4	7.6	.8	3.8	-36%
CPU Shipments	45	16	18	2	0	-100%
Workstation Shipments	270	64	80	10	0	-100%
Workstations Shipped To-Date	271	336	416	426	426	12%
Personal Computer						
Total Revenue	8.9	2.6	.0	.0	.0	-100%
CPU Shipments	200	131	154	0	0	-100%
Workstation Shipments	200	131	154	0	0	-100%
Workstations Shipped To-Date	202	332	487	487	487	25%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 133
TITLE: Company History
COMPANY: Hitachi Zosen Info Systems
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	29.8	51.7	69.3	74.4	58.8	18%
CPU Shipments	216	474	784	668	595	29%
Workstation Shipments	411	522	846	675	595	10%
Workstations Shipped To-Date	413	935	1,781	2,456	3,051	65%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	29.8	51.7	69.3	74.4	58.8	18%
CPU Shipments	216	474	784	668	595	29%
Workstation Shipments	411	522	846	675	595	10%
Workstations Shipped To-Date	413	935	1,781	2,456	3,051	65%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	2.4	37.7	61.7	73.7	55.2	119%
CPU Shipments	20	327	612	666	595	134%
Workstation Shipments	20	327	612	666	595	134%
Workstations Shipped To-Date	20	347	959	1,625	2,219	225%
Host/Server						
Total Revenue	19.7	11.4	7.6	.7	3.5	-35%
CPU Shipments	35	16	18	2	0	-100%
Workstation Shipments	230	64	80	9	0	-100%
Workstations Shipped To-Date	231	295	375	384	384	14%
Personal Computer						
Total Revenue	7.8	2.6	.0	.0	.0	-100%
CPU Shipments	161	131	154	0	0	-100%
Workstation Shipments	161	131	154	0	0	-100%
Workstations Shipped To-Date	162	293	447	447	447	29%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 134
TITLE: Company History
COMPANY: Hitachi Zosen Info Systems
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	2.3	6.9	7.7	7.4	3.8	13%
CPU Shipments	45	29	46	67	38	-4%
Workstation Shipments	63	29	46	68	38	-12%
Workstations Shipped To-Date	64	93	139	207	245	40%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	2.3	6.9	7.7	7.4	3.8	13%
CPU Shipments	45	29	46	67	38	-4%
Workstation Shipments	63	29	46	68	38	-12%
Workstations Shipped To-Date	64	93	139	207	245	40%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	6.9	7.7	7.4	3.5	NA
CPU Shipments	0	29	46	67	38	NA
Workstation Shipments	0	29	46	67	38	NA
Workstations Shipped To-Date	0	29	75	142	180	NA
Host/Server						
Total Revenue	1.2	.0	.0	.1	.2	-33%
CPU Shipments	6	0	0	0	0	-100%
Workstation Shipments	24	0	0	1	0	-100%
Workstations Shipped To-Date	24	24	24	25	25	1%
Personal Computer						
Total Revenue	1.2	.0	.0	.0	.0	-100%
CPU Shipments	39	0	0	0	0	-100%
Workstation Shipments	39	0	0	0	0	-100%
Workstations Shipped To-Date	40	40	40	40	40	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 135
TITLE: Company History
COMPANY: IBM
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1,200.4	1,384.9	1,510.1	1,615.7	1,777.3	10%
CPU Shipments	39,061	58,401	31,814	41,254	53,022	8%
Workstation Shipments	46,835	68,813	44,365	53,951	67,855	10%
Workstations Shipped To-Date	122,927	191,740	236,105	290,056	357,911	31%
North America						
Total Revenue	564.9	528.6	385.0	441.7	486.1	-4%
CPU Shipments	18,895	27,005	8,155	12,202	15,720	-4%
Workstation Shipments	22,905	30,677	11,327	15,423	19,598	-4%
Workstations Shipped To-Date	71,948	102,625	113,952	129,374	148,972	20%
Europe						
Total Revenue	359.8	380.3	604.0	588.9	651.4	16%
CPU Shipments	11,055	14,889	14,397	16,452	21,109	18%
Workstation Shipments	13,615	17,942	19,399	21,431	26,886	19%
Workstations Shipped To-Date	29,042	46,984	66,383	87,814	114,701	41%
Asia						
Total Revenue	263.7	440.8	486.3	532.9	582.2	22%
CPU Shipments	8,717	13,840	7,911	10,629	13,669	12%
Workstation Shipments	9,835	17,324	12,038	14,768	18,416	17%
Workstations Shipped To-Date	18,686	36,009	48,047	62,815	81,231	44%
Rest of World						
Total Revenue	12.0	35.2	34.7	52.1	57.5	48%
CPU Shipments	395	2,667	1,351	1,971	2,524	59%
Workstation Shipments	480	2,871	1,601	2,329	2,955	58%
Workstations Shipped To-Date	3,251	6,122	7,723	10,052	13,007	41%
Technical Workstation						
Total Revenue	55.4	56.7	69.2	130.9	158.3	30%
CPU Shipments	462	973	1,538	2,913	3,899	70%
Workstation Shipments	462	973	1,538	2,913	3,899	70%
Workstations Shipped To-Date	462	1,435	2,973	5,886	9,785	114%
Host/Server						
Total Revenue	888.5	964.6	1,270.3	1,301.7	1,410.3	12%
CPU Shipments	790	882	837	1,411	2,472	33%
Workstation Shipments	8,563	11,294	13,388	14,107	17,305	19%
Workstations Shipped To-Date	29,524	40,818	54,206	68,313	85,618	30%
Personal Computer						
Total Revenue	256.6	363.5	170.6	183.1	208.7	-5%
CPU Shipments	37,809	56,545	29,439	36,931	46,651	5%
Workstation Shipments	37,809	56,545	29,439	36,931	46,651	5%
Workstations Shipped To-Date	92,941	149,487	178,926	215,857	262,508	30%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 136
TITLE: Company History
COMPANY: IBM
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1,019.5	1,126.5	1,287.0	1,303.5	1,414.7	9%
CPU Shipments	23,237	28,542	15,489	18,345	23,887	1%
Workstation Shipments	30,212	37,691	26,785	29,161	36,367	5%
Workstations Shipped To-Date	75,761	113,452	140,237	169,398	205,765	28%
North America						
Total Revenue	477.9	418.1	324.9	354.1	384.4	-5%
CPU Shipments	10,895	12,785	3,739	5,345	7,001	-10%
Workstation Shipments	14,504	16,089	6,594	8,089	10,264	-8%
Workstations Shipped To-Date	41,369	57,458	64,052	72,141	82,405	19%
Europe						
Total Revenue	307.7	312.3	514.8	472.1	515.3	14%
CPU Shipments	7,003	7,383	7,013	7,292	9,465	8%
Workstation Shipments	9,307	9,924	11,515	11,534	14,326	11%
Workstations Shipped To-Date	19,563	29,486	41,001	52,535	66,860	36%
Asia						
Total Revenue	223.7	370.4	419.6	436.7	470.9	20%
CPU Shipments	5,108	7,174	4,120	4,873	6,340	6%
Workstation Shipments	6,093	10,295	7,834	8,399	10,334	14%
Workstations Shipped To-Date	12,409	22,704	30,538	38,937	49,271	41%
Rest of World						
Total Revenue	10.2	25.7	27.6	40.5	44.1	44%
CPU Shipments	232	1,200	616	834	1,081	47%
Workstation Shipments	309	1,384	841	1,139	1,444	47%
Workstations Shipped To-Date	2,421	3,805	4,646	5,785	7,228	31%
Technical Workstation						
Total Revenue	50.4	51.1	62.2	123.2	146.7	31%
CPU Shipments	421	876	1,384	2,740	3,613	71%
Workstation Shipments	421	876	1,384	2,740	3,613	71%
Workstations Shipped To-Date	421	1,296	2,681	5,421	9,034	115%
Host/Server						
Total Revenue	799.4	868.3	1,143.3	1,108.8	1,186.6	10%
CPU Shipments	708	775	753	1,202	2,080	31%
Workstation Shipments	7,683	9,925	12,049	12,018	14,560	17%
Workstations Shipped To-Date	27,134	37,058	49,108	61,125	75,685	29%
Personal Computer						
Total Revenue	169.6	207.1	81.5	71.4	81.4	-17%
CPU Shipments	22,108	26,891	13,351	14,403	18,194	-5%
Workstation Shipments	22,108	26,891	13,351	14,403	18,194	-5%
Workstations Shipped To-Date	48,207	75,098	88,449	102,852	121,046	26%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June--Reproduction Prohibited

TABLE NUMBER: 137
TITLE: Company History
COMPANY: IBM
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	76.7	105.4	90.4	154.9	171.4	22%
CPU Shipments	7,290	12,354	6,749	8,322	10,598	10%
Workstation Shipments	7,588	12,984	7,251	9,406	11,865	12%
Workstations Shipped To-Date	25,001	37,985	45,236	54,642	66,507	28%
North America						
Total Revenue	37.6	45.1	24.4	43.0	47.7	6%
CPU Shipments	3,755	5,880	1,826	2,488	3,168	-4%
Workstation Shipments	3,915	6,027	1,953	2,763	3,500	-3%
Workstations Shipped To-Date	15,859	21,886	23,840	26,603	30,102	17%
Europe						
Total Revenue	20.8	27.7	36.2	57.4	63.8	32%
CPU Shipments	1,609	3,112	3,053	3,327	4,235	27%
Workstation Shipments	1,712	3,430	3,253	3,752	4,728	29%
Workstations Shipped To-Date	5,060	8,490	11,743	15,495	20,223	41%
Asia						
Total Revenue	17.6	28.7	27.0	49.0	53.9	32%
CPU Shipments	1,846	2,755	1,566	2,095	2,672	10%
Workstation Shipments	1,877	2,912	1,731	2,449	3,077	13%
Workstations Shipped To-Date	3,566	6,478	8,209	10,658	13,735	40%
Rest of World						
Total Revenue	.8	3.9	2.9	5.5	6.1	66%
CPU Shipments	80	607	304	412	523	60%
Workstation Shipments	83	615	314	442	560	61%
Workstations Shipped To-Date	516	1,130	1,445	1,887	2,447	48%
Technical Workstation						
Total Revenue	2.5	2.3	2.8	3.4	5.0	19%
CPU Shipments	21	39	62	76	124	57%
Workstation Shipments	21	39	62	76	124	57%
Workstations Shipped To-Date	21	59	121	197	321	99%
Host/Server						
Total Revenue	33.0	38.6	50.8	111.2	120.5	38%
CPU Shipments	30	53	33	120	211	63%
Workstation Shipments	327	683	535	1,205	1,478	46%
Workstations Shipped To-Date	704	1,386	1,922	3,127	4,605	60%
Personal Computer						
Total Revenue	41.2	64.5	36.8	40.3	45.9	3%
CPU Shipments	7,240	12,262	6,654	8,125	10,263	9%
Workstation Shipments	7,240	12,262	6,654	8,125	10,263	9%
Workstations Shipped To-Date	24,277	36,539	43,193	51,318	61,581	26%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 138
TITLE: Company History
COMPANY: IBM
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	27.3	61.5	57.3	73.6	97.6	38%
CPU Shipments	411	5,752	3,145	6,263	7,992	110%
Workstation Shipments	618	6,058	3,522	6,661	8,612	93%
Workstations Shipped To-Date	994	7,052	10,574	17,235	25,847	126%
North America						
Total Revenue	12.8	25.5	15.2	20.8	27.4	21%
CPU Shipments	196	2,730	845	1,875	2,391	87%
Workstation Shipments	296	2,840	940	1,976	2,553	71%
Workstations Shipped To-Date	572	3,412	4,352	6,328	8,881	99%
Europe						
Total Revenue	8.3	16.4	22.9	27.7	36.7	45%
CPU Shipments	146	1,446	1,423	2,504	3,194	116%
Workstation Shipments	210	1,532	1,573	2,660	3,435	101%
Workstations Shipped To-Date	231	1,763	3,336	5,997	9,432	153%
Asia						
Total Revenue	6.0	17.6	17.6	22.3	29.9	50%
CPU Shipments	64	1,295	737	1,573	2,011	136%
Workstation Shipments	105	1,399	861	1,702	2,209	114%
Workstations Shipped To-Date	178	1,578	2,439	4,141	6,351	144%
Rest of World						
Total Revenue	.3	2.1	1.7	2.8	3.6	91%
CPU Shipments	4	280	141	311	396	212%
Workstation Shipments	6	286	148	322	414	185%
Workstations Shipped To-Date	13	299	448	770	1,184	207%
Technical Workstation						
Total Revenue	1.0	1.7	2.1	2.1	3.8	39%
CPU Shipments	9	29	46	48	93	80%
Workstation Shipments	9	29	46	48	93	80%
Workstations Shipped To-Date	9	38	84	132	225	125%
Host/Server						
Total Revenue	23.4	28.9	38.1	40.8	59.0	26%
CPU Shipments	21	26	25	44	103	49%
Workstation Shipments	228	332	402	442	724	33%
Workstations Shipped To-Date	605	937	1,339	1,781	2,505	43%
Personal Computer						
Total Revenue	2.9	30.9	17.2	30.6	34.9	86%
CPU Shipments	381	5,696	3,074	6,171	7,795	113%
Workstation Shipments	381	5,696	3,074	6,171	7,795	113%
Workstations Shipped To-Date	381	6,077	9,151	15,322	23,117	179%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 139
TITLE: Company History
COMPANY: IBM
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	40.4	41.2	18.0	34.8	39.7	-0%
CPU Shipments	5,964	6,085	3,286	7,017	8,864	10%
Workstation Shipments	6,051	6,201	3,286	7,017	8,864	10%
Workstations Shipped To-Date	16,305	22,506	25,792	32,809	41,673	26%
North America						
Total Revenue	20.7	18.5	5.4	10.4	11.9	-13%
CPU Shipments	3,193	2,910	900	2,105	2,659	-4%
Workstation Shipments	3,234	2,947	900	2,105	2,659	-5%
Workstations Shipped To-Date	11,460	14,407	15,307	17,412	20,071	15%
Europe						
Total Revenue	9.7	10.7	7.2	13.9	15.9	13%
CPU Shipments	1,219	1,525	1,486	2,807	3,545	31%
Workstation Shipments	1,244	1,569	1,486	2,807	3,545	30%
Workstations Shipped To-Date	2,666	4,235	5,721	8,528	12,073	46%
Asia						
Total Revenue	9.7	10.3	4.5	8.7	9.9	1%
CPU Shipments	1,484	1,348	750	1,754	2,216	11%
Workstation Shipments	1,505	1,382	750	1,754	2,216	10%
Workstations Shipped To-Date	1,981	3,363	4,113	5,867	8,083	42%
Rest of World						
Total Revenue	.5	1.7	.9	1.7	2.0	45%
CPU Shipments	68	302	150	351	443	60%
Workstation Shipments	69	304	150	351	443	59%
Workstations Shipped To-Date	199	502	652	1,003	1,446	64%
Technical Workstation						
Total Revenue	.4	.6	.0	.0	.0	-100%
CPU Shipments	3	10	0	0	0	-100%
Workstation Shipments	3	10	0	0	0	-100%
Workstations Shipped To-Date	3	13	13	13	13	40%
Host/Server						
Total Revenue	9.3	9.5	.0	.0	.0	-100%
CPU Shipments	9	10	0	0	0	-100%
Workstation Shipments	96	126	0	0	0	-100%
Workstations Shipped To-Date	96	222	222	222	222	23%
Personal Computer						
Total Revenue	30.7	31.1	18.0	34.8	39.7	7%
CPU Shipments	5,952	6,065	3,286	7,017	8,864	10%
Workstation Shipments	5,952	6,065	3,286	7,017	8,864	10%
Workstations Shipped To-Date	16,206	22,272	25,558	32,574	41,438	26%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 140
TITLE: Company History
COMPANY: IBM
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	34.7	45.2	54.3	49.0	53.9	12%
CPU Shipments	1,810	4,668	2,597	1,307	1,682	-2%
Workstation Shipments	2,018	4,879	2,974	1,705	2,147	2%
Workstations Shipped To-Date	4,517	9,396	12,370	14,075	16,222	38%
North America						
Total Revenue	14.4	19.0	14.3	13.4	14.8	1%
CPU Shipments	516	2,220	695	388	500	-1%
Workstation Shipments	616	2,294	790	489	622	0%
Workstations Shipped To-Date	2,348	4,642	5,431	5,921	6,542	29%
Europe						
Total Revenue	13.3	12.0	21.7	17.9	19.8	10%
CPU Shipments	1,070	1,173	1,175	522	671	-11%
Workstation Shipments	1,133	1,237	1,325	678	852	-7%
Workstations Shipped To-Date	1,514	2,751	4,076	4,754	5,606	39%
Asia						
Total Revenue	6.7	12.7	16.8	16.1	17.6	27%
CPU Shipments	214	1,047	612	334	430	19%
Workstation Shipments	255	1,116	736	463	579	23%
Workstations Shipped To-Date	552	1,668	2,404	2,867	3,446	58%
Rest of World						
Total Revenue	.3	1.6	1.5	1.6	1.8	54%
CPU Shipments	11	228	116	63	81	65%
Workstation Shipments	13	232	123	75	95	64%
Workstations Shipped To-Date	103	335	458	533	628	57%
Technical Workstation						
Total Revenue	1.0	1.1	2.1	2.1	2.8	29%
CPU Shipments	9	19	46	48	70	68%
Workstation Shipments	9	19	46	48	70	68%
Workstations Shipped To-Date	9	28	74	122	192	116%
Host/Server						
Total Revenue	23.4	19.3	38.1	40.8	44.2	17%
CPU Shipments	21	18	25	44	78	38%
Workstation Shipments	228	229	402	443	543	24%
Workstations Shipped To-Date	986	1,214	1,616	2,059	2,601	27%
Personal Computer						
Total Revenue	10.4	24.8	14.1	6.0	6.9	-10%
CPU Shipments	1,781	4,631	2,526	1,215	1,535	-4%
Workstation Shipments	1,781	4,631	2,526	1,215	1,535	-4%
Workstations Shipped To-Date	3,522	8,153	10,679	11,894	13,429	40%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 141
TITLE: Company History
COMPANY: ICL
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.3	17.5	22.2	15.5	22.9	29%
CPU Shipments	190	400	416	484	629	35%
Workstation Shipments	190	400	416	484	629	35%
Workstations Shipped To-Date	190	590	1,006	1,490	2,119	83%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	8.3	16.6	20.9	15.4	22.9	29%
CPU Shipments	190	380	380	479	629	35%
Workstation Shipments	190	380	380	479	629	35%
Workstations Shipped To-Date	190	570	950	1,429	2,058	81%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.9	1.3	.2	.0	NA
CPU Shipments	0	20	36	5	0	NA
Workstation Shipments	0	20	36	5	0	NA
Workstations Shipped To-Date	0	20	56	61	61	NA
Technical Workstation						
Total Revenue	8.3	17.5	22.2	15.5	22.9	29%
CPU Shipments	190	400	416	484	629	35%
Workstation Shipments	190	400	416	484	629	35%
Workstations Shipped To-Date	190	590	1,006	1,490	2,119	83%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 142
TITLE: Company History
COMPANY: ICL
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.7	7.9	10.6	7.4	8.7	24%
CPU Shipments	86	181	198	231	239	29%
Workstation Shipments	86	181	198	231	239	29%
Workstations Shipped To-Date	86	267	465	696	935	82%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	3.7	7.5	9.9	7.3	8.7	24%
CPU Shipments	86	171	180	229	239	29%
Workstation Shipments	86	171	180	229	239	29%
Workstations Shipped To-Date	86	257	437	665	904	80%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.4	.7	.1	.0	NA
CPU Shipments	0	10	18	2	0	NA
Workstation Shipments	0	10	18	2	0	NA
Workstations Shipped To-Date	0	10	28	31	31	NA
Technical Workstation						
Total Revenue	3.7	7.9	10.6	7.4	8.7	24%
CPU Shipments	86	181	198	231	239	29%
Workstation Shipments	86	181	198	231	239	29%
Workstations Shipped To-Date	86	267	465	696	935	82%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 143
TITLE: Company History
COMPANY: ICL
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.7	7.9	10.5	7.4	13.5	38%
CPU Shipments	86	181	198	231	371	44%
Workstation Shipments	86	181	198	231	371	44%
Workstations Shipped To-Date	86	267	464	695	1,066	88%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	3.7	7.5	9.9	7.3	13.5	38%
CPU Shipments	86	171	180	229	371	44%
Workstation Shipments	86	171	180	229	371	44%
Workstations Shipped To-Date	86	257	437	665	1,036	87%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.4	.6	.1	.0	NA
CPU Shipments	0	10	18	2	0	NA
Workstation Shipments	0	10	18	2	0	NA
Workstations Shipped To-Date	0	10	28	30	30	NA
Technical Workstation						
Total Revenue	3.7	7.9	10.5	7.4	13.5	38%
CPU Shipments	86	181	198	231	371	44%
Workstation Shipments	86	181	198	231	371	44%
Workstations Shipped To-Date	86	267	464	695	1,066	88%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 144
TITLE: Company History
COMPANY: ICL
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	.4	.8	1.1	.7	.7	13%
CPU Shipments	10	19	20	22	19	19%
Workstation Shipments	10	19	20	22	19	19%
Workstations Shipped To-Date	10	29	49	71	90	75%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.4	.8	1.1	.7	.7	13%
CPU Shipments	10	19	20	22	19	19%
Workstation Shipments	10	19	20	22	19	19%
Workstations Shipped To-Date	10	29	49	71	89	75%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.4	.8	1.1	.7	.7	13%
CPU Shipments	10	19	20	22	19	19%
Workstation Shipments	10	19	20	22	19	19%
Workstations Shipped To-Date	10	29	49	71	90	75%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 145
TITLE: Company History
COMPANY: Intergraph
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	605.4	639.6	801.5	842.2	1,013.3	14%
CPU Shipments	1,822	1,766	5,828	7,516	9,603	52%
Workstation Shipments	5,469	5,665	8,780	8,605	10,585	18%
Workstations Shipped To-Date	17,821	23,486	32,266	40,871	51,456	30%
North America						
Total Revenue	424.3	459.3	498.6	480.9	543.1	6%
CPU Shipments	1,294	1,255	3,626	4,292	5,145	41%
Workstation Shipments	3,886	4,025	5,462	4,914	5,674	10%
Workstations Shipped To-Date	14,174	18,199	23,662	28,576	34,250	25%
Europe						
Total Revenue	133.8	133.0	232.4	279.4	368.2	29%
CPU Shipments	416	398	1,689	2,493	3,490	70%
Workstation Shipments	1,248	1,278	2,545	2,855	3,846	32%
Workstations Shipped To-Date	2,295	3,573	6,118	8,973	12,819	54%
Asia						
Total Revenue	15.9	15.2	35.3	32.8	42.0	28%
CPU Shipments	16	26	256	293	398	124%
Workstation Shipments	47	82	386	335	439	75%
Workstations Shipped To-Date	0	82	468	803	1,242	NA
Rest of World						
Total Revenue	31.5	32.0	35.3	49.1	60.0	18%
CPU Shipments	96	87	257	437	570	56%
Workstation Shipments	288	280	386	501	626	21%
Workstations Shipped To-Date	1,352	1,632	2,018	2,519	3,145	24%
Technical Workstation						
Total Revenue	70.2	148.4	521.0	666.2	838.6	86%
CPU Shipments	735	1,070	5,261	7,153	9,276	88%
Workstation Shipments	735	1,070	5,261	7,153	9,276	88%
Workstations Shipped To-Date	735	1,805	7,065	14,218	23,494	138%
Host/Server						
Total Revenue	523.1	482.9	266.3	151.6	146.0	-27%
CPU Shipments	651	696	568	363	327	-16%
Workstation Shipments	4,299	4,595	3,519	1,452	1,309	-26%
Workstations Shipped To-Date	16,681	21,277	24,796	26,248	27,557	13%
Personal Computer						
Total Revenue	12.1	8.3	14.3	24.4	28.8	24%
CPU Shipments	435	0	0	0	0	-100%
Workstation Shipments	435	0	0	0	0	-100%
Workstations Shipped To-Date	405	405	405	405	405	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 146
TITLE: Company History
COMPANY: Intergraph
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	91.0	102.3	128.3	139.1	169.7	17%
CPU Shipments	273	283	933	1,239	1,596	55%
Workstation Shipments	821	906	1,405	1,419	1,767	21%
Workstations Shipped To-Date	4,071	4,977	6,382	7,801	9,568	24%
North America						
Total Revenue	63.6	73.5	79.8	79.2	87.9	8%
CPU Shipments	194	201	580	706	826	44%
Workstation Shipments	583	644	874	808	915	12%
Workstations Shipped To-Date	3,140	3,784	4,658	5,467	6,382	19%
Europe						
Total Revenue	20.1	21.3	37.2	46.1	62.6	33%
CPU Shipments	62	64	270	411	589	75%
Workstation Shipments	187	204	407	471	652	37%
Workstations Shipped To-Date	730	935	1,342	1,812	2,464	36%
Asia						
Total Revenue	2.5	2.4	5.7	5.4	7.2	30%
CPU Shipments	3	4	41	48	67	127%
Workstation Shipments	8	13	62	55	74	77%
Workstations Shipped To-Date	0	13	75	130	204	NA
Rest of World						
Total Revenue	4.7	5.1	5.6	8.3	12.1	26%
CPU Shipments	14	14	41	74	113	68%
Workstation Shipments	43	45	62	85	126	31%
Workstations Shipped To-Date	200	245	307	392	518	27%
Technical Workstation						
Total Revenue	10.6	23.8	83.4	109.9	139.1	91%
CPU Shipments	110	171	842	1,180	1,539	93%
Workstation Shipments	110	171	842	1,180	1,539	93%
Workstations Shipped To-Date	171	342	1,184	2,364	3,902	118%
Host/Server						
Total Revenue	78.6	77.3	42.6	25.0	25.5	-25%
CPU Shipments	98	111	91	60	57	-13%
Workstation Shipments	645	735	563	240	228	-23%
Workstations Shipped To-Date	3,783	4,518	5,081	5,321	5,549	10%
Personal Computer						
Total Revenue	1.8	1.3	2.3	4.2	5.1	30%
CPU Shipments	65	0	0	0	0	-100%
Workstation Shipments	65	0	0	0	0	-100%
Workstations Shipped To-Date	117	117	117	117	117	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 147
TITLE: Company History
COMPANY: Intergraph
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	260.2	268.6	320.6	337.1	342.7	7%
CPU Shipments	783	742	2,331	3,005	3,285	43%
Workstation Shipments	2,351	2,379	3,512	3,441	3,584	11%
Workstations Shipped To-Date	7,684	10,063	13,575	17,016	20,600	28%
North America						
Total Revenue	182.5	192.9	199.4	192.0	182.6	0%
CPU Shipments	557	527	1,450	1,712	1,750	33%
Workstation Shipments	1,671	1,690	2,185	1,960	1,910	3%
Workstations Shipped To-Date	6,163	7,854	10,039	11,998	13,908	23%
Europe						
Total Revenue	57.5	55.9	93.0	111.8	125.2	21%
CPU Shipments	179	167	676	996	1,200	61%
Workstation Shipments	537	537	1,018	1,141	1,309	25%
Workstations Shipped To-Date	1,004	1,541	2,559	3,699	5,009	49%
Asia						
Total Revenue	6.7	6.4	14.1	13.1	14.3	21%
CPU Shipments	7	11	102	117	137	114%
Workstation Shipments	20	34	154	134	149	66%
Workstations Shipped To-Date	0	34	189	323	472	NA
Rest of World						
Total Revenue	13.5	13.4	14.1	20.2	20.7	11%
CPU Shipments	41	37	103	180	198	48%
Workstation Shipments	124	118	155	206	216	15%
Workstations Shipped To-Date	517	635	789	995	1,212	24%
Technical Workstation						
Total Revenue	30.2	62.3	208.4	266.3	287.9	76%
CPU Shipments	316	449	2,104	2,860	3,185	78%
Workstation Shipments	316	449	2,104	2,860	3,185	78%
Workstations Shipped To-Date	269	719	2,823	5,682	8,867	140%
Host/Server						
Total Revenue	224.8	202.8	106.5	60.7	44.6	-33%
CPU Shipments	280	292	227	145	100	-23%
Workstation Shipments	1,848	1,930	1,408	581	400	-32%
Workstations Shipped To-Date	7,231	9,161	10,569	11,150	11,550	12%
Personal Computer						
Total Revenue	5.2	3.5	5.7	10.1	10.3	19%
CPU Shipments	187	0	0	0	0	-100%
Workstation Shipments	187	0	0	0	0	-100%
Workstations Shipped To-Date	184	184	184	184	184	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 148
TITLE: Company History
COMPANY: Intergraph
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	230.1	243.0	320.6	337.1	447.9	18%
CPU Shipments	692	671	2,331	3,005	4,254	57%
Workstation Shipments	2,078	2,153	3,512	3,441	4,676	22%
Workstations Shipped To-Date	5,485	7,638	11,150	14,590	19,266	37%
North America						
Total Revenue	161.2	174.5	199.4	192.0	240.8	11%
CPU Shipments	492	477	1,450	1,712	2,286	47%
Workstation Shipments	1,477	1,529	2,185	1,960	2,513	14%
Workstations Shipped To-Date	4,361	5,890	8,075	10,035	12,548	30%
Europe						
Total Revenue	50.8	50.5	93.0	111.8	162.0	34%
CPU Shipments	158	151	676	996	1,538	77%
Workstation Shipments	474	486	1,018	1,141	1,691	37%
Workstations Shipped To-Date	513	998	2,016	3,157	4,848	75%
Asia						
Total Revenue	6.0	5.8	14.1	13.1	18.5	32%
CPU Shipments	6	10	103	117	175	133%
Workstation Shipments	18	31	154	134	193	81%
Workstations Shipped To-Date	0	31	186	320	512	NA
Rest of World						
Total Revenue	12.0	12.2	14.1	20.2	26.8	22%
CPU Shipments	36	33	103	180	254	62%
Workstation Shipments	110	106	155	206	279	26%
Workstations Shipped To-Date	611	718	873	1,079	1,358	22%
Technical Workstation						
Total Revenue	26.7	56.4	208.4	266.3	371.8	93%
CPU Shipments	279	407	2,104	2,860	4,113	96%
Workstation Shipments	279	407	2,104	2,860	4,113	96%
Workstations Shipped To-Date	153	560	2,664	5,523	9,637	182%
Host/Server						
Total Revenue	198.8	183.5	106.5	60.7	62.7	-25%
CPU Shipments	248	265	227	145	141	-13%
Workstation Shipments	1,633	1,746	1,408	581	563	-23%
Workstations Shipped To-Date	5,228	6,974	8,382	8,963	9,525	16%
Personal Computer						
Total Revenue	4.6	3.1	5.7	10.1	13.4	31%
CPU Shipments	165	0	0	0	0	-100%
Workstation Shipments	165	0	0	0	0	-100%
Workstations Shipped To-Date	104	104	104	104	104	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 149
TITLE: Company History
COMPANY: Intergraph
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	12.1	12.8	16.0	16.5	26.5	22%
CPU Shipments	36	35	117	153	209	55%
Workstation Shipments	109	113	176	174	273	26%
Workstations Shipped To-Date	61	175	350	524	797	90%
North America						
Total Revenue	8.5	9.2	10.0	10.1	16.0	17%
CPU Shipments	26	25	73	93	126	49%
Workstation Shipments	78	81	109	106	165	21%
Workstations Shipped To-Date	44	125	234	340	505	84%
Europe						
Total Revenue	2.7	2.7	4.6	5.6	9.2	36%
CPU Shipments	8	8	34	52	73	72%
Workstation Shipments	25	26	51	59	95	40%
Workstations Shipped To-Date	14	40	91	149	244	104%
Asia						
Total Revenue	.3	.3	.7	.7	1.1	35%
CPU Shipments	0	1	5	6	8	127%
Workstation Shipments	1	2	8	7	11	86%
Workstations Shipped To-Date	0	2	9	16	27	NA
Rest of World						
Total Revenue	.6	.6	.7	.2	.3	-20%
CPU Shipments	2	2	5	2	2	1%
Workstation Shipments	6	6	8	2	3	-18%
Workstations Shipped To-Date	3	9	17	18	21	59%
Technical Workstation						
Total Revenue	1.4	3.0	10.4	13.6	16.9	87%
CPU Shipments	15	21	105	145	187	89%
Workstation Shipments	15	21	105	145	187	89%
Workstations Shipped To-Date	61	83	188	333	521	71%
Host/Server						
Total Revenue	10.5	9.7	5.3	3.0	9.5	-2%
CPU Shipments	13	14	11	7	21	13%
Workstation Shipments	86	92	70	28	85	-0%
Workstations Shipped To-Date	0	92	162	191	276	NA
Personal Computer						
Total Revenue	.3	.2	.3	.0	.0	-100%
CPU Shipments	9	0	0	0	0	-100%
Workstation Shipments	9	0	0	0	0	-100%
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 150
TITLE: Company History
COMPANY: Intergraph
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	12.1	12.8	16.0	12.4	26.5	22%
CPU Shipments	36	35	117	114	260	63%
Workstation Shipments	109	113	176	130	285	27%
Workstations Shipped To-Date	458	571	747	878	1,163	26%
North America						
Total Revenue	8.5	9.2	10.0	7.6	16.0	17%
CPU Shipments	26	25	73	70	157	57%
Workstation Shipments	78	81	109	80	172	22%
Workstations Shipped To-Date	422	502	612	691	863	20%
Europe						
Total Revenue	2.7	2.7	4.6	4.2	9.2	36%
CPU Shipments	8	8	34	39	90	82%
Workstation Shipments	25	26	51	44	99	41%
Workstations Shipped To-Date	20	45	96	140	239	87%
Asia						
Total Revenue	.3	.3	.7	.5	1.1	35%
CPU Shipments	0	1	5	5	10	140%
Workstation Shipments	1	2	8	5	11	88%
Workstations Shipped To-Date	0	2	9	15	26	NA
Rest of World						
Total Revenue	.6	.6	.7	.1	.3	-20%
CPU Shipments	2	2	5	1	2	7%
Workstation Shipments	6	6	8	1	3	-17%
Workstations Shipped To-Date	17	22	30	31	34	20%
Technical Workstation						
Total Revenue	1.4	3.0	10.4	10.2	22.8	102%
CPU Shipments	15	21	105	109	252	103%
Workstation Shipments	15	21	105	109	252	103%
Workstations Shipped To-Date	18	40	145	254	506	129%
Host/Server						
Total Revenue	10.5	9.7	5.3	2.2	3.7	-23%
CPU Shipments	13	14	11	5	8	-11%
Workstation Shipments	86	92	70	21	33	-21%
Workstations Shipped To-Date	440	532	602	624	657	11%
Personal Computer						
Total Revenue	.3	.2	.3	.0	.0	-100%
CPU Shipments	9	0	0	0	0	-100%
Workstation Shipments	9	0	0	0	0	-100%
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 151
TITLE: Company History
COMPANY: Investronica SA
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	16.1	18.2	20.8	25.0	27.0	14%
CPU Shipments	705	804	925	1,000	1,080	11%
Workstation Shipments	705	804	925	1,000	1,080	11%
Workstations Shipped To-Date	0	804	1,729	2,729	3,809	NA
North America						
Total Revenue	.6	.7	.8	1.0	1.1	14%
CPU Shipments	28	32	37	40	43	11%
Workstation Shipments	28	32	37	40	43	11%
Workstations Shipped To-Date	0	32	69	109	152	NA
Europe						
Total Revenue	15.2	17.2	19.6	23.6	25.5	14%
CPU Shipments	665	758	872	943	1,018	11%
Workstation Shipments	665	758	872	943	1,018	11%
Workstations Shipped To-Date	0	758	1,630	2,573	3,592	NA
Asia						
Total Revenue	.2	.2	.2	.3	.3	14%
CPU Shipments	7	8	9	10	11	11%
Workstation Shipments	7	8	9	10	11	11%
Workstations Shipped To-Date	0	8	17	27	38	NA
Rest of World						
Total Revenue	.1	.1	.2	.2	.2	15%
CPU Shipments	5	6	6	7	8	11%
Workstation Shipments	5	6	6	7	8	11%
Workstations Shipped To-Date	0	6	12	19	27	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	16.1	18.2	20.8	25.0	27.0	14%
CPU Shipments	705	804	925	1,000	1,080	11%
Workstation Shipments	705	804	925	1,000	1,080	11%
Workstations Shipped To-Date	0	804	1,729	2,729	3,809	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 152
TITLE: Company History
COMPANY: Investronica SA
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	16.1	18.2	20.8	25.0	27.0	14%
CPU Shipments	705	804	925	1,000	1,080	11%
Workstation Shipments	705	804	925	1,000	1,080	11%
Workstations Shipped To-Date	0	804	1,729	2,729	3,809	NA
North America						
Total Revenue	.6	.7	.8	1.0	1.1	14%
CPU Shipments	28	32	37	40	43	11%
Workstation Shipments	28	32	37	40	43	11%
Workstations Shipped To-Date	0	32	69	109	152	NA
Europe						
Total Revenue	15.2	17.2	19.6	23.6	25.5	14%
CPU Shipments	665	758	872	943	1,018	11%
Workstation Shipments	665	758	872	943	1,018	11%
Workstations Shipped To-Date	0	758	1,630	2,573	3,592	NA
Asia						
Total Revenue	.2	.2	.2	.3	.3	14%
CPU Shipments	7	8	9	10	11	11%
Workstation Shipments	7	8	9	10	11	11%
Workstations Shipped To-Date	0	8	17	27	38	NA
Rest of World						
Total Revenue	.1	.1	.2	.2	.2	15%
CPU Shipments	5	6	6	7	8	11%
Workstation Shipments	5	6	6	7	8	11%
Workstations Shipped To-Date	0	6	12	19	27	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	16.1	18.2	20.8	25.0	27.0	14%
CPU Shipments	705	804	925	1,000	1,080	11%
Workstation Shipments	705	804	925	1,000	1,080	11%
Workstations Shipped To-Date	0	804	1,729	2,729	3,809	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 153
TITLE: Company History
COMPANY: ISICAD
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	29.8	34.0	42.0	45.0	48.0	13%
CPU Shipments	402	346	420	477	407	0%
Workstation Shipments	402	346	420	477	407	0%
Workstations Shipped To-Date	657	1,003	1,423	1,900	2,307	37%
North America						
Total Revenue	24.0	23.4	18.7	11.9	12.0	-16%
CPU Shipments	322	195	181	123	93	-27%
Workstation Shipments	322	195	181	123	93	-27%
Workstations Shipped To-Date	496	691	872	995	1,088	22%
Europe						
Total Revenue	5.8	8.7	20.7	31.2	34.3	56%
CPU Shipments	80	135	213	334	300	39%
Workstation Shipments	80	135	213	334	300	39%
Workstations Shipped To-Date	134	269	483	816	1,116	70%
Asia						
Total Revenue	.0	1.9	2.1	1.4	1.4	NA
CPU Shipments	0	16	21	14	13	NA
Workstation Shipments	0	16	21	14	13	NA
Workstations Shipped To-Date	14	29	50	64	77	54%
Rest of World						
Total Revenue	.0	.0	.5	.5	.3	NA
CPU Shipments	0	0	5	6	2	NA
Workstation Shipments	0	0	5	6	2	NA
Workstations Shipped To-Date	14	14	18	24	26	18%
Technical Workstation						
Total Revenue	28.7	32.1	36.7	38.7	36.8	6%
CPU Shipments	402	288	420	477	407	0%
Workstation Shipments	402	288	420	477	407	0%
Workstations Shipped To-Date	591	879	1,299	1,776	2,183	39%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.0	1.9	5.2	6.3	11.2	82%
CPU Shipments	0	58	0	0	0	NA
Workstation Shipments	0	58	0	0	0	NA
Workstations Shipped To-Date	66	124	124	124	124	17%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 154
TITLE: Company History
COMPANY: ISICAD
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	6.8	16.8	13.0	15.4	NA
CPU Shipments	NA	61	173	146	143	NA
Workstation Shipments	NA	61	173	146	143	NA
Workstations Shipped To-Date	NA	61	234	380	523	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	6.8	16.5	12.5	15.4	NA
CPU Shipments	NA	61	169	140	143	NA
Workstation Shipments	NA	61	169	140	143	NA
Workstations Shipped To-Date	NA	61	230	370	513	NA
Asia						
Total Revenue	NA	.0	.3	.5	.0	NA
CPU Shipments	NA	0	3	6	0	NA
Workstation Shipments	NA	0	3	6	0	NA
Workstations Shipped To-Date	NA	0	3	10	10	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	6.8	15.1	11.9	14.0	NA
CPU Shipments	NA	61	173	146	143	NA
Workstation Shipments	NA	61	173	146	143	NA
Workstations Shipped To-Date	NA	61	234	380	523	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	1.7	1.2	1.4	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 155
TITLE: Company History
COMPANY: ISICAD
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	29.8	27.2	25.2	32.0	32.6	2%
CPU Shipments	402	285	247	331	264	-10%
Workstation Shipments	402	285	247	331	264	-10%
Workstations Shipped To-Date	653	938	1,185	1,516	1,780	28%
North America						
Total Revenue	24.0	23.4	18.7	11.9	12.0	-16%
CPU Shipments	322	195	181	123	93	-27%
Workstation Shipments	322	195	181	123	93	-27%
Workstations Shipped To-Date	492	687	869	992	1,084	22%
Europe						
Total Revenue	5.8	1.9	4.3	18.7	18.9	35%
CPU Shipments	80	74	44	194	157	18%
Workstation Shipments	80	74	44	194	157	18%
Workstations Shipped To-Date	134	208	252	446	603	46%
Asia						
Total Revenue	.0	1.9	1.8	.8	1.4	NA
CPU Shipments	0	16	17	8	13	NA
Workstation Shipments	0	16	17	8	13	NA
Workstations Shipped To-Date	13	29	46	55	67	50%
Rest of World						
Total Revenue	.0	.0	.5	.5	.3	NA
CPU Shipments	0	0	5	6	2	NA
Workstation Shipments	0	0	5	6	2	NA
Workstations Shipped To-Date	13	13	18	24	26	18%
Technical Workstation						
Total Revenue	28.7	25.3	21.6	26.9	22.8	-6%
CPU Shipments	402	227	247	331	264	-10%
Workstation Shipments	402	227	247	331	264	-10%
Workstations Shipped To-Date	589	815	1,063	1,393	1,658	30%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.0	1.9	3.6	5.1	9.8	76%
CPU Shipments	0	58	0	0	0	NA
Workstation Shipments	0	58	0	0	0	NA
Workstations Shipped To-Date	65	123	123	123	123	17%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 156
TITLE: Company History
COMPANY: ISYKON Software
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	5.8	7.5	11.7	15.4	NA
CPU Shipments	NA	42	125	220	220	NA
Workstation Shipments	NA	95	125	220	220	NA
Workstations Shipped To-Date	NA	95	220	440	660	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	5.8	7.5	11.7	15.4	NA
CPU Shipments	NA	42	125	220	220	NA
Workstation Shipments	NA	95	125	220	220	NA
Workstations Shipped To-Date	NA	95	220	440	660	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	3.5	5.0	11.7	15.4	NA
CPU Shipments	NA	32	125	220	220	NA
Workstation Shipments	NA	32	125	220	220	NA
Workstations Shipped To-Date	NA	32	157	377	597	NA
Host/Server						
Total Revenue	NA	2.3	2.5	.0	.0	NA
CPU Shipments	NA	11	0	0	0	NA
Workstation Shipments	NA	63	0	0	0	NA
Workstations Shipped To-Date	NA	63	63	63	63	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 157
TITLE: Company History
COMPANY: ISYKON Software
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	5.8	7.5	11.7	15.4	NA
CPU Shipments	NA	42	125	220	220	NA
Workstation Shipments	NA	95	125	220	220	NA
Workstations Shipped To-Date	NA	95	220	440	660	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	5.8	7.5	11.7	15.4	NA
CPU Shipments	NA	42	125	220	220	NA
Workstation Shipments	NA	95	125	220	220	NA
Workstations Shipped To-Date	NA	95	220	440	660	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	3.5	5.0	11.7	15.4	NA
CPU Shipments	NA	32	125	220	220	NA
Workstation Shipments	NA	32	125	220	220	NA
Workstations Shipped To-Date	NA	32	157	377	597	NA
Host/Server						
Total Revenue	NA	2.3	2.5	.0	.0	NA
CPU Shipments	NA	11	0	0	0	NA
Workstation Shipments	NA	63	0	0	0	NA
Workstations Shipped To-Date	NA	63	63	63	63	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 158
TITLE: Company History
COMPANY: ItalCad
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	21.0	18.0	13.0	24.0	30.0	9%
CPU Shipments	203	174	220	250	280	8%
Workstation Shipments	210	180	220	250	280	7%
Workstations Shipped To-Date	210	390	610	860	1,140	53%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	21.0	18.0	13.0	24.0	30.0	9%
CPU Shipments	203	174	220	250	280	8%
Workstation Shipments	210	180	220	250	280	7%
Workstations Shipped To-Date	210	390	610	860	1,140	53%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	20.5	17.6	13.0	24.0	30.0	10%
CPU Shipments	202	173	220	250	280	9%
Workstation Shipments	202	173	220	250	280	9%
Workstations Shipped To-Date	202	375	595	845	1,125	54%
Host/Server						
Total Revenue	.5	.4	.0	.0	.0	-100%
CPU Shipments	1	1	0	0	0	-100%
Workstation Shipments	8	7	0	0	0	-100%
Workstations Shipped To-Date	8	15	15	15	15	16%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 159
TITLE: Company History
COMPANY: ItalCad
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	11.5	9.9	7.8	12.0	10.8	-2%
CPU Shipments	115	98	132	125	101	-3%
Workstation Shipments	115	98	132	125	101	-3%
Workstations Shipped To-Date	115	213	345	470	571	49%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	11.5	9.9	7.8	12.0	10.8	-2%
CPU Shipments	115	98	132	125	101	-3%
Workstation Shipments	115	98	132	125	101	-3%
Workstations Shipped To-Date	115	213	345	470	571	49%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	11.5	9.9	7.8	12.0	10.8	-2%
CPU Shipments	115	98	132	125	101	-3%
Workstation Shipments	115	98	132	125	101	-3%
Workstations Shipped To-Date	115	213	345	470	571	49%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 160
TITLE: Company History
COMPANY: ItalCad
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	6.3	5.4	3.2	9.8	14.4	23%
CPU Shipments	55	48	55	103	134	25%
Workstation Shipments	60	52	55	103	134	22%
Workstations Shipped To-Date	60	112	167	269	404	61%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	6.3	5.4	3.2	9.8	14.4	23%
CPU Shipments	55	48	55	103	134	25%
Workstation Shipments	60	52	55	103	134	22%
Workstations Shipped To-Date	60	112	167	269	404	61%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	6.0	5.1	3.2	9.8	14.4	25%
CPU Shipments	55	47	55	103	134	25%
Workstation Shipments	55	47	55	103	134	25%
Workstations Shipped To-Date	55	102	157	259	394	64%
Host/Server						
Total Revenue	.3	.3	.0	.0	.0	-100%
CPU Shipments	1	1	0	0	0	-100%
Workstation Shipments	5	5	0	0	0	-100%
Workstations Shipped To-Date	5	10	10	10	10	17%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 161
TITLE: Company History
COMPANY: ItalCad
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.2	2.7	1.9	2.2	4.8	11%
CPU Shipments	33	28	33	23	45	8%
Workstation Shipments	35	30	33	23	45	6%
Workstations Shipped To-Date	35	65	98	121	166	47%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	3.2	2.7	1.9	2.2	4.8	11%
CPU Shipments	33	28	33	23	45	8%
Workstation Shipments	35	30	33	23	45	6%
Workstations Shipped To-Date	35	65	98	121	166	47%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	3.0	2.6	1.9	2.2	4.8	12%
CPU Shipments	32	28	33	23	45	8%
Workstation Shipments	32	28	33	23	45	8%
Workstations Shipped To-Date	32	60	93	116	161	49%
Host/Server						
Total Revenue	.2	.1	.0	.0	.0	-100%
CPU Shipments	0	0	0	0	0	-100%
Workstation Shipments	3	2	0	0	0	-100%
Workstations Shipped To-Date	3	5	5	5	5	16%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 162
TITLE: Company History
COMPANY: Kewill Systems
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	11.7	14.7	19.2	25.0	NA
CPU Shipments	NA	131	153	363	474	NA
Workstation Shipments	NA	131	153	384	500	NA
Workstations Shipped To-Date	NA	131	284	668	1,168	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	11.7	14.7	19.2	25.0	NA
CPU Shipments	NA	131	153	363	474	NA
Workstation Shipments	NA	131	153	384	500	NA
Workstations Shipped To-Date	NA	131	284	668	1,168	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	10.6	13.2	17.3	22.5	NA
CPU Shipments	NA	118	138	363	474	NA
Workstation Shipments	NA	118	138	363	474	NA
Workstations Shipped To-Date	NA	118	256	618	1,092	NA
Host/Server						
Total Revenue	NA	.0	.0	1.9	2.5	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	21	26	NA
Workstations Shipped To-Date	NA	0	0	21	48	NA
Personal Computer						
Total Revenue	NA	1.2	1.5	.0	.0	NA
CPU Shipments	NA	13	15	0	0	NA
Workstation Shipments	NA	13	15	0	0	NA
Workstations Shipped To-Date	NA	13	28	28	28	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 163
TITLE: Company History
COMPANY: Kewill Systems
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	5.9	7.4	9.6	12.5	NA
CPU Shipments	NA	65	77	181	237	NA
Workstation Shipments	NA	65	77	192	250	NA
Workstations Shipped To-Date	NA	65	142	334	584	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	5.9	7.4	9.6	12.5	NA
CPU Shipments	NA	65	77	181	237	NA
Workstation Shipments	NA	65	77	192	250	NA
Workstations Shipped To-Date	NA	65	142	334	584	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	5.3	6.6	8.7	11.3	NA
CPU Shipments	NA	59	69	181	237	NA
Workstation Shipments	NA	59	69	181	237	NA
Workstations Shipped To-Date	NA	59	128	309	546	NA
Host/Server						
Total Revenue	NA	.0	.0	1.0	1.3	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	11	13	NA
Workstations Shipped To-Date	NA	0	0	11	24	NA
Personal Computer						
Total Revenue	NA	.6	.7	.0	.0	NA
CPU Shipments	NA	7	8	0	0	NA
Workstation Shipments	NA	7	8	0	0	NA
Workstations Shipped To-Date	NA	7	14	14	14	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 164
TITLE: Company History
COMPANY: Kewill Systems
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	5.9	7.4	9.6	12.5	NA
CPU Shipments	NA	65	77	181	237	NA
Workstation Shipments	NA	65	77	192	250	NA
Workstations Shipped To-Date	NA	65	142	334	584	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	5.9	7.4	9.6	12.5	NA
CPU Shipments	NA	65	77	181	237	NA
Workstation Shipments	NA	65	77	192	250	NA
Workstations Shipped To-Date	NA	65	142	334	584	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	5.3	6.6	8.7	11.3	NA
CPU Shipments	NA	59	69	181	237	NA
Workstation Shipments	NA	59	69	181	237	NA
Workstations Shipped To-Date	NA	59	128	309	546	NA
Host/Server						
Total Revenue	NA	.0	.0	1.0	1.3	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	11	13	NA
Workstations Shipped To-Date	NA	0	0	11	24	NA
Personal Computer						
Total Revenue	NA	.6	.7	.0	.0	NA
CPU Shipments	NA	7	8	0	0	NA
Workstation Shipments	NA	7	8	0	0	NA
Workstations Shipped To-Date	NA	7	14	14	14	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 165
TITLE: Company History
COMPANY: Landmark Graphics
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	21.9	25.6	30.0	33.2	48.5	22%
CPU Shipments	123	144	190	249	297	25%
Workstation Shipments	170	199	233	249	297	15%
Workstations Shipped To-Date	123	322	555	804	1,101	73%
North America						
Total Revenue	19.7	23.1	27.0	16.6	24.3	5%
CPU Shipments	110	129	171	125	149	8%
Workstation Shipments	153	179	210	125	149	-1%
Workstations Shipped To-Date	110	290	499	624	772	63%
Europe						
Total Revenue	1.8	2.1	2.4	10.0	14.6	70%
CPU Shipments	10	11	15	75	89	74%
Workstation Shipments	14	16	19	75	89	60%
Workstations Shipped To-Date	10	26	44	119	208	115%
Asia						
Total Revenue	.4	.5	.6	2.3	3.4	67%
CPU Shipments	2	3	4	17	21	71%
Workstation Shipments	3	4	5	17	21	57%
Workstations Shipped To-Date	2	6	11	29	49	112%
Rest of World						
Total Revenue	.0	.0	.0	4.3	6.3	NA
CPU Shipments	0	0	0	32	39	NA
Workstation Shipments	0	0	0	32	39	NA
Workstations Shipped To-Date	0	0	0	32	71	NA
Technical Workstation						
Total Revenue	15.3	18.0	21.0	33.2	48.5	33%
CPU Shipments	123	144	168	249	297	25%
Workstation Shipments	123	144	168	249	297	25%
Workstations Shipped To-Date	123	266	434	683	980	68%
Host/Server						
Total Revenue	6.6	7.7	9.0	.0	.0	-100%
CPU Shipments	0	0	22	0	0	NA
Workstation Shipments	47	55	65	0	0	-100%
Workstations Shipped To-Date	0	55	120	120	120	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 166
TITLE: Company History
COMPANY: Landmark Graphics
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	21.9	25.6	30.0	33.2	48.5	22%
CPU Shipments	123	144	190	249	297	25%
Workstation Shipments	170	199	233	249	297	15%
Workstations Shipped To-Date	123	322	555	804	1,101	73%
North America						
Total Revenue	19.7	23.1	27.0	16.6	24.3	5%
CPU Shipments	110	129	171	125	149	8%
Workstation Shipments	153	179	210	125	149	-1%
Workstations Shipped To-Date	110	290	499	624	772	63%
Europe						
Total Revenue	1.8	2.1	2.4	10.0	14.6	70%
CPU Shipments	10	11	15	75	89	74%
Workstation Shipments	14	16	19	75	89	60%
Workstations Shipped To-Date	10	26	44	119	208	115%
Asia						
Total Revenue	.4	.5	.6	2.3	3.4	67%
CPU Shipments	2	3	4	17	21	71%
Workstation Shipments	3	4	5	17	21	57%
Workstations Shipped To-Date	2	6	11	29	49	112%
Rest of World						
Total Revenue	.0	.0	.0	4.3	6.3	NA
CPU Shipments	0	0	0	32	39	NA
Workstation Shipments	0	0	0	32	39	NA
Workstations Shipped To-Date	0	0	0	32	71	NA
Technical Workstation						
Total Revenue	15.3	18.0	21.0	33.2	48.5	33%
CPU Shipments	123	144	168	249	297	25%
Workstation Shipments	123	144	168	249	297	25%
Workstations Shipped To-Date	123	266	434	683	980	68%
Host/Server						
Total Revenue	6.6	7.7	9.0	.0	.0	-100%
CPU Shipments	0	0	22	0	0	NA
Workstation Shipments	47	55	65	0	0	-100%
Workstations Shipped To-Date	0	55	120	120	120	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 167
TITLE: Company History
COMPANY: MacNeal-Schwendler
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	22.8	34.1	39.9	45.0	54.0	24%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	18.3	21.8	23.9	25.2	26.2	9%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	6.8	8.4	9.5	16.6	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	4.4	5.1	6.8	9.0	10.3	23%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.3	.8	1.4	1.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	7.3	1.4	4.0	4.5	11.6	12%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	14.4	31.7	34.1	39.1	42.0	31%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.1	1.0	1.8	1.4	.4	-25%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 168
TITLE: Company History
COMPANY: MacNeal-Schwendler
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	22.8	34.1	39.9	45.0	53.2	24%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	18.3	21.8	23.9	25.2	26.2	9%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	6.8	8.4	9.5	15.8	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	4.4	5.1	6.8	9.0	10.3	23%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.3	.8	1.4	1.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	7.3	1.4	4.0	4.5	11.4	12%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	14.4	31.7	34.1	39.1	41.4	30%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.1	1.0	1.8	1.4	.4	-25%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 169
TITLE: Company History
COMPANY: MacNeal-Schwendler
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	NA	.8	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA
North America						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA
Europe						
Total Revenue	NA	NA	NA	NA	.8	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA
Asia						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA
Rest of World						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	NA	.2	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA
Host/Server						
Total Revenue	NA	NA	NA	NA	.7	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA
Personal Computer						
Total Revenue	NA	NA	NA	NA	.0	NA
CPU Shipments	NA	NA	NA	NA	0	NA
Workstation Shipments	NA	NA	NA	NA	0	NA
Workstations Shipped To-Date	NA	NA	NA	NA	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 170
TITLE: Company History
COMPANY: Mannesmann PROCAD
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	12.5	15.0	15.7	NA
CPU Shipments	NA	NA	175	200	218	NA
Workstation Shipments	NA	NA	175	200	218	NA
Workstations Shipped To-Date	NA	NA	175	375	593	NA
North America						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	12.5	15.0	15.7	NA
CPU Shipments	NA	NA	175	200	218	NA
Workstation Shipments	NA	NA	175	200	218	NA
Workstations Shipped To-Date	NA	NA	175	375	593	NA
Asia						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	12.5	15.0	15.7	NA
CPU Shipments	NA	NA	175	200	218	NA
Workstation Shipments	NA	NA	175	200	218	NA
Workstations Shipped To-Date	NA	NA	175	375	593	NA
Host/Server						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 171
TITLE: Company History
COMPANY: Mannesmann PROCAD
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	12.5	15.0	15.7	NA
CPU Shipments	NA	NA	175	200	218	NA
Workstation Shipments	NA	NA	175	200	218	NA
Workstations Shipped To-Date	NA	NA	175	375	593	NA
North America						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	12.5	15.0	15.7	NA
CPU Shipments	NA	NA	175	200	218	NA
Workstation Shipments	NA	NA	175	200	218	NA
Workstations Shipped To-Date	NA	NA	175	375	593	NA
Asia						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	12.5	15.0	15.7	NA
CPU Shipments	NA	NA	175	200	218	NA
Workstation Shipments	NA	NA	175	200	218	NA
Workstations Shipped To-Date	NA	NA	175	375	593	NA
Host/Server						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 172
TITLE: Company History
COMPANY: Matra Datavision
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	42.9	55.0	70.5	64.2	82.6	18%
CPU Shipments	158	150	862	700	901	55%
Workstation Shipments	630	600	893	700	901	9%
Workstations Shipped To-Date	983	1,583	2,476	3,176	4,077	43%
North America						
Total Revenue	4.7	4.4	10.6	9.6	10.3	22%
CPU Shipments	17	12	121	105	113	60%
Workstation Shipments	69	48	121	105	113	13%
Workstations Shipped To-Date	150	198	319	424	537	38%
Europe						
Total Revenue	36.1	41.3	56.4	51.3	68.1	17%
CPU Shipments	133	113	685	560	743	54%
Workstation Shipments	530	450	685	560	743	9%
Workstations Shipped To-Date	787	1,237	1,922	2,482	3,225	42%
Asia						
Total Revenue	2.1	8.3	3.5	3.2	4.1	18%
CPU Shipments	8	23	41	35	45	56%
Workstation Shipments	31	90	41	35	45	10%
Workstations Shipped To-Date	46	136	177	212	257	54%
Rest of World						
Total Revenue	.0	1.1	.0	.0	.0	NA
CPU Shipments	0	3	15	0	0	NA
Workstation Shipments	0	12	46	0	0	NA
Workstations Shipped To-Date	0	12	58	58	58	NA
Technical Workstation						
Total Revenue	.0	.0	70.5	64.2	82.6	NA
CPU Shipments	0	0	847	700	901	NA
Workstation Shipments	0	0	847	700	901	NA
Workstations Shipped To-Date	0	0	847	1,547	2,448	NA
Host/Server						
Total Revenue	42.9	55.0	.0	.0	.0	-100%
CPU Shipments	158	150	15	0	0	-100%
Workstation Shipments	630	600	46	0	0	-100%
Workstations Shipped To-Date	983	1,583	1,629	1,629	1,629	13%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 173
TITLE: Company History
COMPANY: Matra Datavision
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	42.1	55.0	70.5	64.2	82.6	18%
CPU Shipments	154	150	862	700	901	55%
Workstation Shipments	618	600	893	700	901	10%
Workstations Shipped To-Date	962	1,562	2,455	3,155	4,056	43%
North America						
Total Revenue	4.6	4.4	10.6	9.6	10.3	22%
CPU Shipments	17	12	121	105	113	61%
Workstation Shipments	68	48	121	105	113	14%
Workstations Shipped To-Date	141	189	310	415	528	39%
Europe						
Total Revenue	35.3	41.3	56.4	51.3	68.1	18%
CPU Shipments	130	113	685	560	743	55%
Workstation Shipments	520	450	685	560	743	9%
Workstations Shipped To-Date	775	1,225	1,910	2,470	3,214	43%
Asia						
Total Revenue	2.1	8.3	3.5	3.2	4.1	18%
CPU Shipments	8	23	41	35	45	56%
Workstation Shipments	31	90	41	35	45	10%
Workstations Shipped To-Date	46	136	176	211	256	54%
Rest of World						
Total Revenue	.0	1.1	.0	.0	.0	NA
CPU Shipments	0	3	15	0	0	NA
Workstation Shipments	0	12	46	0	0	NA
Workstations Shipped To-Date	0	12	58	58	58	NA
Technical Workstation						
Total Revenue	.0	.0	70.5	64.2	82.6	NA
CPU Shipments	0	0	847	700	901	NA
Workstation Shipments	0	0	847	700	901	NA
Workstations Shipped To-Date	0	0	847	1,547	2,448	NA
Host/Server						
Total Revenue	42.1	55.0	.0	.0	.0	-100%
CPU Shipments	154	150	15	0	0	-100%
Workstation Shipments	618	600	46	0	0	-100%
Workstations Shipped To-Date	962	1,562	1,608	1,608	1,608	14%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 174
TITLE: Company History
COMPANY: McDonnell Douglas
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	183.1	191.3	231.0	282.0	352.7	18%
CPU Shipments	779	1,703	2,081	2,861	3,639	47%
Workstation Shipments	2,015	2,950	3,081	3,968	4,907	25%
Workstations Shipped To-Date	6,619	9,569	12,649	16,617	21,524	34%
North America						
Total Revenue	138.7	137.9	128.7	180.8	204.2	10%
CPU Shipments	554	707	783	1,797	2,019	38%
Workstation Shipments	1,522	1,938	1,255	2,260	2,486	13%
Workstations Shipped To-Date	5,464	7,402	8,657	10,917	13,402	25%
Europe						
Total Revenue	38.5	45.5	75.6	86.9	124.9	34%
CPU Shipments	199	869	1,040	896	1,357	62%
Workstation Shipments	428	869	1,545	1,499	2,099	49%
Workstations Shipped To-Date	895	1,764	3,309	4,808	6,907	67%
Asia						
Total Revenue	5.9	6.1	23.5	8.7	16.5	30%
CPU Shipments	27	119	239	111	193	64%
Workstation Shipments	65	119	249	139	237	38%
Workstations Shipped To-Date	252	371	620	759	996	41%
Rest of World						
Total Revenue	.0	1.7	3.2	5.6	7.0	NA
CPU Shipments	0	8	20	56	70	NA
Workstation Shipments	0	24	32	70	86	NA
Workstations Shipped To-Date	7	31	63	133	219	136%
Technical Workstation						
Total Revenue	24.5	27.3	70.0	211.2	276.5	83%
CPU Shipments	369	536	1,027	2,458	3,181	71%
Workstation Shipments	369	536	1,027	2,458	3,181	71%
Workstations Shipped To-Date	447	983	2,010	4,468	7,649	103%
Host/Server						
Total Revenue	148.8	163.9	161.0	70.8	76.3	-15%
CPU Shipments	363	1,167	1,054	403	458	6%
Workstation Shipments	1,598	2,414	2,053	1,510	1,726	2%
Workstations Shipped To-Date	6,124	8,538	10,591	12,101	13,828	23%
Personal Computer						
Total Revenue	9.7	.0	.0	.0	.0	-100%
CPU Shipments	48	0	0	0	0	-100%
Workstation Shipments	48	0	0	0	0	-100%
Workstations Shipped To-Date	48	48	48	48	48	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 175
TITLE: Company History
COMPANY: McDonnell Douglas
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	145.5	163.8	181.1	206.0	247.5	14%
CPU Shipments	377	1,419	1,686	2,152	2,592	62%
Workstation Shipments	1,530	2,508	2,417	2,703	3,289	21%
Workstations Shipped To-Date	5,383	7,891	10,308	13,011	16,300	32%
North America						
Total Revenue	112.1	122.4	103.2	135.7	143.3	6%
CPU Shipments	260	643	624	1,384	1,434	53%
Workstation Shipments	1,171	1,721	986	1,680	1,733	10%
Workstations Shipped To-Date	4,466	6,187	7,173	8,853	10,586	24%
Europe						
Total Revenue	29.1	34.1	52.6	58.9	87.7	32%
CPU Shipments	107	652	812	631	971	74%
Workstation Shipments	313	652	1,165	857	1,331	44%
Workstations Shipped To-Date	713	1,364	2,529	3,387	4,718	60%
Asia						
Total Revenue	4.4	6.1	23.5	7.0	11.6	28%
CPU Shipments	10	119	239	91	137	92%
Workstation Shipments	46	119	249	111	165	38%
Workstations Shipped To-Date	197	316	565	676	842	44%
Rest of World						
Total Revenue	.0	1.1	1.8	4.4	4.9	NA
CPU Shipments	0	6	11	45	49	NA
Workstation Shipments	0	16	17	55	60	NA
Workstations Shipped To-Date	7	23	40	95	155	117%
Technical Workstation						
Total Revenue	.0	25.1	61.6	167.2	203.1	NA
CPU Shipments	0	493	915	1,946	2,337	NA
Workstation Shipments	0	493	915	1,946	2,337	NA
Workstations Shipped To-Date	0	493	1,408	3,354	5,691	NA
Host/Server						
Total Revenue	135.8	138.7	119.5	38.9	44.4	-24%
CPU Shipments	329	927	771	205	255	-6%
Workstation Shipments	1,482	2,015	1,502	757	952	-10%
Workstations Shipped To-Date	5,335	7,350	8,852	9,609	10,561	19%
Personal Computer						
Total Revenue	9.7	.0	.0	.0	.0	-100%
CPU Shipments	48	0	0	0	0	-100%
Workstation Shipments	48	0	0	0	0	-100%
Workstations Shipped To-Date	48	48	48	48	48	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 176
TITLE: Company History
COMPANY: McDonnell Douglas
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	37.5	13.8	35.3	37.6	52.6	9%
CPU Shipments	402	142	298	368	561	9%
Workstation Shipments	485	221	501	571	690	9%
Workstations Shipped To-Date	1,221	1,442	1,943	2,514	3,204	27%
North America						
Total Revenue	26.7	7.8	12.8	18.1	30.5	3%
CPU Shipments	294	32	78	166	314	2%
Workstation Shipments	351	108	135	233	364	1%
Workstations Shipped To-Date	984	1,093	1,227	1,460	1,824	17%
Europe						
Total Revenue	9.4	5.7	21.5	17.7	18.6	19%
CPU Shipments	92	109	214	182	207	22%
Workstation Shipments	115	109	355	309	279	25%
Workstations Shipped To-Date	181	290	645	954	1,233	61%
Asia						
Total Revenue	1.5	.0	.0	1.5	2.5	13%
CPU Shipments	17	0	0	17	30	16%
Workstation Shipments	20	0	0	24	35	15%
Workstations Shipped To-Date	55	55	55	79	114	20%
Rest of World						
Total Revenue	.0	.3	1.1	.4	1.1	NA
CPU Shipments	0	1	6	4	11	NA
Workstation Shipments	0	4	11	5	13	NA
Workstations Shipped To-Date	0	4	15	20	33	NA
Technical Workstation						
Total Revenue	24.5	1.1	6.6	25.5	44.7	16%
CPU Shipments	369	22	88	296	515	9%
Workstation Shipments	369	22	88	296	515	9%
Workstations Shipped To-Date	446	467	555	851	1,366	32%
Host/Server						
Total Revenue	13.0	12.6	28.7	12.1	7.9	-12%
CPU Shipments	33	120	210	73	47	9%
Workstation Shipments	116	199	413	275	175	11%
Workstations Shipped To-Date	775	974	1,387	1,663	1,838	24%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 177
TITLE: Company History
COMPANY: McDonnell Douglas
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	13.8	14.6	38.4	52.7	NA
CPU Shipments	NA	142	97	340	486	NA
Workstation Shipments	NA	221	162	694	929	NA
Workstations Shipped To-Date	NA	221	383	1,077	2,006	NA
North America						
Total Revenue	NA	7.8	12.8	27.0	30.5	NA
CPU Shipments	NA	32	82	247	271	NA
Workstation Shipments	NA	108	134	347	389	NA
Workstations Shipped To-Date	NA	108	243	590	978	NA
Europe						
Total Revenue	NA	5.7	1.5	10.4	18.7	NA
CPU Shipments	NA	109	13	83	179	NA
Workstation Shipments	NA	109	25	333	490	NA
Workstations Shipped To-Date	NA	109	133	466	956	NA
Asia						
Total Revenue	NA	.0	.0	.2	2.5	NA
CPU Shipments	NA	0	0	3	26	NA
Workstation Shipments	NA	0	0	4	37	NA
Workstations Shipped To-Date	NA	0	0	4	41	NA
Rest of World						
Total Revenue	NA	.3	.3	.8	1.1	NA
CPU Shipments	NA	1	2	7	9	NA
Workstation Shipments	NA	4	3	10	13	NA
Workstations Shipped To-Date	NA	4	7	18	31	NA
Technical Workstation						
Total Revenue	NA	1.1	1.8	18.5	28.6	NA
CPU Shipments	NA	22	24	216	329	NA
Workstation Shipments	NA	22	24	216	329	NA
Workstations Shipped To-Date	NA	22	46	261	591	NA
Host/Server						
Total Revenue	NA	12.6	12.8	19.9	24.0	NA
CPU Shipments	NA	120	73	125	157	NA
Workstation Shipments	NA	199	138	478	600	NA
Workstations Shipped To-Date	NA	199	338	816	1,415	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 178
TITLE: Company History
COMPANY: MCS
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	5.0	11.0	16.6	18.5	20.7	43%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	4.1	8.7	12.8	14.3	15.9	41%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.7	1.6	2.7	3.0	3.3	50%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.3	.7	1.2	1.3	1.5	48%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	1.5	3.4	6.0	6.7	9.5	58%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	2.5	5.3	7.3	8.2	7.0	29%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.0	2.3	3.3	3.7	4.1	43%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 179
TITLE: Company History
COMPANY: MCS
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	5.0	11.0	16.6	18.5	20.7	43%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	4.1	8.7	12.8	14.3	15.9	41%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.7	1.6	2.7	3.0	3.3	50%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.3	.7	1.2	1.3	1.5	48%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	1.5	3.4	6.0	6.7	9.5	58%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	2.5	5.3	7.3	8.2	7.0	29%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.0	2.3	3.3	3.7	4.1	43%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 180
TITLE: Company History
COMPANY: Mentor Graphics
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	189.5	316.3	300.8	376.0	425.2	22%
CPU Shipments	2,023	4,180	4,333	4,997	4,214	20%
Workstation Shipments	2,110	4,303	4,333	4,997	4,214	19%
Workstations Shipped To-Date	5,619	9,921	14,254	19,251	23,465	43%
North America						
Total Revenue	114.5	120.8	158.2	185.8	205.7	16%
CPU Shipments	1,350	1,716	2,297	2,497	2,039	11%
Workstation Shipments	1,424	1,734	2,297	2,497	2,039	9%
Workstations Shipped To-Date	4,036	5,770	8,067	10,563	12,602	33%
Europe						
Total Revenue	43.7	105.3	77.8	105.8	120.7	29%
CPU Shipments	530	1,287	991	1,400	1,196	23%
Workstation Shipments	543	1,290	991	1,400	1,196	22%
Workstations Shipped To-Date	1,036	2,326	3,318	4,718	5,914	55%
Asia						
Total Revenue	31.4	90.2	64.9	84.4	98.8	33%
CPU Shipments	143	678	1,045	1,100	979	62%
Workstation Shipments	143	678	1,045	1,100	979	62%
Workstations Shipped To-Date	533	1,211	2,255	3,355	4,335	69%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	499	0	0	0	NA
Workstation Shipments	0	600	0	0	0	NA
Workstations Shipped To-Date	14	614	614	614	614	157%
Technical Workstation						
Total Revenue	179.9	314.0	300.8	376.0	425.2	24%
CPU Shipments	1,994	4,169	4,333	4,997	4,214	21%
Workstation Shipments	1,994	4,169	4,333	4,997	4,214	21%
Workstations Shipped To-Date	5,325	9,494	13,827	18,824	23,038	44%
Host/Server						
Total Revenue	8.0	2.3	.0	.0	.0	-100%
CPU Shipments	29	11	0	0	0	-100%
Workstation Shipments	116	133	0	0	0	-100%
Workstations Shipped To-Date	182	315	315	315	315	15%
Personal Computer						
Total Revenue	1.7	.0	.0	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	112	112	112	112	112	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 181
TITLE: Company History
COMPANY: Mentor Graphics
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	6.2	4.9	7.5	4.7	NA
CPU Shipments	NA	243	79	100	47	NA
Workstation Shipments	NA	273	79	100	47	NA
Workstations Shipped To-Date	NA	273	352	452	499	NA
North America						
Total Revenue	NA	5.1	4.9	5.8	2.6	NA
CPU Shipments	NA	81	79	78	25	NA
Workstation Shipments	NA	81	79	78	25	NA
Workstations Shipped To-Date	NA	81	160	238	263	NA
Europe						
Total Revenue	NA	1.0	.0	.0	1.2	NA
CPU Shipments	NA	16	0	0	12	NA
Workstation Shipments	NA	16	0	0	12	NA
Workstations Shipped To-Date	NA	16	16	16	28	NA
Asia						
Total Revenue	NA	.0	.0	1.7	1.0	NA
CPU Shipments	NA	0	0	22	10	NA
Workstation Shipments	NA	0	0	22	10	NA
Workstations Shipped To-Date	NA	0	0	22	32	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	147	0	0	0	NA
Workstation Shipments	NA	177	0	0	0	NA
Workstations Shipped To-Date	NA	177	177	177	177	NA
Technical Workstation						
Total Revenue	NA	6.2	4.9	7.5	4.7	NA
CPU Shipments	NA	243	79	100	47	NA
Workstation Shipments	NA	243	79	100	47	NA
Workstations Shipped To-Date	NA	243	322	422	469	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	30	0	0	0	NA
Workstations Shipped To-Date	NA	30	30	30	30	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 182
TITLE: Company History
COMPANY: Mentor Graphics
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	153.9	220.8	210.2	242.5	249.1	13%
CPU Shipments	1,741	2,892	3,417	3,218	2,468	9%
Workstation Shipments	1,774	2,898	3,417	3,218	2,468	9%
Workstations Shipped To-Date	5,088	7,986	11,403	14,621	17,089	35%
North America						
Total Revenue	91.9	85.8	111.1	105.8	117.4	6%
CPU Shipments	1,156	1,352	1,792	1,422	1,163	0%
Workstation Shipments	1,183	1,356	1,792	1,422	1,163	-0%
Workstations Shipped To-Date	3,699	5,055	6,847	8,269	9,432	26%
Europe						
Total Revenue	35.9	70.0	52.1	70.9	72.4	19%
CPU Shipments	457	981	763	938	718	12%
Workstation Shipments	462	981	763	938	718	12%
Workstations Shipped To-Date	897	1,879	2,642	3,580	4,297	48%
Asia						
Total Revenue	26.1	64.9	47.0	65.8	59.3	23%
CPU Shipments	129	557	862	858	588	46%
Workstation Shipments	129	557	862	858	588	46%
Workstations Shipped To-Date	477	1,034	1,896	2,754	3,341	63%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	4	0	0	0	NA
Workstation Shipments	0	4	0	0	0	NA
Workstations Shipped To-Date	14	18	18	18	18	7%
Technical Workstation						
Total Revenue	149.3	220.3	210.2	242.5	249.1	14%
CPU Shipments	1,730	2,890	3,417	3,218	2,468	9%
Workstation Shipments	1,730	2,890	3,417	3,218	2,468	9%
Workstations Shipped To-Date	4,933	7,822	11,239	14,457	16,925	36%
Host/Server						
Total Revenue	2.9	.5	.0	.0	.0	-100%
CPU Shipments	11	3	0	0	0	-100%
Workstation Shipments	44	9	0	0	0	-100%
Workstations Shipped To-Date	44	52	52	52	52	5%
Personal Computer						
Total Revenue	1.7	.0	.0	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	112	112	112	112	112	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 183
TITLE: Company History
COMPANY: Mentor Graphics
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	24.7	32.3	26.3	35.7	75.9	32%
CPU Shipments	191	245	239	476	753	41%
Workstation Shipments	211	256	239	476	753	37%
Workstations Shipped To-Date	361	618	857	1,332	2,085	55%
North America						
Total Revenue	15.7	16.1	14.1	22.8	40.8	27%
CPU Shipments	143	142	131	307	405	30%
Workstation Shipments	160	152	131	307	405	26%
Workstations Shipped To-Date	217	369	500	807	1,212	54%
Europe						
Total Revenue	3.8	9.0	6.2	5.3	19.3	51%
CPU Shipments	34	71	51	70	191	54%
Workstation Shipments	37	72	51	70	191	51%
Workstations Shipped To-Date	89	161	212	282	474	52%
Asia						
Total Revenue	5.3	7.2	6.0	7.6	15.8	31%
CPU Shipments	14	32	57	99	157	82%
Workstation Shipments	14	32	57	99	157	82%
Workstations Shipped To-Date	55	87	144	243	400	64%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	22.8	31.0	26.3	35.7	75.9	35%
CPU Shipments	185	239	239	476	753	42%
Workstation Shipments	185	239	239	476	753	42%
Workstations Shipped To-Date	309	548	788	1,263	2,016	60%
Host/Server						
Total Revenue	1.9	1.4	.0	.0	.0	-100%
CPU Shipments	7	6	0	0	0	-100%
Workstation Shipments	26	17	0	0	0	-100%
Workstations Shipped To-Date	52	69	69	69	69	7%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 184
TITLE: Company History
COMPANY: Mentor Graphics
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	10.9	57.1	59.5	90.3	95.5	72%
CPU Shipments	90	457	599	1,203	946	80%
Workstation Shipments	125	463	599	1,203	946	66%
Workstations Shipped To-Date	169	632	1,231	2,434	3,380	111%
North America						
Total Revenue	6.9	13.8	28.2	51.3	45.0	60%
CPU Shipments	52	141	295	690	446	71%
Workstation Shipments	81	145	295	690	446	53%
Workstations Shipped To-Date	119	265	560	1,250	1,696	94%
Europe						
Total Revenue	4.1	25.2	19.5	29.6	27.8	62%
CPU Shipments	39	220	177	392	275	63%
Workstation Shipments	44	221	177	392	275	58%
Workstations Shipped To-Date	50	271	448	840	1,115	117%
Asia						
Total Revenue	.0	18.0	11.9	9.3	22.7	NA
CPU Shipments	0	89	126	121	225	NA
Workstation Shipments	0	89	126	121	225	NA
Workstations Shipped To-Date	0	89	216	337	562	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	6	0	0	0	NA
Workstation Shipments	0	8	0	0	0	NA
Workstations Shipped To-Date	0	8	8	8	8	NA
Technical Workstation						
Total Revenue	7.7	56.6	59.5	90.3	95.5	87%
CPU Shipments	79	454	599	1,203	946	86%
Workstation Shipments	79	454	599	1,203	946	86%
Workstations Shipped To-Date	83	538	1,136	2,339	3,285	150%
Host/Server						
Total Revenue	3.2	.5	.0	.0	.0	-100%
CPU Shipments	12	2	0	0	0	-100%
Workstation Shipments	46	9	0	0	0	-100%
Workstations Shipped To-Date	86	95	95	95	95	2%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 185
TITLE: Company History
COMPANY: Mitsubishi Electric
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	70.9	70.0	77.0	72.0	90.3	6%
CPU Shipments	292	405	218	1,355	1,536	51%
Workstation Shipments	486	760	400	1,400	1,700	37%
Workstations Shipped To-Date	1,109	1,869	2,269	3,669	5,369	48%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	70.9	70.0	77.0	72.0	90.3	6%
CPU Shipments	292	405	218	1,355	1,536	51%
Workstation Shipments	486	760	400	1,400	1,700	37%
Workstations Shipped To-Date	1,109	1,869	2,269	3,669	5,369	48%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	14.5	30.7	50.4	67.0	NA
CPU Shipments	0	160	111	561	666	NA
Workstation Shipments	0	160	111	561	666	NA
Workstations Shipped To-Date	0	160	271	832	1,498	NA
Host/Server						
Total Revenue	64.2	50.8	38.5	14.4	13.9	-32%
CPU Shipments	112	101	87	0	41	-22%
Workstation Shipments	306	456	268	45	205	-10%
Workstations Shipped To-Date	778	1,234	1,503	1,548	1,753	23%
Personal Computer						
Total Revenue	6.7	4.8	7.9	7.2	9.4	9%
CPU Shipments	180	144	20	794	829	46%
Workstation Shipments	180	144	20	794	829	46%
Workstations Shipped To-Date	330	475	495	1,289	2,117	59%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 186
TITLE: Company History
COMPANY: Mitsubishi Electric
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	65.0	59.5	46.2	28.8	38.4	-12%
CPU Shipments	265	366	128	542	668	26%
Workstation Shipments	445	674	237	560	741	14%
Workstations Shipped To-Date	864	1,537	1,774	2,334	3,075	37%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	65.0	59.5	46.2	28.8	38.4	-12%
CPU Shipments	265	366	128	542	668	26%
Workstation Shipments	445	674	237	560	741	14%
Workstations Shipped To-Date	864	1,537	1,774	2,334	3,075	37%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	13.1	15.3	20.2	28.0	NA
CPU Shipments	0	145	55	224	279	NA
Workstation Shipments	0	145	55	224	279	NA
Workstations Shipped To-Date	0	145	201	425	704	NA
Host/Server						
Total Revenue	58.5	41.7	23.1	5.8	6.1	-43%
CPU Shipments	95	77	52	0	18	-34%
Workstation Shipments	275	384	161	18	90	-24%
Workstations Shipped To-Date	575	959	1,120	1,138	1,228	21%
Personal Computer						
Total Revenue	6.5	4.8	7.9	2.9	4.2	-10%
CPU Shipments	170	144	20	317	372	22%
Workstation Shipments	170	144	20	317	372	22%
Workstations Shipped To-Date	289	433	454	771	1,143	41%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 187
TITLE: Company History
COMPANY: Mitsubishi Electric
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.6	7.0	7.7	7.2	13.5	31%
CPU Shipments	25	24	17	135	226	73%
Workstation Shipments	35	43	54	140	250	63%
Workstations Shipped To-Date	227	270	324	464	714	33%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	4.6	7.0	7.7	7.2	13.5	31%
CPU Shipments	25	24	17	135	226	73%
Workstation Shipments	35	43	54	140	250	63%
Workstations Shipped To-Date	227	270	324	464	714	33%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	1.4	.0	5.0	10.2	NA
CPU Shipments	0	14	0	56	101	NA
Workstation Shipments	0	14	0	56	101	NA
Workstations Shipped To-Date	0	14	14	71	172	NA
Host/Server						
Total Revenue	4.4	5.6	7.7	1.4	2.0	-17%
CPU Shipments	15	10	17	0	6	-21%
Workstation Shipments	25	29	54	5	30	4%
Workstations Shipped To-Date	185	214	268	272	302	13%
Personal Computer						
Total Revenue	.2	.0	.0	.7	1.4	56%
CPU Shipments	10	0	0	79	119	86%
Workstation Shipments	10	0	0	79	119	86%
Workstations Shipped To-Date	41	41	41	121	240	55%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 188
TITLE: Company History
COMPANY: Mitsubishi Electric
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	15.4	28.8	38.4	NA
CPU Shipments	NA	NA	56	542	641	NA
Workstation Shipments	NA	NA	56	560	709	NA
Workstations Shipped To-Date	NA	NA	56	616	1,325	NA
North America						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Asia						
Total Revenue	NA	NA	15.4	28.8	38.4	NA
CPU Shipments	NA	NA	56	542	641	NA
Workstation Shipments	NA	NA	56	560	709	NA
Workstations Shipped To-Date	NA	NA	56	616	1,325	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	15.4	20.2	28.8	NA
CPU Shipments	NA	NA	56	224	286	NA
Workstation Shipments	NA	NA	56	224	286	NA
Workstations Shipped To-Date	NA	NA	56	280	567	NA
Host/Server						
Total Revenue	NA	NA	.0	5.8	5.8	NA
CPU Shipments	NA	NA	0	0	17	NA
Workstation Shipments	NA	NA	0	18	85	NA
Workstations Shipped To-Date	NA	NA	0	18	103	NA
Personal Computer						
Total Revenue	NA	NA	.0	2.9	3.8	NA
CPU Shipments	NA	NA	0	317	338	NA
Workstation Shipments	NA	NA	0	317	338	NA
Workstations Shipped To-Date	NA	NA	0	317	655	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 189
TITLE: Company History
COMPANY: Mitsui Engineering
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	10.2	14.0	17.0	23.4	34.7	36%
CPU Shipments	40	55	114	155	227	54%
Workstation Shipments	75	120	114	155	227	32%
Workstations Shipped To-Date	158	278	392	547	774	49%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	10.2	14.0	17.0	23.4	34.7	36%
CPU Shipments	40	55	114	155	227	54%
Workstation Shipments	75	120	114	155	227	32%
Workstations Shipped To-Date	158	278	392	547	774	49%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	3.5	15.5	22.0	31.6	NA
CPU Shipments	0	22	90	136	207	NA
Workstation Shipments	0	22	90	136	207	NA
Workstations Shipped To-Date	0	22	112	248	455	NA
Host/Server						
Total Revenue	10.2	10.5	.0	.0	.0	-100%
CPU Shipments	40	33	0	0	0	-100%
Workstation Shipments	75	98	0	0	0	-100%
Workstations Shipped To-Date	158	256	256	256	256	13%
Personal Computer						
Total Revenue	.0	.0	1.5	1.4	3.1	NA
CPU Shipments	0	0	24	19	20	NA
Workstation Shipments	0	0	24	19	20	NA
Workstations Shipped To-Date	0	0	24	43	63	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 190
TITLE: Company History
COMPANY: Mitsui Engineering
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	5.4	8.7	10.9	14.2	19.8	38%
CPU Shipments	31	32	78	97	129	43%
Workstation Shipments	53	72	78	97	129	25%
Workstations Shipped To-Date	98	170	248	345	475	48%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	5.4	8.7	10.9	14.2	19.8	38%
CPU Shipments	31	32	78	97	129	43%
Workstation Shipments	53	72	78	97	129	25%
Workstations Shipped To-Date	98	170	248	345	475	48%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	2.1	9.4	12.7	18.0	NA
CPU Shipments	0	13	55	79	118	NA
Workstation Shipments	0	13	55	79	118	NA
Workstations Shipped To-Date	0	13	67	146	263	NA
Host/Server						
Total Revenue	5.4	6.6	.0	.0	.0	-100%
CPU Shipments	31	20	0	0	0	-100%
Workstation Shipments	53	59	0	0	0	-100%
Workstations Shipped To-Date	98	157	157	157	157	13%
Personal Computer						
Total Revenue	.0	.0	1.5	1.4	1.8	NA
CPU Shipments	0	0	24	19	12	NA
Workstation Shipments	0	0	24	19	12	NA
Workstations Shipped To-Date	0	0	24	43	54	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June--Reproduction Prohibited

TABLE NUMBER: 191
TITLE: Company History
COMPANY: Mitsui Engineering
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1.8	1.4	.9	1.2	1.7	-1%
CPU Shipments	6	9	5	7	11	17%
Workstation Shipments	15	9	5	7	11	-7%
Workstations Shipped To-Date	33	42	47	55	66	19%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	1.8	1.4	.9	1.2	1.7	-1%
CPU Shipments	6	9	5	7	11	17%
Workstation Shipments	15	9	5	7	11	-7%
Workstations Shipped To-Date	33	42	47	55	66	19%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	1.4	.9	1.2	1.6	NA
CPU Shipments	0	9	5	7	10	NA
Workstation Shipments	0	9	5	7	10	NA
Workstations Shipped To-Date	0	9	14	22	32	NA
Host/Server						
Total Revenue	1.8	.0	.0	.0	.0	-100%
CPU Shipments	6	0	0	0	0	-100%
Workstation Shipments	15	0	0	0	0	-100%
Workstations Shipped To-Date	33	33	33	33	33	0%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.2	NA
CPU Shipments	0	0	0	0	1	NA
Workstation Shipments	0	0	0	0	1	NA
Workstations Shipped To-Date	0	0	0	0	1	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 192
TITLE: Company History
COMPANY: Mitsui Engineering
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.0	3.9	5.3	8.1	13.2	45%
CPU Shipments	3	13	31	50	86	131%
Workstation Shipments	7	39	31	50	86	87%
Workstations Shipped To-Date	27	66	96	147	233	71%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	3.0	3.9	5.3	8.1	13.2	45%
CPU Shipments	3	13	31	50	86	131%
Workstation Shipments	7	39	31	50	86	87%
Workstations Shipped To-Date	27	66	96	147	233	71%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	5.3	8.1	12.0	NA
CPU Shipments	0	0	31	50	79	NA
Workstation Shipments	0	0	31	50	79	NA
Workstations Shipped To-Date	0	0	31	81	160	NA
Host/Server						
Total Revenue	3.0	3.9	.0	.0	.0	-100%
CPU Shipments	3	13	0	0	0	-100%
Workstation Shipments	7	39	0	0	0	-100%
Workstations Shipped To-Date	27	66	66	66	66	25%
Personal Computer						
Total Revenue	.0	.0	.0	.0	1.2	NA
CPU Shipments	0	0	0	0	8	NA
Workstation Shipments	0	0	0	0	8	NA
Workstations Shipped To-Date	0	0	0	0	8	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 193
TITLE: Company History
COMPANY: Mutoh Industries--NO OEM
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	42.5	44.8	58.5	59.4	70.4	13%
CPU Shipments	718	1,437	1,425	1,500	1,625	23%
Workstation Shipments	745	1,446	1,430	1,500	1,625	22%
Workstations Shipped To-Date	1,439	2,885	4,315	5,815	7,440	51%
North America						
Total Revenue	.0	1.6	1.7	.0	.0	NA
CPU Shipments	0	109	116	0	0	NA
Workstation Shipments	0	111	118	0	0	NA
Workstations Shipped To-Date	0	111	229	229	229	NA
Europe						
Total Revenue	.0	2.7	.0	.0	.5	NA
CPU Shipments	0	181	0	0	11	NA
Workstation Shipments	0	185	0	0	11	NA
Workstations Shipped To-Date	0	185	185	185	197	NA
Asia						
Total Revenue	42.5	39.4	55.1	59.4	70.0	13%
CPU Shipments	718	1,075	1,185	1,500	1,614	22%
Workstation Shipments	745	1,075	1,185	1,500	1,614	21%
Workstations Shipped To-Date	1,439	2,514	3,699	5,199	6,813	48%
Rest of World						
Total Revenue	.0	1.1	1.7	.0	.0	NA
CPU Shipments	0	72	124	0	0	NA
Workstation Shipments	0	74	127	0	0	NA
Workstations Shipped To-Date	0	74	201	201	201	NA
Technical Workstation						
Total Revenue	11.2	16.9	1.5	24.1	30.0	28%
CPU Shipments	127	309	69	299	302	24%
Workstation Shipments	127	309	69	299	302	24%
Workstations Shipped To-Date	263	572	642	941	1,243	47%
Host/Server						
Total Revenue	9.2	.4	.2	3.5	4.0	-19%
CPU Shipments	9	1	1	5	8	-4%
Workstation Shipments	36	10	6	5	8	-32%
Workstations Shipped To-Date	60	70	76	81	88	10%
Personal Computer						
Total Revenue	22.2	27.5	56.8	31.7	36.5	13%
CPU Shipments	581	1,127	1,355	1,196	1,315	23%
Workstation Shipments	581	1,127	1,355	1,196	1,315	23%
Workstations Shipped To-Date	1,116	2,243	3,598	4,794	6,109	53%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 194
TITLE: Company History
COMPANY: Mutoh Industries--NO OEM
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	31.9	38.9	47.5	42.8	45.2	9%
CPU Shipments	638	1,232	1,188	1,165	1,150	16%
Workstation Shipments	644	1,241	1,193	1,165	1,150	16%
Workstations Shipped To-Date	992	2,233	3,426	4,591	5,741	55%
North America						
Total Revenue	.0	1.6	1.7	.0	.0	NA
CPU Shipments	0	109	116	0	0	NA
Workstation Shipments	0	111	118	0	0	NA
Workstations Shipped To-Date	0	111	229	229	229	NA
Europe						
Total Revenue	.0	2.7	.0	.0	.5	NA
CPU Shipments	0	181	0	0	11	NA
Workstation Shipments	0	185	0	0	11	NA
Workstations Shipped To-Date	0	185	185	185	197	NA
Asia						
Total Revenue	31.9	33.5	44.1	42.8	44.8	9%
CPU Shipments	638	870	948	1,165	1,138	16%
Workstation Shipments	644	870	948	1,165	1,138	15%
Workstations Shipped To-Date	992	1,862	2,810	3,976	5,114	51%
Rest of World						
Total Revenue	.0	1.1	1.7	.0	.0	NA
CPU Shipments	0	72	124	0	0	NA
Workstation Shipments	0	74	127	0	0	NA
Workstations Shipped To-Date	0	74	201	201	201	NA
Technical Workstation						
Total Revenue	10.8	16.9	1.5	15.8	16.7	11%
CPU Shipments	126	309	69	196	169	7%
Workstation Shipments	126	309	69	196	169	7%
Workstations Shipped To-Date	262	571	640	837	1,005	40%
Host/Server						
Total Revenue	1.9	.4	.2	1.3	1.4	-8%
CPU Shipments	2	1	1	2	3	7%
Workstation Shipments	8	10	6	2	3	-24%
Workstations Shipped To-Date	14	24	30	31	34	25%
Personal Computer						
Total Revenue	19.1	21.6	45.7	25.7	27.1	9%
CPU Shipments	510	922	1,118	968	978	18%
Workstation Shipments	510	922	1,118	968	978	18%
Workstations Shipped To-Date	716	1,638	2,756	3,724	4,702	60%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 195
TITLE: Company History
COMPANY: Mutoh Industries--NO OEM
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.8	4.3	6.6	11.9	20.3	52%
CPU Shipments	35	150	142	238	370	81%
Workstation Shipments	44	150	142	238	370	71%
Workstations Shipped To-Date	74	224	366	604	975	91%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	3.8	4.3	6.6	11.9	20.3	52%
CPU Shipments	35	150	142	238	370	81%
Workstation Shipments	44	150	142	238	370	71%
Workstations Shipped To-Date	74	224	366	604	975	91%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.3	.0	.0	6.4	11.8	148%
CPU Shipments	1	0	0	80	119	229%
Workstation Shipments	1	0	0	80	119	229%
Workstations Shipped To-Date	1	1	1	81	199	275%
Host/Server						
Total Revenue	3.0	.0	.0	1.3	1.6	-14%
CPU Shipments	3	0	0	2	3	1%
Workstation Shipments	12	0	0	2	3	-28%
Workstations Shipped To-Date	18	18	18	20	23	6%
Personal Computer						
Total Revenue	.6	4.3	6.6	4.2	6.9	87%
CPU Shipments	31	150	142	157	249	69%
Workstation Shipments	31	150	142	157	249	69%
Workstations Shipped To-Date	54	205	347	504	753	93%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 196
TITLE: Company History
COMPANY: Mutoh Industries--NO OEM
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	6.8	1.6	4.4	4.8	4.9	-8%
CPU Shipments	45	55	95	96	105	24%
Workstation Shipments	57	55	95	96	105	17%
Workstations Shipped To-Date	80	135	229	326	431	52%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	6.8	1.6	4.4	4.8	4.9	-8%
CPU Shipments	45	55	95	96	105	24%
Workstation Shipments	57	55	95	96	105	17%
Workstations Shipped To-Date	80	135	229	326	431	52%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	1.9	1.5	NA
CPU Shipments	0	0	0	24	15	NA
Workstation Shipments	0	0	0	24	15	NA
Workstations Shipped To-Date	0	0	0	24	38	NA
Host/Server						
Total Revenue	4.4	.0	.0	1.0	1.0	-31%
CPU Shipments	4	0	0	1	2	-17%
Workstation Shipments	16	0	0	1	2	-41%
Workstations Shipped To-Date	28	28	28	29	31	3%
Personal Computer						
Total Revenue	2.5	1.6	4.4	1.9	2.5	0%
CPU Shipments	41	55	95	72	88	21%
Workstation Shipments	41	55	95	72	88	21%
Workstations Shipped To-Date	52	106	201	273	361	63%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 197
TITLE: Company History
COMPANY: NEC
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	96.0	169.5	226.4	265.0	342.4	37%
CPU Shipments	1,397	6,958	11,400	13,745	17,859	89%
Workstation Shipments	1,770	7,289	11,400	12,963	17,697	78%
Workstations Shipped To-Date	2,768	10,057	21,457	34,420	52,117	108%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	96.0	169.5	226.4	265.0	342.4	37%
CPU Shipments	1,397	6,958	11,400	13,745	17,859	89%
Workstation Shipments	1,770	7,289	11,400	12,963	17,697	78%
Workstations Shipped To-Date	2,768	10,057	21,457	34,420	52,117	108%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	7.2	42.9	51.9	96.3	165.4	119%
CPU Shipments	81	631	862	4,090	8,695	222%
Workstation Shipments	81	631	862	4,090	8,695	222%
Workstations Shipped To-Date	81	712	1,574	5,664	14,359	265%
Host/Server						
Total Revenue	60.2	45.5	81.5	35.6	59.6	-0%
CPU Shipments	87	70	559	1,565	325	39%
Workstation Shipments	460	401	559	782	162	-23%
Workstations Shipped To-Date	809	1,209	1,769	2,551	2,714	35%
Personal Computer						
Total Revenue	28.6	81.1	93.0	133.1	117.4	42%
CPU Shipments	1,229	6,257	9,978	8,090	8,840	64%
Workstation Shipments	1,229	6,257	9,978	8,090	8,840	64%
Workstations Shipped To-Date	1,879	8,136	18,114	26,205	35,044	108%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 198
TITLE: Company History
COMPANY: NEC
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	52.8	95.8	140.7	98.8	198.6	39%
CPU Shipments	829	4,204	7,095	4,682	8,760	80%
Workstation Shipments	1,079	4,454	7,095	3,899	8,598	68%
Workstations Shipped To-Date	1,750	6,204	13,299	17,199	25,797	96%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	52.8	95.8	140.7	98.8	198.6	39%
CPU Shipments	829	4,204	7,095	4,682	8,760	80%
Workstation Shipments	1,079	4,454	7,095	3,899	8,598	68%
Workstations Shipped To-Date	1,750	6,204	13,299	17,199	25,797	96%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	14.0	25.2	39.5	89.4	NA
CPU Shipments	0	232	419	1,676	4,697	NA
Workstation Shipments	0	232	419	1,676	4,697	NA
Workstations Shipped To-Date	0	232	651	2,327	7,024	NA
Host/Server						
Total Revenue	35.4	30.4	56.9	35.6	59.6	14%
CPU Shipments	50	50	390	1,565	325	60%
Workstation Shipments	300	301	390	782	162	-14%
Workstations Shipped To-Date	521	822	1,212	1,995	2,157	43%
Personal Computer						
Total Revenue	17.4	51.4	58.6	23.7	49.7	30%
CPU Shipments	779	3,922	6,286	1,441	3,739	48%
Workstation Shipments	779	3,922	6,286	1,441	3,739	48%
Workstations Shipped To-Date	1,228	5,150	11,436	12,877	16,616	92%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 199
TITLE: Company History
COMPANY: NEC
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	14.4	24.9	29.6	91.4	78.8	53%
CPU Shipments	162	923	1,470	5,302	5,142	137%
Workstation Shipments	210	973	1,470	5,302	5,142	122%
Workstations Shipped To-Date	296	1,268	2,738	8,040	13,182	158%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	14.4	24.9	29.6	91.4	78.8	53%
CPU Shipments	162	923	1,470	5,302	5,142	137%
Workstation Shipments	210	973	1,470	5,302	5,142	122%
Workstations Shipped To-Date	296	1,268	2,738	8,040	13,182	158%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	1.6	5.4	13.7	34.7	NA
CPU Shipments	0	66	89	581	1,821	NA
Workstation Shipments	0	66	89	581	1,821	NA
Workstations Shipped To-Date	0	66	155	737	2,558	NA
Host/Server						
Total Revenue	9.2	8.3	12.1	.0	.0	-100%
CPU Shipments	12	10	83	0	0	-100%
Workstation Shipments	60	60	83	0	0	-100%
Workstations Shipped To-Date	95	155	238	238	238	26%
Personal Computer						
Total Revenue	5.2	15.0	12.1	77.7	44.1	71%
CPU Shipments	150	847	1,297	4,720	3,321	117%
Workstation Shipments	150	847	1,297	4,720	3,321	117%
Workstations Shipped To-Date	200	1,047	2,344	7,065	10,386	168%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 200
TITLE: Company History
COMPANY: NEC
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.8	3.5	2.8	2.7	6.8	16%
CPU Shipments	5	5	19	119	375	194%
Workstation Shipments	20	20	19	119	375	108%
Workstations Shipped To-Date	32	52	71	190	566	105%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	3.8	3.5	2.8	2.7	6.8	16%
CPU Shipments	5	5	19	119	375	194%
Workstation Shipments	20	20	19	119	375	108%
Workstations Shipped To-Date	32	52	71	190	566	105%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	2.3	6.2	NA
CPU Shipments	0	0	0	97	324	NA
Workstation Shipments	0	0	0	97	324	NA
Workstations Shipped To-Date	0	0	0	97	421	NA
Host/Server						
Total Revenue	3.8	3.5	2.8	.0	.0	-100%
CPU Shipments	5	5	19	0	0	-100%
Workstation Shipments	20	20	19	0	0	-100%
Workstations Shipped To-Date	32	52	71	71	71	22%
Personal Computer						
Total Revenue	.0	.0	.0	.4	.7	NA
CPU Shipments	0	0	0	23	52	NA
Workstation Shipments	0	0	0	23	52	NA
Workstations Shipped To-Date	0	0	0	23	74	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 201
TITLE: Company History
COMPANY: NEC
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	16.3	22.7	21.8	36.6	34.2	20%
CPU Shipments	386	933	1,206	1,812	2,088	52%
Workstation Shipments	401	948	1,206	1,812	2,088	51%
Workstations Shipped To-Date	551	1,499	2,705	4,516	6,604	86%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	16.3	22.7	21.8	36.6	34.2	20%
CPU Shipments	386	933	1,206	1,812	2,088	52%
Workstation Shipments	401	948	1,206	1,812	2,088	51%
Workstations Shipped To-Date	551	1,499	2,705	4,516	6,604	86%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	7.2	11.2	12.5	23.0	21.6	32%
CPU Shipments	81	133	208	984	1,134	94%
Workstation Shipments	81	133	208	984	1,134	94%
Workstations Shipped To-Date	81	214	422	1,406	2,539	137%
Host/Server						
Total Revenue	3.1	3.5	.0	.0	.0	-100%
CPU Shipments	5	5	0	0	0	-100%
Workstation Shipments	20	20	0	0	0	-100%
Workstations Shipped To-Date	20	40	40	40	40	19%
Personal Computer						
Total Revenue	6.0	8.1	9.3	13.5	12.7	20%
CPU Shipments	300	795	998	828	954	33%
Workstation Shipments	300	795	998	828	954	33%
Workstations Shipped To-Date	450	1,245	2,243	3,071	4,025	73%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 202
TITLE: Company History
COMPANY: NEC
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	.8	NA	NA	3.4	NA
CPU Shipments	NA	33	NA	NA	180	NA
Workstation Shipments	NA	33	NA	NA	180	NA
Workstations Shipped To-Date	NA	33	NA	NA	213	NA
North America						
Total Revenue	NA	.0	NA	NA	.0	NA
CPU Shipments	NA	0	NA	NA	0	NA
Workstation Shipments	NA	0	NA	NA	0	NA
Workstations Shipped To-Date	NA	0	NA	NA	0	NA
Europe						
Total Revenue	NA	.0	NA	NA	.0	NA
CPU Shipments	NA	0	NA	NA	0	NA
Workstation Shipments	NA	0	NA	NA	0	NA
Workstations Shipped To-Date	NA	0	NA	NA	0	NA
Asia						
Total Revenue	NA	.8	NA	NA	3.4	NA
CPU Shipments	NA	33	NA	NA	180	NA
Workstation Shipments	NA	33	NA	NA	180	NA
Workstations Shipped To-Date	NA	33	NA	NA	213	NA
Rest of World						
Total Revenue	NA	.0	NA	NA	.0	NA
CPU Shipments	NA	0	NA	NA	0	NA
Workstation Shipments	NA	0	NA	NA	0	NA
Workstations Shipped To-Date	NA	0	NA	NA	0	NA
Technical Workstation						
Total Revenue	NA	.8	NA	NA	3.4	NA
CPU Shipments	NA	33	NA	NA	180	NA
Workstation Shipments	NA	33	NA	NA	180	NA
Workstations Shipped To-Date	NA	33	NA	NA	213	NA
Host/Server						
Total Revenue	NA	.0	NA	NA	.0	NA
CPU Shipments	NA	0	NA	NA	0	NA
Workstation Shipments	NA	0	NA	NA	0	NA
Workstations Shipped To-Date	NA	0	NA	NA	0	NA
Personal Computer						
Total Revenue	NA	.0	NA	NA	.0	NA
CPU Shipments	NA	0	NA	NA	0	NA
Workstation Shipments	NA	0	NA	NA	0	NA
Workstations Shipped To-Date	NA	0	NA	NA	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 203
TITLE: Company History
COMPANY: NEC
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.6	21.9	31.5	35.5	20.5	24%
CPU Shipments	15	861	1,609	1,831	1,313	206%
Workstation Shipments	60	861	1,609	1,831	1,313	116%
Workstations Shipped To-Date	140	1,001	2,610	4,441	5,755	153%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	8.6	21.9	31.5	35.5	20.5	24%
CPU Shipments	15	861	1,609	1,831	1,313	206%
Workstation Shipments	60	861	1,609	1,831	1,313	116%
Workstations Shipped To-Date	140	1,001	2,610	4,441	5,755	153%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	15.4	8.8	17.8	10.3	NA
CPU Shipments	0	166	146	753	540	NA
Workstation Shipments	0	166	146	753	540	NA
Workstations Shipped To-Date	0	166	312	1,065	1,605	NA
Host/Server						
Total Revenue	8.6	.0	9.7	.0	.0	-100%
CPU Shipments	15	0	67	0	0	-100%
Workstation Shipments	60	0	67	0	0	-100%
Workstations Shipped To-Date	140	140	207	207	207	10%
Personal Computer						
Total Revenue	.0	6.5	13.0	17.8	10.3	NA
CPU Shipments	0	694	1,397	1,079	774	NA
Workstation Shipments	0	694	1,397	1,079	774	NA
Workstations Shipped To-Date	0	694	2,091	3,170	3,943	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 204
TITLE: Company History
COMPANY: Nemetschek
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	11.9	13.7	17.5	20.6	30.9	27%
CPU Shipments	206	242	279	333	500	25%
Workstation Shipments	206	242	279	333	500	25%
Workstations Shipped To-Date	0	242	521	854	1,354	NA
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	11.9	13.7	17.5	20.6	30.9	27%
CPU Shipments	206	242	279	333	500	25%
Workstation Shipments	206	242	279	333	500	25%
Workstations Shipped To-Date	0	242	521	854	1,354	NA
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	1.2	1.4	1.8	2.1	3.1	27%
CPU Shipments	14	16	18	22	33	25%
Workstation Shipments	14	16	18	22	33	25%
Workstations Shipped To-Date	0	16	34	56	89	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	10.7	12.3	15.7	18.5	27.8	27%
CPU Shipments	192	226	261	311	467	25%
Workstation Shipments	192	226	261	311	467	25%
Workstations Shipped To-Date	0	226	487	798	1,265	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 205
TITLE: Company History
COMPANY: Nemetschek
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	11.9	13.7	17.5	20.6	30.9	27%
CPU Shipments	206	242	279	333	500	25%
Workstation Shipments	206	242	279	333	500	25%
Workstations Shipped To-Date	0	242	521	854	1,354	NA
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	11.9	13.7	17.5	20.6	30.9	27%
CPU Shipments	206	242	279	333	500	25%
Workstation Shipments	206	242	279	333	500	25%
Workstations Shipped To-Date	0	242	521	854	1,354	NA
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	1.2	1.4	1.8	2.1	3.1	27%
CPU Shipments	14	16	18	22	33	25%
Workstation Shipments	14	16	18	22	33	25%
Workstations Shipped To-Date	0	16	34	56	89	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	10.7	12.3	15.7	18.5	27.8	27%
CPU Shipments	192	226	261	311	467	25%
Workstation Shipments	192	226	261	311	467	25%
Workstations Shipped To-Date	0	226	487	798	1,265	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 206
TITLE: Company History
COMPANY: Nihon Unisys
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	41.7	93.0	138.5	181.0	210.9	50%
CPU Shipments	55	293	290	561	853	99%
Workstation Shipments	420	500	700	1,550	1,900	46%
Workstations Shipped To-Date	635	1,135	1,835	3,385	5,285	70%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	41.7	93.0	138.5	181.0	210.9	50%
CPU Shipments	55	293	290	561	853	99%
Workstation Shipments	420	500	700	1,550	1,900	46%
Workstations Shipped To-Date	635	1,135	1,835	3,385	5,285	70%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	24.2	39.9	48.0	62.6	NA
CPU Shipments	0	250	222	451	736	NA
Workstation Shipments	0	250	222	451	736	NA
Workstations Shipped To-Date	0	250	472	923	1,659	NA
Host/Server						
Total Revenue	41.7	68.8	98.6	133.0	148.4	37%
CPU Shipments	55	43	68	110	116	21%
Workstation Shipments	420	250	478	1,099	1,164	29%
Workstations Shipped To-Date	635	885	1,363	2,462	3,626	55%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 207
TITLE: Company History
COMPANY: Nihon Unisys
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	38.7	86.5	128.8	161.1	183.5	48%
CPU Shipments	45	287	283	500	789	105%
Workstation Shipments	385	470	653	1,380	1,670	44%
Workstations Shipped To-Date	585	1,055	1,708	3,087	4,757	69%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	38.7	86.5	128.8	161.1	183.5	48%
CPU Shipments	45	287	283	500	789	105%
Workstation Shipments	385	470	653	1,380	1,670	44%
Workstations Shipped To-Date	585	1,055	1,708	3,087	4,757	69%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	24.2	39.9	42.7	58.7	NA
CPU Shipments	0	250	222	402	691	NA
Workstation Shipments	0	250	222	402	691	NA
Workstations Shipped To-Date	0	250	472	873	1,564	NA
Host/Server						
Total Revenue	38.7	62.3	88.9	118.4	124.8	34%
CPU Shipments	45	37	62	98	98	21%
Workstation Shipments	385	220	431	978	979	26%
Workstations Shipped To-Date	585	804	1,236	2,214	3,192	53%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 208
TITLE: Company History
COMPANY: Nihon Unisys
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.0	6.5	9.7	19.9	27.4	74%
CPU Shipments	9	6	7	62	64	61%
Workstation Shipments	35	30	47	170	230	60%
Workstations Shipped To-Date	50	80	127	298	528	80%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	3.0	6.5	9.7	19.9	27.4	74%
CPU Shipments	9	6	7	62	64	61%
Workstation Shipments	35	30	47	170	230	60%
Workstations Shipped To-Date	50	80	127	298	528	80%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	5.3	3.8	NA
CPU Shipments	0	0	0	50	45	NA
Workstation Shipments	0	0	0	50	45	NA
Workstations Shipped To-Date	0	0	0	50	95	NA
Host/Server						
Total Revenue	3.0	6.5	9.7	14.6	23.6	68%
CPU Shipments	9	6	7	12	19	18%
Workstation Shipments	35	30	47	121	185	51%
Workstations Shipped To-Date	50	80	127	248	433	71%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 209
TITLE: Company History
COMPANY: Norsk Data
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	15.0	30.0	34.0	41.7	50.0	35%
CPU Shipments	83	92	253	406	500	57%
Workstation Shipments	83	313	395	417	500	57%
Workstations Shipped To-Date	83	396	791	1,208	1,708	113%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	15.0	29.0	34.0	41.7	50.0	35%
CPU Shipments	83	89	253	406	500	57%
Workstation Shipments	83	303	395	417	500	57%
Workstations Shipped To-Date	83	386	781	1,198	1,698	113%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	1.1	.0	.0	.0	NA
CPU Shipments	0	3	0	0	0	NA
Workstation Shipments	0	10	0	0	0	NA
Workstations Shipped To-Date	0	10	10	10	10	NA
Technical Workstation						
Total Revenue	15.0	.0	13.6	21.1	25.4	14%
CPU Shipments	83	0	167	311	316	40%
Workstation Shipments	83	0	167	311	316	40%
Workstations Shipped To-Date	83	83	250	561	877	80%
Host/Server						
Total Revenue	.0	30.0	19.7	20.2	24.3	NA
CPU Shipments	0	92	57	38	178	NA
Workstation Shipments	0	313	198	49	178	NA
Workstations Shipped To-Date	0	313	511	560	738	NA
Personal Computer						
Total Revenue	.0	.0	.7	.3	.4	NA
CPU Shipments	0	0	29	57	7	NA
Workstation Shipments	0	0	29	57	7	NA
Workstations Shipped To-Date	0	0	29	87	93	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 210
TITLE: Company History
COMPANY: Norsk Data
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	15.0	30.0	28.6	31.6	38.0	26%
CPU Shipments	83	92	213	303	372	46%
Workstation Shipments	83	313	332	312	372	46%
Workstations Shipped To-Date	83	396	728	1,040	1,411	103%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	15.0	29.0	28.6	31.6	38.0	26%
CPU Shipments	83	89	213	303	372	46%
Workstation Shipments	83	303	332	312	372	46%
Workstations Shipped To-Date	83	386	718	1,030	1,401	103%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	1.1	.0	.0	.0	NA
CPU Shipments	0	3	0	0	0	NA
Workstation Shipments	0	10	0	0	0	NA
Workstations Shipped To-Date	0	10	10	10	10	NA
Technical Workstation						
Total Revenue	15.0	.0	11.4	14.6	17.5	4%
CPU Shipments	83	0	141	214	218	27%
Workstation Shipments	83	0	141	214	218	27%
Workstations Shipped To-Date	83	83	224	438	655	68%
Host/Server						
Total Revenue	.0	30.0	16.6	16.8	20.2	NA
CPU Shipments	0	92	48	31	147	NA
Workstation Shipments	0	313	167	40	147	NA
Workstations Shipped To-Date	0	313	480	520	668	NA
Personal Computer						
Total Revenue	.0	.0	.6	.3	.4	NA
CPU Shipments	0	0	25	57	7	NA
Workstation Shipments	0	0	25	57	7	NA
Workstations Shipped To-Date	0	0	25	82	88	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 211
TITLE: Company History
COMPANY: Norsk Data
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	3.9	7.5	9.0	NA
CPU Shipments	NA	NA	29	79	97	NA
Workstation Shipments	NA	NA	45	80	97	NA
Workstations Shipped To-Date	NA	NA	45	125	222	NA
North America						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	3.9	7.5	9.0	NA
CPU Shipments	NA	NA	29	79	97	NA
Workstation Shipments	NA	NA	45	80	97	NA
Workstations Shipped To-Date	NA	NA	45	125	222	NA
Asia						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	1.6	5.0	6.0	NA
CPU Shipments	NA	NA	19	74	75	NA
Workstation Shipments	NA	NA	19	74	75	NA
Workstations Shipped To-Date	NA	NA	19	93	168	NA
Host/Server						
Total Revenue	NA	NA	2.3	2.5	3.0	NA
CPU Shipments	NA	NA	7	5	22	NA
Workstation Shipments	NA	NA	23	6	22	NA
Workstations Shipped To-Date	NA	NA	23	29	51	NA
Personal Computer						
Total Revenue	NA	NA	.1	.0	.0	NA
CPU Shipments	NA	NA	3	0	0	NA
Workstation Shipments	NA	NA	3	0	0	NA
Workstations Shipped To-Date	NA	NA	3	3	3	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 212
TITLE: Company History
COMPANY: Norsk Data
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	1.5	2.5	3.0	NA
CPU Shipments	NA	NA	11	25	32	NA
Workstation Shipments	NA	NA	18	25	32	NA
Workstations Shipped To-Date	NA	NA	18	43	74	NA
North America						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	1.5	2.5	3.0	NA
CPU Shipments	NA	NA	11	25	32	NA
Workstation Shipments	NA	NA	18	25	32	NA
Workstations Shipped To-Date	NA	NA	18	43	74	NA
Asia						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	.6	1.6	1.9	NA
CPU Shipments	NA	NA	8	23	23	NA
Workstation Shipments	NA	NA	8	23	23	NA
Workstations Shipped To-Date	NA	NA	8	30	53	NA
Host/Server						
Total Revenue	NA	NA	.9	1.0	1.1	NA
CPU Shipments	NA	NA	3	2	8	NA
Workstation Shipments	NA	NA	9	2	8	NA
Workstations Shipped To-Date	NA	NA	9	11	20	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	1	0	0	NA
Workstation Shipments	NA	NA	1	0	0	NA
Workstations Shipped To-Date	NA	NA	1	1	1	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 213
TITLE: Company History
COMPANY: PAFEC
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	13.6	20.0	22.0	24.9	23.3	14%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	7	7	7	7	7	0%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	13.6	20.0	21.6	24.4	22.9	14%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	7	7	7	7	7	0%
Asia						
Total Revenue	.0	.0	.5	.5	.5	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	3.8	16.0	19.7	22.4	20.9	53%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	2	2	2	2	2	0%
Host/Server						
Total Revenue	9.8	4.0	.0	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	5	5	5	5	5	0%
Personal Computer						
Total Revenue	.0	.0	2.3	2.6	2.4	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 214
TITLE: Company History
COMPANY: PAFEC
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	10.2	15.0	15.2	17.2	16.1	12%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	5	5	5	5	5	0%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	10.2	15.0	14.9	16.9	15.8	12%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	5	5	5	5	5	0%
Asia						
Total Revenue	.0	.0	.3	.3	.3	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	2.9	12.0	12.9	14.6	13.7	48%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	1	1	1	1	1	0%
Host/Server						
Total Revenue	7.3	3.0	.0	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	4	4	4	4	4	0%
Personal Computer						
Total Revenue	.0	.0	2.3	2.6	2.4	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 215
TITLE: Company History
COMPANY: PAFEC
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	2.7	5.0	1.3	1.5	1.4	-15%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	1	1	1	1	1	0%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	2.7	5.0	1.3	1.5	1.4	-16%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	1	1	1	1	1	0%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.8	4.0	1.3	1.5	1.4	17%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	0%
Host/Server						
Total Revenue	2.0	1.0	.0	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	1	1	1	1	1	0%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 216
TITLE: Company History
COMPANY: PAFEC
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	.7	NA	5.5	6.2	5.8	72%
CPU Shipments	0	NA	0	0	0	NA
Workstation Shipments	0	NA	0	0	0	NA
Workstations Shipped To-Date	0	NA	0	0	0	0%
North America						
Total Revenue	.0	NA	.0	.0	.0	NA
CPU Shipments	0	NA	0	0	0	NA
Workstation Shipments	0	NA	0	0	0	NA
Workstations Shipped To-Date	0	NA	0	0	0	NA
Europe						
Total Revenue	.7	NA	5.4	6.1	5.7	71%
CPU Shipments	0	NA	0	0	0	NA
Workstation Shipments	0	NA	0	0	0	NA
Workstations Shipped To-Date	0	NA	0	0	0	0%
Asia						
Total Revenue	.0	NA	.1	.1	.1	NA
CPU Shipments	0	NA	0	0	0	NA
Workstation Shipments	0	NA	0	0	0	NA
Workstations Shipped To-Date	0	NA	0	0	0	NA
Rest of World						
Total Revenue	.0	NA	.0	.0	.0	NA
CPU Shipments	0	NA	0	0	0	NA
Workstation Shipments	0	NA	0	0	0	NA
Workstations Shipped To-Date	0	NA	0	0	0	NA
Technical Workstation						
Total Revenue	.2	NA	5.5	6.2	5.8	135%
CPU Shipments	0	NA	0	0	0	NA
Workstation Shipments	0	NA	0	0	0	NA
Workstations Shipped To-Date	0	NA	0	0	0	0%
Host/Server						
Total Revenue	.5	NA	.0	.0	.0	-100%
CPU Shipments	0	NA	0	0	0	NA
Workstation Shipments	0	NA	0	0	0	NA
Workstations Shipped To-Date	0	NA	0	0	0	0%
Personal Computer						
Total Revenue	.0	NA	.0	.0	.0	NA
CPU Shipments	0	NA	0	0	0	NA
Workstation Shipments	0	NA	0	0	0	NA
Workstations Shipped To-Date	0	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 217
TITLE: Company History
COMPANY: Parametric Technology
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	3.0	14.2	26.5	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
North America						
Total Revenue	NA	NA	1.8	8.5	15.9	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	.3	1.4	5.3	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Asia						
Total Revenue	NA	NA	.9	4.3	5.3	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	3.0	14.2	26.5	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Host/Server						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 218
TITLE: Company History
COMPANY: Parametric Technology
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	3.0	14.2	26.5	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
North America						
Total Revenue	NA	NA	1.8	8.5	15.9	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	.3	1.4	5.3	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Asia						
Total Revenue	NA	NA	.9	4.3	5.3	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	3.0	14.2	26.5	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Host/Server						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 219
TITLE: Company History
COMPANY: PDA Engineering
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	13.3	15.2	22.9	20.6	28.4	21%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	10.8	12.2	15.6	14.2	18.5	14%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	2.2	2.6	6.4	5.6	8.8	42%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.2	.3	.5	.4	1.1	55%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.1	.2	.5	.4	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	4.5	5.3	9.2	11.3	19.1	44%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	8.8	9.9	13.7	9.3	9.4	2%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 220
TITLE: Company History
COMPANY: PDA Engineering
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	13.3	15.2	22.9	20.6	28.4	21%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	10.8	12.2	15.6	14.2	18.5	14%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	2.2	2.6	6.4	5.6	8.8	42%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.2	.3	.5	.4	1.1	55%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.1	.2	.5	.4	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	4.5	5.3	9.2	11.3	19.1	44%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	8.8	9.9	13.7	9.3	9.4	2%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 221
TITLE: Company History
COMPANY: Racal-Redac
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	62.1	78.9	75.2	90.5	82.3	7%
CPU Shipments	469	199	181	427	380	-5%
Workstation Shipments	469	199	181	427	380	-5%
Workstations Shipped To-Date	2,973	3,172	3,353	3,779	4,159	9%
North America						
Total Revenue	10.9	20.9	20.9	22.7	21.9	19%
CPU Shipments	115	5	40	84	98	-4%
Workstation Shipments	115	5	40	84	98	-4%
Workstations Shipped To-Date	820	824	864	948	1,046	6%
Europe						
Total Revenue	46.1	48.8	36.3	43.3	39.7	-4%
CPU Shipments	310	134	105	163	181	-13%
Workstation Shipments	310	134	105	163	181	-13%
Workstations Shipped To-Date	1,310	1,444	1,549	1,712	1,893	10%
Asia						
Total Revenue	3.9	9.0	17.8	24.5	20.7	52%
CPU Shipments	32	60	36	180	101	33%
Workstation Shipments	32	60	36	180	101	33%
Workstations Shipped To-Date	67	127	163	343	444	60%
Rest of World						
Total Revenue	1.1	.2	.2	.0	.0	-100%
CPU Shipments	12	0	0	0	0	-100%
Workstation Shipments	12	0	0	0	0	-100%
Workstations Shipped To-Date	776	777	777	777	777	0%
Technical Workstation						
Total Revenue	50.5	60.8	71.9	81.3	74.3	10%
CPU Shipments	469	199	181	427	380	-5%
Workstation Shipments	469	199	181	427	380	-5%
Workstations Shipped To-Date	1,529	1,728	1,909	2,336	2,716	15%
Host/Server						
Total Revenue	.0	1.7	3.1	2.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	1,418	1,418	1,418	1,418	1,418	0%
Personal Computer						
Total Revenue	11.5	16.3	.2	7.2	8.0	-9%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	26	26	26	26	26	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 222
TITLE: Company History
COMPANY: Racal-Redac
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	.5	20.0	22.4	30.7	27.8	176%
CPU Shipments	23	36	45	136	125	54%
Workstation Shipments	23	36	45	136	125	54%
Workstations Shipped To-Date	49	85	130	266	392	68%
North America						
Total Revenue	.4	12.4	12.4	13.7	14.6	141%
CPU Shipments	4	1	22	51	65	98%
Workstation Shipments	4	1	22	51	65	98%
Workstations Shipped To-Date	10	11	33	84	149	94%
Europe						
Total Revenue	.0	5.9	6.7	10.8	13.2	NA
CPU Shipments	18	21	17	41	60	35%
Workstation Shipments	18	21	17	41	60	35%
Workstations Shipped To-Date	37	58	75	116	176	48%
Asia						
Total Revenue	.0	1.7	3.3	6.2	.0	NA
CPU Shipments	0	15	6	45	0	NA
Workstation Shipments	0	15	6	45	0	NA
Workstations Shipped To-Date	1	16	21	66	66	185%
Rest of World						
Total Revenue	.1	.1	.1	.0	.0	-100%
CPU Shipments	0	0	0	0	0	-100%
Workstation Shipments	0	0	0	0	0	-100%
Workstations Shipped To-Date	0	0	1	1	1	4%
Technical Workstation						
Total Revenue	.3	16.1	19.1	27.4	24.2	202%
CPU Shipments	23	36	45	136	125	54%
Workstation Shipments	23	36	45	136	125	54%
Workstations Shipped To-Date	39	75	120	256	382	77%
Host/Server						
Total Revenue	.0	1.7	3.1	.7	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	2	2	2	2	2	0%
Personal Computer						
Total Revenue	.2	2.1	.2	2.5	3.6	109%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	8	8	8	8	8	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 223
TITLE: Company History
COMPANY: Recal-Redac
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	60.1	57.8	52.8	59.8	54.5	-2%
CPU Shipments	443	163	136	290	254	-13%
Workstation Shipments	443	163	136	290	254	-13%
Workstations Shipped To-Date	2,910	3,072	3,209	3,499	3,754	7%
North America						
Total Revenue	10.4	8.6	8.6	9.0	7.3	-8%
CPU Shipments	110	4	18	33	33	-26%
Workstation Shipments	110	4	18	33	33	-26%
Workstations Shipped To-Date	808	812	830	863	896	3%
Europe						
Total Revenue	44.8	42.0	29.6	32.4	26.5	-12%
CPU Shipments	290	113	88	122	121	-20%
Workstation Shipments	290	113	88	122	121	-20%
Workstations Shipped To-Date	1,260	1,373	1,461	1,583	1,704	8%
Asia						
Total Revenue	3.9	7.1	14.5	18.4	20.7	52%
CPU Shipments	32	45	30	135	101	33%
Workstation Shipments	32	45	30	135	101	33%
Workstations Shipped To-Date	66	111	142	277	377	55%
Rest of World						
Total Revenue	1.1	.2	.2	.0	.0	-100%
CPU Shipments	11	0	0	0	0	-100%
Workstation Shipments	11	0	0	0	0	-100%
Workstations Shipped To-Date	776	776	776	776	776	0%
Technical Workstation						
Total Revenue	49.1	43.6	52.8	53.9	50.1	1%
CPU Shipments	443	163	136	290	254	-13%
Workstation Shipments	443	163	136	290	254	-13%
Workstations Shipped To-Date	1,485	1,647	1,784	2,074	2,329	12%
Host/Server						
Total Revenue	.0	.0	.0	1.3	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	1,415	1,415	1,415	1,415	1,415	0%
Personal Computer						
Total Revenue	11.1	14.2	.0	4.7	4.4	-21%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	10	10	10	10	10	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 224
TITLE: Company History
COMPANY: Schlumberger
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	164.7	135.0	140.0	141.1	143.0	-3%
CPU Shipments	997	1,459	1,498	1,372	1,182	4%
Workstation Shipments	2,437	2,958	1,911	1,558	1,500	-11%
Workstations Shipped To-Date	11,455	14,413	16,323	17,881	19,381	14%
North America						
Total Revenue	99.0	67.5	65.1	63.6	57.0	-13%
CPU Shipments	881	680	725	649	471	-15%
Workstation Shipments	1,686	1,479	937	754	597	-23%
Workstations Shipped To-Date	7,633	9,112	10,049	10,803	11,401	11%
Europe						
Total Revenue	57.4	63.5	67.2	70.4	78.6	8%
CPU Shipments	61	761	736	657	650	81%
Workstation Shipments	610	1,390	936	738	824	8%
Workstations Shipped To-Date	1,611	3,001	3,937	4,675	5,499	36%
Asia						
Total Revenue	4.9	4.0	7.7	7.2	7.5	11%
CPU Shipments	26	18	37	66	62	24%
Workstation Shipments	84	89	38	66	78	-2%
Workstations Shipped To-Date	580	669	707	773	851	10%
Rest of World						
Total Revenue	3.3	.0	.0	.0	.0	-100%
CPU Shipments	29	0	0	0	0	-100%
Workstation Shipments	56	0	0	0	0	-100%
Workstations Shipped To-Date	1,630	1,630	1,630	1,630	1,630	0%
Technical Workstation						
Total Revenue	10.6	31.4	95.2	121.9	100.1	75%
CPU Shipments	238	764	1,254	1,184	855	38%
Workstation Shipments	238	764	1,254	1,184	855	38%
Workstations Shipped To-Date	300	1,063	2,317	3,501	4,356	95%
Host/Server						
Total Revenue	142.5	103.6	44.8	18.9	41.5	-27%
CPU Shipments	439	695	244	186	318	-8%
Workstation Shipments	1,879	2,194	657	372	636	-24%
Workstations Shipped To-Date	10,556	12,750	13,406	13,778	14,414	8%
Personal Computer						
Total Revenue	11.6	.0	.0	.3	1.4	-41%
CPU Shipments	320	0	0	3	9	-59%
Workstation Shipments	320	0	0	3	9	-59%
Workstations Shipped To-Date	599	599	599	602	611	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 225
TITLE: Company History
COMPANY: Schlumberger
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	148.5	125.5	138.0	134.8	141.5	-1%
CPU Shipments	944	1,395	1,486	1,311	1,170	6%
Workstation Shipments	2,222	2,757	1,880	1,472	1,484	-10%
Workstations Shipped To-Date	5,927	8,684	10,564	12,036	13,520	23%
North America						
Total Revenue	89.1	62.8	64.1	60.1	56.3	-11%
CPU Shipments	835	645	719	614	465	-14%
Workstation Shipments	1,539	1,371	921	697	590	-21%
Workstations Shipped To-Date	4,108	5,479	6,400	7,097	7,687	17%
Europe						
Total Revenue	52.0	59.0	66.2	67.6	77.8	11%
CPU Shipments	55	732	731	631	643	85%
Workstation Shipments	555	1,304	921	708	816	10%
Workstations Shipped To-Date	1,157	2,460	3,381	4,090	4,906	44%
Asia						
Total Revenue	4.5	3.8	7.7	7.2	7.5	14%
CPU Shipments	26	18	37	66	62	24%
Workstation Shipments	77	82	38	66	78	0%
Workstations Shipped To-Date	260	343	381	447	525	19%
Rest of World						
Total Revenue	3.0	.0	.0	.0	.0	-100%
CPU Shipments	28	0	0	0	0	-100%
Workstation Shipments	51	0	0	0	0	-100%
Workstations Shipped To-Date	402	402	402	402	402	0%
Technical Workstation						
Total Revenue	10.6	31.4	95.2	118.1	99.1	75%
CPU Shipments	238	764	1,254	1,147	846	37%
Workstation Shipments	238	764	1,254	1,147	846	37%
Workstations Shipped To-Date	261	1,025	2,279	3,426	4,272	101%
Host/Server						
Total Revenue	126.3	94.2	42.8	16.5	41.0	-25%
CPU Shipments	386	632	232	161	315	-5%
Workstation Shipments	1,664	1,994	626	321	629	-22%
Workstations Shipped To-Date	5,144	7,137	7,763	8,084	8,714	14%
Personal Computer						
Total Revenue	11.6	.0	.0	.3	1.4	-41%
CPU Shipments	320	0	0	3	9	-59%
Workstation Shipments	320	0	0	3	9	-59%
Workstations Shipped To-Date	522	522	522	525	534	1%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 226
TITLE: Company History
COMPANY: Schlumberger
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	12.4	9.5	2.0	4.9	1.5	-41%
CPU Shipments	40	63	11	48	12	-26%
Workstation Shipments	164	200	31	69	16	-44%
Workstations Shipped To-Date	1,811	2,012	2,042	2,111	2,127	4%
North America						
Total Revenue	7.4	4.7	1.0	2.8	.7	-45%
CPU Shipments	35	35	6	29	6	-36%
Workstation Shipments	111	108	16	47	7	-49%
Workstations Shipped To-Date	1,142	1,249	1,265	1,312	1,319	4%
Europe						
Total Revenue	4.3	4.5	1.0	2.1	.8	-35%
CPU Shipments	4	29	5	20	7	10%
Workstation Shipments	44	86	15	22	8	-34%
Workstations Shipped To-Date	169	256	270	293	301	15%
Asia						
Total Revenue	.4	.3	.0	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	6	6	0	0	0	-100%
Workstations Shipped To-Date	40	47	47	47	47	4%
Rest of World						
Total Revenue	.3	.0	.0	.0	.0	-100%
CPU Shipments	1	0	0	0	0	-100%
Workstation Shipments	4	0	0	0	0	-100%
Workstations Shipped To-Date	460	460	460	460	460	0%
Technical Workstation						
Total Revenue	.0	.0	.0	2.8	1.1	NA
CPU Shipments	0	0	0	27	9	NA
Workstation Shipments	0	0	0	27	9	NA
Workstations Shipped To-Date	0	0	0	27	36	NA
Host/Server						
Total Revenue	12.4	9.5	2.0	2.1	.4	-57%
CPU Shipments	40	63	11	21	3	-46%
Workstation Shipments	164	200	31	42	7	-55%
Workstations Shipped To-Date	1,811	2,012	2,042	2,084	2,091	4%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 227
TITLE: Company History
COMPANY: Scientific Calc.
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	50.0	64.3	29.0	26.0	28.6	-13%
CPU Shipments	55	79	92	107	89	13%
Workstation Shipments	154	154	101	120	102	-10%
Workstations Shipped To-Date	842	996	1,098	1,218	1,320	12%
North America						
Total Revenue	34.0	30.6	11.0	10.4	12.3	-22%
CPU Shipments	38	33	35	43	38	0%
Workstation Shipments	105	92	38	48	44	-19%
Workstations Shipped To-Date	564	656	695	743	787	9%
Europe						
Total Revenue	14.0	28.1	10.8	9.1	9.5	-9%
CPU Shipments	16	32	33	37	30	18%
Workstation Shipments	43	46	35	42	34	-6%
Workstations Shipped To-Date	158	204	239	281	315	19%
Asia						
Total Revenue	2.0	5.6	7.2	6.5	6.8	36%
CPU Shipments	1	14	24	27	21	98%
Workstation Shipments	6	15	28	30	24	41%
Workstations Shipped To-Date	121	136	164	194	218	16%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	14.0	22.6	19.2	19.5	23.4	14%
CPU Shipments	35	64	86	93	76	21%
Workstation Shipments	35	64	86	93	76	21%
Workstations Shipped To-Date	174	237	324	417	492	30%
Host/Server						
Total Revenue	34.6	41.8	9.9	6.5	5.2	-38%
CPU Shipments	20	16	6	13	13	-9%
Workstation Shipments	119	90	15	27	27	-31%
Workstations Shipped To-Date	669	759	774	801	828	5%
Personal Computer						
Total Revenue	1.5	.0	.0	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 228
TITLE: Company History
COMPANY: Scientific Calc.
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1.5	NA	.8	.8	1.9	6%
CPU Shipments	0	NA	4	3	6	NA
Workstation Shipments	0	NA	4	4	8	NA
Workstations Shipped To-Date	0	NA	4	8	16	NA
North America						
Total Revenue	1.0	NA	.8	.3	1.4	9%
CPU Shipments	0	NA	4	1	4	NA
Workstation Shipments	0	NA	4	1	6	NA
Workstations Shipped To-Date	0	NA	4	6	11	NA
Europe						
Total Revenue	.4	NA	.0	.3	.5	3%
CPU Shipments	0	NA	0	1	1	NA
Workstation Shipments	0	NA	0	1	2	NA
Workstations Shipped To-Date	0	NA	0	1	3	NA
Asia						
Total Revenue	.1	NA	.0	.2	.0	-100%
CPU Shipments	0	NA	0	1	0	NA
Workstation Shipments	0	NA	0	1	0	NA
Workstations Shipped To-Date	0	NA	0	1	1	NA
Rest of World						
Total Revenue	.0	NA	.0	.0	.0	NA
CPU Shipments	0	NA	0	0	0	NA
Workstation Shipments	0	NA	0	0	0	NA
Workstations Shipped To-Date	0	NA	0	0	0	NA
Technical Workstation						
Total Revenue	.0	NA	.8	.6	1.0	NA
CPU Shipments	0	NA	4	3	3	NA
Workstation Shipments	0	NA	4	3	3	NA
Workstations Shipped To-Date	0	NA	4	7	10	NA
Host/Server						
Total Revenue	.0	NA	.0	.2	1.0	NA
CPU Shipments	0	NA	0	0	2	NA
Workstation Shipments	0	NA	0	1	5	NA
Workstations Shipped To-Date	0	NA	0	1	6	NA
Personal Computer						
Total Revenue	1.5	NA	.0	.0	.0	-100%
CPU Shipments	0	NA	0	0	0	NA
Workstation Shipments	0	NA	0	0	0	NA
Workstations Shipped To-Date	0	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 229
TITLE: Company History
COMPANY: Scientific Calc.
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	46.5	64.3	28.2	25.2	26.7	-13%
CPU Shipments	54	79	88	103	83	12%
Workstation Shipments	152	154	97	116	94	-11%
Workstations Shipped To-Date	755	910	1,007	1,123	1,218	13%
North America						
Total Revenue	31.6	30.6	10.2	10.1	10.9	-23%
CPU Shipments	37	33	31	41	34	-2%
Workstation Shipments	103	92	34	47	38	-22%
Workstations Shipped To-Date	480	572	606	653	691	10%
Europe						
Total Revenue	13.0	28.1	10.8	8.8	9.0	-9%
CPU Shipments	15	32	33	36	28	17%
Workstation Shipments	42	46	35	41	32	-7%
Workstations Shipped To-Date	156	202	238	278	310	19%
Asia						
Total Revenue	1.9	5.6	7.2	6.3	6.8	38%
CPU Shipments	1	14	24	26	21	98%
Workstation Shipments	6	15	28	29	24	41%
Workstations Shipped To-Date	120	135	163	192	216	16%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	14.0	22.6	18.3	18.9	22.4	13%
CPU Shipments	35	64	82	90	73	20%
Workstation Shipments	35	64	82	90	73	20%
Workstations Shipped To-Date	174	237	320	410	482	29%
Host/Server						
Total Revenue	32.6	41.8	9.9	6.3	4.3	-40%
CPU Shipments	19	16	6	13	11	-13%
Workstation Shipments	117	90	15	26	22	-34%
Workstations Shipped To-Date	582	672	687	713	735	6%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 230
TITLE: Company History
COMPANY: SDRC
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	22.8	24.5	42.0	56.6	80.5	37%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	16.6	14.7	21.0	27.2	33.0	19%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	3.2	6.1	12.6	15.8	24.1	66%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	2.1	3.7	8.4	13.6	21.7	80%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.9	.0	.0	.0	1.6	15%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	13.7	14.9	28.6	45.3	70.0	50%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	9.1	9.5	13.4	11.3	10.5	4%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 231
TITLE: Company History
COMPANY: SDRC
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	22.8	24.5	42.0	56.6	80.5	37%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	16.6	14.7	21.0	27.2	33.0	19%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	3.2	6.1	12.6	15.8	24.1	66%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	2.1	3.7	8.4	13.6	21.7	80%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.9	.0	.0	.0	1.6	15%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	13.7	14.9	28.6	45.3	70.0	50%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	9.1	9.5	13.4	11.3	10.5	4%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 232
TITLE: Company History
COMPANY: Seiko Instruments--NO OEM
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	83.2	38.5	48.5	45.1	36.3	-19%
CPU Shipments	381	185	550	240	221	-13%
Workstation Shipments	564	200	550	258	232	-20%
Workstations Shipped To-Date	1,013	1,213	1,763	2,021	2,253	22%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.3	NA
CPU Shipments	0	0	0	0	2	NA
Workstation Shipments	0	0	0	0	2	NA
Workstations Shipped To-Date	0	0	0	0	2	NA
Asia						
Total Revenue	83.2	38.5	48.5	45.1	36.0	-19%
CPU Shipments	381	185	550	240	219	-13%
Workstation Shipments	564	200	550	258	230	-20%
Workstations Shipped To-Date	1,013	1,213	1,763	2,021	2,251	22%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	23.3	31.5	42.2	36.7	32.4	9%
CPU Shipments	92	180	200	231	216	24%
Workstation Shipments	92	180	200	231	216	24%
Workstations Shipped To-Date	215	395	595	826	1,042	48%
Host/Server						
Total Revenue	34.1	7.0	.0	8.4	3.9	-42%
CPU Shipments	59	5	0	9	4	-48%
Workstation Shipments	242	20	0	27	16	-50%
Workstations Shipped To-Date	508	528	528	555	571	3%
Personal Computer						
Total Revenue	25.8	.0	6.3	.0	.0	-100%
CPU Shipments	230	0	350	0	0	-100%
Workstation Shipments	230	0	350	0	0	-100%
Workstations Shipped To-Date	290	290	640	640	640	22%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 233
TITLE: Company History
COMPANY: Seiko Instruments--NO OEM
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	28.3	28.0	38.3	38.4	35.6	6%
CPU Shipments	82	155	182	197	216	27%
Workstation Shipments	129	170	182	215	227	15%
Workstations Shipped To-Date	273	443	624	840	1,067	41%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.3	NA
CPU Shipments	0	0	0	0	2	NA
Workstation Shipments	0	0	0	0	2	NA
Workstations Shipped To-Date	0	0	0	0	2	NA
Asia						
Total Revenue	28.3	28.0	38.3	38.4	35.3	6%
CPU Shipments	82	155	182	197	214	27%
Workstation Shipments	129	170	182	215	225	15%
Workstations Shipped To-Date	273	443	624	840	1,065	41%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	19.9	21.0	38.3	29.9	31.7	12%
CPU Shipments	75	150	182	188	212	29%
Workstation Shipments	75	150	182	188	212	29%
Workstations Shipped To-Date	98	248	430	618	830	70%
Host/Server						
Total Revenue	8.3	7.0	.0	8.4	3.9	-17%
CPU Shipments	7	5	0	9	4	-10%
Workstation Shipments	53	20	0	27	16	-26%
Workstations Shipped To-Date	174	194	194	221	237	8%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 234
TITLE: Company History
COMPANY: Seiko Instruments--NO OEM
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.3	NA	NA	6.8	.7	-32%
CPU Shipments	17	NA	NA	43	5	-27%
Workstation Shipments	17	NA	NA	43	5	-27%
Workstations Shipped To-Date	92	NA	NA	135	139	11%
North America						
Total Revenue	.0	NA	NA	.0	.0	NA
CPU Shipments	0	NA	NA	0	0	NA
Workstation Shipments	0	NA	NA	0	0	NA
Workstations Shipped To-Date	0	NA	NA	0	0	NA
Europe						
Total Revenue	.0	NA	NA	.0	.0	NA
CPU Shipments	0	NA	NA	0	0	NA
Workstation Shipments	0	NA	NA	0	0	NA
Workstations Shipped To-Date	0	NA	NA	0	0	NA
Asia						
Total Revenue	3.3	NA	NA	6.8	.7	-32%
CPU Shipments	17	NA	NA	43	5	-27%
Workstation Shipments	17	NA	NA	43	5	-27%
Workstations Shipped To-Date	92	NA	NA	135	139	11%
Rest of World						
Total Revenue	.0	NA	NA	.0	.0	NA
CPU Shipments	0	NA	NA	0	0	NA
Workstation Shipments	0	NA	NA	0	0	NA
Workstations Shipped To-Date	0	NA	NA	0	0	NA
Technical Workstation						
Total Revenue	2.7	NA	NA	6.8	.7	-28%
CPU Shipments	13	NA	NA	43	5	-22%
Workstation Shipments	13	NA	NA	43	5	-22%
Workstations Shipped To-Date	13	NA	NA	56	61	46%
Host/Server						
Total Revenue	.0	NA	NA	.0	.0	NA
CPU Shipments	0	NA	NA	0	0	NA
Workstation Shipments	0	NA	NA	0	0	NA
Workstations Shipped To-Date	75	NA	NA	75	75	0%
Personal Computer						
Total Revenue	.7	NA	NA	.0	.0	-100%
CPU Shipments	4	NA	NA	0	0	-100%
Workstation Shipments	4	NA	NA	0	0	-100%
Workstations Shipped To-Date	4	NA	NA	4	4	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 235
TITLE: Company History
COMPANY: Sharp System Products--NO OEM
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	21.0	25.0	36.2	41.6	55.6	28%
CPU Shipments	84	150	100	235	350	43%
Workstation Shipments	120	150	100	235	350	31%
Workstations Shipped To-Date	220	370	470	705	1,055	48%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	21.0	25.0	36.2	41.6	55.6	28%
CPU Shipments	84	150	100	235	350	43%
Workstation Shipments	120	150	100	235	350	31%
Workstations Shipped To-Date	220	370	470	705	1,055	48%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	12.6	25.0	36.2	41.6	48.4	40%
CPU Shipments	66	150	100	235	301	46%
Workstation Shipments	66	150	100	235	301	46%
Workstations Shipped To-Date	116	266	366	601	901	67%
Host/Server						
Total Revenue	8.4	.0	.0	.0	5.0	-12%
CPU Shipments	18	0	0	0	22	5%
Workstation Shipments	54	0	0	0	22	-20%
Workstations Shipped To-Date	104	104	104	104	126	5%
Personal Computer						
Total Revenue	.0	.0	.0	.0	2.2	NA
CPU Shipments	0	0	0	0	28	NA
Workstation Shipments	0	0	0	0	28	NA
Workstations Shipped To-Date	0	0	0	0	28	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 236
TITLE: Company History
COMPANY: Sharp System Products--NO OEM
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.2	8.8	19.5	22.4	27.8	60%
CPU Shipments	17	65	54	127	184	81%
Workstation Shipments	25	65	54	127	184	65%
Workstations Shipped To-Date	45	110	164	291	475	80%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	4.2	8.8	19.5	22.4	27.8	60%
CPU Shipments	17	65	54	127	184	81%
Workstation Shipments	25	65	54	127	184	65%
Workstations Shipped To-Date	45	110	164	291	475	80%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	2.5	8.8	19.5	22.4	24.2	76%
CPU Shipments	13	65	54	127	150	84%
Workstation Shipments	13	65	54	127	150	84%
Workstations Shipped To-Date	23	88	142	269	419	107%
Host/Server						
Total Revenue	1.7	.0	.0	.0	1.4	-5%
CPU Shipments	4	0	0	0	6	11%
Workstation Shipments	12	0	0	0	6	-16%
Workstations Shipped To-Date	22	22	22	22	28	6%
Personal Computer						
Total Revenue	.0	.0	.0	.0	2.2	NA
CPU Shipments	0	0	0	0	28	NA
Workstation Shipments	0	0	0	0	28	NA
Workstations Shipped To-Date	0	0	0	0	28	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 237
TITLE: Company History
COMPANY: Sharp System Products--NO OEM
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	16.8	16.3	16.7	19.1	27.8	13%
CPU Shipments	67	85	46	108	166	25%
Workstation Shipments	95	85	46	108	166	15%
Workstations Shipped To-Date	175	260	306	414	580	35%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	16.8	16.3	16.7	19.1	27.8	13%
CPU Shipments	67	85	46	108	166	25%
Workstation Shipments	95	85	46	108	166	15%
Workstations Shipped To-Date	175	260	306	414	580	35%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	10.1	16.3	16.7	19.1	24.2	24%
CPU Shipments	53	85	46	108	150	30%
Workstation Shipments	53	85	46	108	150	30%
Workstations Shipped To-Date	93	178	224	332	483	51%
Host/Server						
Total Revenue	6.7	.0	.0	.0	3.6	-14%
CPU Shipments	14	0	0	0	16	3%
Workstation Shipments	42	0	0	0	16	-22%
Workstations Shipped To-Date	82	82	82	82	98	4%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 238
TITLE: Company History
COMPANY: Siemens
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	50.0	100.0	105.6	203.7	269.7	52%
CPU Shipments	135	802	2,192	2,470	3,380	124%
Workstation Shipments	540	1,080	2,238	2,470	3,652	61%
Workstations Shipped To-Date	710	1,790	4,028	6,498	10,150	94%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	50.0	100.0	105.6	195.8	258.4	51%
CPU Shipments	135	802	2,192	2,374	3,238	121%
Workstation Shipments	540	1,080	2,238	2,374	3,499	60%
Workstations Shipped To-Date	710	1,790	4,028	6,402	9,900	93%
Asia						
Total Revenue	.0	.0	.0	6.5	9.5	NA
CPU Shipments	0	0	0	79	118	NA
Workstation Shipments	0	0	0	79	128	NA
Workstations Shipped To-Date	0	0	0	79	207	NA
Rest of World						
Total Revenue	.0	.0	.0	1.4	1.9	NA
CPU Shipments	0	0	0	17	24	NA
Workstation Shipments	0	0	0	17	26	NA
Workstations Shipped To-Date	0	0	0	17	43	NA
Technical Workstation						
Total Revenue	.0	50.0	97.3	176.5	244.4	NA
CPU Shipments	0	524	2,169	2,294	3,244	NA
Workstation Shipments	0	524	2,169	2,294	3,244	NA
Workstations Shipped To-Date	0	524	2,693	4,986	8,230	NA
Host/Server						
Total Revenue	50.0	50.0	8.3	27.2	25.3	-16%
CPU Shipments	135	278	23	176	136	0%
Workstation Shipments	540	556	69	176	408	-7%
Workstations Shipped To-Date	710	1,266	1,335	1,511	1,920	28%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 239
TITLE: Company History
COMPANY: Siemens
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	31.0	62.0	72.9	43.2	54.7	15%
CPU Shipments	113	453	1,596	555	727	59%
Workstation Shipments	450	583	1,604	555	727	13%
Workstations Shipped To-Date	556	1,139	2,742	3,298	4,024	64%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	31.0	62.0	72.9	41.5	52.4	14%
CPU Shipments	113	453	1,596	534	696	58%
Workstation Shipments	450	583	1,604	534	696	12%
Workstations Shipped To-Date	556	1,139	2,742	3,276	3,972	64%
Asia						
Total Revenue	.0	.0	.0	1.4	1.9	NA
CPU Shipments	0	0	0	18	25	NA
Workstation Shipments	0	0	0	18	25	NA
Workstations Shipped To-Date	0	0	0	18	43	NA
Rest of World						
Total Revenue	.0	.0	.0	.3	.4	NA
CPU Shipments	0	0	0	4	5	NA
Workstation Shipments	0	0	0	4	5	NA
Workstations Shipped To-Date	0	0	0	4	9	NA
Technical Workstation						
Total Revenue	.0	31.0	71.4	42.3	54.7	NA
CPU Shipments	0	324	1,592	550	727	NA
Workstation Shipments	0	324	1,592	550	727	NA
Workstations Shipped To-Date	0	324	1,915	2,465	3,192	NA
Host/Server						
Total Revenue	31.0	31.0	1.5	.9	.0	-100%
CPU Shipments	113	130	4	6	0	-100%
Workstation Shipments	450	259	12	6	0	-100%
Workstations Shipped To-Date	556	815	827	833	833	11%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 240
TITLE: Company History
COMPANY: Siemens
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	2.5	5.0	14.3	18.5	24.0	76%
CPU Shipments	4	38	251	208	319	197%
Workstation Shipments	16	49	270	208	319	110%
Workstations Shipped To-Date	25	74	344	552	871	143%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	2.5	5.0	14.3	17.8	23.0	74%
CPU Shipments	4	38	251	200	305	194%
Workstation Shipments	16	49	270	200	305	108%
Workstations Shipped To-Date	25	74	344	544	849	142%
Asia						
Total Revenue	.0	.0	.0	.6	.8	NA
CPU Shipments	0	0	0	7	11	NA
Workstation Shipments	0	0	0	7	11	NA
Workstations Shipped To-Date	0	0	0	7	18	NA
Rest of World						
Total Revenue	.0	.0	.0	.1	.2	NA
CPU Shipments	0	0	0	1	2	NA
Workstation Shipments	0	0	0	1	2	NA
Workstations Shipped To-Date	0	0	0	1	4	NA
Technical Workstation						
Total Revenue	.0	2.5	10.8	13.5	24.0	NA
CPU Shipments	0	28	241	176	319	NA
Workstation Shipments	0	28	241	176	319	NA
Workstations Shipped To-Date	0	28	269	445	764	NA
Host/Server						
Total Revenue	2.5	2.5	3.4	5.0	.0	-100%
CPU Shipments	4	10	10	33	0	-100%
Workstation Shipments	16	21	29	33	0	-100%
Workstations Shipped To-Date	25	46	74	107	107	44%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 241
TITLE: Company History
COMPANY: Siemens
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	16.5	33.0	14.3	132.2	158.1	76%
CPU Shipments	18	310	251	1,580	1,898	219%
Workstation Shipments	73	448	270	1,580	2,170	133%
Workstations Shipped To-Date	129	578	848	2,428	4,598	144%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	16.5	33.0	14.3	127.1	151.4	74%
CPU Shipments	18	310	251	1,518	1,818	216%
Workstation Shipments	73	448	270	1,518	2,079	131%
Workstations Shipped To-Date	129	578	848	2,366	4,445	142%
Asia						
Total Revenue	.0	.0	.0	4.2	5.5	NA
CPU Shipments	0	0	0	51	66	NA
Workstation Shipments	0	0	0	51	76	NA
Workstations Shipped To-Date	0	0	0	51	127	NA
Rest of World						
Total Revenue	.0	.0	.0	.9	1.1	NA
CPU Shipments	0	0	0	11	13	NA
Workstation Shipments	0	0	0	11	15	NA
Workstations Shipped To-Date	0	0	0	11	26	NA
Technical Workstation						
Total Revenue	.0	16.5	10.8	111.1	132.8	NA
CPU Shipments	0	172	241	1,443	1,762	NA
Workstation Shipments	0	172	241	1,443	1,762	NA
Workstations Shipped To-Date	0	172	414	1,857	3,618	NA
Host/Server						
Total Revenue	16.5	16.5	3.4	21.2	25.3	11%
CPU Shipments	18	138	10	137	136	65%
Workstation Shipments	73	276	29	137	408	54%
Workstations Shipped To-Date	129	405	434	571	979	66%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 242
TITLE: Company History
COMPANY: Siemens
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	6.5	20.5	NA
CPU Shipments	NA	NA	NA	84	272	NA
Workstation Shipments	NA	NA	NA	84	272	NA
Workstations Shipped To-Date	NA	NA	NA	84	356	NA
North America						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Europe						
Total Revenue	NA	NA	NA	6.3	19.6	NA
CPU Shipments	NA	NA	NA	81	261	NA
Workstation Shipments	NA	NA	NA	81	261	NA
Workstations Shipped To-Date	NA	NA	NA	81	341	NA
Asia						
Total Revenue	NA	NA	NA	.2	.7	NA
CPU Shipments	NA	NA	NA	3	10	NA
Workstation Shipments	NA	NA	NA	3	10	NA
Workstations Shipped To-Date	NA	NA	NA	3	12	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.1	NA
CPU Shipments	NA	NA	NA	1	2	NA
Workstation Shipments	NA	NA	NA	1	2	NA
Workstations Shipped To-Date	NA	NA	NA	1	2	NA
Technical Workstation						
Total Revenue	NA	NA	NA	6.4	20.5	NA
CPU Shipments	NA	NA	NA	83	272	NA
Workstation Shipments	NA	NA	NA	83	272	NA
Workstations Shipped To-Date	NA	NA	NA	83	355	NA
Host/Server						
Total Revenue	NA	NA	NA	.1	.0	NA
CPU Shipments	NA	NA	NA	1	0	NA
Workstation Shipments	NA	NA	NA	1	0	NA
Workstations Shipped To-Date	NA	NA	NA	1	1	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 243
TITLE: Company History
COMPANY: Siemens
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	2.1	1.6	12.4	NA
CPU Shipments	NA	NA	47	21	165	NA
Workstation Shipments	NA	NA	47	21	165	NA
Workstations Shipped To-Date	NA	NA	47	68	233	NA
North America						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	2.1	1.6	11.9	NA
CPU Shipments	NA	NA	47	20	158	NA
Workstation Shipments	NA	NA	47	20	158	NA
Workstations Shipped To-Date	NA	NA	47	67	225	NA
Asia						
Total Revenue	NA	NA	.0	.1	.4	NA
CPU Shipments	NA	NA	0	1	6	NA
Workstation Shipments	NA	NA	0	1	6	NA
Workstations Shipped To-Date	NA	NA	0	1	6	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.1	NA
CPU Shipments	NA	NA	0	0	1	NA
Workstation Shipments	NA	NA	0	0	1	NA
Workstations Shipped To-Date	NA	NA	0	0	1	NA
Technical Workstation						
Total Revenue	NA	NA	2.1	1.6	12.4	NA
CPU Shipments	NA	NA	47	21	165	NA
Workstation Shipments	NA	NA	47	21	165	NA
Workstations Shipped To-Date	NA	NA	47	68	233	NA
Host/Server						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 244
TITLE: Company History
COMPANY: Silicon Graphics
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	35.0	55.7	134.9	151.3	NA
CPU Shipments	NA	1,000	1,441	3,088	3,533	NA
Workstation Shipments	NA	1,000	1,441	3,088	3,533	NA
Workstations Shipped To-Date	NA	1,000	2,441	5,529	9,062	NA
North America						
Total Revenue	NA	24.5	40.3	65.7	51.3	NA
CPU Shipments	NA	700	1,044	1,679	1,381	NA
Workstation Shipments	NA	700	1,044	1,679	1,381	NA
Workstations Shipped To-Date	NA	700	1,744	3,423	4,804	NA
Europe						
Total Revenue	NA	7.7	10.2	23.1	32.4	NA
CPU Shipments	NA	220	241	522	724	NA
Workstation Shipments	NA	220	241	522	724	NA
Workstations Shipped To-Date	NA	220	461	983	1,707	NA
Asia						
Total Revenue	NA	2.8	5.1	46.1	67.6	NA
CPU Shipments	NA	80	156	887	1,428	NA
Workstation Shipments	NA	80	156	887	1,428	NA
Workstations Shipped To-Date	NA	80	236	1,123	2,551	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	35.0	55.7	129.2	149.6	NA
CPU Shipments	NA	1,000	1,441	2,968	3,501	NA
Workstation Shipments	NA	1,000	1,441	2,968	3,501	NA
Workstations Shipped To-Date	NA	1,000	2,441	5,409	8,910	NA
Host/Server						
Total Revenue	NA	.0	.0	5.7	1.7	NA
CPU Shipments	NA	0	0	120	32	NA
Workstation Shipments	NA	0	0	120	32	NA
Workstations Shipped To-Date	NA	0	0	120	152	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 245
TITLE: Company History
COMPANY: Silicon Graphics
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	35.0	55.7	126.4	139.6	NA
CPU Shipments	NA	1,000	1,441	2,924	3,271	NA
Workstation Shipments	NA	1,000	1,441	2,924	3,271	NA
Workstations Shipped To-Date	NA	1,000	2,441	5,365	8,636	NA
North America						
Total Revenue	NA	24.5	40.3	64.7	49.0	NA
CPU Shipments	NA	700	1,044	1,652	1,319	NA
Workstation Shipments	NA	700	1,044	1,652	1,319	NA
Workstations Shipped To-Date	NA	700	1,744	3,396	4,715	NA
Europe						
Total Revenue	NA	7.7	10.2	22.9	31.7	NA
CPU Shipments	NA	220	241	517	710	NA
Workstation Shipments	NA	220	241	517	710	NA
Workstations Shipped To-Date	NA	220	461	978	1,687	NA
Asia						
Total Revenue	NA	2.8	5.1	38.9	58.8	NA
CPU Shipments	NA	80	156	755	1,242	NA
Workstation Shipments	NA	80	156	755	1,242	NA
Workstations Shipped To-Date	NA	80	236	991	2,233	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	35.0	55.7	121.2	137.9	NA
CPU Shipments	NA	1,000	1,441	2,806	3,240	NA
Workstation Shipments	NA	1,000	1,441	2,806	3,240	NA
Workstations Shipped To-Date	NA	1,000	2,441	5,247	8,487	NA
Host/Server						
Total Revenue	NA	.0	.0	5.2	1.6	NA
CPU Shipments	NA	0	0	118	31	NA
Workstation Shipments	NA	0	0	118	31	NA
Workstations Shipped To-Date	NA	0	0	118	149	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 246
TITLE: Company History
COMPANY: Silicon Graphics
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	7.2	8.8	NA
CPU Shipments	NA	NA	NA	132	186	NA
Workstation Shipments	NA	NA	NA	132	186	NA
Workstations Shipped To-Date	NA	NA	NA	132	318	NA
North America						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Europe						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Asia						
Total Revenue	NA	NA	NA	7.2	8.8	NA
CPU Shipments	NA	NA	NA	132	186	NA
Workstation Shipments	NA	NA	NA	132	186	NA
Workstations Shipped To-Date	NA	NA	NA	132	318	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	6.8	8.8	NA
CPU Shipments	NA	NA	NA	132	186	NA
Workstation Shipments	NA	NA	NA	132	186	NA
Workstations Shipped To-Date	NA	NA	NA	132	318	NA
Host/Server						
Total Revenue	NA	NA	NA	.4	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 247
TITLE: Company History
COMPANY: Silicon Graphics
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	1.3	3.0	NA
CPU Shipments	NA	NA	NA	32	77	NA
Workstation Shipments	NA	NA	NA	32	77	NA
Workstations Shipped To-Date	NA	NA	NA	32	109	NA
North America						
Total Revenue	NA	NA	NA	1.1	2.3	NA
CPU Shipments	NA	NA	NA	27	62	NA
Workstation Shipments	NA	NA	NA	27	62	NA
Workstations Shipped To-Date	NA	NA	NA	27	89	NA
Europe						
Total Revenue	NA	NA	NA	.2	.6	NA
CPU Shipments	NA	NA	NA	5	15	NA
Workstation Shipments	NA	NA	NA	5	15	NA
Workstations Shipped To-Date	NA	NA	NA	5	20	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	1.2	2.9	NA
CPU Shipments	NA	NA	NA	30	75	NA
Workstation Shipments	NA	NA	NA	30	75	NA
Workstations Shipped To-Date	NA	NA	NA	30	106	NA
Host/Server						
Total Revenue	NA	NA	NA	.1	.1	NA
CPU Shipments	NA	NA	NA	2	1	NA
Workstation Shipments	NA	NA	NA	2	1	NA
Workstations Shipped To-Date	NA	NA	NA	2	3	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June--Reproduction Prohibited

TABLE NUMBER: 248
TITLE: Company History
COMPANY: Solbourne
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	13.6	15.1	NA
CPU Shipments	NA	NA	NA	1,000	1,120	NA
Workstation Shipments	NA	NA	NA	1,000	1,120	NA
Workstations Shipped To-Date	NA	NA	NA	1,000	2,120	NA
North America						
Total Revenue	NA	NA	NA	9.8	11.0	NA
CPU Shipments	NA	NA	NA	661	813	NA
Workstation Shipments	NA	NA	NA	661	813	NA
Workstations Shipped To-Date	NA	NA	NA	661	1,474	NA
Europe						
Total Revenue	NA	NA	NA	3.0	3.2	NA
CPU Shipments	NA	NA	NA	202	237	NA
Workstation Shipments	NA	NA	NA	202	237	NA
Workstations Shipped To-Date	NA	NA	NA	202	439	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	83	0	NA
Workstation Shipments	NA	NA	NA	83	0	NA
Workstations Shipped To-Date	NA	NA	NA	83	83	NA
Rest of World						
Total Revenue	NA	NA	NA	.8	.9	NA
CPU Shipments	NA	NA	NA	55	70	NA
Workstation Shipments	NA	NA	NA	55	70	NA
Workstations Shipped To-Date	NA	NA	NA	55	125	NA
Technical Workstation						
Total Revenue	NA	NA	NA	10.9	6.3	NA
CPU Shipments	NA	NA	NA	800	464	NA
Workstation Shipments	NA	NA	NA	800	464	NA
Workstations Shipped To-Date	NA	NA	NA	800	1,264	NA
Host/Server						
Total Revenue	NA	NA	NA	2.7	8.8	NA
CPU Shipments	NA	NA	NA	200	656	NA
Workstation Shipments	NA	NA	NA	200	656	NA
Workstations Shipped To-Date	NA	NA	NA	200	856	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 249
TITLE: Company History
COMPANY: Solbourne
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	.4	.5	NA
CPU Shipments	NA	NA	NA	30	33	NA
Workstation Shipments	NA	NA	NA	30	33	NA
Workstations Shipped To-Date	NA	NA	NA	30	63	NA
North America						
Total Revenue	NA	NA	NA	.3	.3	NA
CPU Shipments	NA	NA	NA	20	24	NA
Workstation Shipments	NA	NA	NA	20	24	NA
Workstations Shipped To-Date	NA	NA	NA	20	44	NA
Europe						
Total Revenue	NA	NA	NA	.1	.1	NA
CPU Shipments	NA	NA	NA	6	7	NA
Workstation Shipments	NA	NA	NA	6	7	NA
Workstations Shipped To-Date	NA	NA	NA	6	13	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	2	0	NA
Workstation Shipments	NA	NA	NA	2	0	NA
Workstations Shipped To-Date	NA	NA	NA	2	2	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	2	2	NA
Workstation Shipments	NA	NA	NA	2	2	NA
Workstations Shipped To-Date	NA	NA	NA	2	4	NA
Technical Workstation						
Total Revenue	NA	NA	NA	.3	.2	NA
CPU Shipments	NA	NA	NA	24	17	NA
Workstation Shipments	NA	NA	NA	24	17	NA
Workstations Shipped To-Date	NA	NA	NA	24	41	NA
Host/Server						
Total Revenue	NA	NA	NA	.1	.2	NA
CPU Shipments	NA	NA	NA	6	16	NA
Workstation Shipments	NA	NA	NA	6	16	NA
Workstations Shipped To-Date	NA	NA	NA	6	22	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 250
TITLE: Company History
COMPANY: Solbourne
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	.1	.1	NA
CPU Shipments	NA	NA	NA	10	11	NA
Workstation Shipments	NA	NA	NA	10	11	NA
Workstations Shipped To-Date	NA	NA	NA	10	21	NA
North America						
Total Revenue	NA	NA	NA	.1	.0	NA
CPU Shipments	NA	NA	NA	7	3	NA
Workstation Shipments	NA	NA	NA	7	3	NA
Workstations Shipped To-Date	NA	NA	NA	7	10	NA
Europe						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	2	2	NA
Workstation Shipments	NA	NA	NA	2	2	NA
Workstations Shipped To-Date	NA	NA	NA	2	4	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	1	0	NA
Workstation Shipments	NA	NA	NA	1	0	NA
Workstations Shipped To-Date	NA	NA	NA	1	1	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.1	NA
CPU Shipments	NA	NA	NA	1	6	NA
Workstation Shipments	NA	NA	NA	1	6	NA
Workstations Shipped To-Date	NA	NA	NA	1	6	NA
Technical Workstation						
Total Revenue	NA	NA	NA	.1	.1	NA
CPU Shipments	NA	NA	NA	8	4	NA
Workstation Shipments	NA	NA	NA	8	4	NA
Workstations Shipped To-Date	NA	NA	NA	8	12	NA
Host/Server						
Total Revenue	NA	NA	NA	.0	.1	NA
CPU Shipments	NA	NA	NA	2	7	NA
Workstation Shipments	NA	NA	NA	2	7	NA
Workstations Shipped To-Date	NA	NA	NA	2	9	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 251
TITLE: Company History
COMPANY: Solbourne
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	2.0	2.3	NA
CPU Shipments	NA	NA	NA	150	169	NA
Workstation Shipments	NA	NA	NA	150	169	NA
Workstations Shipped To-Date	NA	NA	NA	150	319	NA
North America						
Total Revenue	NA	NA	NA	1.5	1.6	NA
CPU Shipments	NA	NA	NA	99	117	NA
Workstation Shipments	NA	NA	NA	99	117	NA
Workstations Shipped To-Date	NA	NA	NA	99	216	NA
Europe						
Total Revenue	NA	NA	NA	.5	.5	NA
CPU Shipments	NA	NA	NA	30	36	NA
Workstation Shipments	NA	NA	NA	30	36	NA
Workstations Shipped To-Date	NA	NA	NA	30	66	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	12	0	NA
Workstation Shipments	NA	NA	NA	12	0	NA
Workstations Shipped To-Date	NA	NA	NA	12	12	NA
Rest of World						
Total Revenue	NA	NA	NA	.1	.2	NA
CPU Shipments	NA	NA	NA	8	17	NA
Workstation Shipments	NA	NA	NA	8	17	NA
Workstations Shipped To-Date	NA	NA	NA	8	25	NA
Technical Workstation						
Total Revenue	NA	NA	NA	1.6	.6	NA
CPU Shipments	NA	NA	NA	120	45	NA
Workstation Shipments	NA	NA	NA	120	45	NA
Workstations Shipped To-Date	NA	NA	NA	120	165	NA
Host/Server						
Total Revenue	NA	NA	NA	.4	1.7	NA
CPU Shipments	NA	NA	NA	30	124	NA
Workstation Shipments	NA	NA	NA	30	124	NA
Workstations Shipped To-Date	NA	NA	NA	30	154	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 252
TITLE: Company History
COMPANY: Solbourne
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	2.7	3.0	NA
CPU Shipments	NA	NA	NA	200	224	NA
Workstation Shipments	NA	NA	NA	200	224	NA
Workstations Shipped To-Date	NA	NA	NA	200	424	NA
North America						
Total Revenue	NA	NA	NA	2.0	2.2	NA
CPU Shipments	NA	NA	NA	132	165	NA
Workstation Shipments	NA	NA	NA	132	165	NA
Workstations Shipped To-Date	NA	NA	NA	132	297	NA
Europe						
Total Revenue	NA	NA	NA	.6	.6	NA
CPU Shipments	NA	NA	NA	40	47	NA
Workstation Shipments	NA	NA	NA	40	47	NA
Workstations Shipped To-Date	NA	NA	NA	40	88	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	17	0	NA
Workstation Shipments	NA	NA	NA	17	0	NA
Workstations Shipped To-Date	NA	NA	NA	17	17	NA
Rest of World						
Total Revenue	NA	NA	NA	.2	.2	NA
CPU Shipments	NA	NA	NA	11	11	NA
Workstation Shipments	NA	NA	NA	11	11	NA
Workstations Shipped To-Date	NA	NA	NA	11	22	NA
Technical Workstation						
Total Revenue	NA	NA	NA	2.2	1.3	NA
CPU Shipments	NA	NA	NA	160	98	NA
Workstation Shipments	NA	NA	NA	160	98	NA
Workstations Shipped To-Date	NA	NA	NA	160	258	NA
Host/Server						
Total Revenue	NA	NA	NA	.5	1.7	NA
CPU Shipments	NA	NA	NA	40	126	NA
Workstation Shipments	NA	NA	NA	40	126	NA
Workstations Shipped To-Date	NA	NA	NA	40	166	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 253
TITLE: Company History
COMPANY: Solbourne
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	6.0	6.7	NA
CPU Shipments	NA	NA	NA	440	492	NA
Workstation Shipments	NA	NA	NA	440	492	NA
Workstations Shipped To-Date	NA	NA	NA	440	932	NA
North America						
Total Revenue	NA	NA	NA	4.3	4.9	NA
CPU Shipments	NA	NA	NA	291	364	NA
Workstation Shipments	NA	NA	NA	291	364	NA
Workstations Shipped To-Date	NA	NA	NA	291	654	NA
Europe						
Total Revenue	NA	NA	NA	1.3	1.4	NA
CPU Shipments	NA	NA	NA	89	104	NA
Workstation Shipments	NA	NA	NA	89	104	NA
Workstations Shipped To-Date	NA	NA	NA	89	193	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	36	0	NA
Workstation Shipments	NA	NA	NA	36	0	NA
Workstations Shipped To-Date	NA	NA	NA	36	36	NA
Rest of World						
Total Revenue	NA	NA	NA	.4	.3	NA
CPU Shipments	NA	NA	NA	24	25	NA
Workstation Shipments	NA	NA	NA	24	25	NA
Workstations Shipped To-Date	NA	NA	NA	24	49	NA
Technical Workstation						
Total Revenue	NA	NA	NA	4.8	3.0	NA
CPU Shipments	NA	NA	NA	352	216	NA
Workstation Shipments	NA	NA	NA	352	216	NA
Workstations Shipped To-Date	NA	NA	NA	352	568	NA
Host/Server						
Total Revenue	NA	NA	NA	1.2	3.7	NA
CPU Shipments	NA	NA	NA	88	276	NA
Workstation Shipments	NA	NA	NA	88	276	NA
Workstations Shipped To-Date	NA	NA	NA	88	364	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 254
TITLE: Company History
COMPANY: Solbourne
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	2.3	2.6	NA
CPU Shipments	NA	NA	NA	170	190	NA
Workstation Shipments	NA	NA	NA	170	190	NA
Workstations Shipped To-Date	NA	NA	NA	170	360	NA
North America						
Total Revenue	NA	NA	NA	1.7	1.9	NA
CPU Shipments	NA	NA	NA	112	140	NA
Workstation Shipments	NA	NA	NA	112	140	NA
Workstations Shipped To-Date	NA	NA	NA	112	253	NA
Europe						
Total Revenue	NA	NA	NA	.5	.5	NA
CPU Shipments	NA	NA	NA	34	40	NA
Workstation Shipments	NA	NA	NA	34	40	NA
Workstations Shipped To-Date	NA	NA	NA	34	75	NA
Asia						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	14	0	NA
Workstation Shipments	NA	NA	NA	14	0	NA
Workstations Shipped To-Date	NA	NA	NA	14	14	NA
Rest of World						
Total Revenue	NA	NA	NA	.1	.1	NA
CPU Shipments	NA	NA	NA	9	9	NA
Workstation Shipments	NA	NA	NA	9	9	NA
Workstations Shipped To-Date	NA	NA	NA	9	19	NA
Technical Workstation						
Total Revenue	NA	NA	NA	1.9	1.1	NA
CPU Shipments	NA	NA	NA	136	83	NA
Workstation Shipments	NA	NA	NA	136	83	NA
Workstations Shipped To-Date	NA	NA	NA	136	219	NA
Host/Server						
Total Revenue	NA	NA	NA	.5	1.4	NA
CPU Shipments	NA	NA	NA	34	107	NA
Workstation Shipments	NA	NA	NA	34	107	NA
Workstations Shipped To-Date	NA	NA	NA	34	141	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 255
TITLE: Company History
COMPANY: STI-Straessle
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	11.8	14.2	17.1	26.7	39.6	35%
CPU Shipments	12	14	22	270	370	137%
Workstation Shipments	19	23	27	270	370	111%
Workstations Shipped To-Date	12	34	62	332	702	178%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	11.8	14.2	17.1	26.7	39.6	35%
CPU Shipments	12	14	22	270	370	137%
Workstation Shipments	19	23	27	270	370	111%
Workstations Shipped To-Date	12	34	62	332	702	178%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	9.1	10.9	13.2	21.6	39.6	45%
CPU Shipments	12	14	17	231	370	137%
Workstation Shipments	12	14	17	231	370	137%
Workstations Shipped To-Date	12	26	43	274	644	172%
Host/Server						
Total Revenue	2.7	3.3	4.0	5.1	.0	-100%
CPU Shipments	0	0	5	39	0	NA
Workstation Shipments	7	8	10	39	0	-100%
Workstations Shipped To-Date	0	8	19	58	58	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 256
TITLE: Company History
COMPANY: STI-Straessle
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.2	9.9	12.0	19.3	28.8	37%
CPU Shipments	11	13	16	214	269	124%
Workstation Shipments	11	13	16	214	269	124%
Workstations Shipped To-Date	11	24	39	253	522	165%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	8.2	9.9	12.0	19.3	28.8	37%
CPU Shipments	11	13	16	214	269	124%
Workstation Shipments	11	13	16	214	269	124%
Workstations Shipped To-Date	11	24	39	253	522	165%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	8.2	9.9	12.0	16.1	28.8	37%
CPU Shipments	11	13	16	189	269	124%
Workstation Shipments	11	13	16	189	269	124%
Workstations Shipped To-Date	11	24	39	228	497	161%
Host/Server						
Total Revenue	.0	.0	.0	3.2	.0	NA
CPU Shipments	0	0	0	25	0	NA
Workstation Shipments	0	0	0	25	0	NA
Workstations Shipped To-Date	0	0	0	25	25	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 257
TITLE: Company History
COMPANY: STI-Straessle
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.5	4.3	5.1	7.4	10.8	32%
CPU Shipments	1	1	7	56	101	212%
Workstation Shipments	8	10	12	56	101	88%
Workstations Shipped To-Date	1	11	23	79	180	261%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	3.5	4.3	5.1	7.4	10.8	32%
CPU Shipments	1	1	7	56	101	212%
Workstation Shipments	8	10	12	56	101	88%
Workstations Shipped To-Date	1	11	23	79	180	261%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.8	1.0	1.2	5.5	10.8	91%
CPU Shipments	1	1	2	42	101	212%
Workstation Shipments	1	1	2	42	101	212%
Workstations Shipped To-Date	1	2	4	46	147	243%
Host/Server						
Total Revenue	2.7	3.3	4.0	1.9	.0	-100%
CPU Shipments	0	0	5	14	0	NA
Workstation Shipments	7	8	10	14	0	-100%
Workstations Shipped To-Date	0	8	19	33	33	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 258
TITLE: Company History
COMPANY: Sumitomo Denko Workstation
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	25.0	31.2	NA
CPU Shipments	NA	NA	NA	1,158	2,148	NA
Workstation Shipments	NA	NA	NA	1,158	2,280	NA
Workstations Shipped To-Date	NA	NA	NA	1,158	3,438	NA
North America						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Europe						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Asia						
Total Revenue	NA	NA	NA	25.0	31.2	NA
CPU Shipments	NA	NA	NA	1,158	2,148	NA
Workstation Shipments	NA	NA	NA	1,158	2,280	NA
Workstations Shipped To-Date	NA	NA	NA	1,158	3,438	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	25.0	28.4	NA
CPU Shipments	NA	NA	NA	1,158	2,148	NA
Workstation Shipments	NA	NA	NA	1,158	2,148	NA
Workstations Shipped To-Date	NA	NA	NA	1,158	3,306	NA
Host/Server						
Total Revenue	NA	NA	NA	.0	2.8	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	132	NA
Workstations Shipped To-Date	NA	NA	NA	0	132	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 259
TITLE: Company History
COMPANY: Sumitomo Denko Workstation
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	20.0	28.4	NA
CPU Shipments	NA	NA	NA	926	1,955	NA
Workstation Shipments	NA	NA	NA	926	2,075	NA
Workstations Shipped To-Date	NA	NA	NA	926	3,001	NA
North America						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Europe						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Asia						
Total Revenue	NA	NA	NA	20.0	28.4	NA
CPU Shipments	NA	NA	NA	926	1,955	NA
Workstation Shipments	NA	NA	NA	926	2,075	NA
Workstations Shipped To-Date	NA	NA	NA	926	3,001	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	20.0	25.8	NA
CPU Shipments	NA	NA	NA	926	1,955	NA
Workstation Shipments	NA	NA	NA	926	1,955	NA
Workstations Shipped To-Date	NA	NA	NA	926	2,881	NA
Host/Server						
Total Revenue	NA	NA	NA	.0	2.6	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	120	NA
Workstations Shipped To-Date	NA	NA	NA	0	120	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 260
TITLE: Company History
COMPANY: Sumitomo Denko Workstation
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	NA	2.5	2.8	NA
CPU Shipments	NA	NA	NA	116	193	NA
Workstation Shipments	NA	NA	NA	116	205	NA
Workstations Shipped To-Date	NA	NA	NA	116	321	NA
North America						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Europe						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Asia						
Total Revenue	NA	NA	NA	2.5	2.8	NA
CPU Shipments	NA	NA	NA	116	193	NA
Workstation Shipments	NA	NA	NA	116	205	NA
Workstations Shipped To-Date	NA	NA	NA	116	321	NA
Rest of World						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	NA	2.5	2.6	NA
CPU Shipments	NA	NA	NA	116	193	NA
Workstation Shipments	NA	NA	NA	116	193	NA
Workstations Shipped To-Date	NA	NA	NA	116	309	NA
Host/Server						
Total Revenue	NA	NA	NA	.0	.3	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	12	NA
Workstations Shipped To-Date	NA	NA	NA	0	12	NA
Personal Computer						
Total Revenue	NA	NA	NA	.0	.0	NA
CPU Shipments	NA	NA	NA	0	0	NA
Workstation Shipments	NA	NA	NA	0	0	NA
Workstations Shipped To-Date	NA	NA	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 261
TITLE: Company History
COMPANY: Sun
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	41.1	110.0	227.0	399.5	589.3	95%
CPU Shipments	1,900	4,603	10,463	21,316	30,693	100%
Workstation Shipments	1,900	4,603	10,463	21,316	30,693	100%
Workstations Shipped To-Date	2,786	7,389	17,851	39,168	69,860	124%
North America						
Total Revenue	27.2	75.0	145.6	239.1	298.3	82%
CPU Shipments	1,259	3,252	6,570	12,415	16,123	89%
Workstation Shipments	1,259	3,252	6,570	12,415	16,123	89%
Workstations Shipped To-Date	2,090	5,342	11,912	24,327	40,449	110%
Europe						
Total Revenue	6.3	16.0	50.8	101.9	177.2	131%
CPU Shipments	290	694	2,049	4,450	7,448	125%
Workstation Shipments	290	694	2,049	4,450	7,448	125%
Workstations Shipped To-Date	290	984	3,033	7,483	14,931	168%
Asia						
Total Revenue	7.6	19.0	30.7	54.7	107.2	94%
CPU Shipments	351	657	1,844	4,254	6,765	110%
Workstation Shipments	351	657	1,844	4,254	6,765	110%
Workstations Shipped To-Date	406	1,063	2,907	7,161	13,925	142%
Rest of World						
Total Revenue	.0	.0	.0	3.8	6.6	NA
CPU Shipments	0	0	0	198	357	NA
Workstation Shipments	0	0	0	198	357	NA
Workstations Shipped To-Date	0	0	0	198	555	NA
Technical Workstation						
Total Revenue	41.1	110.0	193.0	319.6	474.5	84%
CPU Shipments	1,900	4,603	9,406	18,112	26,373	93%
Workstation Shipments	1,900	4,603	9,406	18,112	26,373	93%
Workstations Shipped To-Date	2,786	7,389	16,795	34,907	61,281	117%
Host/Server						
Total Revenue	.0	.0	34.1	79.9	114.7	NA
CPU Shipments	0	0	1,056	3,204	4,319	NA
Workstation Shipments	0	0	1,056	3,204	4,319	NA
Workstations Shipped To-Date	0	0	1,056	4,260	8,580	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 262
TITLE: Company History
COMPANY: Sun
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	19.4	33.5	79.5	140.1	225.2	85%
CPU Shipments	897	1,370	3,662	7,476	11,288	88%
Workstation Shipments	897	1,370	3,662	7,476	11,288	88%
Workstations Shipped To-Date	1,378	2,747	6,409	13,885	25,173	107%
North America						
Total Revenue	13.7	20.0	51.0	83.8	109.4	68%
CPU Shipments	635	868	2,299	4,354	5,693	73%
Workstation Shipments	635	868	2,299	4,354	5,693	73%
Workstations Shipped To-Date	1,086	1,953	4,252	8,606	14,300	91%
Europe						
Total Revenue	1.6	4.0	17.8	35.7	70.9	159%
CPU Shipments	73	174	717	1,561	2,879	151%
Workstation Shipments	73	174	717	1,561	2,879	151%
Workstations Shipped To-Date	73	246	963	2,524	5,403	194%
Asia						
Total Revenue	4.1	9.5	10.8	19.2	42.9	80%
CPU Shipments	190	328	645	1,492	2,605	93%
Workstation Shipments	190	328	645	1,492	2,605	93%
Workstations Shipped To-Date	219	548	1,193	2,685	5,290	122%
Rest of World						
Total Revenue	.0	.0	.0	1.3	2.1	NA
CPU Shipments	0	0	0	69	111	NA
Workstation Shipments	0	0	0	69	111	NA
Workstations Shipped To-Date	0	0	0	69	180	NA
Technical Workstation						
Total Revenue	19.4	33.5	67.6	112.1	157.7	69%
CPU Shipments	897	1,370	3,292	6,352	8,747	77%
Workstation Shipments	897	1,370	3,292	6,352	8,747	77%
Workstations Shipped To-Date	1,378	2,747	6,039	12,391	21,138	98%
Host/Server						
Total Revenue	.0	.0	11.9	28.0	67.6	NA
CPU Shipments	0	0	370	1,124	2,541	NA
Workstation Shipments	0	0	370	1,124	2,541	NA
Workstations Shipped To-Date	0	0	370	1,493	4,035	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 263
TITLE: Company History
COMPANY: Sun
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	6.0	9.1	23.6	23.9	NA
CPU Shipments	NA	260	418	1,260	1,291	NA
Workstation Shipments	NA	260	418	1,260	1,291	NA
Workstations Shipped To-Date	NA	474	893	2,153	3,444	NA
North America						
Total Revenue	NA	6.0	5.8	14.1	11.7	NA
CPU Shipments	NA	260	263	734	653	NA
Workstation Shipments	NA	260	263	734	653	NA
Workstations Shipped To-Date	NA	461	724	1,458	2,111	NA
Europe						
Total Revenue	NA	.0	2.0	6.0	7.1	NA
CPU Shipments	NA	0	82	263	308	NA
Workstation Shipments	NA	0	82	263	308	NA
Workstations Shipped To-Date	NA	0	82	345	653	NA
Asia						
Total Revenue	NA	.0	1.2	3.2	4.3	NA
CPU Shipments	NA	0	74	251	281	NA
Workstation Shipments	NA	0	74	251	281	NA
Workstations Shipped To-Date	NA	13	87	338	620	NA
Rest of World						
Total Revenue	NA	.0	.0	.2	.9	NA
CPU Shipments	NA	0	0	12	48	NA
Workstation Shipments	NA	0	0	12	48	NA
Workstations Shipped To-Date	NA	0	0	12	59	NA
Technical Workstation						
Total Revenue	NA	6.0	7.7	18.9	21.8	NA
CPU Shipments	NA	260	376	1,071	1,210	NA
Workstation Shipments	NA	260	376	1,071	1,210	NA
Workstations Shipped To-Date	NA	474	851	1,921	3,131	NA
Host/Server						
Total Revenue	NA	.0	1.4	4.7	2.2	NA
CPU Shipments	NA	0	42	189	81	NA
Workstation Shipments	NA	0	42	189	81	NA
Workstations Shipped To-Date	NA	0	42	232	313	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 264
TITLE: Company History
COMPANY: Sun
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	2.0	6.8	11.6	24.6	NA
CPU Shipments	NA	87	314	619	1,262	NA
Workstation Shipments	NA	87	314	619	1,262	NA
Workstations Shipped To-Date	NA	87	401	1,020	2,282	NA
North America						
Total Revenue	NA	2.0	4.4	7.0	12.4	NA
CPU Shipments	NA	87	197	361	658	NA
Workstation Shipments	NA	87	197	361	658	NA
Workstations Shipped To-Date	NA	87	284	645	1,303	NA
Europe						
Total Revenue	NA	.0	1.5	3.0	7.1	NA
CPU Shipments	NA	0	61	129	293	NA
Workstation Shipments	NA	0	61	129	293	NA
Workstations Shipped To-Date	NA	0	61	191	484	NA
Asia						
Total Revenue	NA	.0	.9	1.6	4.3	NA
CPU Shipments	NA	0	55	124	265	NA
Workstation Shipments	NA	0	55	124	265	NA
Workstations Shipped To-Date	NA	0	55	179	445	NA
Rest of World						
Total Revenue	NA	.0	.0	.1	.9	NA
CPU Shipments	NA	0	0	6	45	NA
Workstation Shipments	NA	0	0	6	45	NA
Workstations Shipped To-Date	NA	0	0	6	51	NA
Technical Workstation						
Total Revenue	NA	2.0	5.8	9.3	18.5	NA
CPU Shipments	NA	87	282	526	1,029	NA
Workstation Shipments	NA	87	282	526	1,029	NA
Workstations Shipped To-Date	NA	87	369	896	1,925	NA
Host/Server						
Total Revenue	NA	.0	1.0	2.3	6.2	NA
CPU Shipments	NA	0	32	93	233	NA
Workstation Shipments	NA	0	32	93	233	NA
Workstations Shipped To-Date	NA	0	32	125	357	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 265
TITLE: Company History
COMPANY: Sun
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.7	27.3	72.7	100.1	145.6	102%
CPU Shipments	405	1,153	3,348	5,340	7,707	109%
Workstation Shipments	405	1,153	3,348	5,340	7,707	109%
Workstations Shipped To-Date	493	1,646	4,994	10,334	18,042	146%
North America						
Total Revenue	5.4	19.0	46.6	59.9	76.1	94%
CPU Shipments	250	824	2,102	3,110	4,170	102%
Workstation Shipments	250	824	2,102	3,110	4,170	102%
Workstations Shipped To-Date	333	1,157	3,260	6,369	10,540	137%
Europe						
Total Revenue	1.9	5.0	16.2	25.5	42.5	116%
CPU Shipments	90	215	656	1,115	1,815	112%
Workstation Shipments	90	215	656	1,115	1,815	112%
Workstations Shipped To-Date	90	305	961	2,076	3,891	156%
Asia						
Total Revenue	1.4	3.3	9.8	13.7	25.7	107%
CPU Shipments	64	114	590	1,066	1,652	125%
Workstation Shipments	64	114	590	1,066	1,652	125%
Workstations Shipped To-Date	70	184	774	1,839	3,491	166%
Rest of World						
Total Revenue	.0	.0	.0	1.0	1.3	NA
CPU Shipments	0	0	0	50	70	NA
Workstation Shipments	0	0	0	50	70	NA
Workstations Shipped To-Date	0	0	0	50	120	NA
Technical Workstation						
Total Revenue	8.7	27.3	61.8	80.1	123.8	94%
CPU Shipments	405	1,153	3,010	4,537	6,884	103%
Workstation Shipments	405	1,153	3,010	4,537	6,884	103%
Workstations Shipped To-Date	493	1,646	4,656	9,193	16,077	139%
Host/Server						
Total Revenue	.0	.0	10.9	20.0	21.8	NA
CPU Shipments	0	0	338	803	824	NA
Workstation Shipments	0	0	338	803	824	NA
Workstations Shipped To-Date	0	0	338	1,141	1,964	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 266
TITLE: Company History
COMPANY: Sun
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.6	27.1	34.1	72.1	97.1	83%
CPU Shipments	397	1,148	1,569	3,845	5,225	90%
Workstation Shipments	397	1,148	1,569	3,845	5,225	90%
Workstations Shipped To-Date	441	1,590	3,159	7,004	12,229	129%
North America						
Total Revenue	5.4	19.0	21.8	43.1	50.7	75%
CPU Shipments	250	824	985	2,239	2,827	83%
Workstation Shipments	250	824	985	2,239	2,827	83%
Workstations Shipped To-Date	292	1,116	2,101	4,340	7,167	123%
Europe						
Total Revenue	1.9	5.0	7.6	18.4	28.4	96%
CPU Shipments	90	215	307	803	1,230	92%
Workstation Shipments	90	215	307	803	1,230	92%
Workstations Shipped To-Date	90	305	612	1,415	2,645	133%
Asia						
Total Revenue	1.2	3.2	4.6	9.9	17.2	93%
CPU Shipments	57	109	277	767	1,121	111%
Workstation Shipments	57	109	277	767	1,121	111%
Workstations Shipped To-Date	60	169	446	1,213	2,334	150%
Rest of World						
Total Revenue	.0	.0	.0	.7	.9	NA
CPU Shipments	0	0	0	36	48	NA
Workstation Shipments	0	0	0	36	48	NA
Workstations Shipped To-Date	0	0	0	36	83	NA
Technical Workstation						
Total Revenue	8.6	27.1	28.9	57.6	87.4	79%
CPU Shipments	397	1,148	1,411	3,267	4,859	87%
Workstation Shipments	397	1,148	1,411	3,267	4,859	87%
Workstations Shipped To-Date	441	1,590	3,000	6,267	11,126	124%
Host/Server						
Total Revenue	.0	.0	5.1	14.4	9.7	NA
CPU Shipments	0	0	158	578	366	NA
Workstation Shipments	0	0	158	578	366	NA
Workstations Shipped To-Date	0	0	158	736	1,102	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 267
TITLE: Company History
COMPANY: Sun
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.4	14.1	25.0	52.1	72.8	102%
CPU Shipments	201	585	1,151	2,777	3,919	110%
Workstation Shipments	201	585	1,151	2,777	3,919	110%
Workstations Shipped To-Date	259	845	1,996	4,772	8,691	141%
North America						
Total Revenue	2.7	9.0	16.0	31.1	38.0	94%
CPU Shipments	123	390	723	1,617	2,120	104%
Workstation Shipments	123	390	723	1,617	2,120	104%
Workstations Shipped To-Date	178	568	1,291	2,908	5,028	131%
Europe						
Total Revenue	.8	2.1	5.6	13.3	21.3	126%
CPU Shipments	38	90	225	580	922	122%
Workstation Shipments	38	90	225	580	922	122%
Workstations Shipped To-Date	38	128	353	933	1,855	165%
Asia						
Total Revenue	.9	3.0	3.4	7.1	12.9	97%
CPU Shipments	40	105	203	554	841	114%
Workstation Shipments	40	105	203	554	841	114%
Workstations Shipped To-Date	44	149	352	906	1,746	151%
Rest of World						
Total Revenue	.0	.0	.0	.5	.6	NA
CPU Shipments	0	0	0	26	36	NA
Workstation Shipments	0	0	0	26	36	NA
Workstations Shipped To-Date	0	0	0	26	61	NA
Technical Workstation						
Total Revenue	4.4	14.1	21.2	41.6	65.5	97%
CPU Shipments	201	585	1,035	2,359	3,644	106%
Workstation Shipments	201	585	1,035	2,359	3,644	106%
Workstations Shipped To-Date	259	845	1,879	4,239	7,883	135%
Host/Server						
Total Revenue	.0	.0	3.7	10.4	7.3	NA
CPU Shipments	0	0	116	417	275	NA
Workstation Shipments	0	0	116	417	275	NA
Workstations Shipped To-Date	0	0	116	534	808	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 268
TITLE: Company History
COMPANY: Swanson Analysis
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	12.9	15.5	17.3	20.9	24.6	18%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	10.3	12.2	12.4	13.9	15.3	10%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	2.0	2.4	2.6	4.3	6.5	34%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.5	.7	1.9	2.6	2.9	54%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.1	.1	.4	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	1.0	2.2	3.3	6.7	11.6	86%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	10.2	11.9	11.9	11.7	10.6	1%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.7	1.4	2.1	2.5	2.4	9%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 269
TITLE: Company History
COMPANY: Swanson Analysis
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	12.1	15.5	17.3	20.9	24.6	19%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	9.7	12.2	12.4	13.9	15.3	12%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	1.9	2.4	2.6	4.3	6.5	36%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.5	.7	1.9	2.6	2.9	56%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.1	.1	.4	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	1.0	2.2	3.3	6.7	11.6	86%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	10.2	11.9	11.9	11.7	10.6	1%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.0	1.4	2.1	2.5	2.4	26%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 270
TITLE: Company History
COMPANY: Synercom
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	17.3	10.3	13.3	17.5	13.7	-6%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	13.0	7.7	8.5	11.0	8.2	-11%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	1.7	1.0	4.0	5.3	5.1	31%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.9	.5	.0	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	1.7	1.0	.8	1.2	.4	-30%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	8.0	10.0	8.7	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	17.3	10.3	5.3	7.5	5.1	-26%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 271
TITLE: Company History
COMPANY: Synercom
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	17.3	10.3	13.3	17.5	13.7	-6%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	13.0	7.7	8.5	11.0	8.2	-11%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	1.7	1.0	4.0	5.3	5.1	31%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.9	.5	.0	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	1.7	1.0	.8	1.2	.4	-30%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	8.0	10.0	8.7	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	17.3	10.3	5.3	7.5	5.1	-26%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 272
TITLE: Company History
COMPANY: Synopsys
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	.8	9.0	26.2	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
North America						
Total Revenue	NA	NA	.8	6.3	14.4	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	.0	.9	3.9	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Asia						
Total Revenue	NA	NA	.0	1.8	7.9	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	.8	4.5	12.6	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Host/Server						
Total Revenue	NA	NA	.0	4.5	13.6	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 273
TITLE: Company History
COMPANY: Synopsys
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	.8	9.0	26.2	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
North America						
Total Revenue	NA	NA	.8	6.3	14.4	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	.0	.9	3.9	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Asia						
Total Revenue	NA	NA	.0	1.8	7.9	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	.8	4.5	12.6	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Host/Server						
Total Revenue	NA	NA	.0	4.5	13.6	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 274
TITLE: Company History
COMPANY: Teradyne
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	9.8	10.8	22.3	20.0	18.8	18%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	7.2	7.9	16.7	15.0	10.5	10%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	2.4	2.6	4.5	4.0	7.3	33%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.2	.2	.9	.8	.8	40%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.1	.1	.2	.2	.2	21%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	1.5	1.6	6.7	6.0	7.9	53%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	8.3	9.2	11.2	10.0	7.5	-3%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	4.5	4.0	3.4	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 275
TITLE: Company History
COMPANY: Teradyne
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	9.8	10.8	22.3	20.0	18.8	18%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	7.2	7.9	16.7	15.0	10.5	10%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	2.4	2.6	4.5	4.0	7.3	33%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.2	.2	.9	.8	.8	40%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.1	.1	.2	.2	.2	21%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	1.5	1.6	6.7	6.0	7.9	53%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	8.3	9.2	11.2	10.0	7.5	-3%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	4.5	4.0	3.4	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 276
TITLE: Company History
COMPANY: Tokyo Electron--NO OEM
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	16.7	30.0	29.0	39.4	NA
CPU Shipments	NA	57	60	107	143	NA
Workstation Shipments	NA	69	70	107	143	NA
Workstations Shipped To-Date	NA	69	139	246	389	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	16.7	30.0	29.0	39.4	NA
CPU Shipments	NA	57	60	107	143	NA
Workstation Shipments	NA	69	70	107	143	NA
Workstations Shipped To-Date	NA	69	139	246	389	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	11.1	29.0	29.0	39.4	NA
CPU Shipments	NA	48	56	107	143	NA
Workstation Shipments	NA	48	56	107	143	NA
Workstations Shipped To-Date	NA	48	104	211	354	NA
Host/Server						
Total Revenue	NA	5.5	1.0	.0	.0	NA
CPU Shipments	NA	6	3	0	0	NA
Workstation Shipments	NA	18	14	0	0	NA
Workstations Shipped To-Date	NA	18	32	32	32	NA
Personal Computer						
Total Revenue	NA	.1	.0	.0	.0	NA
CPU Shipments	NA	3	0	0	0	NA
Workstation Shipments	NA	3	0	0	0	NA
Workstations Shipped To-Date	NA	3	3	3	3	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 277
TITLE: Company History
COMPANY: Tokyo Electron--NO OEM
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	13.4	27.6	24.7	33.5	NA
CPU Shipments	NA	45	53	91	122	NA
Workstation Shipments	NA	55	53	91	122	NA
Workstations Shipped To-Date	NA	55	108	199	321	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	13.4	27.6	24.7	33.5	NA
CPU Shipments	NA	45	53	91	122	NA
Workstation Shipments	NA	55	53	91	122	NA
Workstations Shipped To-Date	NA	55	108	199	321	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	8.6	27.6	24.7	33.5	NA
CPU Shipments	NA	37	53	91	122	NA
Workstation Shipments	NA	37	53	91	122	NA
Workstations Shipped To-Date	NA	37	90	181	303	NA
Host/Server						
Total Revenue	NA	4.7	.0	.0	.0	NA
CPU Shipments	NA	5	0	0	0	NA
Workstation Shipments	NA	15	0	0	0	NA
Workstations Shipped To-Date	NA	15	15	15	15	NA
Personal Computer						
Total Revenue	NA	.1	.0	.0	.0	NA
CPU Shipments	NA	3	0	0	0	NA
Workstation Shipments	NA	3	0	0	0	NA
Workstations Shipped To-Date	NA	3	3	3	3	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 278
TITLE: Company History
COMPANY: Tokyo Electron--NO OEM
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	.8	1.8	1.7	2.8	NA
CPU Shipments	NA	0	4	6	10	NA
Workstation Shipments	NA	0	8	6	10	NA
Workstations Shipped To-Date	NA	0	8	14	24	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	.8	1.8	1.7	2.8	NA
CPU Shipments	NA	0	4	6	10	NA
Workstation Shipments	NA	0	8	6	10	NA
Workstations Shipped To-Date	NA	0	8	14	24	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.4	1.4	1.7	2.8	NA
CPU Shipments	NA	0	3	6	10	NA
Workstation Shipments	NA	0	3	6	10	NA
Workstations Shipped To-Date	NA	0	3	9	19	NA
Host/Server						
Total Revenue	NA	.4	.4	.0	.0	NA
CPU Shipments	NA	0	1	0	0	NA
Workstation Shipments	NA	0	5	0	0	NA
Workstations Shipped To-Date	NA	0	5	5	5	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 279
TITLE: Company History
COMPANY: Tokyo Electron--NO OEM
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	.6	2.6	3.2	NA
CPU Shipments	NA	NA	2	10	11	NA
Workstation Shipments	NA	NA	9	10	11	NA
Workstations Shipped To-Date	NA	NA	9	18	30	NA
North America						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Europe						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Asia						
Total Revenue	NA	NA	.6	2.6	3.2	NA
CPU Shipments	NA	NA	2	10	11	NA
Workstation Shipments	NA	NA	9	10	11	NA
Workstations Shipped To-Date	NA	NA	9	18	30	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA
Technical Workstation						
Total Revenue	NA	NA	.0	2.6	3.2	NA
CPU Shipments	NA	NA	0	10	11	NA
Workstation Shipments	NA	NA	0	10	11	NA
Workstations Shipped To-Date	NA	NA	0	10	21	NA
Host/Server						
Total Revenue	NA	NA	.6	.0	.0	NA
CPU Shipments	NA	NA	2	0	0	NA
Workstation Shipments	NA	NA	9	0	0	NA
Workstations Shipped To-Date	NA	NA	9	9	9	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 280
TITLE: Company History
COMPANY: Toshiba--NO OEM
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	51.0	64.0	25.4	73.4	100.1	18%
CPU Shipments	417	0	397	1,429	2,049	49%
Workstation Shipments	707	0	520	1,530	2,224	33%
Workstations Shipped To-Date	1,185	1,185	1,705	3,235	5,459	47%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	51.0	64.0	25.4	73.4	100.1	18%
CPU Shipments	417	0	397	1,429	2,049	49%
Workstation Shipments	707	0	520	1,530	2,224	33%
Workstations Shipped To-Date	1,185	1,185	1,705	3,235	5,459	47%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	64.0	5.6	53.0	64.5	NA
CPU Shipments	0	0	49	494	566	NA
Workstation Shipments	0	0	49	494	566	NA
Workstations Shipped To-Date	0	0	49	544	1,110	NA
Host/Server						
Total Revenue	44.5	.0	12.5	8.2	15.2	-24%
CPU Shipments	172	0	41	17	29	-36%
Workstation Shipments	462	0	163	118	204	-18%
Workstations Shipped To-Date	939	939	1,103	1,221	1,425	11%
Personal Computer						
Total Revenue	6.5	.0	7.2	12.1	20.4	33%
CPU Shipments	245	0	307	918	1,453	56%
Workstation Shipments	245	0	307	918	1,453	56%
Workstations Shipped To-Date	245	245	552	1,470	2,924	86%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 281
TITLE: Company History
COMPANY: Toshiba--NO OEM
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	38.8	41.5	25.4	48.4	69.1	16%
CPU Shipments	355	0	397	1,197	1,626	46%
Workstation Shipments	612	0	520	1,298	1,801	31%
Workstations Shipped To-Date	1,016	1,016	1,536	2,834	4,635	46%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	38.8	41.5	25.4	48.4	69.1	16%
CPU Shipments	355	0	397	1,197	1,626	46%
Workstation Shipments	612	0	520	1,298	1,801	31%
Workstations Shipped To-Date	1,016	1,016	1,536	2,834	4,635	46%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	41.5	5.6	28.1	35.9	NA
CPU Shipments	0	0	49	262	315	NA
Workstation Shipments	0	0	49	262	315	NA
Workstations Shipped To-Date	0	0	49	311	626	NA
Host/Server						
Total Revenue	34.1	.0	12.5	8.2	15.2	-18%
CPU Shipments	144	0	41	17	29	-33%
Workstation Shipments	401	0	163	118	204	-15%
Workstations Shipped To-Date	805	805	968	1,086	1,291	13%
Personal Computer						
Total Revenue	4.7	.0	7.2	12.1	18.0	40%
CPU Shipments	211	0	307	918	1,282	57%
Workstation Shipments	211	0	307	918	1,282	57%
Workstations Shipped To-Date	211	211	518	1,436	2,718	89%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 282
TITLE: Company History
COMPANY: Toshiba--NO OEM
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	7.1	13.0	NA	15.4	16.0	22%
CPU Shipments	45	0	NA	144	291	59%
Workstation Shipments	59	0	NA	144	291	49%
Workstations Shipped To-Date	133	133	NA	276	567	44%
North America						
Total Revenue	.0	.0	NA	.0	.0	NA
CPU Shipments	0	0	NA	0	0	NA
Workstation Shipments	0	0	NA	0	0	NA
Workstations Shipped To-Date	0	0	NA	0	0	NA
Europe						
Total Revenue	.0	.0	NA	.0	.0	NA
CPU Shipments	0	0	NA	0	0	NA
Workstation Shipments	0	0	NA	0	0	NA
Workstations Shipped To-Date	0	0	NA	0	0	NA
Asia						
Total Revenue	7.1	13.0	NA	15.4	16.0	22%
CPU Shipments	45	0	NA	144	291	59%
Workstation Shipments	59	0	NA	144	291	49%
Workstations Shipped To-Date	133	133	NA	276	567	44%
Rest of World						
Total Revenue	.0	.0	NA	.0	.0	NA
CPU Shipments	0	0	NA	0	0	NA
Workstation Shipments	0	0	NA	0	0	NA
Workstations Shipped To-Date	0	0	NA	0	0	NA
Technical Workstation						
Total Revenue	.0	13.0	NA	15.4	13.6	NA
CPU Shipments	0	0	NA	144	119	NA
Workstation Shipments	0	0	NA	144	119	NA
Workstations Shipped To-Date	0	0	NA	144	263	NA
Host/Server						
Total Revenue	5.9	.0	NA	.0	.0	-100%
CPU Shipments	15	0	NA	0	0	-100%
Workstation Shipments	29	0	NA	0	0	-100%
Workstations Shipped To-Date	102	102	NA	102	102	0%
Personal Computer						
Total Revenue	1.2	.0	NA	.0	2.4	19%
CPU Shipments	30	0	NA	0	172	55%
Workstation Shipments	30	0	NA	0	172	55%
Workstations Shipped To-Date	30	30	NA	30	202	61%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 283
TITLE: Company History
COMPANY: Toshiba--NO OEM
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	.7	NA	1.5	4.0	NA
CPU Shipments	NA	0	NA	14	35	NA
Workstation Shipments	NA	0	NA	14	35	NA
Workstations Shipped To-Date	NA	0	NA	14	49	NA
North America						
Total Revenue	NA	.0	NA	.0	.0	NA
CPU Shipments	NA	0	NA	0	0	NA
Workstation Shipments	NA	0	NA	0	0	NA
Workstations Shipped To-Date	NA	0	NA	0	0	NA
Europe						
Total Revenue	NA	.0	NA	.0	.0	NA
CPU Shipments	NA	0	NA	0	0	NA
Workstation Shipments	NA	0	NA	0	0	NA
Workstations Shipped To-Date	NA	0	NA	0	0	NA
Asia						
Total Revenue	NA	.7	NA	1.5	4.0	NA
CPU Shipments	NA	0	NA	14	35	NA
Workstation Shipments	NA	0	NA	14	35	NA
Workstations Shipped To-Date	NA	0	NA	14	49	NA
Rest of World						
Total Revenue	NA	.0	NA	.0	.0	NA
CPU Shipments	NA	0	NA	0	0	NA
Workstation Shipments	NA	0	NA	0	0	NA
Workstations Shipped To-Date	NA	0	NA	0	0	NA
Technical Workstation						
Total Revenue	NA	.7	NA	1.5	4.0	NA
CPU Shipments	NA	0	NA	14	35	NA
Workstation Shipments	NA	0	NA	14	35	NA
Workstations Shipped To-Date	NA	0	NA	14	49	NA
Host/Server						
Total Revenue	NA	.0	NA	.0	.0	NA
CPU Shipments	NA	0	NA	0	0	NA
Workstation Shipments	NA	0	NA	0	0	NA
Workstations Shipped To-Date	NA	0	NA	0	0	NA
Personal Computer						
Total Revenue	NA	.0	NA	.0	.0	NA
CPU Shipments	NA	0	NA	0	0	NA
Workstation Shipments	NA	0	NA	0	0	NA
Workstations Shipped To-Date	NA	0	NA	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 284
TITLE: Company History
COMPANY: Toshiba--NO OEM
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	5.1	8.7	NA	7.3	11.0	21%
CPU Shipments	17	0	NA	68	97	54%
Workstation Shipments	36	0	NA	68	97	28%
Workstations Shipped To-Date	36	36	NA	104	201	54%
North America						
Total Revenue	.0	.0	NA	.0	.0	NA
CPU Shipments	0	0	NA	0	0	NA
Workstation Shipments	0	0	NA	0	0	NA
Workstations Shipped To-Date	0	0	NA	0	0	NA
Europe						
Total Revenue	.0	.0	NA	.0	.0	NA
CPU Shipments	0	0	NA	0	0	NA
Workstation Shipments	0	0	NA	0	0	NA
Workstations Shipped To-Date	0	0	NA	0	0	NA
Asia						
Total Revenue	5.1	8.7	NA	7.3	11.0	21%
CPU Shipments	17	0	NA	68	97	54%
Workstation Shipments	36	0	NA	68	97	28%
Workstations Shipped To-Date	36	36	NA	104	201	54%
Rest of World						
Total Revenue	.0	.0	NA	.0	.0	NA
CPU Shipments	0	0	NA	0	0	NA
Workstation Shipments	0	0	NA	0	0	NA
Workstations Shipped To-Date	0	0	NA	0	0	NA
Technical Workstation						
Total Revenue	.0	8.7	NA	7.3	11.0	NA
CPU Shipments	0	0	NA	68	97	NA
Workstation Shipments	0	0	NA	68	97	NA
Workstations Shipped To-Date	0	0	NA	68	165	NA
Host/Server						
Total Revenue	4.4	.0	NA	.0	.0	-100%
CPU Shipments	13	0	NA	0	0	-100%
Workstation Shipments	32	0	NA	0	0	-100%
Workstations Shipped To-Date	32	32	NA	32	32	0%
Personal Computer						
Total Revenue	.7	.0	NA	.0	.0	-100%
CPU Shipments	4	0	NA	0	0	-100%
Workstation Shipments	4	0	NA	0	0	-100%
Workstations Shipped To-Date	4	4	NA	4	4	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 285
TITLE: Company History
COMPANY: Toyo Information Systems-NO OEM
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	6.0	6.0	16.5	17.3	20.1	35%
CPU Shipments	30	65	150	76	210	63%
Workstation Shipments	30	70	150	172	210	63%
Workstations Shipped To-Date	110	180	330	502	712	60%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	6.0	6.0	16.5	17.3	20.1	35%
CPU Shipments	30	65	150	76	210	63%
Workstation Shipments	30	70	150	172	210	63%
Workstations Shipped To-Date	110	180	330	502	712	60%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	4.6	4.5	13.2	11.8	15.3	35%
CPU Shipments	25	60	137	45	182	64%
Workstation Shipments	25	60	137	45	182	64%
Workstations Shipped To-Date	35	95	232	277	459	90%
Host/Server						
Total Revenue	1.4	1.5	3.3	5.5	4.8	35%
CPU Shipments	5	5	13	32	28	53%
Workstation Shipments	5	10	13	127	28	53%
Workstations Shipped To-Date	75	85	98	225	253	35%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 286
TITLE: Company History
COMPANY: Toyo Information Systems-NO OEM
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.8	4.0	13.2	14.7	16.9	37%
CPU Shipments	26	44	120	65	176	62%
Workstation Shipments	26	47	120	146	176	62%
Workstations Shipped To-Date	85	132	252	399	575	61%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	4.8	4.0	13.2	14.7	16.9	37%
CPU Shipments	26	44	120	65	176	62%
Workstation Shipments	26	47	120	146	176	62%
Workstations Shipped To-Date	85	132	252	399	575	61%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	3.4	3.0	10.6	10.0	12.8	40%
CPU Shipments	20	40	110	38	152	65%
Workstation Shipments	20	40	110	38	152	65%
Workstations Shipped To-Date	30	71	181	219	371	87%
Host/Server						
Total Revenue	1.4	1.0	2.6	4.7	4.1	30%
CPU Shipments	5	3	10	27	24	47%
Workstation Shipments	5	7	10	108	24	47%
Workstations Shipped To-Date	55	62	72	180	204	39%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 287
TITLE: Company History
COMPANY: Toyo Information Systems-NO OEM
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1.2	2.0	3.3	2.6	3.2	28%
CPU Shipments	4	21	30	11	34	66%
Workstation Shipments	4	23	30	26	34	66%
Workstations Shipped To-Date	25	48	78	103	137	54%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	1.2	2.0	3.3	2.6	3.2	28%
CPU Shipments	4	21	30	11	34	66%
Workstation Shipments	4	23	30	26	34	66%
Workstations Shipped To-Date	25	48	78	103	137	54%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	1.2	1.5	2.6	1.8	2.5	20%
CPU Shipments	4	20	28	7	30	60%
Workstation Shipments	4	20	28	7	30	60%
Workstations Shipped To-Date	4	24	52	58	88	111%
Host/Server						
Total Revenue	.0	.5	.7	.8	.7	NA
CPU Shipments	0	2	3	5	4	NA
Workstation Shipments	0	3	3	19	4	NA
Workstations Shipped To-Date	20	23	26	45	49	25%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 288
TITLE: Company History
COMPANY: Uchida Yoko
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	7.8	37.0	42.6	47.9	55.4	63%
CPU Shipments	120	150	34	761	880	65%
Workstation Shipments	120	150	34	761	880	65%
Workstations Shipped To-Date	120	270	304	1,065	1,945	101%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	7.8	37.0	42.6	47.9	55.4	63%
CPU Shipments	120	150	34	761	880	65%
Workstation Shipments	120	150	34	761	880	65%
Workstations Shipped To-Date	120	270	304	1,065	1,945	101%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	37.0	42.6	47.9	55.4	NA
CPU Shipments	0	25	34	761	880	NA
Workstation Shipments	0	25	34	761	880	NA
Workstations Shipped To-Date	0	25	59	820	1,700	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	7.8	.0	.0	.0	.0	-100%
CPU Shipments	120	125	0	0	0	-100%
Workstation Shipments	120	125	0	0	0	-100%
Workstations Shipped To-Date	120	245	245	245	245	20%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 289
TITLE: Company History
COMPANY: Uchida Yoko
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	8.9	10.2	5.3	6.1	NA
CPU Shipments	NA	0	0	84	97	NA
Workstation Shipments	NA	0	0	84	97	NA
Workstations Shipped To-Date	NA	0	0	84	181	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	8.9	10.2	5.3	6.1	NA
CPU Shipments	NA	0	0	84	97	NA
Workstation Shipments	NA	0	0	84	97	NA
Workstations Shipped To-Date	NA	0	0	84	181	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	8.9	10.2	5.3	6.1	NA
CPU Shipments	NA	0	0	84	97	NA
Workstation Shipments	NA	0	0	84	97	NA
Workstations Shipped To-Date	NA	0	0	84	181	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 290
TITLE: Company History
COMPANY: Uchida Yoko
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	10.7	12.4	14.4	16.6	NA
CPU Shipments	NA	0	0	228	264	NA
Workstation Shipments	NA	0	0	228	264	NA
Workstations Shipped To-Date	NA	0	0	228	492	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	10.7	12.4	14.4	16.6	NA
CPU Shipments	NA	0	0	228	264	NA
Workstation Shipments	NA	0	0	228	264	NA
Workstations Shipped To-Date	NA	0	0	228	492	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	10.7	12.4	14.4	16.6	NA
CPU Shipments	NA	0	0	228	264	NA
Workstation Shipments	NA	0	0	228	264	NA
Workstations Shipped To-Date	NA	0	0	228	492	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 291
TITLE: Company History
COMPANY: Uchida Yoko
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.7	15.2	17.5	28.3	32.7	63%
CPU Shipments	60	67	34	449	519	72%
Workstation Shipments	60	67	34	449	519	72%
Workstations Shipped To-Date	60	127	161	610	1,129	108%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	4.7	15.2	17.5	28.3	32.7	63%
CPU Shipments	60	67	34	449	519	72%
Workstation Shipments	60	67	34	449	519	72%
Workstations Shipped To-Date	60	127	161	610	1,129	108%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	15.2	17.5	28.3	32.7	NA
CPU Shipments	0	25	34	449	519	NA
Workstation Shipments	0	25	34	449	519	NA
Workstations Shipped To-Date	0	25	59	508	1,027	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	4.7	.0	.0	.0	.0	-100%
CPU Shipments	60	42	0	0	0	-100%
Workstation Shipments	60	42	0	0	0	-100%
Workstations Shipped To-Date	60	102	102	102	102	14%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 292
TITLE: Company History
COMPANY: Unisys
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	26.7	33.3	38.6	40.5	38.0	9%
CPU Shipments	189	327	451	485	511	28%
Workstation Shipments	325	512	617	612	581	16%
Workstations Shipped To-Date	547	1,059	1,677	2,289	2,870	51%
North America						
Total Revenue	17.3	22.0	23.6	24.7	23.2	8%
CPU Shipments	123	215	235	296	312	26%
Workstation Shipments	211	359	338	373	354	14%
Workstations Shipped To-Date	350	710	1,047	1,421	1,775	50%
Europe						
Total Revenue	7.2	8.0	10.0	10.5	9.9	8%
CPU Shipments	51	81	161	126	133	27%
Workstation Shipments	88	100	196	159	151	15%
Workstations Shipped To-Date	151	251	447	606	757	50%
Asia						
Total Revenue	2.1	3.2	4.8	4.9	4.6	21%
CPU Shipments	15	32	52	58	61	42%
Workstation Shipments	26	53	79	73	70	28%
Workstations Shipped To-Date	39	92	171	244	314	68%
Rest of World						
Total Revenue	.0	.0	.2	.4	.4	NA
CPU Shipments	0	0	3	5	5	NA
Workstation Shipments	0	0	5	6	6	NA
Workstations Shipped To-Date	7	7	12	18	24	38%
Technical Workstation						
Total Revenue	8.0	15.2	21.7	28.8	29.3	38%
CPU Shipments	98	211	323	388	458	47%
Workstation Shipments	98	211	323	388	458	47%
Workstations Shipped To-Date	122	333	656	1,043	1,501	87%
Host/Server						
Total Revenue	18.7	18.0	16.8	11.7	8.7	-17%
CPU Shipments	91	117	128	97	54	-12%
Workstation Shipments	228	302	295	224	123	-14%
Workstations Shipped To-Date	425	727	1,021	1,245	1,368	34%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 293
TITLE: Company History
COMPANY: Unisys
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	26.7	33.3	38.6	40.5	38.0	9%
CPU Shipments	189	327	451	485	511	28%
Workstation Shipments	325	512	617	612	581	16%
Workstations Shipped To-Date	547	1,059	1,677	2,289	2,870	51%
North America						
Total Revenue	17.3	22.0	23.6	24.7	23.2	8%
CPU Shipments	123	215	235	296	312	26%
Workstation Shipments	211	359	338	373	354	14%
Workstations Shipped To-Date	350	710	1,047	1,421	1,775	50%
Europe						
Total Revenue	7.2	8.0	10.0	10.5	9.9	8%
CPU Shipments	51	81	161	126	133	27%
Workstation Shipments	88	100	196	159	151	15%
Workstations Shipped To-Date	151	251	447	606	757	50%
Asia						
Total Revenue	2.1	3.2	4.8	4.9	4.6	21%
CPU Shipments	15	32	52	58	61	42%
Workstation Shipments	26	53	79	73	70	28%
Workstations Shipped To-Date	39	92	171	244	314	68%
Rest of World						
Total Revenue	.0	.0	.2	.4	.4	NA
CPU Shipments	0	0	3	5	5	NA
Workstation Shipments	0	0	5	6	6	NA
Workstations Shipped To-Date	7	7	12	18	24	38%
Technical Workstation						
Total Revenue	8.0	15.2	21.7	28.8	29.3	38%
CPU Shipments	98	211	323	388	458	47%
Workstation Shipments	98	211	323	388	458	47%
Workstations Shipped To-Date	122	333	656	1,043	1,501	87%
Host/Server						
Total Revenue	18.7	18.0	16.8	11.7	8.7	-17%
CPU Shipments	91	117	128	97	54	-12%
Workstation Shipments	228	302	295	224	123	-14%
Workstations Shipped To-Date	425	727	1,021	1,245	1,368	34%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 294
TITLE: Company History
COMPANY: Valid
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	60.9	67.3	141.0	174.0	158.5	27%
CPU Shipments	1,260	688	1,277	1,695	945	-7%
Workstation Shipments	1,260	688	1,277	1,695	945	-7%
Workstations Shipped To-Date	3,595	4,283	5,560	7,255	8,200	23%
North America						
Total Revenue	28.0	37.1	74.8	90.5	84.6	32%
CPU Shipments	585	346	692	1,020	494	-4%
Workstation Shipments	585	346	692	1,020	494	-4%
Workstations Shipped To-Date	2,314	2,660	3,352	4,372	4,866	20%
Europe						
Total Revenue	21.3	22.1	41.4	43.5	39.6	17%
CPU Shipments	438	216	356	475	204	-17%
Workstation Shipments	438	216	356	475	204	-17%
Workstations Shipped To-Date	932	1,148	1,504	1,979	2,182	24%
Asia						
Total Revenue	11.0	7.5	23.5	40.0	34.3	33%
CPU Shipments	225	120	216	200	247	2%
Workstation Shipments	225	120	216	200	247	2%
Workstations Shipped To-Date	337	457	673	873	1,120	35%
Rest of World						
Total Revenue	.6	.7	1.4	.0	.0	-100%
CPU Shipments	13	6	13	0	0	-100%
Workstation Shipments	13	6	13	0	0	-100%
Workstations Shipped To-Date	13	19	32	32	32	26%
Technical Workstation						
Total Revenue	55.3	63.3	135.5	174.0	158.5	30%
CPU Shipments	1,113	659	1,194	1,695	945	-4%
Workstation Shipments	1,113	659	1,194	1,695	945	-4%
Workstations Shipped To-Date	3,382	4,041	5,235	6,930	7,875	24%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	5.6	4.0	5.5	.0	.0	-100%
CPU Shipments	147	29	83	0	0	-100%
Workstation Shipments	147	29	83	0	0	-100%
Workstations Shipped To-Date	213	242	325	325	325	11%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 295
TITLE: Company History
COMPANY: Valid
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	56.1	54.4	110.0	121.8	91.9	13%
CPU Shipments	1,176	589	1,152	1,237	549	-17%
Workstation Shipments	1,176	589	1,152	1,237	549	-17%
Workstations Shipped To-Date	3,322	3,911	5,063	6,300	6,849	20%
North America						
Total Revenue	25.8	28.5	56.1	71.4	48.4	17%
CPU Shipments	540	300	612	805	283	-15%
Workstation Shipments	540	300	612	805	283	-15%
Workstations Shipped To-Date	2,131	2,432	3,044	3,848	4,131	18%
Europe						
Total Revenue	19.6	20.3	34.1	30.5	23.0	4%
CPU Shipments	413	210	330	333	118	-27%
Workstation Shipments	413	210	330	333	118	-27%
Workstations Shipped To-Date	864	1,074	1,404	1,737	1,855	21%
Asia						
Total Revenue	10.1	5.2	18.7	20.0	20.6	20%
CPU Shipments	211	75	199	100	148	-8%
Workstation Shipments	211	75	199	100	148	-8%
Workstations Shipped To-Date	314	389	588	688	836	28%
Rest of World						
Total Revenue	.6	.4	1.1	.0	.0	-100%
CPU Shipments	12	4	11	0	0	-100%
Workstation Shipments	12	4	11	0	0	-100%
Workstations Shipped To-Date	12	16	28	28	28	24%
Technical Workstation						
Total Revenue	50.4	50.4	104.5	121.8	91.9	16%
CPU Shipments	1,029	560	1,070	1,237	549	-15%
Workstation Shipments	1,029	560	1,070	1,237	549	-15%
Workstations Shipped To-Date	3,120	3,680	4,749	5,986	6,535	20%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	5.6	4.0	5.5	.0	.0	-100%
CPU Shipments	147	29	83	0	0	-100%
Workstation Shipments	147	29	83	0	0	-100%
Workstations Shipped To-Date	202	231	314	314	314	12%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 296
TITLE: Company History
COMPANY: Valid
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.3	4.1	9.9	17.4	19.0	45%
CPU Shipments	74	23	30	131	117	12%
Workstation Shipments	74	23	30	131	117	12%
Workstations Shipped To-Date	263	285	316	447	564	21%
North America						
Total Revenue	2.0	1.4	3.9	3.0	7.4	39%
CPU Shipments	39	4	12	34	43	3%
Workstation Shipments	39	4	12	34	43	3%
Workstations Shipped To-Date	177	181	194	228	271	11%
Europe						
Total Revenue	1.5	1.6	3.1	4.4	4.8	34%
CPU Shipments	22	5	9	47	24	3%
Workstation Shipments	22	5	9	47	24	3%
Workstations Shipped To-Date	64	69	78	125	150	24%
Asia						
Total Revenue	.8	1.1	2.8	10.0	6.9	73%
CPU Shipments	12	13	9	50	49	42%
Workstation Shipments	12	13	9	50	49	42%
Workstations Shipped To-Date	21	34	43	93	142	62%
Rest of World						
Total Revenue	.0	.0	.1	.0	.0	-100%
CPU Shipments	1	0	0	0	0	-100%
Workstation Shipments	1	0	0	0	0	-100%
Workstations Shipped To-Date	1	1	1	1	1	17%
Technical Workstation						
Total Revenue	4.3	4.1	9.9	17.4	19.0	45%
CPU Shipments	74	23	30	131	117	12%
Workstation Shipments	74	23	30	131	117	12%
Workstations Shipped To-Date	252	274	304	436	553	22%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	11	11	11	11	11	0%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 297
TITLE: Company History
COMPANY: Valid
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	.6	8.9	21.2	34.8	47.6	196%
CPU Shipments	11	76	94	327	279	126%
Workstation Shipments	11	76	94	327	279	126%
Workstations Shipped To-Date	11	87	181	508	787	193%
North America						
Total Revenue	.3	7.2	14.8	16.1	28.8	218%
CPU Shipments	6	42	68	182	168	134%
Workstation Shipments	6	42	68	182	168	134%
Workstations Shipped To-Date	6	47	115	297	465	202%
Europe						
Total Revenue	.2	.2	4.2	8.7	11.9	171%
CPU Shipments	3	1	17	95	61	108%
Workstation Shipments	3	1	17	95	61	108%
Workstations Shipped To-Date	3	5	22	117	178	172%
Asia						
Total Revenue	.1	1.2	1.9	10.0	6.9	181%
CPU Shipments	2	32	8	50	49	132%
Workstation Shipments	2	32	8	50	49	132%
Workstations Shipped To-Date	2	33	42	92	141	201%
Rest of World						
Total Revenue	.0	.2	.2	.0	.0	-100%
CPU Shipments	0	2	1	0	0	-100%
Workstation Shipments	0	2	1	0	0	-100%
Workstations Shipped To-Date	0	2	3	3	3	137%
Technical Workstation						
Total Revenue	.6	8.9	21.2	34.8	47.6	196%
CPU Shipments	11	76	94	327	279	126%
Workstation Shipments	11	76	94	327	279	126%
Workstations Shipped To-Date	11	87	181	508	787	193%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 298
TITLE: Company History
COMPANY: Vero International Software
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	9.4	10.8	12.8	19.2	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	9.0	10.4	12.3	18.2	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.4	.4	.5	1.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	9.4	10.8	12.8	19.2	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 299
TITLE: Company History
COMPANY: Vero International Software
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	9.4	10.8	12.8	19.2	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	9.0	10.4	12.3	18.2	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Rest of World						
Total Revenue	NA	.4	.4	.5	1.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	9.4	10.8	12.8	19.2	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 300
TITLE: Company History
COMPANY: Viewlogic Systems
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.0	7.0	10.8	18.3	27.5	62%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	3.0	5.2	7.7	11.0	20.1	60%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.5	.8	1.0	3.7	3.0	59%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.5	1.0	2.2	3.1	4.4	74%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.6	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	2.6	4.6	11.6	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.1	.2	.5	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	3.9	6.8	7.7	13.8	15.8	42%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 301
TITLE: Company History
COMPANY: Viewlogic Systems
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.0	7.0	10.8	18.3	27.5	62%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	3.0	5.2	7.7	11.0	20.1	60%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.5	.8	1.0	3.7	3.0	59%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	.5	1.0	2.2	3.1	4.4	74%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.6	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	2.6	4.6	11.6	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.1	.2	.5	.0	.0	-100%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	3.9	6.8	7.7	13.8	15.8	42%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 302
TITLE: Company History
COMPANY: VLSI Technology
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.5	12.2	20.2	18.8	18.5	22%
CPU Shipments	30	44	260	51	53	15%
Workstation Shipments	30	50	260	60	53	15%
Workstations Shipped To-Date	30	80	340	400	453	97%
North America						
Total Revenue	6.0	12.2	11.1	10.7	8.9	11%
CPU Shipments	21	44	143	29	25	5%
Workstation Shipments	21	50	143	34	25	5%
Workstations Shipped To-Date	21	71	214	248	273	90%
Europe						
Total Revenue	2.3	.0	7.1	6.4	7.6	35%
CPU Shipments	8	0	91	17	22	28%
Workstation Shipments	8	0	91	20	22	28%
Workstations Shipped To-Date	8	8	99	120	141	104%
Asia						
Total Revenue	.3	.0	2.0	1.7	1.7	61%
CPU Shipments	1	0	26	5	5	51%
Workstation Shipments	1	0	26	5	5	51%
Workstations Shipped To-Date	1	1	27	32	37	153%
Rest of World						
Total Revenue	.0	.0	.0	.0	.4	NA
CPU Shipments	0	0	0	0	1	NA
Workstation Shipments	0	0	0	0	1	NA
Workstations Shipped To-Date	0	0	0	0	1	NA
Technical Workstation						
Total Revenue	6.4	9.8	17.2	16.0	17.1	28%
CPU Shipments	30	38	260	51	49	13%
Workstation Shipments	30	38	260	51	49	13%
Workstations Shipped To-Date	30	68	328	379	428	94%
Host/Server						
Total Revenue	2.1	2.5	3.0	2.8	1.4	-10%
CPU Shipments	0	6	0	0	3	NA
Workstation Shipments	0	12	0	9	3	NA
Workstations Shipped To-Date	0	12	12	21	25	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 303
TITLE: Company History
COMPANY: VLSI Technology
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	NA	12.1	11.3	11.1	NA
CPU Shipments	NA	NA	156	31	32	NA
Workstation Shipments	NA	NA	156	36	32	NA
Workstations Shipped To-Date	NA	NA	156	192	224	NA
North America						
Total Revenue	NA	NA	6.7	6.4	5.3	NA
CPU Shipments	NA	NA	86	17	15	NA
Workstation Shipments	NA	NA	86	21	15	NA
Workstations Shipped To-Date	NA	NA	86	106	122	NA
Europe						
Total Revenue	NA	NA	4.3	3.8	4.6	NA
CPU Shipments	NA	NA	55	10	13	NA
Workstation Shipments	NA	NA	55	12	13	NA
Workstations Shipped To-Date	NA	NA	55	67	80	NA
Asia						
Total Revenue	NA	NA	1.2	1.0	1.0	NA
CPU Shipments	NA	NA	16	3	3	NA
Workstation Shipments	NA	NA	16	3	3	NA
Workstations Shipped To-Date	NA	NA	16	19	22	NA
Rest of World						
Total Revenue	NA	NA	.0	.0	.2	NA
CPU Shipments	NA	NA	0	0	1	NA
Workstation Shipments	NA	NA	0	0	1	NA
Workstations Shipped To-Date	NA	NA	0	0	1	NA
Technical Workstation						
Total Revenue	NA	NA	10.3	9.6	10.2	NA
CPU Shipments	NA	NA	156	31	29	NA
Workstation Shipments	NA	NA	156	31	29	NA
Workstations Shipped To-Date	NA	NA	156	187	216	NA
Host/Server						
Total Revenue	NA	NA	1.8	1.7	.9	NA
CPU Shipments	NA	NA	0	0	2	NA
Workstation Shipments	NA	NA	0	5	2	NA
Workstations Shipped To-Date	NA	NA	0	5	8	NA
Personal Computer						
Total Revenue	NA	NA	.0	.0	.0	NA
CPU Shipments	NA	NA	0	0	0	NA
Workstation Shipments	NA	NA	0	0	0	NA
Workstations Shipped To-Date	NA	NA	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 304
TITLE: Company History
COMPANY: VLSI Technology
APPLICATION: IC Layout
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	8.5	12.2	8.1	7.5	7.4	-3%
CPU Shipments	30	44	104	20	21	-8%
Workstation Shipments	30	50	104	24	21	-8%
Workstations Shipped To-Date	30	80	184	208	229	66%
North America						
Total Revenue	6.0	12.2	4.5	4.3	3.6	-12%
CPU Shipments	21	44	57	12	10	-17%
Workstation Shipments	21	50	57	14	10	-17%
Workstations Shipped To-Date	21	71	128	142	152	64%
Europe						
Total Revenue	2.3	.0	2.8	2.6	3.0	7%
CPU Shipments	8	0	36	7	9	2%
Workstation Shipments	8	0	36	8	9	2%
Workstations Shipped To-Date	8	8	45	53	61	66%
Asia						
Total Revenue	.3	.0	.8	.7	.7	27%
CPU Shipments	1	0	10	2	2	21%
Workstation Shipments	1	0	10	2	2	21%
Workstations Shipped To-Date	1	1	11	13	15	103%
Rest of World						
Total Revenue	.0	.0	.0	.0	.2	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	6.4	9.8	6.9	6.4	6.9	2%
CPU Shipments	30	38	104	20	20	-10%
Workstation Shipments	30	38	104	20	20	-10%
Workstations Shipped To-Date	30	68	172	192	212	63%
Host/Server						
Total Revenue	2.1	2.5	1.2	1.1	.5	-30%
CPU Shipments	0	6	0	0	1	NA
Workstation Shipments	0	12	0	4	1	NA
Workstations Shipped To-Date	0	12	12	16	17	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 305
TITLE: Company History
COMPANY: Wacom
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	6.0	9.0	11.6	27.8	38.9	60%
CPU Shipments	500	700	752	714	632	6%
Workstation Shipments	500	700	752	714	632	6%
Workstations Shipped To-Date	500	1,200	1,952	2,666	3,298	60%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	6.0	9.0	11.6	27.8	38.9	60%
CPU Shipments	500	700	752	714	632	6%
Workstation Shipments	500	700	752	714	632	6%
Workstations Shipped To-Date	500	1,200	1,952	2,666	3,298	60%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	3.8	NA
CPU Shipments	0	0	0	0	38	NA
Workstation Shipments	0	0	0	0	38	NA
Workstations Shipped To-Date	0	0	0	0	38	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	6.0	9.0	11.6	27.8	35.1	56%
CPU Shipments	500	700	752	714	594	4%
Workstation Shipments	500	700	752	714	594	4%
Workstations Shipped To-Date	500	1,200	1,952	2,666	3,260	60%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 306
TITLE: Company History
COMPANY: Wacom
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	NA	.7	.7	4.7	7.8	NA
CPU Shipments	NA	56	66	121	123	NA
Workstation Shipments	NA	56	66	121	123	NA
Workstations Shipped To-Date	NA	56	122	243	366	NA
North America						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Europe						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Asia						
Total Revenue	NA	.7	.7	4.7	7.8	NA
CPU Shipments	NA	56	66	121	123	NA
Workstation Shipments	NA	56	66	121	123	NA
Workstations Shipped To-Date	NA	56	122	243	366	NA
Rest of World						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Technical Workstation						
Total Revenue	NA	.0	.0	.0	1.3	NA
CPU Shipments	NA	0	0	0	13	NA
Workstation Shipments	NA	0	0	0	13	NA
Workstations Shipped To-Date	NA	0	0	0	13	NA
Host/Server						
Total Revenue	NA	.0	.0	.0	.0	NA
CPU Shipments	NA	0	0	0	0	NA
Workstation Shipments	NA	0	0	0	0	NA
Workstations Shipped To-Date	NA	0	0	0	0	NA
Personal Computer						
Total Revenue	NA	.7	.7	4.7	6.5	NA
CPU Shipments	NA	56	66	121	109	NA
Workstation Shipments	NA	56	66	121	109	NA
Workstations Shipped To-Date	NA	56	122	243	353	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 307
TITLE: Company History
COMPANY: Wacom
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	5.1	3.4	5.1	23.1	31.1	57%
CPU Shipments	425	266	239	593	509	5%
Workstation Shipments	425	266	239	593	509	5%
Workstations Shipped To-Date	425	691	930	1,523	2,032	48%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	5.1	3.4	5.1	23.1	31.1	57%
CPU Shipments	425	266	239	593	509	5%
Workstation Shipments	425	266	239	593	509	5%
Workstations Shipped To-Date	425	691	930	1,523	2,032	48%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	2.5	NA
CPU Shipments	0	0	0	0	25	NA
Workstation Shipments	0	0	0	0	25	NA
Workstations Shipped To-Date	0	0	0	0	25	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	5.1	3.4	5.1	23.1	28.6	54%
CPU Shipments	425	266	239	593	484	3%
Workstation Shipments	425	266	239	593	484	3%
Workstations Shipped To-Date	425	691	930	1,523	2,007	47%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 308
TITLE: Company History
COMPANY: Wiechers Datentechnik
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	5.5	6.8	8.5	17.0	20.3	39%
CPU Shipments	32	40	50	400	494	98%
Workstation Shipments	32	40	50	400	494	98%
Workstations Shipped To-Date	32	72	122	522	1,016	137%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	5.5	6.8	8.5	17.0	20.3	39%
CPU Shipments	32	40	50	400	494	98%
Workstation Shipments	32	40	50	400	494	98%
Workstations Shipped To-Date	32	72	122	522	1,016	137%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	5.1	5.7	NA
CPU Shipments	0	0	0	120	80	NA
Workstation Shipments	0	0	0	120	80	NA
Workstations Shipped To-Date	0	0	0	120	200	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	5.5	6.8	8.5	11.9	14.6	28%
CPU Shipments	32	40	50	280	414	89%
Workstation Shipments	32	40	50	280	414	89%
Workstations Shipped To-Date	32	72	122	402	816	124%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 309
TITLE: Company History
COMPANY: Wiechers Datentechnik
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.1	5.1	6.4	17.0	20.3	49%
CPU Shipments	24	30	38	400	494	113%
Workstation Shipments	24	30	38	400	494	113%
Workstations Shipped To-Date	24	54	92	492	986	153%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	4.1	5.1	6.4	17.0	20.3	49%
CPU Shipments	24	30	38	400	494	113%
Workstation Shipments	24	30	38	400	494	113%
Workstations Shipped To-Date	24	54	92	492	986	153%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	5.1	5.7	NA
CPU Shipments	0	0	0	120	80	NA
Workstation Shipments	0	0	0	120	80	NA
Workstations Shipped To-Date	0	0	0	120	200	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	4.1	5.1	6.4	11.9	14.6	37%
CPU Shipments	24	30	38	280	414	103%
Workstation Shipments	24	30	38	280	414	103%
Workstations Shipped To-Date	24	54	92	372	785	139%

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 310
TITLE: Company History
COMPANY: Xilinx
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	6.2	8.2	10.8	15.0	16.5	28%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	3.1	4.0	5.3	6.0	10.7	37%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	1.9	2.5	3.2	4.5	3.0	12%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	1.3	1.7	2.3	3.8	2.5	17%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.8	.3	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.8	1.3	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	6.2	8.2	10.8	14.3	15.2	25%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 311
TITLE: Company History
COMPANY: Xilinx
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	6.2	8.2	10.8	15.0	16.5	28%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
North America						
Total Revenue	3.1	4.0	5.3	6.0	10.7	37%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	1.9	2.5	3.2	4.5	3.0	12%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Asia						
Total Revenue	1.3	1.7	2.3	3.8	2.5	17%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.8	.3	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.8	1.3	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	6.2	8.2	10.8	14.3	15.2	25%
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 312
TITLE: Company History
COMPANY: Ziegler
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	16.9	8.5	14.1	15.0	18.5	2%
CPU Shipments	129	0	0	14	0	-100%
Workstation Shipments	129	0	0	14	0	-100%
Workstations Shipped To-Date	129	129	129	142	142	3%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	16.9	8.1	14.1	15.0	18.4	2%
CPU Shipments	129	0	0	14	0	-100%
Workstation Shipments	129	0	0	14	0	-100%
Workstations Shipped To-Date	129	129	129	142	142	3%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.4	.0	.0	.1	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	3.0	.0	.0	.0	.0	-100%
CPU Shipments	129	0	0	0	0	-100%
Workstation Shipments	129	0	0	0	0	-100%
Workstations Shipped To-Date	129	129	129	129	129	0%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	13.9	8.5	14.1	15.0	18.5	7%
CPU Shipments	0	0	0	14	0	NA
Workstation Shipments	0	0	0	14	0	NA
Workstations Shipped To-Date	0	0	0	14	14	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 313
TITLE: Company History
COMPANY: Ziegler
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	4.0	2.5	4.2	5.8	7.4	16%
CPU Shipments	0	0	0	2	0	NA
Workstation Shipments	0	0	0	2	0	NA
Workstations Shipped To-Date	0	0	0	2	2	NA
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	4.0	2.4	4.2	5.8	7.4	16%
CPU Shipments	0	0	0	2	0	NA
Workstation Shipments	0	0	0	2	0	NA
Workstations Shipped To-Date	0	0	0	2	2	NA
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.1	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	4.0	2.5	4.2	5.8	7.4	16%
CPU Shipments	0	0	0	2	0	NA
Workstation Shipments	0	0	0	2	0	NA
Workstations Shipped To-Date	0	0	0	2	2	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 314
TITLE: Company History
COMPANY: Ziegler
APPLICATION: AEC
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1.5	.9	1.8	1.8	2.4	12%
CPU Shipments	0	0	0	2	0	NA
Workstation Shipments	0	0	0	2	0	NA
Workstations Shipped To-Date	0	0	0	2	2	NA
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	1.5	.9	1.8	1.8	2.4	12%
CPU Shipments	0	0	0	2	0	NA
Workstation Shipments	0	0	0	2	0	NA
Workstations Shipped To-Date	0	0	0	2	2	NA
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.5	.9	1.8	1.8	2.4	12%
CPU Shipments	0	0	0	2	0	NA
Workstation Shipments	0	0	0	2	0	NA
Workstations Shipped To-Date	0	0	0	2	2	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 315
TITLE: Company History
COMPANY: Ziegler
APPLICATION: GIS/Mapping
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1.1	.7	1.0	1.3	2.0	16%
CPU Shipments	0	0	0	2	0	NA
Workstation Shipments	0	0	0	2	0	NA
Workstations Shipped To-Date	0	0	0	2	2	NA
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	1.1	.6	1.0	1.3	2.0	16%
CPU Shipments	0	0	0	2	0	NA
Workstation Shipments	0	0	0	2	0	NA
Workstations Shipped To-Date	0	0	0	2	2	NA
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	1.1	.7	1.0	1.3	2.0	16%
CPU Shipments	0	0	0	2	0	NA
Workstation Shipments	0	0	0	2	0	NA
Workstations Shipped To-Date	0	0	0	2	2	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 316
TITLE: Company History
COMPANY: Ziegler
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	3.9	2.4	4.2	3.1	3.7	-1%
CPU Shipments	0	0	0	4	0	NA
Workstation Shipments	0	0	0	4	0	NA
Workstations Shipped To-Date	0	0	0	4	4	NA
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	3.9	2.3	4.2	3.1	3.7	-1%
CPU Shipments	0	0	0	4	0	NA
Workstation Shipments	0	0	0	4	0	NA
Workstations Shipped To-Date	0	0	0	4	4	NA
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.1	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	3.9	2.4	4.2	3.1	3.7	-1%
CPU Shipments	0	0	0	4	0	NA
Workstation Shipments	0	0	0	4	0	NA
Workstations Shipped To-Date	0	0	0	4	4	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 317
TITLE: Company History
COMPANY: Ziegler
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	6.3	2.0	2.8	3.0	3.0	-17%
CPU Shipments	129	0	0	4	0	-100%
Workstation Shipments	129	0	0	4	0	-100%
Workstations Shipped To-Date	129	129	129	133	133	1%
North America						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Europe						
Total Revenue	6.3	2.0	2.8	3.0	2.9	-17%
CPU Shipments	129	0	0	4	0	-100%
Workstation Shipments	129	0	0	4	0	-100%
Workstations Shipped To-Date	129	129	129	133	133	1%
Asia						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Rest of World						
Total Revenue	.0	.1	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	3.0	.0	.0	.0	.0	-100%
CPU Shipments	129	0	0	0	0	-100%
Workstation Shipments	129	0	0	0	0	-100%
Workstations Shipped To-Date	129	129	129	129	129	0%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	3.3	2.0	2.8	3.0	3.0	-3%
CPU Shipments	0	0	0	4	0	NA
Workstation Shipments	0	0	0	4	0	NA
Workstations Shipped To-Date	0	0	0	4	4	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 318
TITLE: Company History
COMPANY: Zuken
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	32.9	43.0	58.5	62.6	78.9	24%
CPU Shipments	109	158	195	300	533	49%
Workstation Shipments	334	346	350	380	557	14%
Workstations Shipped To-Date	520	866	1,216	1,596	2,153	43%
North America						
Total Revenue	.0	.4	.1	.0	3.9	NA
CPU Shipments	0	0	0	0	27	NA
Workstation Shipments	0	0	0	0	28	NA
Workstations Shipped To-Date	0	0	0	0	28	NA
Europe						
Total Revenue	.0	.0	.0	.0	.5	NA
CPU Shipments	0	0	0	0	4	NA
Workstation Shipments	0	0	0	0	4	NA
Workstations Shipped To-Date	0	0	0	0	4	NA
Asia						
Total Revenue	32.9	42.6	58.5	62.6	74.2	23%
CPU Shipments	109	158	195	300	502	46%
Workstation Shipments	334	346	350	380	524	12%
Workstations Shipped To-Date	520	866	1,216	1,596	2,120	42%
Rest of World						
Total Revenue	.0	.0	.0	.0	.2	NA
CPU Shipments	0	0	0	0	1	NA
Workstation Shipments	0	0	0	0	2	NA
Workstations Shipped To-Date	0	0	0	0	2	NA
Technical Workstation						
Total Revenue	2.3	6.8	28.0	51.2	75.0	139%
CPU Shipments	30	59	143	273	522	105%
Workstation Shipments	30	59	143	273	522	105%
Workstations Shipped To-Date	60	119	262	535	1,057	105%
Host/Server						
Total Revenue	30.6	36.2	30.5	11.5	3.9	-40%
CPU Shipments	80	99	52	27	12	-38%
Workstation Shipments	304	287	207	107	35	-42%
Workstations Shipped To-Date	461	747	954	1,061	1,097	24%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 319
TITLE: Company History
COMPANY: Zuken
APPLICATION: Mechanical
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	1.3	1.3	.6	NA	.8	-12%
CPU Shipments	7	0	3	NA	5	-7%
Workstation Shipments	15	0	3	NA	5	-22%
Workstations Shipped To-Date	21	21	24	NA	29	9%
North America						
Total Revenue	.0	.0	.0	NA	.0	NA
CPU Shipments	0	0	0	NA	0	NA
Workstation Shipments	0	0	0	NA	0	NA
Workstations Shipped To-Date	0	0	0	NA	0	NA
Europe						
Total Revenue	.0	.0	.0	NA	.0	NA
CPU Shipments	0	0	0	NA	0	NA
Workstation Shipments	0	0	0	NA	0	NA
Workstations Shipped To-Date	0	0	0	NA	0	NA
Asia						
Total Revenue	1.3	1.3	.6	NA	.7	-13%
CPU Shipments	7	0	3	NA	5	-9%
Workstation Shipments	15	0	3	NA	5	-23%
Workstations Shipped To-Date	21	21	24	NA	29	9%
Rest of World						
Total Revenue	.0	.0	.0	NA	.0	NA
CPU Shipments	0	0	0	NA	0	NA
Workstation Shipments	0	0	0	NA	0	NA
Workstations Shipped To-Date	0	0	0	NA	0	NA
Technical Workstation						
Total Revenue	.0	1.3	.6	NA	.8	NA
CPU Shipments	0	0	3	NA	5	NA
Workstation Shipments	0	0	3	NA	5	NA
Workstations Shipped To-Date	0	0	3	NA	8	NA
Host/Server						
Total Revenue	1.3	.0	.0	NA	.0	-100%
CPU Shipments	7	0	0	NA	0	-100%
Workstation Shipments	15	0	0	NA	0	-100%
Workstations Shipped To-Date	21	21	21	NA	21	0%
Personal Computer						
Total Revenue	.0	.0	.0	NA	.0	NA
CPU Shipments	0	0	0	NA	0	NA
Workstation Shipments	0	0	0	NA	0	NA
Workstations Shipped To-Date	0	0	0	NA	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 320
TITLE: Company History
COMPANY: Zuken
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	2.3	5.5	8.8	10.6	12.6	53%
CPU Shipments	30	59	45	57	88	31%
Workstation Shipments	30	59	45	57	88	31%
Workstations Shipped To-Date	60	119	164	221	309	51%
North America						
Total Revenue	.0	.0	.0	.0	.6	NA
CPU Shipments	0	0	0	0	4	NA
Workstation Shipments	0	0	0	0	4	NA
Workstations Shipped To-Date	0	0	0	0	4	NA
Europe						
Total Revenue	.0	.0	.0	.0	.1	NA
CPU Shipments	0	0	0	0	1	NA
Workstation Shipments	0	0	0	0	1	NA
Workstations Shipped To-Date	0	0	0	0	1	NA
Asia						
Total Revenue	2.3	5.5	8.8	10.6	11.9	51%
CPU Shipments	30	59	45	57	83	29%
Workstation Shipments	30	59	45	57	83	29%
Workstations Shipped To-Date	60	119	164	221	303	50%
Rest of World						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Technical Workstation						
Total Revenue	2.3	5.5	8.8	10.6	12.6	53%
CPU Shipments	30	59	45	57	88	31%
Workstation Shipments	30	59	45	57	88	31%
Workstations Shipped To-Date	60	119	164	221	309	51%
Host/Server						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 321
TITLE: Company History
COMPANY: Zuken
APPLICATION: PCB/Hybrid/MCM
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	29.3	36.2	49.2	52.0	65.5	22%
CPU Shipments	72	99	147	243	440	57%
Workstation Shipments	290	287	302	323	464	12%
Workstations Shipped To-Date	440	726	1,029	1,352	1,816	43%
North America						
Total Revenue	.0	.4	.1	.0	3.3	NA
CPU Shipments	0	0	0	0	22	NA
Workstation Shipments	0	0	0	0	23	NA
Workstations Shipped To-Date	0	0	0	0	23	NA
Europe						
Total Revenue	.0	.0	.0	.0	.4	NA
CPU Shipments	0	0	0	0	3	NA
Workstation Shipments	0	0	0	0	3	NA
Workstations Shipped To-Date	0	0	0	0	3	NA
Asia						
Total Revenue	29.3	35.8	49.1	52.0	61.6	20%
CPU Shipments	72	99	147	243	414	55%
Workstation Shipments	290	287	302	323	436	11%
Workstations Shipped To-Date	440	726	1,029	1,352	1,788	42%
Rest of World						
Total Revenue	.0	.0	.0	.0	.2	NA
CPU Shipments	0	0	0	0	1	NA
Workstation Shipments	0	0	0	0	1	NA
Workstations Shipped To-Date	0	0	0	0	1	NA
Technical Workstation						
Total Revenue	.0	.0	18.7	40.5	61.6	NA
CPU Shipments	0	0	95	216	428	NA
Workstation Shipments	0	0	95	216	428	NA
Workstations Shipped To-Date	0	0	95	311	740	NA
Host/Server						
Total Revenue	29.3	36.2	30.5	11.5	3.9	-39%
CPU Shipments	72	99	52	27	12	-36%
Workstation Shipments	290	287	207	107	35	-41%
Workstations Shipped To-Date	440	726	933	1,041	1,076	25%
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 322
TITLE: Company History
COMPANY: Zycad
APPLICATION: All Applications
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	19.2	28.9	35.2	31.5	30.4	12%
CPU Shipments	82	133	168	150	250	32%
Workstation Shipments	82	133	168	150	250	32%
Workstations Shipped To-Date	0	133	301	451	701	NA
North America						
Total Revenue	18.7	21.8	26.4	20.5	19.8	1%
CPU Shipments	80	115	126	98	163	20%
Workstation Shipments	80	115	126	98	163	20%
Workstations Shipped To-Date	0	115	241	339	501	NA
Europe						
Total Revenue	.0	5.4	5.3	7.9	4.6	NA
CPU Shipments	0	9	25	38	38	NA
Workstation Shipments	0	9	25	38	38	NA
Workstations Shipped To-Date	0	9	34	72	109	NA
Asia						
Total Revenue	.4	1.1	3.5	3.2	6.1	100%
CPU Shipments	2	6	17	15	50	135%
Workstation Shipments	2	6	17	15	50	135%
Workstations Shipped To-Date	0	6	23	38	88	NA
Rest of World						
Total Revenue	.2	.6	.0	.0	.0	-100%
CPU Shipments	1	3	0	0	0	-100%
Workstation Shipments	1	3	0	0	0	-100%
Workstations Shipped To-Date	0	3	3	3	3	NA
Technical Workstation						
Total Revenue	.0	.0	.5	.3	24.3	NA
CPU Shipments	0	0	3	2	204	NA
Workstation Shipments	0	0	3	2	204	NA
Workstations Shipped To-Date	0	0	3	4	209	NA
Host/Server						
Total Revenue	19.2	28.9	34.7	31.2	6.1	-25%
CPU Shipments	82	133	165	148	46	-14%
Workstation Shipments	82	133	165	148	46	-14%
Workstations Shipped To-Date	0	133	299	447	493	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

TABLE NUMBER: 323
TITLE: Company History
COMPANY: Zycad
APPLICATION: Electronic CAE
UNITS: Millions of Dollars and Actual Units

	1986	1987	1988	1989	1990	CAGR 86-90
Worldwide						
Total Revenue	19.2	28.9	35.2	31.5	30.4	12%
CPU Shipments	82	133	168	150	250	32%
Workstation Shipments	82	133	168	150	250	32%
Workstations Shipped To-Date	0	133	301	451	701	NA
North America						
Total Revenue	18.7	21.8	26.4	20.5	19.8	1%
CPU Shipments	80	115	126	98	163	20%
Workstation Shipments	80	115	126	98	163	20%
Workstations Shipped To-Date	0	115	241	339	501	NA
Europe						
Total Revenue	.0	5.4	5.3	7.9	4.6	NA
CPU Shipments	0	9	25	38	38	NA
Workstation Shipments	0	9	25	38	38	NA
Workstations Shipped To-Date	0	9	34	72	109	NA
Asia						
Total Revenue	.4	1.1	3.5	3.2	6.1	100%
CPU Shipments	2	6	17	15	50	135%
Workstation Shipments	2	6	17	15	50	135%
Workstations Shipped To-Date	0	6	23	38	88	NA
Rest of World						
Total Revenue	.2	.6	.0	.0	.0	-100%
CPU Shipments	1	3	0	0	0	-100%
Workstation Shipments	1	3	0	0	0	-100%
Workstations Shipped To-Date	0	3	3	3	3	NA
Technical Workstation						
Total Revenue	.0	.0	.5	.3	24.3	NA
CPU Shipments	0	0	3	2	204	NA
Workstation Shipments	0	0	3	2	204	NA
Workstations Shipped To-Date	0	0	3	4	209	NA
Host/Server						
Total Revenue	19.2	28.9	34.7	31.2	6.1	-25%
CPU Shipments	82	133	165	148	46	-14%
Workstation Shipments	82	133	165	148	46	-14%
Workstations Shipped To-Date	0	133	299	447	493	NA
Personal Computer						
Total Revenue	.0	.0	.0	.0	.0	NA
CPU Shipments	0	0	0	0	0	NA
Workstation Shipments	0	0	0	0	0	NA
Workstations Shipped To-Date	0	0	0	0	0	NA

Source: Dataquest
June 1991

©1991 Dataquest Incorporated June—Reproduction Prohibited

Dataquest

Dataquest Research and Sales Offices:

Dataquest Incorporated
1290 Ridder Park Drive
San Jose, California 95131-2398
Phone: (408) 437-8000
Telex: 171973
Fax: (408) 437-0292

Technology Products Group
Phone: (800) 624-3280

Dataquest Incorporated
Ledgeway/Dataquest
The Corporate Center
550 Cochituate Road
Framingham, MA 01701
Phone: (508) 370-5555
Fax: (508) 370-6262

Dataquest Incorporated
Invitational Computer Conferences Division
3151 Airway Avenue, C-2
Costa Mesa, California 92626
Phone: (714) 957-0171
Telex: 5101002189 ICCDQ
Fax: (714) 957-0903

Dataquest Australia
Suite 1, Century Plaza
80 Berry Street
North Sydney, NSW 2060
Australia
Phone: (02) 959 4544
Telex: 25468
Fax: (02) 929 0635

Dataquest GmbH
Kronstadter Strasse 9
8000 Munich 80
West Germany
Phone: 011 49 89 93 09 09 0
Fax: 49 89 930 3277

Dataquest Europe Limited
Roussel House, Broadwater Park
Denham, Uxbridge, Middx UB9 5HP
England
Phone: 0895-835050
Telex: 266195
Fax: 0895 835260/1/2

Dataquest Europe SA
Tour Gallièni 2
36, avenue du Général-de-Gaulle
93175 Bagnolet Cedex
France
Phone: (1) 48 97 31 00
Telex: 233 263
Fax: (1) 48 97 34 00

Dataquest Hong Kong
Rm. 401, Connaught Comm. Bldg.
185 Wanchai Rd.
Wanchai, Hong Kong
Phone: 8387336
Telex: 80587
Fax: 5722375

Dataquest Israel
59 Mishmar Ha'yarden Street
Tel Aviv, Israel 69865
or
P.O. Box 18198
Tel Aviv, Israel
Phone: 52 913937
Telex: 341118
Fax: 52 32865

Dataquest Japan Limited
Shinkawa Sanko Building
1-3-17 Shinkawa, Chuo-ku
Tokyo 104 Japan
Phone: (03) 5566-0411
Fax: (03) 5566-0425

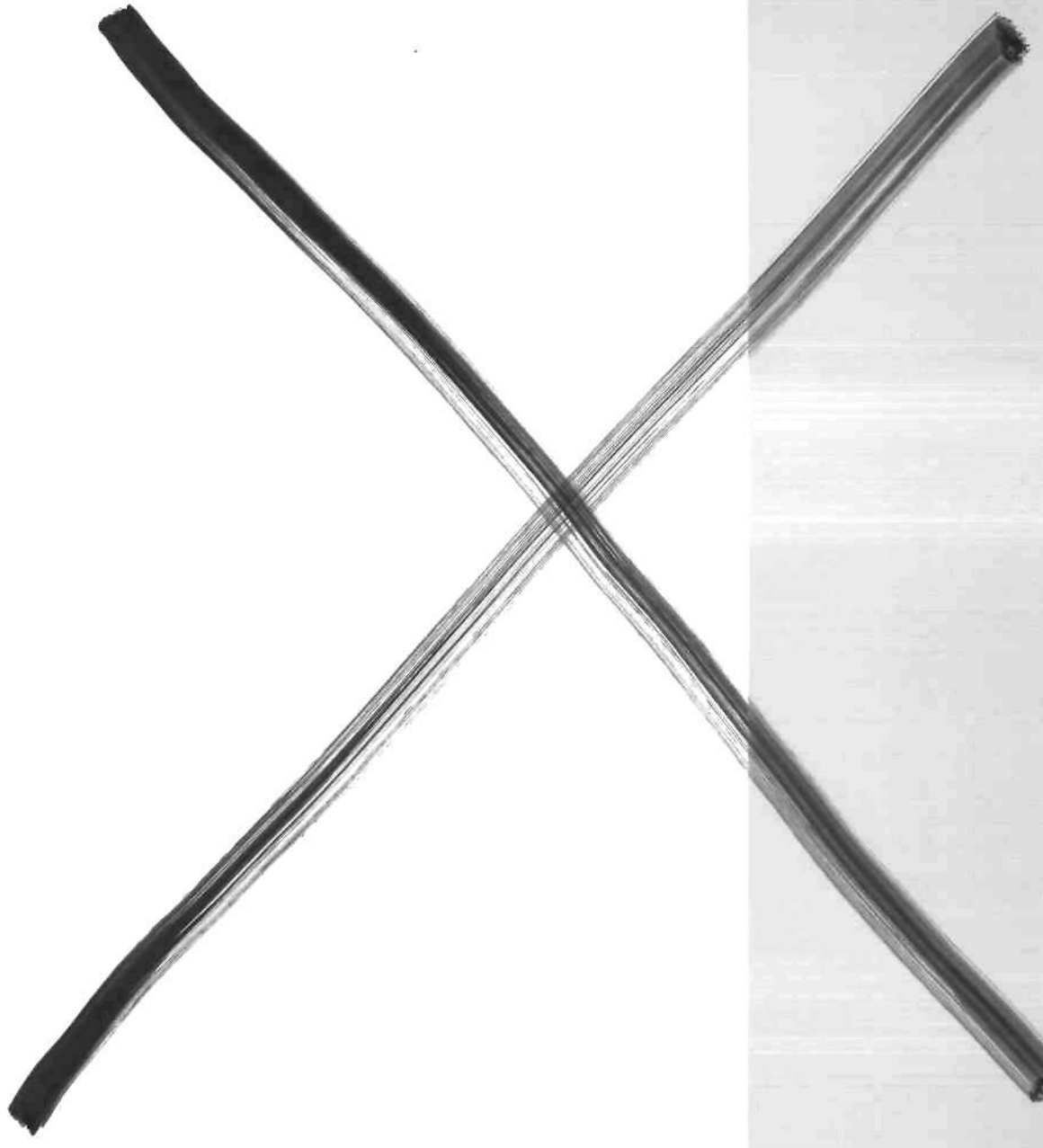
Dataquest Korea
Daeheung Bldg. 1105
648-23 Yeoksam-dong
Kangnam-gu
Seoul, Korea 135
Phone: (02) 556-4166
Fax: (02) 552-2661

Dataquest Singapore
4012 Ang Mo Kio Industrial Park 1
Ave. 10, #03-10 to #03-12
Singapore 2056
Phone: 4597181
Telex: 38257
Fax: 4563129

Dataquest Taiwan
Room 801/8th Floor
Ever Spring Building
147, Sect. 2, Chien Kuo N. Rd.
Taipei, Taiwan R.O.C. 104
Phone: (02) 501-7960
Telex: 27459
Fax: (02) 505-4265

Dataquest West Germany
In der Schneithohl 17
6242 Kronberg 2
West Germany
Phone: 06173/61685
Telex: 418089
Fax: 06173/67901

001081



Dataquest

Apple Computer Inc.

20525 Mariani Avenue
Cupertino, California 95014
Telephone: (408) 996-1010
Fax: (408) 973-2483
Dun's Number: 06-070-4780

Date Founded: 1977

CORPORATE STRATEGIC DIRECTION

Apple Computer Inc. designs, develops, manufactures, and markets personal computer systems for use in business, science, education, engineering, and government. Because of product innovation in the areas of computer hardware and system software design, Apple products have become the accepted alternative to the world of MS-DOS.

Total revenue increased 5.2 percent to $5.56 billion* in fiscal year 1990, up from $5.28 billion in fiscal year 1989. In each of the past six years, Apple has seen its net income increase steadily. During fiscal 1990, the Company's net income totaled $474.9 million, resulting in a 4.6 percent increase over the fiscal 1989 result of $454.0 million.

Apple principally sells its products to the business market through independent resellers, value-added resellers (VARs), and systems integrators. Apple markets its products to the home market through independent resellers and to the educational market through direct sales and Apple Education sales consultants.

In fiscal 1990, international net sales grew 23 percent over 1989, representing 41.7 percent of net sales in 1990 compared with 35.6 percent in fiscal 1989. In Japan, Apple's fastest-growing market, the number of Macintosh computers sold nearly doubled during fiscal 1990. Apple's U.S. sales decreased 5.2 percent in 1990 compared with 1989, primarily reflecting reduced sales of the company's more established products and an overall slowdown in growth of personal computer industry in the United States. Because of this slowdown, Apple has continued to focus and build its infrastructure in the European and Pacific Rim areas through its Apple Europe and Apple Pacific regional offices.

*All dollar amounts are in U.S. dollars.

Apple maintains a continuing R&D program to remain adaptable to the dynamic personal computer industry. Apple currently is developing new products and enhancing existing products in the areas of hardware and peripherals, system software, and networking and communications. During fiscal years 1990, 1989, and 1988, R&D expenditure equaled $478.0 million, $420.1 million, and $272.5 million, respectively. These amounts accounted for 8.6, 8.0, and 6.7 percent, respectively, of total revenue.

Each of Apple's three regional entities (Apple USA, Apple Europe, and Apple Pacific) are regarded as full business operations. As such, they have profit and loss responsibility, production facilities, and R&D objectives. Apple's philosophy is to allow the subsidiaries to function with a high level of independence so that any regional differences (e.g., economic, cultural) are met by localization of the product as appropriate. This element is important within Apple's ambitions to become a global company as opposed to a multinational one.

During May 1991, the company announced that it will institute an across-the-board layoff of 10 percent of its employees by the end of 1991 as part of a cost-reduction program. The overwhelming success of the Macintosh Classic, introduced in October 1990, and the strong performance of the company's low-cost peripherals forced Apple to revamp its market strategy from one that emphasized high-gross margins to that of a volume dealer. Apple plans to dismiss approximately 1,500 employees in an effort to recover from the profit erosion this new low-priced, high-volume strategy has created. Apple has said it will also take a number of other short-term and long-term actions—including relocating and consolidating some functions and reducing management levels—to reduce expenses.

©1991 Dataquest Incorporated October—Reproduction Prohibited

In June 1991, Apple announced that it was reorganizing its Apple USA unit from five to three regional sales divisions, with headquarters in New York, Atlanta, and Irvine. The restructuring, which went into effect in July, eliminated Apple USA's northwest regional headquarters in San Jose and central regional headquarters in Chicago.

In a major alliance between the world's two largest personal computer manufacturers, Apple and IBM Corporation announced in July 1991 that they aim to develop and market new technologies that will integrate into their existing and future products. The major points in this letter of intent are as follows:

- Apple and IBM intend to create a new open system software platform that will be based on object-oriented technology. To market this platform, Apple and IBM will form a new system software company that will be jointly owned and independently managed. Software will be offered for sale on IBM and Apple computers as well as on other vendor systems.
- The Apple Macintosh will be integrated into IBM's enterprise client/server environment. The two companies will develop, market, and support networking and communications products for this environment. Apple and IBM also will develop and market an enhanced version of IBM's AIX operating system that will take the best of AIX and the Macintosh operating system and will span from desktops to servers.
- Apple intends to adopt future single-chip implementations of IBM's RISC System 6000 POWER architecture. Motorola Incorporated and IBM will use their expertise to design and manufacture this new family of POWER PC chips, with Motorola serving as a source for the chips.
- IBM and Apple plan to work together to create and license multimedia platform-independent software environments (initially introduced by Apple in May 1990 as QuickTime).

Both companies hope to complete and sign contracts for the announced partnership by the end of 1991.

During 1990, Apple gave its wholly owned subsidiary Claris Corporation, a software developing company, a new and more prominent role within the company. After the creation of the Claris in 1987, Apple intended eventually to divest itself of the subsidiary and was moving gradually to reduce its stake. In early 1990, as Apple was preparing to sell some of its Claris stock through a public offering, it reversed its position. Apple decided to buy back Claris shares that had been issued to employees and have the subsidiary work on software that would improve the ability of Macintosh computers to work with other brands.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Tables 4 through 6 at the end of this backgrounder present comprehensive financial information.

BUSINESS SEGMENT STRATEGIC DIRECTION

Apple offers a wide range of personal computing products including personal computers, related software, and peripheral and communications products. The following paragraphs summarize Apple's principal products.

Personal Computers

According to Dataquest, Apple ranked second in the worldwide personal computer vendor market for 1990, trailing only IBM. Dataquest estimates that Apple's worldwide market share in 1990 was 8.59 percent, based on estimated factory revenue of $4.28 billion.

The Apple II and Apple Macintosh lines make up Apple's two central processing unit (CPU) product families. The Apple II family, first introduced in 1977, is the company's older CPU product family. The Macintosh product family, first introduced in 1984, is characterized by its graphical user interface and 32-bit technology. This group includes such high-end personal computers as the Macintosh IIci and Apple's most powerful computer, the Macintosh IIfx.

On October 15, 1990, Apple made a major push into the low-end personal computer market by announcing a new generation of low-priced Macintosh computers: the Macintosh Classic, the Macintosh LC, and the Macintosh IIsi. These new computers and the low-end strategy accompanying them are key parts of Apple's five-year plan to regain market share in the personal computer market.

Macintosh Classic

The least expensive personal computer in the Macintosh family, the Macintosh Classic, is targeted at first-time buyers and replaces both the Macintosh Plus and Macintosh SE systems. Based on an 8-MHz

©1991 Dataquest Incorporated October—Reproduction Prohibited

Motorola 68000 microprocessor and running applications up to 25 percent faster than its predecessors, the Macintosh Classic can handle word processing, spreadsheet analysis, and a wide variety of other home, education, and business tasks. The unit also comes with a built-in, 9-inch black-and-white monitor, 1MB of memory, six built-in ports, and a 1.4MB Apple SuperDrive floppy disk drive that can read and write to DOS files. A 40MB version of the Classic with 2MB of memory is also available.

Macintosh LC

The modular Macintosh LC represents Apple's lowest-cost color machine to date. Built around a 16-MHz 68020 Motorola microprocessor, the Macintosh LC offers a new sound input feature for adding voice comments to word processing documents, spreadsheets, and presentations. The LC machine also features a 40MB hard drive, 256KB of video RAM, 2MB of RAM (expandable to 10MB), one NuBus slot, and built-in support for three different monitors. Apple is targeting the Macintosh LC at the school market and at small- to medium-size businesses.

In an effort to make the LC more appealing to corporate buyers, Apple added two new configurations in May 1991. Both new versions now offer 512KB of video RAM, boosting the machine's palette to more than 16 million colors on a 12-inch Macintosh RGB monitor. Also, neither version includes the standard keyboard, which came in what was previously the main LC configuration. In addition, the first new configuration offers 2MB of RAM and a 40MB hard drive, and the second new package offers 4MB of RAM and an 80MB hard drive.

Macintosh IIsi

Apple's third new personal computer, the Macintosh IIsi, is the least expensive member of the Macintosh II product line. The Macintosh IIsi, which comes in a 4-inch high case, runs at 20 MHz and has a 68030 microprocessor, allowing it to run applications up to five times faster than the Macintosh SE. Some key features of the IIsi include built-in support for four monitors, 2MB of memory (expandable to 17MB), sound input like the Macintosh LC, eight built-in ports, and a processor direct slot (which is SE-30 compatible) or a NuBus slot. The Macintosh IIsi comes in two configurations: 3MB of memory with a 40MB hard disk and 5MB RAM with an 80MB hard drive.

Macintosh Portable

The Macintosh Portable personal computer provides Macintosh functionality in a portable design. It is fully compatible with other Macintosh hardware and runs virtually all current versions of Macintosh software. The machine incorporates the CPU, screen, keyboard, pointing device, battery, and disk storage into a single easy-to-carry package. The system can supply 6 to 12 hours of operation, depending on the system configuration and usage. Recently, Apple enhanced the Macintosh Portable to include an improved backlit liquid crystal display (LCD), which makes the screen easier to use. The newer version of the Portable, which replaces the original model, also includes 2MB or 4MB of RAM rather than only 1MB in order to be able to support the new System Software 7.0 operating system. It also can access up to 8MB of memory when configured with RAM cards from third-party vendors.

Software

Currently, Apple has two organizations developing software for its line of computers. Apple offers its own line of operating system software, including its proprietary Macintosh system software and A/UX UNIX-based operating system. Claris Corporation also develops and markets software applications and extensions to the Macintosh system software. Currently, the Claris product line includes Macintosh software products for customization (HyperCard), word processing (MacWrite II), graphics (MacDraw Pro and MacDraw II), database management (FileMaker Pro), planning (MacProject II), computer-aided design (Claris CAD), and electronic forms processing (SmartForm Series).

AU/X 2.0 and A/UX 2.01 are the latest versions of Apple's UNIX operating systems for the Macintosh personal computers. The A/UX operating system allows users to simultaneously run multiple Macintosh productivity applications, UNIX applications, X Window System applications, and MS-DOS applications (using SoftPC from Insignia Software). Both operating systems can run on most personal computers in the Macintosh product family.

Macintosh System Software 6.0.7 is the latest version available of the System Software 6.0.x for the Macintosh PC family. System 6.0.7 supports and is required for the Macintosh Classic and is compatible with all Macintosh computers that have at least 1Mb of memory.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Apple's System Software 7.0, the new operating system enhancement software for Macintosh microcomputers, has been referred to as Apple's answer to Microsoft Windows 3.0 and should radically change the way users work with their Macintoshes. System 7.0, which began shipping in mid-1991, requires at least 2MB of memory and a hard disk drive; machines such as the 1MB Classic configuration will continue to ship with the latest version of System 6.0.x. The most important System 7.0 features are underlying technologies such as file sharing, interapplication communication, virtual memory, and 32-bit addressing. Other features include "Aliases," which will let users create duplicate icons for any file, folder, or volume that can be freely partitioned while remaining linked to the original file; and "Apple Events," which allows two-way communication between applications on one Macintosh or across a network. System 7.0 also adds a "logical desktop" on which users can see all disks from inside a Save or Open dialog box.

In February 1991, Apple introduced four new development tools to take advantage of the many new features of System 7.0. MacApp 3.0 is the latest version of Apple's object-oriented framework for applications; ToolServer is a standalone, tool-execution environment; SourceBug is a direct-manipulation, source-level debugger; and BalloonWriter is a tool for creating Balloon Help (an on-line help systems) for application programs.

Monitors

Dataquest estimates that Apple ranked first in the worldwide add-on Macintosh monitor market with a 54.4 percent unit market share (based on estimated unit shipments of 434,900) and a 47.3 percent revenue market share (based on estimated factory revenue of $244.3 million). Apple offers a wide variety of monochrome and color display monitors for its line of personal computers. Among the company's more recent products are the Apple Two-Page Monochrome Monitor, the Apple Macintosh Portrait Display, and the AppleColor High-Resolution RGB Monitor. During fiscal 1990, Apple introduced two new 12-inch display monitors designed for low-end users. The Macintosh Monochrome Display can show the full width (including margins) and more than half the length of a letter-size page. It can also display up to 256 shades of gray, depending on the Macintosh computer or video card to which it is connected. The Macintosh RGB Display is Apple's lowest-cost color display and works with the built-in video support on the Macintosh LC, the Macintosh IIci, or any Macintosh computer equipped with a video card. The RGB Display can display color graphics, text, or photographic-quality images in up to 16.7 million colors. Apple also sells a Two-Page, 21-inch RGB monitor in Europe and in the Pacific region.

Scanners

Apple Scanner

The Apple Scanner allows Apple Macintosh personal computer users to import graphics and images into a variety of software applications. It works with other Apple products such as the Macintosh computer and the LaserWriter family of printers. The scanner was designed to integrate with Apple products as well as with third-party page layout and graphics programs. The scanner is based on a flatbed design that allows the user to scan a range of document sizes: letter (8.5 by 11 inches), A4, and legal (8.5 by 14 inches). It supports three composition modes: line, halftone, and gray scale. The user can scan images at 75, 100, 150, 200, and 300 dots per inch (dpi). The Apple Scanner comes with HyperScan software and has a full range of enhancing controls that allows the user to adjust the contrast, brightness, gray map, and halftone pattern of the scanned image.

Printers

In the North American electronic printer market, Dataquest estimates that Apple achieved an 8.4 percent market share based on estimated end-user revenue of $714.9 million. The entire Apple family of printers now includes the ImageWriter II, StyleWriter, and Personal LaserWriter LS for individual printing capabilities; and the Personal LaserWriter NT, LaserWriter IINT and LaserWriter IINTX for shared printing capabilities and PostScript functionality. In March 1991, Apple introduced the Personal LaserWriter LS and StyleWriter as the newest products in the its line of printers. The StyleWriter is Apple's lowest-priced laser-quality printer and can produce text and graphics at about one-half page per minute in "best" quality mode (360 dpi) or one page per minute in "draft" mode (180 dpi). The printer's other notable characteristics are its small size (about the size of a shoebox) and paper-handling capabilities where up to 50 sheets of paper can be fed automatically through a sheet feeder included with the printer. The Apple

©1991 Dataquest Incorporated October—Reproduction Prohibited

Personal LaserWriter LS is designed for individual users in homes, businesses, or schools, and prints up to four pages per minute at a laser-quality resolution of 300 dpi. Additionally, the Personal LaserWriter LS requires only 512K of RAM to print full pages of text and graphics, unlike most low-cost laser printers, which require 1.5Mb to 2.5Mb of memory.

Further Information

For further information about Apple's business segments, please contact the appropriate Dataquest industry service.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 1
Five-Year Corporate Highlights (Millions of U.S. Dollars)

	1986	1987	1988	1989	1990
Five-Year Revenue	1,901.9	2,661.1	4,071.4	5,284.0	5,558.4
Percent Change	-	39.92	53.00	29.78	5.19
Capital Expenditure	66.6	86.1	144.0	239.0	224.3
Percent of Revenue	3.50	3.24	3.54	4.52	4.04
R&D Expenditure	127.8	191.5	272.5	420.1	478.0
Percent of Revenue	6.72	7.20	6.69	7.95	8.60
Number of Employees	5,600	7,228	10,828	14,517	14,528
Revenue (K)/Employee	339.63	368.17	376.01	363.99	382.60
Net Income	154.0	217.5	400.3	454.0	474.9
Percent Change	-	41.23	84.05	13.41	4.60

1990 Fiscal Year	Q1	Q2	Q3	Q4
Quarterly Revenue	1,493.4	1,346.2	1,364.8	1,354.1
Quarterly Profit	124.8	131.8	119.8	98.5

Source: Apple Computer Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	74.23	72.92	67.94	64.37	58.31
Europe	15.71	17.55	21.08	22.89	27.80
All Others	10.06	9.54	10.98	12.74	13.89

Source: Apple Computer Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989	1990
Direct Sales	20.00	20.00	10.00
Indirect Sales	80.00	80.00	90.00
VARs	20.00	20.00	10.00
Dealers	60.00	60.00	80.00

Source: Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

1990 SALES OFFICE LOCATIONS

North America—62
Europe—13
Japan—3
ROW—6

MANUFACTURING LOCATIONS

North America

Fremont, California
All Macintosh products except the Macintosh Classic and all peripheral cards sold in the United States, Latin America, Canada, and Caribbean region; all Macintosh IIci, Macintosh IIfx, and Macintosh IIsi products for the Pacific Rim region

Europe

Cork (Ireland)
All Apple products for the European community, including Eastern Europe, as well as the Arabic countries and Africa

ROW

Singapore
All Macintosh Classic, Macintosh SE, Macintosh SE/30, and Apple II products for the United States and Pacific Rim region

SUBSIDIARIES

North America

Apple Canada Inc. (Canada)
Claris Corporation (United States)
Coral Software Corp. (United States)
Network Innovations Corp. (United States)
Orion Network Systems Inc. (United States)

Europe

Apple Computer AB (Sweden)
Apple Computer A/S (Norway)
Apple Computer AS (Denmark)
Apple Computer Espana (Spain)
Apple Computer S.A.R.L. (France)
Apple Computer Ges.m.b.H (Austria)
Apple Computer GmbH (Germany)
Apple Computer B.V. (Holland)
Apple Computer Ltd. (Ireland)
Apple Computer N.V./S.A. (Belgium)
Apple Computer OY (Finland)
Apple Computer S.p.A. (Italy)
Apple Computer (UK) Ltd. (United Kingdom)

Japan

Apple Computer Japan Inc.

ROW

Apple Computer Asia Inc. (Taiwan)
Apple Computer Australia Pty Ltd. (Australia)
Apple Computer International Ltd. (Hong Kong)
Apple Singapore Pte Ltd. (Singapore)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1991

Go Corporation
Apple announced it had licensed AppleTalk software to Go Corporation for use in its PenPoint operating system under the AppleTalk Licensing Program.

IBM Corporation
Apple and IBM signed a letter of intent under which the two companies will work together to develop and market new technologies that will integrate into each company's existing and future products.

Novell Inc.
Apple signed a license agreement with Novell under the AppleTalk Licensing Program that supplies the AppleTalk networking source code to Novell for use with its NetWare for Macintosh Version 3.0. The AppleTalk Licensing Program, started in June 1990, is a standard means by Apple to license its AppleTalk source code to third parties, thereby giving them the means to complete network links.

Tandem Computers Incorporated
Apple signed a license agreement with Tandem under the AppleTalk Licensing Program that will supply the AppleTalk networking source code to Tandem. Tandem will use AppleTalk as part of its new Apple Macintosh computer connectivity product, the Tandem Data Access Language Server.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Technical Support Alliance
Apple joined other computer industry leaders to announce the Technical Support Alliance (TSA), formed to provide customers with coordinated post-sales support for multivendor computing environments. Along with Apple, the TSA members include Borland International Inc., Compaq Computer Corporation, Hewlett-Packard Company, IBM, Intel Corporation, Microsoft, NetFrame Systems Incorporated, Novell Inc., Oracle Corporation, Ungermann-Bass Inc., and 3Com Corporation. Each company will participate in cross training, cooperative support, and product and information exchanges to enable quick solutions of customer problems.

1990

Farallon Computing Inc.
Under terms of the AppleTalk Licensing Program, Apple signed a licensing agreement enabling Farallon Computing to develop and market AppleTalk networking products for Microsoft's MS-DOS and Windows 3.0 platforms.

KPMG Peat Marwick
Apple Computer and KPMG Peat Marwick formed a strategic alliance that will provide consulting and systems integration services to companies implementing executive information systems and decision support systems (EIS/DSS) on Macintosh personal computers.

VLSI Technology and Acorn Computer
Apple joined VLSI technology and the British-based Acorn Computer in a joint venture to manufacture a new reduced-instruction-set computing (RISC) microcontroller chip based on technology developed by Acorn. Apple invested $3 million in the $10 million venture, which will operate under the name Advanced RISC Machines Ltd.

1989

GE Information Services
Apple Computer and GE Information Services (GEIS) signed an agreement for Apple to extend use of GEIS' teleprocessing services as part of AppleLink Version 5.0, Apple's on-line information and communications system for the Apple community.

Falcon Microsystems
Apple Computer and Falcon Microsystems signed a three-year exclusive contract stating that Falcon will continue as exclusive holder of Apple's GSA Schedule C, the official purchasing catalog for personal computing products. The deal is estimated to be worth in excess of $100 million to Apple in its first year and could deliver a total value of $0.5 billion by its expiration date of March 31, 1993.

Microsoft Corporation
The two companies announced a cross-license agreement for outline font technology and printer software to be standard across the Apple Macintosh and Microsoft OS/2 Presentation Manager platforms. Under terms of the agreement, Microsoft will license Apple's outline font technology for inclusion in future versions of Microsoft OS/2 Presentation Manager, and Apple will license printer software from Microsoft for implementation in future versions of the Apple LaserWriter printer.

1988

Digital Equipment Corporation
The companies agreed to provide Mac-to-VAX connectivity by applying common standards for distributed applications, file sharing, printing terminal emulation, electronic mail, conferencing, database access, and networking. They also agreed to jointly develop desktop integration software.

Texas Instruments Incorporated (TI)
TI will be a VAR for Micro Explorer, a LISP-based artificial-intelligence system that incorporates a TI-developed coprocessor board and the Mac II.

MERGERS AND ACQUISITIONS

1989

Coral Software Corp.
Apple acquired Coral Software of Cambridge, Massachusetts, which markets a line of programming languages and artificial intelligence tools for the Macintosh computer family.

1988

Network Innovations Corp.
Apple acquired Network Innovations Corp., a manufacturer of standard connectivity products that connect PC applications with minicomputers and mainframes.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Orion Network Systems Inc.
Apple acquired Orion, a developer of IBM-compatible Systems Network Architecture software.

KEY OFFICERS

John Sculley
Chairman and chief executive officer

Michael H. Spindler
President and chief operating officer

Albert A. Eisenstat
Executive vice president and secretary

Joseph A. Graziano
Executive vice president and chief financial officer

Kevin J. Sullivan
Senior vice president, Human Resources

Ian Diery
Senior vice president and president, Apple Pacific

Soren Olsson
Senior vice president and president, Apple Europe

Robert L. Puette
Senior vice president and president, Apple USA

PRINCIPAL INVESTORS

A.C. Markkula, Jr.—5.8 percent

FOUNDERS

Steven Jobs
Stephen Wozniak

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 4
Balance Sheet
Fiscal Year Ending in September
(Millions of U.S. Dollars)

Balance Sheet	1986	1987	1988	1989	1990
Cash	576.2	565.1	545.7	438.3	374.7
Receivables	263.1	405.6	638.8	792.8	761.9
Inventory	108.7	225.8	461.5	475.4	355.5
Other Current Assets	92.9	110.9	137.0	588.0	911.2
Total Current Assets	1,040.9	1,307.4	1,783.0	2,294.5	2,403.3
Net Property, Plants	107.3	130.4	207.4	334.2	398.2
Other Assets	11.9	40.1	91.7	115.2	174.2
Total Assets	1,160.1	1,477.9	2,082.1	2,743.9	2,975.7
Total Current Liabilities	328.5	478.7	827.1	895.2	1,027.0
Long-Term Debt	0	0	0	0	0
Other Liabilities	137.5	162.8	251.6	362.9	501.8
Total Liabilities	466.0	641.5	1,078.7	1,258.1	1,528.8
Converted Preferred Stock	0	0	0	0	0
Common Stock	227.1	263.9	226.2	315.3	136.6
Other Equity	(7.3)	(0.6)	0.7	(5.4)	(1.9)
Retained Earnings	474.3	573.1	776.5	1,175.9	1,312.2
Total Shareholders' Equity	694.1	836.4	1,003.4	1,485.8	1,446.9
Total Liabilities and Shareholders' Equity	1,160.1	1,477.9	2,082.1	2,743.9	2,975.7

Source: Apple Computer Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 5
Consolidated Income Statement
Fiscal Year Ending in September
(Millions of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1986	1987	1988	1989	1990
Revenue	1,901.9	2,661.1	4,071.4	5,284.0	5,558.4
U.S. Revenue	1,411.8	1,940.4	2,766.3	3,401.5	3,241.0
Non-U.S. Revenue	490.1	720.7	1,305.1	1,882.5	2,317.4
Cost of Sales	891.1	1,296.2	1,990.9	2,694.8	2,606.2
R&D Expense	127.8	191.5	272.5	420.1	478.0
SG&A Expense	609.5	801.8	1,187.6	1,534.8	1,762.2
Capital Expense	66.6	86.1	144.0	239.0	224.3
Pretax Income	309.7	410.4	656.2	744.3	778.5
Pretax Margin (%)	16.28	15.42	16.12	14.09	14.01
Effective Tax Rate (%)	50.30	47.00	39.00	39.00	39.00
Net Income	154.0	217.5	400.3	454.0	474.9
Shares Outstanding, Millions	129	132	130	129	126
Per Share Data					
Earnings	1.20	1.65	3.08	3.53	3.77
Dividend	0	0.12	0.32	0.40	0.44
Book Value	5.43	6.35	7.72	11.54	11.50

Source: Apple Computer Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 6
Key Financial Ratios
Fiscal Year Ending in September

Key Financial Ratios	1986	1987	1988	1989	1990
Liquidity					
Current (Times)	3.17	2.73	2.16	2.56	2.34
Total Assets/Equity (%)	167.14	176.70	207.50	184.67	205.66
Current Liabilities/Equity (%)	47.33	57.23	82.43	60.25	70.98
Total Liabilities/Equity (%)	67.14	76.70	107.50	84.67	105.66
Profitability (%)					
Return on Assets	13.27	14.72	19.23	16.55	15.96
Return on Equity	22.19	26.00	39.89	30.56	32.82
Profit Margin (%)	8.10	8.17	9.83	8.59	8.54
Other Key Ratios					
R&D Spending % of Revenue	6.72	7.20	6.69	7.95	8.60
Capital Spending % of Revenue	3.50	3.24	3.54	4.52	4.04
Employees	5,600	7,228	10,828	14,517	14,528
Revenue (K)/Employee	339.63	368.17	376.01	363.99	382.60
Capital Spending % of Assets	5.74	5.83	6.92	8.71	7.54

Source: Apple Computer Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Cadence Design Systems

555 River Oaks Parkway
San Jose, California 95134
Telephone: (408) 943-1234
Fax: (408) 943-0513
Dun's Number: Not Available

Date Founded: 1988

CORPORATE STRATEGIC DIRECTION

Cadence Design Systems Inc. develops, markets, and supports electronic design automation (EDA) software products that automate, enhance, and accelerate the design and verification of integrated circuits (ICs) and electronic systems. Cadence was the result of the merger of SDA Systems Inc., a computer-aided design (CAD) software company, into ECAD Inc. in May 1988. ECAD's name was changed to Cadence Design Systems Inc. in June 1988. Cadence's product lines each comprise suites of individual software packages or tools, integrated through the company's proprietary Design Framework software architecture. The Design Framework architecture features a single common data model for most of the tools, a consistent human interface, portability to industry standard workstations, and open system capabilities that allow users to customize and enhance the system.

In order to further its commitment to provide customers with a complete systems design solution, Cadence has emphasized growth through acquisition. In March 1989, Cadence acquired Tangent Systems Corporation, integrating that company's gate array layout products with Cadence's design environment. In December 1989, Cadence acquired Gateway Design Automation Corporation, a company involved in the development, marketing, and support of high-performance computer-aided engineering (CAE) software simulation and analysis products. In July 1990, Cadence purchased all of the outstanding stock of Automated Systems Inc., which was involved in the design and fabrication of sophisticated printed circuit boards (PCBs) and the licensing and leasing of its proprietary design software.

Total revenue increased 44.8 percent to $231.4 million* in fiscal year 1990, up from $159.9 million in fiscal 1989. Cadence attributes the growth to the increased acceptance of its products by both semiconductor and electronic systems companies, as well as to the acquisition of Tangent Systems in the first quarter of 1989. Net income totaled $38.0 million in fiscal 1990, representing a 45.0 percent increase over fiscal 1989. As of December 1990, Cadence employed 1,676 people worldwide.

In May 1991, Cadence announced a new divisional organization to reflect a greater focus for the company's rapidly expanding PCB layout technology and service elements. A new division, the Systems Division and Consulting Services, was formed to directly address this marketplace and to consolidate Cadence's efforts in PCB layout, verification, and fabrication with its consulting services. Cadence's four divisions now consist of the Analog Division, the Integrated Circuit Design Division, the renamed CAE Division (the combination of Gateway Design Automation Corporation and elements of the old Systems Division), and the new Systems Division and Consulting Services. These four business divisions all use Cadence's core tools and its Design Framework architecture.

R&D expenditure accounted for 18.4 percent, 19.4 percent, and 17.2 percent of total revenue, or $42.6 million, $31.1 million, and $15.8 million for the fiscal years 1990, 1989, and 1988, respectively. During 1990, this expenditure was primarily focused on the company's continued investment in R&D personnel, the addition of Tangent personnel, and continued effort in expanding the company's systems and analog divisions. Recently, Cadence formed Cadence Labs, an independent organization within Cadence that is dedicated to the research of advanced technologies relating to the electronic design automation industry. Also, in June 1990, Cadence and European Silicon Structures SA (ES2), Europe's leading

*All dollar amounts are in U.S. dollars.

©1991 Dataquest Incorporated October—Reproduction Prohibited

supplier of cell-based application-specific integrated circuit (ASIC) designs, announced the formation of a joint venture company called EuCAD. The organization will specialize in R&D activities within the EDA and ASIC design markets.

Cadence licenses its products worldwide to semiconductor, systems, computer, electronics, ASIC, and telecommunications companies through a direct sales force supported by application engineers. Currently, the company has sales offices throughout Europe, Asia, the United States, and Canada. The company opened a Japanese subsidiary in early 1989, Cadence Design Systems K.K., to develop EDA products for the Japanese market and to provide postsales service and engineering support. In January 1990, the company opened a subsidiary in Korea, Cadence Korea Ltd., with the same goals as the Japanese subsidiary. To a lesser extent, Cadence also serves its international customers through manufacturer representatives and distributors.

During fiscal years 1990, 1989, and 1988, international sales accounted for 48.0, 40.0, and 36.0 percent, respectively, of total revenue, with the Asian region representing the majority of sales generated internationally.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information on revenue by distribution channel is not available. Tables 3 through 5 at the end of this backgrounder present comprehensive financial information.

BUSINESS SEGMENT STRATEGIC DIRECTION

According to Dataquest, Cadence was the top-ranked company in the worldwide integrated circuit layout software market in 1990 with a 55.7 percent market share, based on estimated revenue of $101.7 million. In the worldwide EDA software market, Dataquest estimates that Cadence ranked second in 1990, trailing only Mentor Graphics, with a 15.0 percent market share, based on estimated revenue of $173.1 million.

In order to meet the market demand for ever-shorter design times and increasingly productive design tools and environments, Cadence believes that it is necessary to offer customers integrated design solutions. Pursuant to this strategy, Cadence provides customers with its Design Framework II architecture that addresses product integration requirements and a unified set of high-performance IC and systems design layout and verification tools that address issues of design complexity, design time span, performance, and cost.

Cadence's Design Framework architecture is the foundation on which the company's software solutions are built. Cadence developed the Design Framework technology over a period of five years and has offered the technology commercially since 1985. During 1990, the company introduced Design Framework II with significantly enhanced features and usability, including the following:

- Common data model—The Design Framework architecture uses a single common data model that is specifically designed to handle the special problems of electronic design and that can be accessed quickly by all tools in the system. This approach eliminates the need to translate data when moving from tool to tool and reduces the difficulty of design data management.
- Consistent human interface—The architecture has a human interface that utilizes graphics concepts of multiple windows, pop-up menus, keyboard binding, and macro command entry, along with a full procedural input capability. All tools operating within the Design Framework system use this single human interface.
- Software portability—Cadence's interactive product families currently operate on industry standard workstations from Digital Equipment Corporation, Hewlett-Packard/Apollo, IBM Corporation, Intergraph Corporation, NEC Corporation, Sony Corporation, and Sun Microsystems Inc. Cadence believes that it is well-positioned to port its systems quickly to other UNIX-based workstations that may gain broad customer acceptance in the future.
- Open system architecture—The Design Framework architecture allows Cadence's customers to enhance and customize a Cadence tool or to couple their own tools to Cadence's system, thereby augmenting the system with specialized software capabilities. Cadence offers its own interactive extension language called SKILL.

©1991 Dataquest Incorporated October—Reproduction Prohibited

As mentioned previously, the company's software products are currently offered through four divisions, described below in greater detail.

Integrated Circuit Design Division

The Cadence IC Design Division offers a range of IC design automation tools that provide an integrated start-to-finish solution for IC design based upon the Design Framework architecture. During 1990, Cadence's IC Design Division released the Opus IC Design System based upon Design Framework II. The Opus series includes the following product series: the Virtuoso series of custom layout tools supporting polygon layout, symbolic layout, and layout synthesis; the Ensemble series providing automatic place and route for both ASIC and custom cell-based design styles; the DIVA Series of interactive verification tools; and the DRACULA series of standalone layout verification tools. For each step in the IC design process, Opus provides a complete set of tools to meet individual design tasks.

CAE Division

The Cadence CAE Division develops, markets, and supports tools for the logical design and analysis of digital electronic components and systems. Its tools form the front end for Cadence's complete front-to-back framework-based design environments for ICs, ASICs, PCBs, and systems. The division offers Compser for design entry and composition; Analyzer for graphical debug and analysis; Verilog-XL and VHDL-XL for logic simulation; Veritime for timing analysis; and Verifault-XL for fault simulation. In addition, Cadence's CAE tools support a wide range of models and modeling formats, including software models from Logic Automation, hardware models from Logic Modeling, and a comprehensive set of libraries from the leading ASIC vendors.

In early 1991, Cadence introduced HDL Synthesizer and Optimizer, logic-synthesis tools that use the Verilog Hardware Description Language. Capabilities of these products include the synthesis of designs of more than 20KB gates, one library for all verification functions, and timing-driven constraints during the design cycle. Synthesizer uses mixed-level hardware description language inputs to produce gate-level descriptions, while Optimizer optimizes the gate-level circuits produced by the Synthesizer.

Also in 1991, the company announced the XLProcessor, a two-board simulation accelerator for Sun Microsystems servers that speeds the company's Verilog-XL and VHDL-XL software simulators. Cadence characterizes the offering as the first fully integrated, mixed-level accelerator. The first version of the XLProcessor is Sun-specific, but Cadence plans to develop ports to other servers according to demand.

Analog Division

The Cadence Analog Division publicly introduced its Analog Artist Design System in November 1989. The Analog Artist Design System is the first product to serve the analog IC designer with a front-to-back design automated software solution. It provides advanced simulation, layout, and verification for the design of analog, mixed analog, and digital ICs.

In June 1991, Cadence announced the Spectre Advanced Circuit Simulator, which the company claims is the first analog circuit simulator developed that can effectively address the simulation needs of designs with more than 50,000 transistors. According to Cadence, Spectre can handle complex integrated circuits with up to 10 times the speed and equal or better accuracy over existing solutions. Spectre will be available within the Analog Artist Design System.

Systems Division and Consulting Services

The Systems Division and Consulting Services designs, markets, and supports tools for the physical design, layout, and analysis of high-speed printed circuit boards. The division's PCB design tools are fully integrated with Cadence's front-end logic design environment and are based on the company's Design Framework II architecture. Its tools include: Prance, for the layout of high-speed, multiple-layer PCB's; Thermax, a high-speed thermal analysis tool that offers 3-D modeling capabilities; design for manufacturability and design-for-test tools from AT&T, which provide a comprehensive set of manufacturing and test audits; signal integrity analysis tools from Quantic Laboratories; and a growing library of more than 25,000 PCB parts. The division also offers advanced PCB fabrication services and design centers located throughout the United States. The consulting services component of the divisional name reflects Cadence's enhanced emphasis on providing integrated electronic product development automation-related capabilities to its customers.

Further Information

For further information about the company's business segments, please contact the Dataquest CAD/CAM service.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 1
Five-Year Corporate Highlights
(Thousands of U.S. Dollars)

	1986	1987	1988	1989	1990
Five-Year Revenue	21,609.0	44,776.0	91,781.0	159,856.0	231,433.0
Percent Change	-	107.21	104.98	74.17	44.78
Capital Expenditure	2,039.0	3,380.0	9,453.0	6,504.0	22,186.0
Percent of Revenue	9.44	7.55	10.30	4.07	9.59
R&D Expenditure	9,368.0	8,935.0	15,802.0	31,061.0	42,552.0
Percent of Revenue	43.35	19.95	17.22	19.43	18.39
Number of Employees	NA	NA	433	978	1,676
Revenue ($K)/Employee	NA	NA	211.97	163.45	138.09
Net Income	(4,685.0)	6,882.0	14,720.0	26,209.0	38,007.0
Percent Change	-	246.89	113.89	78.05	45.02

1990 Fiscal Year	Q1	Q2	Q3	Q4
Quarterly Revenue	50,187	52,319	59,584	69,343
Quarterly Profit	8,361	7,850	10,525	11,271

NA = Not available

Source: Cadence Design Systems Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	67.00	56.00	64.00	60.00	52.00
Europe	22.00	18.00	11.00	11.00	15.00
Asia	11.00	26.00	25.00	29.00	33.00

Source: Cadence Design Systems Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

1990 SALES OFFICE LOCATIONS

North America—16
Europe—9
Japan—1
ROW—5

MANUFACTURING LOCATIONS

North America

San Jose, California
Carolina, Puerto Rico

SUBSIDIARIES

North America

Cadence Design Systems Ltd. (Canada)
Cadence Puerto Rico Inc. (Puerto Rico)

Europe

Cadence Design Systems AB (Sweden)
Cadence Design Systems BV (Netherlands)
Cadence Design Systems GmbH (Germany)
Cadence Design Systems Limited (United Kingdom)
Cadence Design Systems S.A. (France)
EUCAD Consulting Ltd. (United Kingdom)
European CAD Developments Limited (United Kingdom)

Japan

Cadence Design Systems K.K. (Japan)

ROW

Cadence Design Systems Asia Limited (Hong Kong)
Cadence Design Systems Ltd. (Israel)
Cadence Design Systems Private Limited (India)
Cadence Korea Ltd. (Korea)
Cadence Taiwan Inc. (Taiwan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1991

AT&T Microelectronics
Under terms of a five-year joint technology exchange and partnering agreement, Cadence will incorporate AT&T Microelectronics' design-for-test and design-for-manufacturability technology into Cadence's Prance PC-board layout tools. At the same time, AT&T will integrate Prance with its internal tool environment.

Siemens Nixdorf Informationssysteme AG
The two companies announced their intent to cooperatively develop, market, and sell EDA products and services tailored for the European market. The initial focus of this agreement will be to combine Siemens Nixdorf's EDA operations with Cadence's Central European sales and distribution organization. The resultant company, Cadence Europe GmbH, will be headquartered in Munich.

Sun Microsystems Inc.
The two companies announced that Cadence will offer the Open Look graphical user interface on Design Framework II and all framework-based EDA products shipping on Sun platforms. These include Cadence's Amadeus Systems Design Series, Opus IC Design Series, and Verilog-XL and Prance products.

SunSoft
Cadence announced support of ToolTalk, the UNIX interapplication communication technology developed by SunSoft, a subsidiary of Sun Microsystems Inc. Cadence will integrate ToolTalk into its Design Framework II architecture and its broad line of EDA tools.

1990

Cadre Technologies Inc.
Cadence and Cadre Technologies Inc. signed an agreement to jointly market hardware-software codesign solutions for builders of electronics systems. Under the agreement, Cadence and Cadre will provide integration between their technologies to allow hardware and software engineering to work together from the system level throughout the whole product development process.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Data I/O Corporation
Cadence signed an OEM agreement with Data I/O Corporation that brings programmable logic device design synthesis capability to Cadence's Amadeus Systems Design Series. The agreement gives Amadeus users access to Data I/O's ABEL PLD design software.

Digital Equipment Corporation
Cadence and Digital formed a joint development team to develop next-generation design framework technology. Under the three-year agreement, the two companies will jointly develop and extend Digital's PowerFrame product into a framework technology for the 1990s that automates the total product development process.

European Silicon Structures SA (ES2)
Cadence and ES2 announced the formation of a European joint venture company, European CAD Developments Ltd. (EuCAD), which will specialize in R&D activities within the EDA and ASIC design markets.

IBM Corporation
Cadence announced that it is porting its entire suite of EDA tools onto IBM's RISC System/6000 family of engineering workstations.

1989

Toshiba Corporation
Under terms of a technical agreement, Cadence will receive development funds from Toshiba to develop CAD software to support the design of analog integrated circuits.

NEC Corporation
NEC Corporation will market a version of Cadence's EDGE Systems, a CAD software package for use in the design of advanced PCBs. The software will be ported to the 4800 Series EWSs and the user interface rewritten to accommodate the Japanese language.

Sony Microsystems Inc.
Sony Microsystems signed an independent software vendor agreement with Cadence. Cadence will provide third-party electronic CAE software tools for use with Sony's NEWS family of UNIX workstations.

Frame Technology Corporation
Cadence increased the power and flexibility of its design automation system by integrating Frame Technology's computer-publishing software, called FrameMaker.

1988

Mitsubishi Electric Corporation
Cadence and Mitsubishi Electric signed an agreement to cooperate in the development of a CAD system. The following are the terms of the agreement: The firms will jointly develop CAD software that will be used in an integrated large-scale integration design system to be developed later; they will modify Cadence's CAD software to run on Mitsubishi's EWS; Mitsubishi will receive interfacing data to connect CAD systems developed by Mitsubishi and Cadence; Mitsubishi will send its engineers to Cadence to receive technical information; and Mitsubishi will provide Cadence with material on which Cadence can test its CAD software.

MERGERS AND ACQUISITIONS

1990

Automated Systems Inc. (ASI)
Cadence acquired all of the outstanding stock of ASI in exchange for approximately 975,000 shares of Cadence's common stock. ASI was involved in the design and fabrication of sophisticated PCBs and the licensing and leasing of its proprietary design software.

1989

Gateway Design Automation Corporation
Cadence acquired all of the outstanding common and convertible preferred stock of Gateway Design Automation Corporation in exchange for approximately 4,000,000 shares of Cadence's common stock. Gateway was involved in the development, marketing, and support of high-performance CAE software simulation and analysis products.

Tangent Systems Corporation
Cadence acquired all of the outstanding stock of Tangent Systems in exchange for 1,600,000 shares of Cadence's common stock. Tangent had been involved in the development, marketing, and support of CAD software products for the automated design of ICs.

KEY OFFICERS

Joseph B. Costello
President and chief executive officer

©1991 Dataquest Incorporated October—Reproduction Prohibited

Robert T. Jolls
Executive vice president, Marketing

Leonard J. LeBlanc
Executive vice president, Finance and Administration, and chief financial officer

Michael N. Schuh
Executive vice president, Sales

Prabhu Goel
President, Computer-Aided Engineering Division

Michael D. Lack
President, Integrated Circuit Design Division

Jeffrey A. Miller
President, Systems Division and Consulting Services

James E. Solomon
President, Analog Division

Manny Correia
Vice president, Operations

Robert F. Donohue
Vice president and general counsel

Aki Fujimura
Vice president, Central Engineering

Min-Yu Hsueh
Vice president, Cadence Labs

Scott W. Sherwood
Vice president, Human Resources

Tony Zingale
Vice president, Corporate Marketing

PRINCIPAL INVESTORS

Gilder, Gadnon, Howe & Co.—6.2 percent
Investment Advisors Inc.—5.2 percent

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 4
Balance Sheet
Fiscal Year Ending in December
(Thousands of U.S. Dollars)

Balance Sheet	1987	1988	1989	1990
Cash	16,636.0	28,397.0	42,564.0	61,383.0
Receivables	11,979.0	21,272.0	44,020.0	64,963.0
Marketable Securities	6,946.0	12,650.0	21,750.0	29,806.0
Inventory	-	-	1,868.0	1,576.0
Other Current Assets	885.0	1,887.0	5,567.0	8,486.0
Total Current Assets	36,446.0	64,206.0	115,769.0	166,214.0
Net Property, Plants	7,897.0	13,937.0	26,990.0	39,346.0
Other Assets	7,092.0	7,273.0	27,883.0	28,140.0
Total Assets	51,435.0	85,416.0	170,642.0	233,700.0
Total Current Liabilities	12,373.0	23,717.0	42,777.0	58,145.0
Long-Term Debt	2,914.0	2,246.0	9,955.0	7,919.0
Other Liabilities	2,003.0	1,413.0	6,182.0	9,382.0
Total Liabilities	17,290.0	27,376.0	58,914.0	75,446.0
Converted Preferred Stock	NA	NA	NA	-
Common Stock	206.0	249.0	287.0	299.0
Other Equity	40,824.0	46,283.0	70,787.0	79,294.0
Retained Earnings	(6,885.0)	11,508.0	40,654.0	78,661.0
Total Shareholders' Equity	34,145.0	58,040.0	111,728.0	158,254.0
Total Liabilities and Shareholders' Equity	51,435.0	85,416.0	170,642.0	233,700.0

Source: Cadence Design Systems Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 5
Consolidated Income Statement
Fiscal Year Ending in December
(Thousands of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1986	1987	1988	1989	1990
Revenue	21,609.0	44,776.0	91,781.0	159,856.0	231,433.0
U.S. Revenue	14,532.0	25,022.0	58,770.0	95,357.0	119,130.0
Non-U.S. Revenue	7,077.0	19,754.0	33,011.0	64,499.0	112,303.0
Cost of Sales	3,621.0	5,198.0	19,028.0	31,012.0	41,311.0
R&D Expense	9,368.0	8,935.0	15,802.0	31,061.0	42,552.0
SG&A Expense	12,500.0	20,589.0	35,055.0	58,608.0	94,970.0
Capital Expense	2,039.0	3,380.0	9,453.0	6,504.0	22,186.0
Pretax Income	(3,880.0)	10,020.0	21,480.0	40,821.0	56,306.0
Pretax Margin (%)	(17.96)	22.38	23.40	25.54	24.33
Effective Tax Rate (%)	NA	39.00	31.50	35.80	32.50
Net Income	(4,685.0)	6,882.0	14,720.0	26,209.0	38,007.0
Shares Outstanding, Thousands	16,464	24,723	27,840	30,991	31,910
Per Share Data					
Earnings	(0.17)	0.26	0.53	0.85	1.19
Dividend	NA	NA	NA	NA	NA
Book Value	NA	NA	2.08	3.61	4.96

NA = Not available

Source: Cadence Design Systems Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 6
Key Financial Ratios
Fiscal Year Ending in December

Key Financial Ratios	1986	1987	1988	1989	1990
Liquidity					
Current (Times)	NA	2.95	2.71	2.71	2.86
Fixed Assets/Equity (%)	NA	150.64	147.17	152.73	147.67
Current Liabilities/Equity (%)	NA	36.24	40.86	38.29	36.74
Total Liabilities/Equity (%)	NA	50.64	47.17	52.73	47.67
Profitability (%)					
Return on Assets	NA	13.38	17.23	15.36	16.26
Return on Equity	NA	20.16	25.36	23.46	24.02
Profit Margin	(21.68)	15.37	16.04	16.40	16.42
Other Key Ratios					
R&D Spending % of Revenue	43.35	19.95	17.22	19.43	18.39
Capital Spending % of Revenue	9.44	7.55	10.30	4.07	9.59
Employees	NA	NA	433	978	1,676
Revenue ($K)/Employee	NA	NA	211.97	163.45	138.09
Capital Spending % of Assets	NA	6.57	11.07	3.81	9.49

NA = Not available

Source: Cadence Design Systems Inc
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Compaq Computer Corporation

20555 FM 149
Houston, Texas 77070
Telephone: (713) 370-0670
Fax: (713) 374-1740
Dun's Number: 00-389-7733

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Since its inception in 1982, Compaq Computer Corporation has been a world leader in the manufacturing and marketing of industry standard desktop, laptop, notebook, and portable personal computers and PC systems. Compaq was the first company in history to achieve Fortune 500 status in less than four years, reaching that plateau in 1985. The company surpassed $1 billion in annual sales in 1987, just five years after the initial shipments of its first personal computer. Compaq has established a strong presence in nearly all aspects of the personal computer market. Dataquest estimates that Compaq was the fourth largest worldwide PC manufacturer in 1990, with a 5.70 percent market share and $2.8 billion in PC factory revenue.

With low-end PC sales slowing, Compaq believes that its future lies in the high-end systems market. Dataquest estimates that worldwide shipments of PCs will grow about 10 percent in 1991, with the largest increase expected in Western Europe, where shipments are expected to increase by 15 percent in 1991. Dataquest estimates that over the next five years the worldwide market will increase by 15 percent. Compaq expects to run slightly ahead of these estimates, as a result of its concentration in high-growth PC markets such as 486-based products and notebook computers.

Originally, Compaq focused efforts on the portable computers market. Currently, the company offers a full line of personal computers, including desktop, notebook, laptop, portable, and PC systems such as the Systempro. Traditionally, Compaq has concentrated on the high-performance end of the market, aiming at business and professional users. The company's strategy requires it to continue to introduce new products that offer technological advances and convenient features beyond those of its competitors. Although the company seeks an appropriate balance between price and performance, it believes that its products' performance features are a more important factor than price in purchase decisions of its target market.

Compaq is unusual in that the company sells its products primarily through independent, full-service computer specialty dealers for resale to end users. The company provides training and support programs to over 3,000 authorized dealers in 66 countries. As a result of the increasingly complex and sophisticated nature of the Compaq product line, the company has expanded its dealer support programs. Under the SalesPaq program, Compaq has included incentives for resellers to participate in advanced technical training programs to improve service capabilities. In response, Compaq resellers have enhanced their level of service, employing approximately 3,500 systems engineers and 10,000 service technicians to support new product sales. The company has also started an Accredited Systems Engineer program for dealers to have their systems engineers accredited with advanced systems integration knowledge of the Systempro and Banyon Vines, Microsoft LAN Manager, Novell Netware, and SCO UNIX. In addition, Compaq has opened a service and repair center in Stirling, Scotland, to support its European market base.

Compaq reported another record year in fiscal 1990, as sales revenue topped $3 billion for the first time at $3.6 billion. This figure represents a 25.1 percent increase over the 1989 sales total of $2.9 billion. Compaq recorded its first-ever billion dollar quarter in the fourth quarter of 1990, with sales revenue totaling $1.0 billion. Net income also reached a record total in 1990, increasing 36.5 percent to $454.9 million.

Compaq's solid growth in fiscal 1990 was a direct result of an impressive surge in international sales.

©1991 Dataquest Incorporated October—Reproduction Prohibited

For the first time ever, international sales accounted for the majority of Compaq's sales revenue, at 54 percent of total revenue. International sales increased 49 percent in 1990 to $1.9 billion, compared to a modest 6 percent growth in North American sales to $1.7 billion. With the continued stagnant economic activity in North America and the growing demand and healthy international economies of international markets, Compaq anticipates that the trend toward higher international sales will continue in 1991 and beyond. The unification of the European economic markets in 1992 is also expected to have a significant positive effect on overseas growth. The company is well-positioned to meet the challenges of these international markets, with authorized sales representatives in 66 countries.

Research and development costs increased 40.2 percent in 1990 to $185.7 million, representing 5.2 percent of total sales. This increased focus on R&D resulted in the release of nine new products in 1990, with new desktop, laptop, and notebook PC systems entries. Capital expenses totaled $324.9 million in 1990, representing 9.03 percent of total revenue. At the end of 1990, Compaq employed 11,600 people.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information on revenue by distribution channel is not available. Tables 3 through 5, at the end of this backgrounder, present comprehensive financial information.

BUSINESS SEGMENT STRATEGIC DIRECTION

Compaq's products consist of desktop, notebook, portable, and laptop personal computers and PC systems. These computers incorporate microprocessors developed by Intel Corporation. The first Compaq computer was a portable model based on the Intel 8088 microprocessor. With each subsequent microprocessor family—the 8086, 80286, 80386, 80386SX, and 80486—Compaq has added increased performance to its products while maintaining compatibility with its earlier models. In keeping with its commitment to industry standards, Compaq has been a leader in supporting the Extended Industry Standard Architecture (EISA), which is used to accommodate high-performance 32-bit expansion boards.

Desktop Computers

In 1990, desktop products continued to provide the bulk of Compaq's sales revenue, as well as 85 percent of worldwide PC sales. Product offerings in the desktop line include the Deskpro 286, 386, and 486 series, as well as the Systempro series of advanced PC servers. Compaq segments its desktop product line into four categories: low profile desktops, small desktops, fully expandable desktops, and PC systems.

Compaq's line of low profile desktop computers includes the Deskpro 286N and Deskpro 386N, both of which were introduced in 1990. The 286N and 386N are designed for both standalone and connected environments, with primary applications in word processing, spreadsheets, project management, electronic mail, and order entry. The 286N features a 16-bit Intel 80286 microprocessor running at 12 MHz, while the 386N utilizes a 32-bit or 16-bit Intel 80386SX microprocessor running at 16 MHz. Standard storage options for both computers include a 1.44MB, 3.5-inch flexible disk drive, a 1.2MB, 5.25-inch flexible disk drive, and a 40MB fixed disk drive. Both systems run numerous operating systems including MS-DOS, OS/2, Microsoft Windows, Novell Netware, and SCO XENIX. The improved performance of the 386N allows it to run the SCO UNIX System and Microsoft LAN Manager as well.

In the area of small desktop computers, Compaq offers the Deskpro 386s, the Deskpro 386s/20, the Deskpro 386/20e, and the Deskpro 386/25e. The 386s and 386s/20 are designed for the general business user with requirements in word processing, spreadsheets, or other simpler business applications. Both computers use a 32-bit or 16-bit Intel 80386SX microprocessor and have 2MB of standard memory. The 386s runs at 16 MHz and has a storage capacity of 1.2GB, while the 386s/20 runs at 20 MHz with a storage capacity of 2.6GB. The 386/20e and 386/25e are more advanced systems designed for financial analysis, database management, and CAD/CAE, as well as for simpler functions such as spreadsheets and project management. The 386/20e contains a 32-bit Intel 80386 microprocessor that runs at 20 MHz, while the 386/25e contains a 32-bit 80386 that runs at 25 MHz.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Compaq's line of fully expandable desktop computers includes the Deskpro 386/33L, the Deskpro 486/25, the Deskpro 486/33L, and the Deskpro 486/50L. These models are designed for maximum desktop CPU performance; typical applications include 3-D CAD/CAE, software development, database management, financial modeling, and scientific analysis. The 486 models use Intel's 80486 microprocessor, and run at 25 MHz, 33 MHz, and 50 MHz, respectively, with all three models offering 128K caches. All three models offer enhanced storage capabilities, with 120MB, 320MB, or 650MB standard fixed disk drives and a storage capacity of 2.6GB. The newest model, the 486/50L, offers an EISA expansion bus, support for seven internal mass storage devices, 8MB of standard internal memory with expansion capabilities to 104MB, advanced VGA graphics, and a 256KB second-level write-back memory cache.

In addition to individual desktop computers, Compaq offers its Systempro advanced server for the PC market. Designed for demanding connected-user environments, the Systempro can act as a network server or a multiuser host for 386- or 486-based systems. Primary applications include network resourcing and information sharing, distributed client-server applications, and multiuser UNIX applications. The Systempro is available in 33-MHz 386 and 33-MHz 486 models, with 4.28GB of storage capacity in either model.

Compaq's full desktop line has been extremely successful in the worldwide PC marketplace. By Dataquest estimates, Compaq ranks fourth in the 1990 overall desktop PC market with $2.07 million in factory revenue, garnering a 6.51 percent market share. Dataquest estimates that Compaq ranks third in worldwide revenue for 80286-based computers and 80386SX-based computers, with respective market shares of 6.10 percent and 6.40 percent. Compaq also ranks second in the 80486-based computer market with an 11.44 percent market share, and the Desktop 486/25 computer ranked as the top 486 model in 1990, possessing a 6.10 percent market share based on $145.8 million in factory revenue.

Notebook Computers

According to Dataquest, Compaq has been the industry leader in the two-year old notebook market. The notebook computers offer many of the same features as standard desktops, with the flexibility of easy portability. Applications for notebook computers include spreadsheets, word processing, data collection, sales automation, and communications. These computers typically are the size of an 8.5in. × 11in. piece of paper, with a height of about 2in. and a weight of about 7lb. Compaq has a full line of notebook computers, ranging from models based on the 80C80 microprocessor to innovative new models based on the 386SX microprocessor.

In late 1990, Compaq released its latest notebook offering, the LTE 386s/20, a 7.5lb. computer that is the company's first 386-based notebook offering. The LTE 386s/20 offers increased memory and storage capacities, with 2MB of standard memory and a storage capacity of 60MB. The 386s/20 contains a 32-bit 386SX Intel microprocessor that runs at 20 MHz and runs such operating systems as MS-DOS, OS/2, Microsoft Windows, SCO UNIX System V/386, and SCO XENIX 386.

Dataquest estimates that Compaq is the market leader in notebook computers, with a 48.27 percent market share in 1990, based on factory revenue of $400.1 million. The Compaq LTE/286 was the top model in 1990, with $330.0 million in revenue and a 39.81 percent market share. Compaq has dominated the two-year-old notebook market, but recent releases by Hewlett-Packard Company and Texas Instruments Inc. are likely to cut into Compaq's market share and reduce Compaq's dominance in the market. Dataquest estimates that the notebook PC market will increase by 44 percent in 1991, so the notebook market will remain an important source of revenue for Compaq.

Laptop Computers

Compaq's two offerings in the laptop market, the SLT/286 and the SLT 386s/20, offer expanded features such as VGA graphics, expansion slots, full-size detachable keyboards, 3.5in. flexible disk drives, and 60MB or 120MB fixed disk drives. Weighing roughly 14lb., the SLT models measure approximately 13.5in. × 8.5in. × 4.2in. Applications include financial analysis, database management, graphics-based applications, and project management.

Dataquest estimates that Compaq ranks fourth in the laptop D/C market with a 6.73 percent market share and $265.0 million in factory revenue.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Portable Computers

Compaq's line of portable computers offers full desktop functionality in a portable computer. The Portable III runs a 12-MHz, 16-bit 80286 microprocessor with 40MB of mass storage, while the Portable 386 runs a 20-MHz, 32-bit 80386 microprocessor with a 110MB storage capacity.

By Dataquest estimates, Compaq held a 6.93 percent market share in the 1990 worldwide transportable computer market, ranking them third in the market.

Further Information

For further information about the company's business segments, please contact the appropriate Dataquest industry service.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 1
Five-Year Corporate Highlights (Thousands of U.S. Dollars)

	1986	1987	1988	1989	1990
Five-Year Revenue	620,138	1,224.100	2,065.483	2,876,062	3,598,768
Percent Change	23.07	97.39	68.73	39.24	25.13
Capital Expenditure	50,402	104,393	272,661	367,151	324,859
Percent of Revenue	8.13	8.53	13.20	12.77	9.03
R&D Expenditure	26,594	47,104	74,859	132,474	185,726
Percent of Revenue	4.29	3.85	3.62	4.61	5.16
Number of Employees	2,200	6,900	8,000	9,700	11,600
Revenue ($K)/Employee	281.88	177.41	258.19	296.50	310.24
Net Income	42,897	136,267	255,242	333,300	454,910
Percent Change	61.30	217.66	87.31	30.58	36.49

1990 Fiscal Year	Q1	Q2	Q3	Q4
Quarterly Revenue	872,153	862,163	862,960	1,001,492
Quarterly Profit	92,172	104,277	123,635	134,826

Source: Compaq Computer Corporation
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	81.00	74.00	61.40	55.00	46.00
Europe	17.50	23.80	35.60	41.80	50.00
All Others	1.50	2.20	3.00	3.20	4.00

Source: Compaq Computer Corporation
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

1990 SALES OFFICE LOCATIONS

North America—56
International—38

MANUFACTURING LOCATIONS

North America

Houston, Texas
Personal computers, surface-mount printed circuit boards

Europe

Erskine, Scotland
Personal computers

Asia/Pacific

Singapore
Printed circuit boards

SUBSIDIARIES

North America

Compaq Canada Inc./Ubciroiree D/B/A Compaq Canada Inc. (Canada)
Compaq Finance Corp. Ltd. (United States)
Compaq Foreign Sales Corp. (United States)
Compaq International Corp. (United States)
Compaq Telecommunication Corp. (United States)

Europe

Compaq Computer AB
Compaq Computer AG (Switzerland)
Compaq Computer A.S. (Denmark)
Compaq Computer B.V. (Netherlands)
Compaq Computer Gesselschaft MbH (Austria)
Compaq Computer GmbH (Germany)
Compaq Computer Group Ltd. (United Kingdom)
Compaq Computer Ltd. (United Kingdom)
Compaq Computer Manufacturing Ltd. (United Kingdom)
Compaq Computer Norway A.S. (Norway)
Compaq Computer N.V./S.A. (Belgium)
Compaq Computer OY (Finland)
Compaq Computer S.A. (Spain)
Compaq Computer S.A.R.L. (France)
Compaq Computer S.p.A. (Italy)
Compaq Scandinavia AB (Sweden)
Deskpro Computer AB (Sweden)

Asia/Pacific

CCA Systems Pty. Ltd. (Australia)
Compaq Computer Asia Pte. Ltd. (Singapore)
Compaq Computer Holding Pte. Ltd. (Singapore)
Compaq Computer Hong Kong Ltd. (Taiwan)
Compaq Computer New Zealand Ltd. (New Zealand)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1991

Advanced Computing Environment (ACE)
Compaq and 20 other companies (The Acer Group, Control Data Corporation, Digital Equipment Corporation, Kubota Computer Inc., Microsoft Corporation, MIPS Computer Systems Inc., NEC Corporation, NKK Corporation, Olivetti Systems and Networks, Prime Computer Inc., Pyramid Technology Corporation, The Santa Cruz Operation Inc., Siemens AG/Automation, Siemens/Nixdorf Informationssysteme AG, Silicon Graphics Computer Systems, Sony Corporation, Sumitomo Electric Industries Ltd., Tandem Computers Inc., Wang Laboratories Inc., and Zenith Data Systems) announced their commitment to a nonproprietary, standards-based advanced computing environment.

Microsoft Corporation
Compaq and Microsoft signed an integration agreement including technology transfer, joint development, and joint marketing of future products. Similar agreements were signed with Novell and SCO, linking all four companies.

Novell Inc.
Compaq and Novell signed an integration agreement including technology transfer, joint development, and joint marketing of future products. Similar agreements were signed with Microsoft and SCO, linking all four companies.

The Santa Cruz Operation Inc. (SCO)
Compaq and SCO signed an integration agreement including technology transfer, joint development, and joint marketing of future products. Similar agreements were signed with Microsoft and Novell, linking all four companies.

©1991 Dataquest Incorporated October—Reproduction Prohibited

1990

Banyan Systems, Inc.
The two companies signed a joint integration agreement to further their ongoing efforts to provide multivendor PC-based solutions.

Businessland Inc.
Compaq authorized Businessland to sell and service Compaq products throughout the United States.

Novell Inc.
In February, Compaq entered into a technology development agreement with Novell Inc. to apply resources of both companies toward the enhancement of network systems fault tolerance. The purpose of the joint effort is to develop products that take advantage of Novell's system fault tolerance and Compaq's multiprocessing technology to improve reliability for PC-based networks.

1989

IBM Corporation
Both companies signed a patent cross-licensing agreement in which both companies granted to one another a worldwide, nonexclusive license covering patents having an effective filing date before July 1, 1993.

1988

Digital Equipment Corporation
The company signed a technology exchange agreement to ensure connectivity of their products. In addition, Digital will provide support for Compaq personal computers on DECnet/OSI networks.

EISA
On September 13, Compaq and eight other personal computer manufacturers entered into EISA Patent License Agreements that cover worldwide patent rights filed prior to October 1995 associated with the EISA I/O subsystems ("EISA Patents"). The list of companies involved in the "EISA Alliance" has since grown to include over 60 manufacturers of personal computers and related products.

Microsoft Corporation
Compaq has nonexclusive licenses from Microsoft for the MS-DOS and MS OS/2 operating systems, Microsoft GW-Basic computer language, and other Microsoft software.

MERGERS AND ACQUISITIONS

1991

Silicon Graphics Computer Systems
Compaq purchased a 12 percent equity share in Silicon Graphics for $135 million. Compaq and Silicon Graphics also signed an agreement that included a technology exchange, a technical development program, and $50 million that Compaq will give to Silicon Graphics for R&D.

KEY OFFICERS

Joseph R. Canion
President and chief executive officer

Eckhard Pfeiffer
Executive vice president and chief operating officer

B. Kevin Ellington
Senior vice president, International Market Development

Wilson D. Fargo
Senior vice president, general counsel, and secretary

C. Murray Francois
Senior vice president, Corporate Quality and Materials

James M. Harris
Senior vice president, Engineering

Robert E. Vieau
Senior vice president, Corporate Manufacturing

Gary Stimac
Senior vice president, Systems Engineering

Robert E. Vieau
Senior vice president, Corporate Manufacturing

Daryl J. White
Senior vice president, Finance, and chief financial officer

©1991 Dataquest Incorporated October—Reproduction Prohibited

PRINCIPAL INVESTORS

Lazard Freres and Co.
Kleiner Perkins et al.
Sevin L J et al.

FOUNDERS

Rod Canion
James M. Harris
William F. Murtro
Seven other former Texas Instruments employees

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 3
Balance Sheet
Fiscal Year Ending December 31
(Thousands of U.S. Dollars)

Balance Sheet	1986	1987	1988	1989	1990
Cash	57,133	132,276	281,179	161,313	434,700
Receivables	116,490	254,596	428,338	530,228	626,548
Inventory	81,190	275,988	386,973	559,042	543,630
Other Current Assets	4,966	17,963	18,152	61,916	83,054
Investments in Affiliated Companies	9,535	18,896	35,731	58,671	123,502
Total Current Assets	259,779	680,828	1,114,642	1,312,499	1,687,936
Net Property, Plants	101,975	192,271	428,937	705,475	892,132
Other Assets	6,392	9,040	10,687	13,742	13,963
Total Assets	377,681	901,030	1,589,997	2,090,387	2,717,529
Total Current Liabilities	118,837	342,558	479,847	563,448	643,033
Long-Term Debt	72,809	148,915	274,930	274,434	73,996
Other Liabilities	2,733	10,025	20,666	80,872	141,487
Total Liabilities	194,379	501,498	775,443	918,754	858,516
Converted Preferred Stock	0	0	0	0	0
Common Stock	270	342	385	393	861
Other Equity	100,572	180,463	340,200	363,973	595,973
Retained Earnings	82,460	218,727	473,969	807,269	1,262,179
Total Shareholders' Equity	183,302	399,532	814,554	1,171,635	1,859,013
Total Liabilities and Shareholders' Equity	377,681	901,030	1,589,997	2,090,389	2,717,529

Source: Compaq Computer Corporation
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 4
Consolidated Income Statement
Fiscal Year Ending December 31
(Thousands of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1986	1987	1988	1989	1990
Revenue	620,138	1,224,100	2,065.423	2,876,062	3,598,768
U.S. Revenue*	502,312	905,834	1,268.2	1,581,834	1,657,640
Non-U.S. Revenue	117,826	318,266	797,283	1,294,228	1,941,128
Cost of Sales	360,698	717,336	1,233.3	1,715,243	2,057,886
R&D Expense	26,594	47,104	74,859	132,474	185,726
SG&A Expense	152,043	225,996	397,363	538,721	706,060
Capital Expense	50,402	104,393	272,661	367,151	324,859
Pretax Income	76,536	228,065	366,847	484,539	641,433
Pretax Margin (%)	12.34	18.63	17.76	16.85	17.82
Effective Tax Rate (%)	41.70	40.70	32.50	34.10	33.70
Net Income	42,897	136,267	255,242	333,300	454,910
Shares Outstanding, Millions	54.09	68.34	77.10	78.55	86.09
Per Share Data					
Earnings	0.67	1.80	3.15	3.89	5.14
Dividend	0	0	0	0	0
Book Value	3.39	5.85	10.57	14.92	21.59

*U.S. revenue should be read as North American revenue. It includes data for the United States and Canada.

Source: Compaq Computer Corporation Annual Reports and Forms 10-K Dataquest (October 1991)

Table 5
Key Financial Ratios
Fiscal Year Ending December 31

Key Financial Ratios	1986	1987	1988	1989	1990
Liquidity					
Current (Times)	2.19	1.99	2.32	2.33	2.62
Total Assets/Equity (%)	206.04	225.52	195.20	178.42	146.18
Current Liabilities/Equity (%)	64.83	85.74	58.91	48.09	34.59
Total Liabilities/Equity (%)	106.04	125.52	95.20	78.42	46.18
Profitability (%)					
Return on Assets	11.36	15.12	16.05	15.94	16.74
Return on Equity	23.40	34.11	31.34	28.45	24.47
Profit Margin	6.92	11.13	12.36	11.59	11.59
Other Key Ratios					
R&D Spending % of Revenue	4.29	3.85	3.62	4.61	5.16
Capital Spending % of Revenue	8.13	8.53	13.20	12.77	9.03
Employees	2,200	6,900	8,000	9,700	11,600
Revenue ($K)/Employee	281.88	177.41	258.19	296.5	310.24
Capital Spending % of Assets	13.35	11.59	17.15	17.56	11.95

Source: Compaq Computer Corporation Annual Reports and Forms 10-K Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Fujitsu Limited

6-1, Marunouchi 1-chome
Chiyoda-ku, Tokyo 100, Japan
Telephone: 03-3216-3211
Fax: 03-3216-9365
Dun's Number: 08-292-1644

Date Founded: 1935

CORPORATE STRATEGIC DIRECTION

Fujitsu Limited, founded in 1935 as a spin-off of the Communications Division of Fuji Electric Company Ltd., is a multinational Japanese firm. Fujitsu designs, manufactures, and markets computers and information processing systems, telecommunications equipment, and electronic devices. To organize and unify such a diverse product offering, Fujitsu has segmented its corporate structure into the above-mentioned main divisions, as well as a category called "Other Operations," which includes electronic products such as car stereos, CD players, and digital audiotape players.

Although worldwide economic growth was slower than expected because of the Gulf War and a slowdown in U.S. and European economies, Fujitsu experienced a significant growth in business. The company had an increase of almost 18 percent in total revenue from $17.8 billion* in fiscal year 1990 to $21.0 billion in fiscal 1991. To achieve this growth, Fujitsu, as a total systems supplier, endeavored to offer a wide range of products from large-scale systems to personal equipment.

Almost 70 percent of Fujitsu's revenue was derived from the Computers and Information Processing Systems Division. The greatest focus in this division was on M Series general-purpose computers, UNIX open systems, and advanced value-added software services. Also showing considerable growth was the demand for office machines and personal equipment.

In the telecommunications field, Fujitsu supplied synchronous digital hierarchy (SDH) equipment to Nippon Telegraph and Telephone Corporation (NTT) in Japan and pioneered synchronous optical transmission (SONET) systems in the United States. In addition, the optical submarine cable system between the United Kingdom and Germany came nearer to completion, while the system between Japan and the United States went into operation.

Since the 1Mb DRAM market remained depressed in the world marketplace, business in electronic devices was difficult. Fujitsu, however, expanded the sales of its products in ASICs, microprocessors, and compound semiconductors.

According to Fujitsu, significant changes are occurring in the industry in downsizing, networks, and open systems. The company believes that these changes will define the technology that will be developed in the 1990s. Although downsizing has reduced their size and weight, products are being created with greater power and performance.

Fujitsu has continued to develop products that directly support International Service Digital Network (ISDN) and to offer Corporate Information Network System (COINS), which can be tailored to meet individual company needs. In addition, Fujitsu announced Multi-environment Information Systems Solution by Domain Concept (MISSION/DC), a domain-based mainframe concept that gives users the flexibility necessary to structure the systems they need. Fujitsu also announced a new approach to network system construction that offers a user-friendly connection to Fujitsu mainframes from workstations and PCs. This product is called MESSAGE 90s.

In the field of open systems, Fujitsu is promoting worldwide standardization of the UNIX operating system across industries, offering a full lineup of UNIX products from workstations to supercomputers. The company also developed the first operating system for mainframes and supercomputers to use UNIX System V Release 4. Other computers across the

*All dollar amounts are in U.S. dollars.

©1991 Dataquest Incorporated December—Reproduction Prohibited

Fujitsu product line will be developed to run under this operating system.

In 1990, Fujitsu took a major step toward increasing its global presence by acquiring an 80 percent share in ICL plc, a computer unit of STC plc. In January 1991, as the first joint project between the two companies, Fujitsu began the marketing of DS/90 UNIX server systems, developed by ICL and distributed through Fujitsu's overseas marketing network.

Research and development costs were 11.1 percent of revenue in fiscal 1991. This increase represents $2.3 billion as compared to $2.1 billion for 1990. R&D continues to be an important part of Fujitsu's future strategy. During fiscal 1991, the R&D funds were used to maintain the company's position as a pioneer in the competitive field of electronics. Future R&D products produced by Fujitsu will be more powerful and targeted at customer networks, especially at the low end such as hand-held PCs and cellular telephones.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information on revenue by distribution channel is not available. Tables 3 through 7, at the end of this backgrounder, present comprehensive financial information.

BUSINESS SEGMENT STRATEGIC DIRECTION

Computers and Data Processing

The Computers and Information Processing Systems Division's net sales increased approximately 23.1 percent to $14.6 billion in fiscal 1991, accounting for 69 percent of the company's total net sales. This increase was mainly due to well-received mainframe systems, including the new M-1800 group of very-large-scale general-purpose computers, and to the strong performance of office machines and personal equipment in the domestic market, as well as the contribution of ICL.

Computer Systems

Within the computer systems product line, Fujitsu offers products from supercomputers to general-purpose computers. In August 1991, Fujitsu introduced two new models of the VP2000 Series supercomputers. The new systems, the VP2400/40 and VP2200/40, feature a four-scalar processor, two-vector processor configuration, which enables enhanced high-speed program processing.

In September 1990, Fujitsu announced the M-1800 Model Group of large-scale computers, which consists of five models. This was the first product introduction within the framework of MISSION/DC. Fujitsu plans to have the MISSION/DC be a major influence on its future product introductions.

According to Dataquest, in the worldwide business supercomputer market, Fujitsu ranks first with a 56.03 percent market share for 1990; in the worldwide technical supercomputer market, it ranks fourth with a 9.39 percent market share. In the worldwide business mainframe market, Fujitsu ranks fourth, with a 5.01 percent market share. In the worldwide technical mainframe market, it also ranks fourth with a 7.44 percent market share. Finally, in the worldwide business midrange market, Fujitsu ranks fifth with 5.56 percent of the market share.

Office Automation

Within the office automation product line, Fujitsu offers small business computers, workstations, word processors, and personal computers, including business, hypermedia, desktop, portable, and laptop. In the worldwide personal computer market, including desktop, portable, laptop, and notebooks, Fujitsu had less than 1 percent of the market share in each of these categories.

VAN Services

Within the VAN services product line, Fujitsu offers industry VANs, local VANs, corporate VANs, and personal communications services. During fiscal 1991, Fujitsu expanded the FENICS VAN service network, enhanced database services, and started FENICS-INS packet-switched services. To respond to the expansion of international VAN services in Asia, Fujitsu started a data switching service between Japan and Singapore. In addition, the NIFTY-Serve personal computer communications service was expanded to include English-to-Japanese machine translation, electronic mail, facsimile, and other services. As of March 31, 1991, this service has more than 260,000 subscribers.

Computer Storage

Fujitsu built its reputation in the rigid disk drive market with solutions for high-end computers. The

©1991 Dataquest Incorporated December—Reproduction Prohibited

company produces rigid disk drives in a variety of sizes from 2.5-inch to 14-inch. According to Dataquest, during 1990 Fujitsu ranked eighth in the worldwide overall total rigid disk drive market with a 2.9 percent market share. In the 8- to 14-inch worldwide rigid disk drive market, it ranked fourth with a 13.8 percent market share.

In September 1990, Fujitsu announced the M2671P, an 8-inch disk drive that provides 2.6GB of storage and offers a data transfer rate of 4.78 MB/sec. and a seek time of less than 12ms.

In September 1991, Fujitsu introduced a line of high-capacity, low-profile, 2.5-inch rigid disk drives. This product line consists of three disk drives all backed by a 150,000 hour mean time between failures rating, a comprehensive warranty program, and capacities of 45MB, 67MB, and 90MB. All four drives feature an average seek time of 18ms, burst data transfer rates of up to 6 MB/sec., and an average latency of 8.3ms.

Fujitsu also produces tape drives in 1/2-inch reel-to-reel, start-stop, and streaming. During calendar 1990, according to Dataquest, Fujitsu ranked fourth in the 1/2-inch worldwide tape drive market with a 9.0 percent market share. It also ranked fifth in the 1/2-inch worldwide reel-to-reel worldwide tape drive market with a 7.3 percent market share.

Electronic Printers

The company manufactures and markets line-impacted, fully formed printers, serial impact dot matrix printers, baud printers, and laser printers. According to Dataquest, during 1990 the company had less than 1 percent of the total worldwide printer market.

Software

Within the software product line, Fujitsu offers operating system software, application software, translation support systems, and architectures. In May 1991, MESSAGE 90s was introduced as a new approach to system construction. Its function is to help organizations process information effectively and set up systems quickly through linked software products. This product line allows the use of hardware and software from other vendors to be used in Fujitsu systems. For example, NEC or IBM PCs can run LOTUS 1-2-3 seamlessly in a Fujitsu-based network.

During fiscal 1991, Fujitsu strengthened System Development Architecture and Support facilities, with the SDEM90 standard method of system development and the C-NAP II/CASE technical support tool for analyzing system requirements. Also, to expand the computer-integrated manufacturing business, the company started consulting and basic planning services to support system structuring in the fields of production and product distribution.

Telecommunications

The Telecommunications Division's product line is ISDN systems, COINS, mobile communication, switching systems, and transmission systems. In fiscal 1991, the division recorded net sales of $3.1 billion, an increase of approximately 13 percent over fiscal 1990. Net sales of the division accounted for 15 percent of total net sales.

ISDN

NTT's new ISDN service INS net 64/1500 is achieving acceptance, and many users are applying the network to fit their applications. In fiscal 1991, the packet communications mode in INS net was approved and the new INS-P service was started. In addition, demand increased for the ISDN-compatible systems, which support the entire scope of these ISDN services.

COINS

COINS is a corporate information network system that is receiving significant interest from companies as a multimedia network with excellent economy and extendability. It integrates data, voice, and images. By the end of March 1991, Fujitsu had strengthened COINS to implement ISDN communications forms by adding 1.5Mb line-switching and packet-switching functions to conventional private ISDN functions.

Mobile Communication

Demand increased sharply for small, lightweight cellular telephones in the field of mobile communication. NTT is promoting development of very small and lightweight cellular telephones. Fujitsu is participating in this development under contract with NTT. In the U.S. cellular telephone handset market, Fujitsu ranked sixth with a 7.2 percent market share.

Switching Systems

Within the switching systems product line, Fujitsu offers central office switching systems and digital PBX switching systems. During fiscal 1991, Fujitsu developed and delivered a prototype of the next-generation node system for the D-70. For digital PBXs, the company added application packages to

©1991 Dataquest Incorporated December—Reproduction Prohibited

the series. Fujitsu also released the cost-effective E-100 Series of information switching systems. In the U.S. PBX systems market, with 1,000 plus lines (new), Fujitsu ranked sixth with a 2.5 percent market share. In the 101 to 400 lines (new) segment, the company ranked eighth with a market share of 2.5 percent.

Transmission Systems

Within the transmission systems product line, Fujitsu offers digital communications equipment and earth station systems for satellite communication. The company implemented SDH, an international standard that will open communications environments and enable ISDN and other new services to be used more efficiently. In Japan, NTT is actively promoting the conversion to SDH, while Fujitsu is delivering many transmission systems and radio equipment that comply with SDH.

Electronic Devices

The Electronic Devices Division includes IC memories, ASICs, compound semiconductors, and other electronic devices. Dataquest estimates that Fujitsu ranked sixth in the worldwide semiconductor market, with 4.9 percent of the market share and revenue totaling $2.9 billion during calendar year 1990. This includes captive sales, which are excluded from the Electronic Devices Division's sales, as reported in the annual report. Net sales within this division decreased by 1.0 percent from $2.49 billion to $2.47 billion. The division accounted for 12.0 percent of total net sales. The semiconductor product line can be segmented into IC memories (MOS and bipolar technology), ASICs (MOS and bipolar technology), large-scale integrations (LSIs), and electronic components.

IC Memories

In fiscal 1991, Fujitsu increased its production of 4Mb DRAMs. The company also started delivering samples of 16Mb DRAMs, which will be the next generation of computer memory. In February 1991, Fujitsu announced a prototype of a 64Mb DRAM that uses new photo lithography exposure technology. This new technology will make mass production possible. Also, in February 1991, Fujitsu announced the 4Mb BiCMOS ECL SRAM, with an access time of 7ns.

ASICs

In fiscal 1991, demand rose for faster and larger-scale CMOS gate arrays. To meet this demand, Fujitsu released 15 new products, 7 of which feature a gate delay of 0.5ns and contain up to 14,000 gates. The remaining eight feature a gate delay of 0.35ns and contain up to 102,000 gates. In the worldwide total ASIC market, Fujitsu ranked number one with a market share of 13.0 percent.

Compound Semiconductors

During fiscal 1991, the compound semiconductor market developed a strong demand for low-noise high electron mobility transistors (HEMTs) for satellite broadcasting receivers. Fujitsu developed and released a super HEMT that can capture very weak signals because of dramatic improvements in gain and signal-to-noise ratio. Fujitsu also developed and released a GaAs gate array that features high-speed, large-scale integration and low power consumption. To respond to future increases in demand for HEMTs, GaAs FETs, and GaAs ICs, Fujitsu constructed a plant targeted for GaAs products.

Other Electronic Devices

In fiscal 1991, in response to rising use in home electrical appliances, telephones, and office machines, Fujitsu added application specific microcontrollers to its market offerings. Fujitsu also developed a 16-bit microcontroller that performs full 16-bit processing with an instruction cycle of 100ns. In addition, significant releases included a 16-inch plasma display with a resolution of 1280 × 1024 pixels and a membrane keyboard with a small footprint and low profile.

Other Operations

Other operations range from products such as car stereos to automatic vehicle monitors. Although in fiscal 1991, this division accounted for only 4 percent of total net sales, it increased approximately 16 percent to $885.

Further Information

For further information pertaining to the company's business segments, please contact the appropriate Dataquest industry service.

©1991 Dataquest Incorporated December—Reproduction Prohibited

Table 1
Five-Year Corporate Highlights (Millions of U.S. Dollars)

	1987	1988	1989	1990	1991
Five-Year Revenue	11,218	14,830	18,616	17,839	21,043
Percent Change	46.71	32.19	25.53	(4.17)	17.96
Capital Expenditure	814	1,209	1,825	2,105	2,231
Percent of Revenue	7.25	8.16	9.81	11.80	10.60
R&D Expenditure	1,043	1,378	1,925	2,093	2,336
Percent of Revenue	9.30	9.29	10.34	11.73	11.10
Number of Employees	89,293	94,825	104,503	115,000	145,000
Revenue ($K)/Employee	126	156	178	155	145
Net Income	135	305	545	607	585
Percent Change	(23.00)	125.24	78.74	11.29	(3.55)
Exchange Rate (U.S.$1=¥)	159.51	138.02	128.25	142.93	141.21

1991 Fiscal Year	Q1	Q2	Q3	Q4
Quarterly Revenue	NA	NA	NA	NA
Quarterly Profit	NA	NA	NA	NA

NA = Not available

Source: Fujitsu Limited
Annual Reports
Dataquest (December 1991)

Table 2
Revenue by Geographic Region (Percent)

Region	1987	1988	1989	1990	1991
Japan	78.06	77.89	77.87	76.13	75.17
International	21.94	22.11	22.13	23.87	24.83

Source: Fujitsu Limited
Annual Reports
Dataquest (December 1991)

©1991 Dataquest Incorporated December—Reproduction Prohibited

1991 SALES OFFICE LOCATIONS

North America—3
Europe—4
Asia/Pacific—90
  Japan—82
ROW—3

MANUFACTURING LOCATIONS

North America

Fujitsu America
  Communications and information processing equipment, development of software
Fujitsu Business Communications Systems
  Communications equipment
Fujitsu Microelectronics
  Semiconductor devices
Intellistor Inc.
  Development of information processing equipment

Europe

Fujitsu Espana (Spain)
  Communications and information processing equipment
Fujitsu Microelectronics (Ireland)
  Semiconductor devices
Fujitsu Microelectronics (United Kingdom)
  Development of ASICs

Asia/Pacific

FKL-Dongwa (South Korea)
  Magnetic floppy disk drive heads
Fuji Electrochemical (Japan)
  Ferrites, electronic equipment, dry batteries
Fuji Facom (Japan)
  Development of computer systems for control
Fujitsu (Singapore)
  Electronic parts (digital switching systems)
Fujitsu Australia (Australia)
  Digital key telephones, digital PBXs
Fujitsu Automation (Japan)
  Automation equipment
Fujitsu Buhin (Japan)
  Electronic parts
Fujitsu Component (Malaysia)
  Electronic parts (relays, keyboards, connectors)
Fujitsu Computer Technology (Japan)
  Development of LSIs, software for information processing equipment
Fujitsu Denso (Japan)
  Communications/electronic equipment
Fujitsu General (Japan)
  Home electric appliances, communications equipment, data processing equipment
Fujitsu Isotec (Japan)
  Printers
Fujitsu Kasei (Japan)
  Plastic products for communications equipment
Fujitsu Kiden (Japan)
  Data processing equipment, indicators, molds
Fujitsu Microelectronics Asia (Singapore)
  Semiconductor devices
Fujitsu Microelectronics (Malaysia)
  Semiconductor devices
Fujitsu Miyagi Electronics (Japan)
  Semiconductor devices
Fujitsu Peripherals (Japan)
  Peripherals
Fujitsu TEN (Japan)
  Car radios, stereos
Fujitsu Thailand (Thailand)
  Magnetic disk drive heads, magnetic heads for printers
Fujitsu Tohoku Electronics (Japan)
  Semiconductor devices
Fujitsu VLSI (Japan)
  Development of semiconductor devices
Fujitsu Yamanashi Electronics (Japan)
  Semiconductor devices
Hasegawa Electric (Japan)
  Communications equipment
Kyushu Fujitsu Electronics (Japan)
  Semiconductor devices
Nihon Dengyon (Japan)
  Radio and digital communications equipment
PFU Ltd. (Japan)
  Microcomputers, peripherals
Shinano Fujitsu (Japan)
  Electronic parts
Shinko Electric Industries (Japan)
  Semiconductor parts
Takamisawa Electric (Japan)
  Switching systems, parts
Towa Electron (Japan)
  Capacitors, hybrid ICs
Yamagata Fujitsu (Japan)
  Magnetic disk drives

©1991 Dataquest Incorporated December—Reproduction Prohibited

SUBSIDIARIES

North America

Fujitsu America Inc. (United States)
Fujitsu Business Communications Systems Inc. (United States)
Fujitsu Canada Inc. (Canada)
Fujitsu Component of America Inc. (United States)
Fujitsu Computer Packaging Technologies Inc. (United States)
Fujitsu Computer Products of America Inc. (United States)
Fujitsu Customer Service of America Inc. (United States)
Fujitsu Imaging Systems of America Inc. (United States)
Fujitsu Microelectronics Inc. (United States)
Fujitsu Network Switching of America Inc. (United States)
Fujitsu Network Transmission Systems Inc. (United States)
Fujitsu Systems of America Inc. (United States)
Fujitsu Systems Business of America Inc. (United States)
Intellistor Inc. (United States)
Poqet Computer Corp. (United States)

Europe

Fujitsu Deutschland GmbH (Germany)
Fujitsu Espana S.A. (Spain)
Fujitsu Europe Ltd. (England)
Fujitsu Europe Telecom R&D Centre Limited (United Kingdom)
Fujitsu Finance (U.K.) plc (United Kingdom)
Fujitsu International Finance (Netherlands) B.V. (Netherlands)
Fujitsu Italia S.p.A. (Italy)
Fujitsu Microelectronics Ireland Ltd. (Ireland)
Fujitsu Microelectronics Italia S.r.l. (Italy)
Fujitsu Microelectronics Ltd. (England)
Fujitsu Mikroelektronik GmbH (Germany)
Fujitsu Nordic AB (Sweden)
Fulcrum Communications Limited (United Kingdom)

Asia/Pacific

Beijing Fujitsu Systems Ltd. (China)
Fuji Electrochemical Co. Ltd. (Japan)
Fujitsu Advanced Printing and Publishing Co. Ltd. (Japan)
Fujitsu Aichi Engineering Limited (Japan)
Fujitsu Australia Ltd. (Australia)
Fujitsu Australia Software Technology Pty. Ltd. (Australia)
Fujitsu Australia Wholesale Pty. Ltd. (Australia)
Fujitsu Automation Limited (Japan)
Fujitsu Basic Software Corporation (Japan)
Fujitsu Business Systems (Japan) Ltd. (Japan)
Fujitsu Communications Systems (Japan)
Fujitsu Component (Malaysia) Sdn. Bhd. (Malaysia)
Fujitsu Computer Technologies (Japan)
Fujitsu Dai-ichi Communication Software Limited (Japan)
Fujitsu Dai-ichi System Engineering Limited (Japan)
Fujitsu Denso Ltd. (Japan)
Fujitsu Devices Inc. (Japan)
Fujitsu Digital Technology Limited (Japan)
Fujitsu Distribution Systems Engineering Limited (Japan)
Fujitsu Documents Service Limited (Japan)
Fujitsu Electronics (Singapore) Pte. Ltd. (Singapore)
Fujitsu FACOM Information Processing Corporation (Japan)
Fujitsu Financial Information Systems Limited (Japan)
Fujitsu Fudosan Ltd. (Japan)
Fujitsu Hong Kong Ltd. (Hong Kong)
Fujitsu Isotec Limited (Japan)
Fujitsu Kansai Communication Systems Limited (Japan)
Fujitsu Kansai System Engineering Limited (Japan)
Fujitsu Kasei Ltd. (Japan)
Fujitsu Keihin Systems Engineering Limited (Japan)
Fujitsu Kiden Ltd. (Japan)
Fujitsu Korea Ltd. (Korea)
Fujitsu Kosan Limited (Japan)
Fujitsu Kyushu Communication Systems Limited (Japan)
Fujitsu Kyushu Systems Engineering Ltd. (Japan)
Fujitsu Laboratories Ltd. (Japan)
Fujitsu Lease (Japan)
Fujitsu Logistics Limited (Japan)
Fujitsu Microelectronics Asia Pte. Ltd. (Singapore)
Fujitsu Microelectronics (Malaysia) Sdn. Bhd. (Malaysia)
Fujitsu Microelectronics Pacific Asia Ltd. (Hong Kong)
Fujitsu Minami-Kyushu Systems Engineering Limited (Japan)
Fujitsu Miyagi Electronics Ltd. (Japan)
Fujitsu Nagano Systems Engineering Limited (Japan)
Fujitsu Network Engineering Limited (Japan)
Fujitsu New Zealand Holdings Ltd. (New Zealand)
Fujitsu New Zealand Ltd. (New Zealand)
Fujitsu OA Limited (Japan)
Fujitsu Office Machines Limited (Japan)

©1991 Dataquest Incorporated December—Reproduction Prohibited

Fujitsu Oita Software Laboratories Limited (Japan)
Fujitsu Peripherals Limited (Japan)
Fujitsu Program Laboratories Limited (Japan)
Fujitsu Shikoku Infortec Limited (Japan)
Fujitsu Shizuoka Engineering Limited (Japan)
Fujitsu (Singapore) Pte. Ltd. (Singapore)
Fujitsu Sinter Limited (Japan)
Fujitsu Social Science Laboratory Limited (Japan)
Fujitsu Social Systems Engineering Limited (Japan)
Fujitsu Supplies Limited (Japan)
Fujitsu System Integration Laboratories Ltd. (Japan)
Fujitsu Systems Construction (Japan)
Fujitsu Systems Consulting (Japan)
Fujitsu Technosystems Limited (Japan)
Fujitsu TEN Limited (Japan)
Fujitsu (Thailand) Co. Ltd (Thailand)
Fujitsu Tohoku Electronics Ltd. (Japan)
Fujitsu Tohoku Systems Engineering Limited (Japan)
Fujitsu Tokia Systems Engineering Limited (Japan)
Fujitsu Trading Ltd. (Japan)
Fujitsu VLSI Limited (Japan)
Fujitsu Quantum Devices Ltd. (Japan)
Gunma Fujitsu Limited (Japan)
Hasegawa Electric Co. Ltd. (Japan)
Ishikawa Fujitsu Software Limited (Japan)
Iwaka Densi Ltd. (Japan)
Kyushu Fujitsu Electronics Ltd. (Japan)
Nihon Dengyo Limited (Japan)
Okinawa Fujitsu Systems Engineering Limited (Japan)
PFU Limited (Japan)
Shimane Fujitsu (Japan)
Shinano Fujitsu Ltd. (Japan)
Shin-Etsu Fujitsu (Japan)
Shinko Electric Industries Co. Ltd. (Japan)
Ten Onkyo Ltd. (Japan)
Totalizator Engineering Limited (Japan)
Toyama Fujitsu (Japan)
Yamagata Fujitsu Limited (Japan)
Yonago Fujitsu (Japan)

ROW

Fujitsu de Brasil Limitada (Brazil)
Fujitsu Vitonia Computadores e Servicos Ltda (Brazil)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1991

EPWING Consortium
The EPWING Consortium was created with Sony Corporation and several publishing houses to establish a standard for CD-ROM electronic books.

Hitachi Ltd., Sony Corporation, Texas Instruments Japan Ltd.
Fujitsu Ltd., Hitachi Ltd., Sony Corporation, and Texas Instruments Japan Ltd. signed an agreement to codevelop the MUSE decoder integrated circuits. MUSE is the standard high-definition television format in Japan. The cooperative efforts by the four companies is expected to accelerate the development of a small, low-cost, next generation MUSE decoder.

Texas Instruments
Fujitsu and Texas Instruments signed a five-year global semiconductor patent cross-licensing agreement. The deal encompasses most of the semiconductor patents by the two firms except the Texas Instruments Kilby patent.

Cadence Design Systems
Cadence Design Systems and Fujitsu have signed a joint development agreement to produce ASIC software tools.

Quotient plc
Quotient plc and Fujitsu signed a joint development agreement to produce financial software systems.

KBS2 Corp.
KBS2 Corp. and Fujitsu signed a joint development agreement to develop crashworthiness software.

Rodime plc
Rodime plc entered into a nonexclusive royalty-free patent cross-licensing agreement with Fujitsu Ltd. The agreement is for the use of Rodime patents that apply to 3.5-inch drives.

Cincom Systems
Cincom Systems and Fujitsu will combine business efforts in the Canadian market to offer high-performance software.

McDonnell Douglas Information Systems International (MDISI)
MDISI and Fujitsu have made an agreement to port the PRO-IV 4GL software package developed by MDISI to Fujitsu's K Series office computers. The two firms will then market the software.

1990

Novell K.K.
A joint marketing venture to sell Netware products in Japan was formed with Novell and six partners, Fujitsu being one of them.

©1991 Dataquest Incorporated December—Reproduction Prohibited

Isuzu
The two companies have formed an automotive electronics venture and currently are attempting to get General Motors to join.

Matsushita Electric Industrial
The two companies plan to strengthen their business relationship by mutually supplying their computers on an OEM basis. Fujitsu will supply Matsushita with its high-end laptop and desktop 32-bit PCs; Matsushita will supply Fujitsu with the M550 and M600 series of 32-bit desktop personal computers.

Poqet Computer
Fujitsu will produce and market Poqet Computer's pocket-size computer under license. Fujitsu's stake in Poqet Computer has grown gradually over the last two years because of mutual agreement and investments into R&D and manufacture of Poqet's product lineup.

Nokia Data Systems Oy
An agreement has been made whereby Nokia will act as an OEM of digital PBX systems (the F-620 and F-640) for Fujitsu.

Matsushita Electric Industrial
The two companies plan to strengthen their business relationship by mutually supplying their computers on an OEM basis.

UNIX International
Fujitsu has joined a new marketing group comprising 21 other high-tech companies. The group will promote UNIX's System V release 4 and further standard developments.

Molecular Design Ltd. and IBM
Fujitsu has formed a relationship with the two companies to ensure that Molecular Design software for managing and communicating scientific information will run on their computers.

Mitsui Bank Research Institute
The two companies have agreed to establish a system consulting service.

MEDIAGENIC
MEDIAGENIC has agreed to develop entertainment software for the Fujitsu FM TOWNS.

Daisy/Cadnetix Inc.
The companies jointly produced an ASIC design kit developed for the DAZIX design environment on the Sun-4 family of workstations running on UNIX.

Vitesse Semiconductor Corporation
The companies have entered into an alternate source agreement with regard to Vitesse's Fury gallium arsenide (GaAs) VLSI gate-array family.

1989

Japan Tobacco Inc.
Fujitsu formed a tie-up agreement with Japan Tobacco whereby Fujitsu will market two of Japan Tobacco's software modules.

The Australian National University in Canberra
The two organizations signed an R&D agreement for two three-year projects. One project is to develop a small image processing system; the other is to develop software for parallel processors.

Vitesse Semiconductor
The two companies agreed to jointly develop GaAs gate arrays.

Southern New England Telecommunications Systems
Southern New England Telecommunications agreed to market Fujitsu's ISDN telecommunications equipment in the United States on an exclusive basis. The list of products includes digital telephones and terminal adapters.

NTT Data Communications Systems
The two companies will jointly market their respective logic chip design software products as a total CAE design system.

Sony Corporation
The two companies jointly developed a trial common rule to develop CD-ROM XA software for their personal computers.

Bell Atlantic Optical Network (SONET)
Fujitsu agreed to sell Bell Atlantic's transmission products under a two-year, $2 million contract. Fujitsu will provide its FLM 50/150 Fiber LOOP Multiplexer for deployment in Bell Atlantic areas.

Poqet Computer Corporate
An agreement provides Poqet with funding and credit guarantees; the companies made a cooperative technology agreement allowing for mutual adaptation of technologies and joint development of new technology.

Sun Microsystems Inc.
Sun and Fujitsu will jointly develop a high-speed RISC chip.

1988

Telecom Australia
Telecom Australia agreed to sell Fujitsu's digital PBXs in Australia; the companies established a sales joint-venture, Information Switching Technology.

©1991 Dataquest Incorporated December—Reproduction Prohibited

Daisy Systems
Fujitsu's FAME was made available on Daisy's Advansys Series of CAD/CAE systems.

Hitachi Ltd.
The two companies agreed to cooperate on the development of a 32-bit MPU and peripheral LSI family based on TRON architecture.

MERGERS AND ACQUISITIONS

Fulcrum Communications Ltd.
British Telecommunications plc sold the manufacturing division of Fulcrum Communications to Fujitsu Ltd. but will retain a 25.1 percent interest in the new company. The company makes and markets public switched telephone network equipment such as call monitoring and logging products, call queueing, exchange monitoring, and fiber-optic tools.

Nokia Data
Nokia Data, which is one of Europe's largest computer companies, was purchased by ICL Ltd. (80 percent owned by Fujitsu). ICL Ltd. will pay $402.3 million for the company and will assume about $174.9 million of Nokia's debt. Nokia's parent corporation, Nokia Corporation, will receive a 5 percent stake in ICL Ltd.

Poqet Computer Corporation
Fujitsu increased its stake to 85 percent in Poqet Computer Corporation for $37 million. In 1988, Fujitsu had purchased a 28 percent equity stake in the firm. Fujitsu has been working with Poqet Computer to develop Japanese versions of pocket computers.

Softway
Fujitsu acquired a 40 percent interest in Softway, an Australian software company. Both companies will collaborate on UNIX systems development. Continental Venture Capital, Softway, and Techway staff also hold a 20 percent interest in the company.

Hal Computer Systems Inc.
Fujitsu Ltd. acquired a 44 percent interest totaling $40.2 million in Hal Computer Systems. The company is developing a family of high-performance open systems based on the SPARC architecture and UNIX System V Release 4.

ICL plc
Fujitsu purchased 80 percent of ICL, a subsidiary of STC plc. The merger increases Fujitsu's global presence and makes it the second largest computer manufacturer in the world.

KEY OFFICERS

Takuma Yamamoto
Chairman and representative director

Matami Yasufuku
Vice chairman and representative director

Tadashi Sekizawa
President and representative director

Kazuo Watanabe
Vice president and representative director

Mikio Ohtsuki
Executive vice president

Motojiro Shiromizu
Executive director

Mamoru Mitsugi
Executive director

Tokio Tatsuta
Executive director

Eigo Kato
Executive director

Matsuro Umezu
Executive director

Ryoichi Sugioka
Executive director

PRINCIPAL INVESTORS

Fuji Electric Co. Ltd.—13.5 percent
Asahi Mutual Life Insurance Company—6.5 percent

FOUNDERS

Information is not available.

©1991 Dataquest Incorporated December—Reproduction Prohibited

Table 3
Balance Sheet
Fiscal Year Ending March 31
(Millions of U.S. Dollars)

Balance Sheet	1987	1988	1989	1990	1991
Cash	1,125	1,764	2,379	1,833	2,906
Receivables	2,904	3,645	4,615	5,104	6,025
Marketable Securities	137	648	189	225	159
Inventory	2,562	3,354	3,734	4,097	5,038
Other Current Assets	307	408	452	265	599
Total Current Assets	7,035	9,818	11,369	11,523	14,726
Net Property, Plants	3,424	4,289	5,481	5,777	6,947
Other Assets	2,067	2,678	3,617	3,489	4,792
Total Assets	12,527	16,784	20,467	20,789	26,465
Total Current Liabilities	4,991	7,059	8,581	8,979	11,939
Long-Term Debt	2,117	2,185	2,467	2,368	4,091
Other Liabilities	1,153	1,548	1,924	1,849	2,225
Total Liabilities	8,261	10,792	12,973	13,197	18,256
Converted Preferred Stock	NA	NA	NA	NA	NA
Common Stock	2,115	3,364	4,252	4,219	4,350
Other Equity	71	92	110	110	123
Retained Earnings	2,080	2,536	3,133	3,264	3,737
Total Shareholders' Equity	4,266	5,992	7,495	7,592	8,210
Total Liabilities and Shareholders' Equity	12,527	16,784	20,467	20,789	26,465
Exchange Rate (U.S.$1=¥)	159.51	138.02	128.25	142.93	141.21

NA = Not available

Source: Fujitsu Limited
Annual Reports
Dataquest (December 1991)

©1991 Dataquest Incorporated December—Reproduction Prohibited

Table 4
Consolidated Income Statement
Fiscal Year Ending March 31
(Millions of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1987	1988	1989	1990	1991
Revenue	11,218	14,830	18,616	17,839	21,043
Domestic	8,757	11,551	14,496	13,581	15,818
Overseas	2,461	3,279	4,120	4,258	5,225
Cost of Sales	7,728	9,703	11,914	11,043	12,893
R&D Expense	1,043	1,378	1,925	2,093	2,336
SG&A Expense	2,057	2,883	3,328	3,337	4,298
Capital Expense	814	1,209	1,825	2,105	2,231
Pretax Income	301	768	1,210	1,191	1,088
Pretax Margin (%)	2.68	5.18	6.50	6.68	5.17
Net Income	135	305	545	607	585
Shares Outstanding, Millions	1,593.3	1,710.0	1,760.1	1,760.1	1,760.1
Per Share Data					
Earnings	13.40	23.50	36.80	36.80	$36.80
Dividend	8.00	8.00	9.00	9.00	9.00
Book Value	2.68	3.50	4.26	4.31	4.66
Exchange Rate (U.S.$1=¥)	159.51	138.02	128.25	142.93	141.21

Source: Fujitsu Limited
Annual Reports
Dataquest (December 1991)

©1991 Dataquest Incorporated December—Reproduction Prohibited

Table 5
Balance Sheet
Fiscal Year Ending March 31
(Millions of Yen)

Balance Sheet	1987	1988	1989	1990	1991
Cash	179,409	243,492	305,166	261,928	410,365
Receivables	463,150	503,035	591,815	729,471	850,761
Marketable Securities	21,863	89,402	24,219	32,154	22,413
Inventory	408,718	462,869	478,840	585,546	711,392
Other Current Assets	49,035	56,326	58,017	37,867	84,579
Total Current Assets	1,122,175	1,355,124	1,458,057	1,646,975	2,079,510
Net Property, Plants	546,233	591,921	702,988	825,757	980,961
Other Assets	329,779	369,549	463,882	498,633	676,699
Total Assets	1,998,187	2,316,594	2,624,927	2,971,365	3,737,170
Total Current Liabilities	796,143	974,268	1,100,577	1,283,409	1,685,950
Long-Term Debt	337,660	301,618	316,395	338,481	577,700
Other Liabilities	183,980	213,685	246,778	264,347	314,221
Total Liabilities	1,317,783	1,489,571	1,663,750	1,886,237	2,577,871
Converted Preferred Stock	NA	NA	NA	NA	NA
Common Stock	337,308	464,365	545,369	602,980	614,205
Other Equity	11,359	12,659	14,050	15,658	17,381
Retained Earnings	311,737	349,999	401,758	466,490	527,713
Total Shareholders' Equity	680,404	827,023	961,177	1,085,128	1,159,299
Total Liabilities and Shareholders' Equity	1,998,187	2,316,594	2,624,927	2,971,365	3,737,170
Exchange Rate (U.S.$1=¥)	159.51	138.02	128.25	142.93	141.21

NA = Not available

Source: Fujitsu Limited
Annual Reports
Dataquest (December 1991)

©1991 Dataquest Incorporated December—Reproduction Prohibited

Table 6
Consolidated Income Statement
Fiscal Year Ending March 31
(Millions of Yen, except Per Share Data)

Consolidated Income Statement	1987	1988	1989	1990	1991
Revenue	1,789,417	2,046,802	2,387,442	2,549,773	2,971,462
Domestic	1,396,876	1,594,193	1,859,129	1,941,075	2,233,493
Overseas	392,541	452,609	528,313	608,698	737,969
Cost of Sales	1,232,722	1,339,183	1,527,908	1,578,343	1,820,554
R&D Expense	166,342	190,130	246,906	299,107	329,823
SG&A Expense	328,184	397,968	426,779	476,979	606,890
Capital Expense	129,822	166,924	234,113	300,822	315,109
Pretax Income	48,012	106,048	155,152	170,216	153,573
Pretax Margin (%)	2.68	5.18	6.50	6.68	5.17
Net Income	21,609	42,115	69,948	86,758	82,673
Shares Outstanding, Millions	1,593.3	1,710.0	1,760.1	1,802.4	1,812.1
Per Share Data					
Earnings	13.40	23.50	36.80	45.40	42.20
Dividend	8.00	8.00	9.00	9.00	10.00
Book Value	427.04	483.64	546.09	602.05	639.75
Exchange Rate (U.S.$1=¥)	159.51	138.02	128.25	142.93	141.21

Source: Fujitsu Limited
Annual Reports
Dataquest (December 1991)

©1991 Dataquest Incorporated December—Reproduction Prohibited

Table 7
Key Financial Ratios
Fiscal Year Ending March 31

Key Financial Ratios	1987	1988	1989	1990	1991
Liquidity					
Current (Times)	1.41	1.39	1.32	1.28	1.23
Total Assets/Equity (%)	293.68	280.11	273.10	273.83	322.36
Current Liabilities/Equity (%)	117.01	117.80	114.50	118.27	145.43
Total Liabilities/Equity (%)	193.68	180.11	173.10	173.83	222.36
Profitability (%)					
Return on Assets	1.08	1.82	2.66	2.92	2.21
Return on Equity	3.40	6.19	8.46	9.03	7.62
Profit Margin	1.21	2.06	2.93	3.40	2.78
Other Key Ratios					
R&D Spending % of Revenue	9.30	9.29	10.34	11.73	11.10
Capital Spending % of Revenue	7.25	8.16	9.81	11.80	10.60
Employees	89,293	94,825	104,503	115,000	145,000
Revenue (¥)/Employee	20,040	21,585	22,846	22,172	20,493
Capital Spending % of Assets	6.50	7.21	8.92	10.12	8.43
Exchange Rate (U.S.$1=¥)	159.51	138.02	128.25	142.93	141.21

Source: Fujitsu Limited
Annual Reports
Dataquest (December 1991)

©1991 Dataquest Incorporated December—Reproduction Prohibited

Hewlett-Packard Company

3000 Hanover Street
Palo Alto, California 94303
Telephone: (415) 857-1501
Fax: (415) 857-5518
Dun's Number: Not available

Date Founded: January 1, 1939

CORPORATE STRATEGIC DIRECTION

Hewlett-Packard Company (HP) is engaged worldwide in the design, manufacture, and servicing of a broad array of precision electronic instruments and systems for measurement, analysis, and computation. HP offers integrated systems solutions to specific customer problems. Founded in 1939 by Bill Hewlett and Dave Packard, HP employs 92,000 people worldwide and had revenue of $13.2 billion* during 1990.

The $13.2 billion revenue in fiscal 1990 represented an increase of 11.2 percent over 1989's total revenue of $11.9 billion. Net income decreased 10.9 percent to $739 million in fiscal 1990, down from a 1989 record net income of $829 million. A large factor in this decrease in net income deals was the increasing proportion of HP's sales to volume purchasers such as dealers and OEMs, who receive discounts on the HP products they purchase. These discounts reduce earnings by driving up HP's cost of selling its products.

Domestic sales totaled $6.0 billion, $5.6 billion, and $4.8 billion, respectively, during fiscal years 1990, 1989, and 1988. International sales reached $7.2 billion, $6.3 billion, and $5.1 billion in fiscal years 1990, 1989, and 1988, representing 54.5, 53.3, and 51.6 percent of total revenue, respectively. The majority of international orders were from the commercial sector, primarily in Europe. The percentage of total respective international revenue derived from Europe during fiscal years 1990, 1989, and 1988 was 66.1, 65.2, and 65.2 percent.

In October 1990, HP began to implement a major reorganization in its management structure to reduce operating expenses and facilitate the management of research and development, manufacturing, and marketing activities. Three new organizations were formed as a result of the reorganization: the Computer Systems Organization, the Computer Products Organization, and the Test and Measurement Organization.

The reorganization aligned businesses that had traditionally operated separately in HP's structure, but had been converging in form and function in recent years. The Computer Systems Organization unites HP's workstation and multiuser systems businesses, the Computer Products Organization combines the company's PCs and peripherals businesses, and the Test and Measurement Organization combines the activities of the company's Electronic Instruments and Microwave and Communications groups.

Although HP's structure has been recently reorganized, the company continues to financially divide operations into six business segments, all of which are engaged in the design and manufacture of precision electronic equipment for measurement, analysis, and computation. The six business segments are Measurement, Design, Information, and Manufacturing Equipment and Systems; Peripherals and Network Products; Service for Equipment, Systems, and Peripherals; Medical Electronic Equipment and Service; Analytical Instrumentation and Service; and Electronic Components. The Measurement segment continued to be the largest source of income in fiscal 1990 for the company, with $5 billion in revenue, or 36.9 percent of total revenue. The Service for Equipment, Systems, and Peripherals segment showed the highest rate of increase in 1990, increasing 21.3 percent to $2.6 billion.

HP has more than 480 sales and service offices in approximately 150 cities throughout the United States and in 107 countries worldwide. Approximately 31 percent of the sales and service offices are located in the United States. In areas where HP has no sales or service offices, it markets through more than 150 distributorships located in more than 60 countries.

*All dollar amounts are in U.S. dollars.

©1991 Dataquest Incorporated October—Reproduction Prohibited

HP markets approximately 70 percent of its products directly through its own sales organization. Marketing operations are supported by approximately 30,000 individuals, including field service engineers, service personnel, and administrative support staff. The remaining revenue is obtained through value-added resale channels including dealers and OEMs.

HP currently offers more than 10,000 products, which range from scientific measuring instruments to hand-held calculators. HP's traditional key areas of strength have been test and measurement equipment and minicomputers. The company recently successfully established itself in the UNIX workstation market. HP possesses the key ingredients to be a major force in computer-integrated manufacturing (CIM), with its high-performance instruments, peripherals products, UNIX platforms, and networking products. Local R&D has allowed HP to quickly adapt its products to suit local European markets.

In 1990, HP announced HP NewWave Computing, a strategy to link a variety of computers in a network so they operate as one. The company has based this approach on open systems and advanced software technology, enabling users to build on computing resources currently in their possession. Other major announcements in 1990 included the HP 9000 Model 1240, the company's entrant in the emerging fault-tolerant UNIX-based computer market; the HP LaserJet III printer; and the HP 400 Series workstation, the company's first workstation developed from the combination of HP and recently acquired Apollo Computer Inc.

In November 1989, HP introduced HP NewWave Office, an integrated office system enabling users to share data and information, even with computers and software from different vendors. More than 100 software developers and resellers are supporting HP NewWave Office with a full range of word processing, spreadsheet, database, graphics, communications, and multimedia applications as well as vertical market solutions.

With the HP NewWave line, HP has unveiled its office-systems strategy for the 1990s: to deliver a complete office system that combines industry standards with emerging technologies, allowing customers to quickly and easily receive the information they need. A major part of the strategy is to integrate existing applications and systems from multiple vendors to protect customers' computing investments.

Research and development expenses totaled $1.4 billion in 1990, representing 10.3 percent of total revenue. Capital expenses reached an all-time high in 1990 of $955 million, representing 7.2 percent of total income. The R&D and capital expense totals for 1989 were $1.3 billion and $857 million, respectively, representing 10.7 and 7.2 percent of total revenue.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Tables 4 through 6 at the end of this backgrounder present comprehensive financial information.

BUSINESS SEGMENT STRATEGIC DIRECTION

According to Dataquest estimates, HP ranked first in the 1990 worldwide traditional workstation market for 1990 with a 24.98 percent market share and $709.3 million in factory revenue. Dataquest also estimates that HP was the market leader in the medical workstation and superworkstation worldwide markets in 1990.

Technical Computers

The HP 9000 series includes desktop-size workstations and multiuser systems originally intended to be used by scientists and engineers. HP offers a wide range of workstation products, with applications including the commercial client-server marketplace, electronic publishing, computer-aided design (CAD), computer-aided manufacturing (CAM), computer-aided software engineering (CASE), and other advanced graphics markets.

In May 1991, HP introduced three new models in the HP Apollo 9000 Series 400 workstation family: the 425e, 425t, and 425s models. The Series 400 models run the HP-UX and Domain/OS operating systems and are compatible with HP's Motorola-based workstation family. The 425e is powered by Motorola's 25-MHz MC68040 processor, performs at 22.1 mips and 2.6 mflops, and offers a 2-D, frame-buffer graphics system that is tuned for X Window System performance at 2,017 operations per second (ops). The 425e has an internal storage capacity of 840MB, a total disk capacity of 9.11GB, and storage options consisting of an integrated, DOS-compatible 3.5-inch

©1991 Dataquest Incorporated October—Reproduction Prohibited

floppy drive or an internal CD-ROM drive. The 425e is designed for use in commercial or desktop publishing, CASE, and entry-level CAD markets.

The 425t and 425s models are more advanced models than the 425e, offering increased X Window performance at 3,100 ops. The 425t is a desktop model based on the 25-MHz MC68040 microprocessor, while the 425s is a desk-side system with increased expansion and performance capabilities. The 425s comes with four extended industry standard architecture (EISA) or three DIO-II expansion slots, and three full-height 5.25-inch storage slots for disks, CD-ROM, or digital audio tapes (DATs). Internal disk storage options range from 660MB to 3.9GB, with a maximum disk storage capacity of 27.3GB. The 425t and 425s models are targeted for mechanical-engineering and electrical-engineering design customers.

Other members of the HP Apollo 9000 family include the 300, 700, and 800 Series. The 300 Series includes HP's most basic workstation models. Introduced in March 1991, the 700 Series revolutionized performance levels in the workstation market with system performance exceeding 76 mips, the fastest on the market. The 700 Series is available in both desktop and desk-side models. The 800 Series of superminicomputers is oriented toward technical and real-time computing in the manufacturing sector and toward general-purpose UNIX computing in the government and commercial markets. These computers are based on HP Precision Architecture (HP-PA) reduced-instruction-set computing (RISC) technology, allowing users access to more than 3,500 RISC applications and tools from more than 220 independent software vendors.

In April 1989, HP acquired Apollo for $500 million. The acquisition gave HP an installed base of about 84,000 Apollo machines at almost 3,000 sites and another proprietary RISC architecture.

Business Computers

The HP 3000 series of superminicomputer systems spans a broad performance range and is designed for business data processing applications. Introduced in 1970, the 3000 Series is suited for on-line transaction processing (OLTP) and distributed processing and is compatible throughout the product line. The HP 3000 family shares the MPE operating system and uses HP's Precision Architecture in the higher-end systems. All HP 3000 computers use an open network computer philosophy for customers with a multivendor or multiarchitecture environment.

HP unveiled eight new multiuser HP 3000 systems in January 1990: 980/100, 980/200, 949, 922LX, 922RX, 922, 932, and the MICRO 3000RX. The Series 980/100 and 980/200 are the first to use advanced complementary metal-oxide semiconductor (CMOS) technology on a single VLSI chip. The 980/100 operates between 60 and 70 transactions per second (tps); and the 980/200 operates at more than 100 tps. The 922LX, 922RX, 922, and 932 perform at 7.7 tps and are designed to support 16 to 240 users in small to medium-size businesses, departments of large corporations, or branch offices. The HP MICRO 3000RX is a complete entry-level business system that can support up to 24 users. It is fully compatible with the HP 3000 product line and includes a system disk, tape cartridge, console, 16 terminal ports, operating system, database, and a menu-driven interface.

The company recently announced 10 new models for the HP 3000 line, which should be available in October 1991. These new models in the 900 Series are powered by the same Precision Architecture-RISC (PA-RISC) chips used in the 700 Series, making HP an industry leader in offering compatible RISC-based products from the desktop level to enterprisewide data center systems.

Personal Computers

Since its entry into the PC business, HP has been a high-end PC vendor aiming at the business market. The company's Vectra product line has met with considerable success since its introduction in 1986. The Vectra line consists of computers based on Intel's 80286, 80386, and 80486 microprocessors. Dataquest estimates that HP ranked 11th in the worldwide PC market in calendar year 1990, with a market share of 1.77 percent and factory revenue of $884.6 million.

The HP Vectra 486 personal computer is the highest-performing member of the HP Vectra family. It is a floor-standing unit based on the Intel i486 microprocessor. It uses the EISA, and the design optimizes performance for high-end personal computing (for example PC CAD multiuser, LAN serve) and provides the speed for high-powered single-user applications. The 486 supports up to 64MB of RAM on a single memory board, 1.3GB of mass storage, and a video graphics adapter. It comes standard with

©1991 Dataquest Incorporated October—Reproduction Prohibited

2MB of RAM; one 5.25-inch, 1.2MB flexible disk drive; two serial (RS-232-C) ports; one parallel (Centronics) port; connections for four flexible disks and tow-embedded hard disks; keyboard (Mini-DIN) and mouse (Mini-DIN) ports; HP disk-cache software; and memory management software. It also offers an array of hard disk drives, memory, and video products.

Dataquest estimates that the Vectra 486 PC was the third-ranked 80486 model in 1990, with $113.7 million in factory revenue and a 4.76 percent market share. HP ranked third overall in the worldwide 80486 computer market, based on $146.7 million in factory revenue and a 6.14 percent market share.

In April 1991, HP released the much-heralded HP 95LX palmtop PC, the first hand-held computer to combine PC power with the capabilities of Lotus 1-2-3 in a device the size of a business calculator. The 11oz 95LX is designed to work as a companion to desktop and laptop PCs, and will run MS-DOS 3.22 in addition to Lotus 1-2-3 Release 2.2. According to Dataquest estimates, the 95LX will propel HP into the leading position in 1991 in terms of units shipped in the notebook market.

Supercomputers and Visualization Systems

Through its Apollo Systems Division, HP offers the Apollo Series 10000 personal supercomputers and visualization systems designed for graphic-intensive applications. Both systems incorporate multiprocessing capabilities, parallel-instruction dispatch and extension, advanced-compiler technology, a RISC-based instruction set, and the capability to be configured with the IBM Token-Ring network or Ethernet as native networks. During 1990, the major components of the Series 10000 received the following upgrades: a new PRISM CPU that doubles computer power from 22 mips to 44 mips (12 mflops) per processor; parallelizing and vectorizing compilers that increase system performance two to four times; a specialized software-development environment for parallel programs and an interactive scientific-software computation and visualization environment; main memory capacity expanded fourfold, disk capacity improved by a factor of six, and local area network (LAN) bandwidth increased by a factor of 10.

Software

Although HP offers a selection of software for business and technical applications, a vital part of its Cooperative Computing Environment is the NewWave environment, which has continued to gain widespread acceptance. In May 1990, HP introduced the HP NewWave 3.0, a software applications environment that runs on any industry-compatible MS-DOS PC with an Intel 80286 or 80386 microprocessor. The HP NewWave 3.0 utilizes the enhancements made by Microsoft to Windows, including improvements to memory management and the user interface. From this, HP NewWave 3.0 requires only 2MB of extended memory to run several applications. More than 100 independent software vendors, including Micrografx Inc. and Microsoft Corporation, have committed resources to develop future HP NewWave applications. FutureSoft Engineering Inc., Lotus Development Corporation, New Media Graphics Corporation, and VideoLogic have all begun shipping NewWave. HP also has licensing agreements for HP NewWave with AT&T Computer Systems Inc., Canon Inc., Data General Corporation, and NCR Corporation.

In January 1991, HP announced that its SoftBench and Encapsulator products, which had previously only been offered for HP/Apollo workstations, would be compatible with Sun's SPARCstation computers. SoftBench is a software-development product for CASE that coordinates and controls the separate software programs that engineers use to design, build, and test software products. Encapsulator allows the customization of SoftBench through the addition of CASE tools of the user's choice. The move by HP further demonstrates the company's commitment to open systems environments.

HP released several new software products in the first half of 1991. In May, the company released HP SharedX, a distributed-computing software product that allows geographically separated work groups to view and modify information simultaneously on their UNIX-based workstations and X terminals. The program is a breakthrough in real-time computing and can be used immediately by current X Window System users with no modification to their existing systems. In June, the company released HP OpenView Interconnect Manager, a network-management program that greatly reduces mapping time on networks.

Peripherals

HP's peripherals products include video display terminals, magnetic disk and tape drives, plotters, and laser printers. HP's laser printers were first introduced in 1975. Technology exchanges and license agreements with Canon led to HP's 2680 laser printer series, which includes the 2689, an IBM-compatible version.

©1991 Dataquest Incorporated October—Reproduction Prohibited

HP expanded its printer product line in March 1991 with the release of the high-end HP LaserJet IIIsi printer. Designed for the business environment, the LaserJet IIIsi prints 17 pages per minute (ppm) and uses Resolution Enhancement technology and HP's PCL 5 printer language. Options include a network-printer interface card for direct connection to a LAN, a two-sided printing mechanism, and a power envelope feeder that holds up to 100 envelopes.

According to Dataquest, HP led the North American 1- to 10-ppm PNPP printer market with a 53.5 percent market share in 1990, based on $1.96 billion in factory revenue.

HP has also been a market leader in the X Window System graphics terminals market. HP released the HP 700/X family of X Window graphics terminals in 1989, and the family has continued to gain market share. The 700/X family consists of a comprehensive set of color and monochrome network-based graphics terminals based on the industry-standard X Window System from the Massachusetts Institute of Technology (MIT). The terminals are designed to operate in multivendor networked environments and provide the equivalent graphics and LAN performance of an entry-level workstation configured as an X server.

Dataquest estimates that HP ranked third in the 1990 worldwide X Window terminal market with a 12.4 percent market share and $22.3 million in factory revenue. HP was the market leader in the 1990 worldwide Color X Window market, garnering 20.3 percent of the market with $17.0 million in factory revenue.

HP also provides monitors for workstations, where Dataquest estimates that HP ranked second in the 1990 worldwide workstation monitor market, with $175.5 million in revenue and a 22.2 percent market share.

Telecommunication

HP's vision of future information technology is called the Cooperative Computing Environment. Its goal is to develop integrated networks of both general-purpose and specialized computers working together as a single, integrated system, regardless of location, vendor, or operating system. These networks will manage the simultaneous transmission of voices, data, and video. The resulting distributed system can integrate diverse applications, environments, and computers, and will allow more effective processing of information.

Semiconductors

According to Dataquest, HP ranked 21st in the 1990 North American total semiconductor market, with a market share of 1 percent. HP is the market leader in the North American optoelectronic semiconductor market, holding a 40 percent market share in 1990 with $132 million in factory revenue.

HP manufactures a number of dedicated integrated circuits (ICs) for internal consumption only. These are supported by a wide range of optoelectronic devices (both components and modules) that are generally available on the merchant market, together with several specialized diode and transistor products.

Computer Storage

HP's storage devices family includes 5.25-inch hard-disk storage systems for entry-level through high-end computer systems; digital data storage (DDS) format tape drives for HP computer systems; and a family of mass-storage systems that combine a high-capacity hard-disk mechanism with a choice of two additional drives (DAT drive, CD-ROM drive, rewritable-optical disk drive, and/or additional hard-disk drives).

Dataquest estimates that HP ranked eighth in the worldwide 5.25-inch rigid disk drive market in 1990, with a 1.7 percent market share. HP also ranked second in the worldwide 1/2-inch reel-to-reel tape drive market, with 14.9 percent of the market.

Further Information

For further information about the business segments, please contact the appropriate industry service.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 1
Five-Year Corporate Highlights
(Millions of U.S. Dollars)

	1986	1987	1988	1989	1990
Five-Year Revenue	7,102	8,090	9,831	11,899	13,233
Percent Change	9.18	13.91	21.52	21.04	11.21
Capital Expenditure	497	510	648	857	955
Percent of Revenue	7.00	6.30	6.59	7.20	7.22
R&D Expenditure	824	901	1,056	1,269	1,367
Percent of Revenue	11.60	11.14	10.74	10.66	10.33
Number of Employees	82,000	82,000	87,000	95,000	92,000
Revenue ($K)/Employee	86.61	98.66	113.00	125.25	143.84
Net Income	516	644	816	829	739
Percent Change	5.52	24.81	26.71	1.59	(10.86)

1990 Fiscal Year	Q1	Q2	Q3	Q4
Quarterly Revenue	3,103	3,308	3,242	3,580
Quarterly Profit	173	186	178	202

Source: Hewlett-Packard Company Annual Reports
Dataquest (October 1991)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	54.00	51.00	48.00	46.73	45.53
International	31.00	33.00	34.00	34.72	36.00
All Others	15.00	16.00	18.00	18.55	18.47

Source: Hewlett-Packard Company Annual Reports
Dataquest (October 1991)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1987*	1988*	1989
Direct Sales	58	60	60
Indirect Sales	42	40	40
Distributors	1	1	NA
Dealers	1	1	NA
OEMs	40	38	NA

*Computer systems only
NA = Not available

Source: Hewlett-Packard Company Annual Reports
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

1990/1991 SALES OFFICE LOCATIONS*

North America—129
Europe—111
Japan—28
ROW—191
*Includes service offices

MANUFACTURING LOCATIONS

North America

Aguadilla, Puerto Rico
Terminals
Andover, Massachusetts
Medical equipment
Avondale, Pennsylvania
Analytical instruments
Boise, Idaho
Disk drives, printers
Chelmsford, Massachusetts
Workstations
Colorado Springs, Colorado
Electronic test instruments, telecom test equipment
Corvallis, Oregon
Calculators, hand-held computers, ASICs
Cupertino, California
Minicomputers
Everett, Washington
Electronic instruments
Exeter, New Hampshire
Workstation components
Fort Collins, Colorado
Workstations, network controllers, ASICs, RISC Processors
Greeley, Colorado
Printers, tape drives
Loveland, Colorado
Logic design systems, high-frequency linear digital oscilloscopes
McMinnville, Oregon
Medical equipment
Palo Alto, California
Test equipment
Rockaway, New Jersey
Test equipment
Rohnert Park, California
Test equipment
Roseville, California
Network products, personal computers
San Diego, California
Plotters
San Jose, California
Microwave, opto, diode, transistors
Santa Clara, California
Electronic instruments, ASICs
Santa Rosa, California
Microwave test equipment, opto, diode, transistors
Spokane, Washington
Test equipment
Sunnyvale, California
Computer-integrated manufacturing systems, workstation systems integration, PCs, workstations
Waltham, Massachusetts
Medical equipment
Waterloo, Canada
X terminals, industrial terminals
Vancouver, Washington
Printers

Europe

Barcelona, Spain
Printers, drives
Bergamo, Italy
Network products
Boeblingen, Germany
Workstations, midrange computers, analytical instruments, medical instruments
Bristol, England
Disk drives
Grenoble, France
Networking products personal computers
Lyon, France
Midrange computers
Pineswood, England
Software
South Queensferry, Scotland
Telecom test equipment, microwave test equipment
Villefontaine, France
A-series and various industrial automation and medical products, networks, telecom
Waldbronn, Germany
Analytical instruments

Japan

Hachioji, Japan
Test equipment
Kobe, Japan
Test equipment

ROW

Bangalore, India
Distribution
Guadalajara, Mexico
PCs, multiuser systems

©1991 Dataquest Incorporated October—Reproduction Prohibited

Penang, Malaysia
Semiconductor devices
Singapore
Software networks, printers, graphics imaging components, calculators, keyboards, terminals, optoelectronic LED components
Seoul, South Korea
Instruments, peripherals, distribution
Taipei, Taiwan
Asian language PC products
Aguadilla, Puerto Rico
Printed circuit devices

SUBSIDIARIES

North America

Apollo Computer Inc. (United States)
Apollo World Trade Inc. (United States)
Applied Optoelectronic Technology Corp. (United States)
EON Systems Inc. (United States)
Fleet Systems Inc. (United States)
Hewlett-Packard Atlantic Inc. (United States)
Hewlett-Packard (Canada) Ltd. (Canada)
Hewlett-Packard Delaware Inc. (United States)
Hewlett-Packard Delaware Funding Inc. (United States)
Hewlett-Packard Delaware Holding Inc. (United States)
Hewlett-Packard Delaware Investment Inc. (United States)
Hewlett-Packard European Distribution Operations Netherlands Inc. (United States)
Hewlett-Packard Finance Company (United States)
Hewlett-Packard Hellas Inc. (United States)
Hewlett-Packard Inter-Americas Corp. (United States)
Hewlett-Packard Laboratories Japan Inc. (United States)
Hewlett-Packard Pipeline Co. (United States)
Hewlett-Packard Puerto Rico (United States)
Hewlett-Packard World Trade Inc. (United States)
IDACOM Electronics Inc. (United States)
The Tall Tree Insurance Company (United States)

Europe

Geneva Investments N.V. (Netherlands Antilles)
Hewlett-Packard A/S (Denmark)
Hewlett-Packard (Austria) Ges.m.b.H. (Austria)
Hewlett-Packard Belgium S.A.N.V. (Belgium)
Hewlett-Packard Benelux B.V. (Netherlands)
Hewlett-Packard DDR (Germany)
Hewlett-Packard Equipment Leasing Ltd. (Great Britain)
Hewlett-Packard Espanola S.A. (Spain)
Hewlett-Packard Finance Ltd. (Great Britain)
Hewlett-Packard France (France) Hewlett-Packard GmbH (Germany)
Hewlett-Packard International Sales Corporation B.V. (Netherlands)
Hewlett-Packard Ireland Ltd. (Ireland)
Hewlett-Packard Italiana S.p.A. (Italy)
Hewlett-Packard Leasing Ltd. (Great Britain)
Hewlett-Packard Ltd. (Great Britain)
Hewlett-Packard Nederland B.V. (Netherlands)
Hewlett-Packard Norge A/S (Norway)
Hewlett-Packard OY (Finland)
Hewlett-Packard Product Leasing Ltd. (Great Britain)
Hewlett-Packard S.A. (Switzerland)
Hewlett-Packard (Schweiz) A.G.
Hewlett-Packard Singapore (PTE) Ltd. (Singapore)
Hewlett-Packard Sverige A.B. (Sweden)
Hewlett-Packard Technical B.V. (Netherlands)
Hewlett-Packard Trading S.A. (Switzerland)
IDACOM Electronics (Germany)

Japan

Yogokawa Hewlett-Packard Design Systems Laboratory Ltd. (Japan)
Yokogawa Hewlett-Packard Ltd. (Japan)

ROW

Applied Optoelectronic Technology (Asia) PTE Ltd. (Singapore)
Applied Optoelectronic Technology Taiwan Ltd. (Taiwan)
Arrendadora Hewlett-Packard S.A. de C.V. (Mexico)
China Hewlett-Packard Company Ltd. (China)
China Hewlett-Packard (Shenzhen) Company Ltd. (China)
E.I. Industria e Cuercio S.A. (Brazil)
Grupo Hewlett-Packard S.A. de C.V. (Mexico)
Hewlett-Packard Argentina S.A. (Argentina)
Hewlett-Packard Asia Pacific Limited (Hong Kong)
Hewlett-Packard Australia Finance Ltd. (Australia)
Hewlett-Packard Australia Ltd. (Australia)
Hewlett-Packard Bilgisayar Ve Olcum Sistemleri Anonim Sirketi (Turkey)
Hewlett-Packard de Venezuela C.A. (Venezuela)
Hewlett-Packard do Brasil S.A. (Brazil)
Hewlett-Packard Far East Pte. Ltd. (Singapore)
Hewlett-Packard FPG (China)
Hewlett-Packard Hong Kong Ltd. (Hong Kong)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Hewlett-Packard (India) Private Ltd. (India)
Hewlett-Packard (India) Software Operation Private Ltd. (India)
Hewlett-Packard Investment Ltd. (Liberia)
Hewlett-Packard (Malaysia) SDN.BHD. (Malaysia)
Hewlett-Packard Malaysia Technology, Sdn. Bhd. (Malaysia)
Hewlett-Packard (N.Z.) Ltd. (New Zealand)
Hewlett-Packard Penang Sdn. Bhd. (Malaysia)
Hewlett-Packard S.A. de C.V. (Mexico)
Hewlett-Packard Sales (Malaysia) Sdn. Bhd.
Hewlett-Packard Singapore (Sales) Pte. Ltd. (Singapore)
Hewlett-Packard Taiwan Ltd. (China)
Hewlett-Packard (Thailand) Ltd. (Thailand)
Hewlett-Packard USSR (USSR)
Moriya Pty. Inc. (Australia)
Samsung Hewlett-Packard Ltd. (Korea)
Sispar Participacoes Ltda. (Brazil)
Telecom Hewlett-Packard Pty. Ltd. (Australia)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1991

Computer Associates International Inc.
HP and Computer Associates agreed to codevelop systems management, database, and applications software for HP's 9000 Series computers that run the HP/UX UNIX-based operating system.

Hermes Plus
HP and Hermes jointly formed the Yugoslavian-based Hermes Plus Company, which will market and service HP personal computers and peripherals in Yugoslavia.

Hitachi Ltd.
HP and Hitachi entered a cooperative agreement to develop expert-systems technology based on an enhanced version of Hitachi's ES/Kernel for HP's Motorola-based 9000 workstations and Precision Architecture RISC-based computers.

IBM Corporation
HP and IBM signed a licensing agreement licensing HP's SoftBench integration framework and Encapsulator software technologies for use in future CASE solutions targeted to IBM's AIX-based RISC System/6000 family of workstations and servers.

Informix Software Inc.
HP and Informix signed a five-year joint agreement to develop, market, and sell faster versions of HP hardware and Informix software primarily for OLTP and CASE.

Ithaca Software
HP and Ithaca Software agreed to a licensing arrangement under which Ithaca will incorporate HP Advanced Rendering Technology into its HOOPS graphics development system.

Lotus Development Corporation
HP and Lotus agreed to a marketing and development treaty designed to make Lotus 1-2-3 software available on HP workstations.

Mentor Graphics and Serveco
HP, Mentor Graphics, and Serveco signed an agreement to manufacture CAD systems in the Soviet Union for use in electronic equipment design. Serveco, a Soviet-Swiss joint venture, will be the distributor and servicer on the Soviet market Mentor Graphics will provide specialized CAD software and HP's USSR subsidiary (HP USSR) will manufacture the hardware.

Microsoft Corporation
HP and Microsoft signed an agreement authorizing HP to provide worldwide support for Microsoft LAN Manager, Microsoft Windows graphical environment 3.0, MS-DOS and OS/2 operating systems, and Microsoft SQL Server.

Microtest Inc.
HP and Microtest entered into an agreement in which Microtest will supply its LAN test products to HP, and HP will market them.

Mitsubishi Electric Corporation
HP and Mitsubishi signed an agreement whereby Mitsubishi will be supplied with a new RISC workstation that it will market in Japan.

Mitsumi Electric Company
HP and Mitsumi signed a contract giving HP an exclusive supply of 3.5-inch DAT mechanisms from Mitsumi for HP's 2GB and 8GB DAT drives.

Northern Telecom Limited
HP and Northern Telecom signed an agreement in which the companies will jointly market central office-based call handling capabilities based on a link between Northern's DMS-100 central office switch and HP's UNIX-based Applied Computerized Telephony.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Panacea Inc.
HP and Panacea signed a nonexclusive licensing agreement allowing a version of Panacea's Display List Driver (DLD) to be tailored to the HP Intelligent Graphics Controllers (IGCs).

Sequoia Systems Inc.
HP extended its OEM and technology-licensing agreement with Sequoia Systems through 1994. The new agreement extends HP's exclusive marketing rights for Sequoia systems to the worldwide telecommunications market and increases the number of Sequoia's fault-tolerant systems HP is committed to sell in 1992.

Software AG
HP and the Germany-based Software AG made a marketing agreement under which Software AG's Adabas database management system, Network networking product, and Natural fourth-generation language will be made available on HP's UNIX platforms.

Sun Microsystems Inc.
HP and Sun entered a joint-development agreement to create a common, next-generation, object-oriented distributed computing environment called Distributed Application Architecture (DAA). The move brings together two of the leading operating systems in Sun's Open Network Computing (ONC) and HP's Network Computing System (NCS).

HP and Sun also signed an agreement by which HP will port its mechanical computer-aided design (MCAD) software to Sun SPARCstation workstations.

1990

Actel Corporation
HP and Actel Corporation announced that they will cooperate in developing, licensing, and manufacturing an advanced family of field programmable gate arrays (FPGAs). Under the terms of the five-year agreement, HP has immediate access to Actel's FPGA design software and will make a 5 percent equity investment in Actel.

AT&T Computer Systems
HP signed an agreement to license HP NewWave software to AT&T Computer Systems. Terms of the contract were not disclosed.

Cascade Microtech Inc.
HP purchased a minority equity position in Cascade Microtech Inc. and licensed some wafer-probing technology to Cascade.

Cognos
HP entered into an agreement with Cognos, establishing Cognos' PowerHouse fourth-generation language (4GL) software as a growth path for users of HP's RAPID and ALLBASE tool sets.

Emerald Systems Corporation
HP signed Emerald Systems to a distribution agreement in which Emerald will offer RAMP backup and restore software for use with the HP Network Mass Storage System.

Hughes Aircraft Company
HP and Hughes Aircraft Company signed a strategic agreement to develop and manufacture advanced workstations, personal computers, and other related equipment.

MAI Basic Four Inc.
MAI Basic Four became an HP VAR. Under the VAR agreement, MAI Basic Four will resell the computers with MANBASE, its MRP II (manufacturing/resource/planning) software solution to manufacturers.

McDonnell Douglas Systems Integration Co.
HP and McDonnell Douglas Systems Integration entered into a three-year, $75 million VAR agreement that allows McDonnell Douglas to resell HP's Motorola and RISC-based HP 9000 family of workstations with its Unigraphics software.

Mentor Graphics Corporation
HP and Mentor Graphics announced a multimillion-dollar software-marketing agreement. Under the terms of the agreement, HP will adapt Mentor Graphics' design and analysis software for board-test applications and will market it with future HP board-test products.

NCR/Data General/Canon
HP signed an agreement to license the HP NewWave software environment to NCR, Data General, and Canon.

Novell Inc.
HP and Novell signed a licensing agreement that will enable HP to offer Novell's Portable NetWare network operating system to users of its HP 3000 Model 900 RISC-based minicomputers.

Numetrix Inc.
HP and Numetrix Inc. signed an agreement in which Numetrix's Schedulex production scheduling software will be ported to HP 9000 Series 800 HP-PA computers and HP Vectra personal computers. HP and Numetrix will market the HP-based Schedulex software solution to process manufacturers in the food, beverage, pulp and paper, chemical, pharmaceutical, and consumer packaged goods industries.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Octel Communications Corporation
HP and Octel Communications Corporation have become strategic partners in bringing high-performance voice-processing equipment to Europe.

Penstock Inc.
HP announced that Penstock Inc. has become a distributor of HP RF and microwave components and integrated products in the United States and Canada. Under the terms of the agreement, Penstock will focus on selling devices above 1 GHz and will stock a broad line of silicon and gallium arsenide (GaAs) beam-lead and chip devices, as well as packaged versions of these products. In addition, Penstock will have inventory of selected HP mechanical switches, programmable step attenuators, and fixed coaxial attentuators.

Sequoia Systems Inc.
HP and Sequoia Systems Inc. announced a strategic relationship that includes a marketing agreement, technology licensing, and an equity investment. Under the technology licensing agreement, HP has the right to use most of Sequoia's fault-tolerance, muiltiprocessor technology in future HP systems. The agreement also calls for the cross-licensing of any improvements to this technology by either company.

Visual Information Technologies Inc. (VITec)
HP and VITec signed an agreement to develop and market a high-end, image-processing workstation that runs on the recently introduced HP Apollo 9000 Model 400s.

1989

3Com Corporation
HP announced a strategic alliance with 3Com, which will license its OS/2-based 3+Open LAN Manager network operating system to HP. HP will sell the product under the name HP3+Open LAN Manager.

Aeritalia's Systems and RPVs Group of Italy
HP, Aeritalia's Systems, and RPVs Group of Italy signed a joint agreement to market EMC measurement systems.

AGFA Compugraphic Division
HP and AGFA Compugraphic Division jointly developed Type Director, which is based on Compugraphic's Intellifont font-scaling technology and has been implemented according to HP's specifications.

Blue Star Ltd.
HP has established Hewlett-Packard India Pvt. Ltd., a joint-venture company with Blue Star Ltd., the sole distributor of HP products in India. HP will have 40 percent equity in the venture and Blue Star 20 percent. The remaining 40 percent will be in the form of public shares to be issued in 1990.

Carlisle Memory Products Group
HP signed a $4.5 million contract that renews and expands a previous agreement to purchase Carlisle half-inch tape reels in all worldwide locations.

Compression Labs Inc. (CLI)
Compression Labs Inc. signed an agreement with HP to provide videoconferencing systems for HP's international communications network. The agreement, worth more than $2 million, calls for CLI to provide 50 videoconferencing systems over a two-year period.

Decision Data Inc. (DDI)
HP and Decision Data Inc. established an OEM agreement in which DDI intends to purchase $20 million worth of newly developed HP terminals compatible with IBM System/3X and AS/400 computers. The new terminals will be resold by Decision Data Computer Corporation, a subsidiary of DDI. The OEM terminals, developed jointly by HP and DDI, are manufactured at HP's automotated facility in Roseville, California. The terminals will be sold exclusively to DDI.

Interphase
HP, through its Apollo Division, extended its OEM agreement with Interphase for another two years at a value of approximately $2.1 million.

Microsoft Corporation
The two companies engaged in joint development to port the MS LAN Manager OS/2 technology to the UNIX system environment.

NEC Corporation
HP and NEC announced an agreement to develop comprehensive development tools for several NEC original microprocessors and microcomputers. Under the terms of the agreement, HP will develop, sell, and support HP 64700 series emulators for many of NEX's original microprocessors and microcontrollers.

National Semiconductor Corporation
HP and National Semiconductor Corporation announced joint development efforts aimed at providing integrated semiconductor and system network products that conform to the IEEE 802.3 10BASE-T network standard.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Nellcor Inc.
HP was granted a license under Nellcor Inc.'s sensor-coding patents to use Nellcor's oximeter sensors with HP patent-monitoring systems.

Oki Electric Industry Co. Ltd.
The two companies agreed to build and operate a printed circuit board facility in Puerto Rico.

Oracle Corporation
HP, through its Apollo Division, announced a marketing agreement with Oracle under which both companies will promote and market the Oracle relational database management systems software products.

Philips Components
HP and Philips Components of the Netherlands announced an agreement to develop and make high-voltage optocouplers.

Samsung Electronics Co. Ltd.
HP and Samsung Electronics Co. in Korea formed an agreement for Samsung to develop, manufacture, and resell chip sets, workstations, and other computers using HP's RISC technology.

Sony of America
Sony of America will supply 5.25-inch rewritable optical disk storage products to HP for the HP C17QA Optical Disk Library System, the first rewritable optical disk autochanger. The Sony drive and controller will also be used for a standalone rewritable optical disk subsystem, the HP C1711A, which is fully compatible with the Optical Disk Library System.

Spatial Technology Inc.
HP and Spatial Technology Inc. agreed to jointly market solid-modeling software for the mechanical computer-aided design and computer-aided manufacturing market. HP bought about a 10 percent equity stake in Spatial.

VHA Supply Company Inc.
HP and VHA Supply Company signed a two-year extension to a three-year purchase agreement signed in 1987, covering a variety of HP medical-electronic and computer products. Under the terms of the agreement, HP will provide critical-care and diagnostic equipment as well as computer systems to VHA's national network of 669 locally owned hospitals and their 177 affiliates. Included in the critical-care equipment are the HP CareVue 9000 clinical information system and the HP Component Monitoring System.

MERGERS AND ACQUISITIONS

1991

Applied Optoelectronic Technology
HP purchased Milpitas, California-based Applied Optoelectronic Technology, thereby expanding HP's range of semiconductor test gear. AOT makes automatic testing gear for smart-power modules and integrated circuits.

1989

Apollo Computer Inc.
This merger with Apollo gave HP a strong foothold in the networking arena, with a 30.4 percent share of the 1988 workstation market. The acquisition gave HP an installed base of about 84,000 Apollo machines at almost 3,000 sites and another proprietary RISC architecture.

Optotech
HP purchased certain assets of Optotech, a privately held company that designs and develops optical disk drives.

KEY OFFICERS

David Packard
Chairman of the board

John A. Young
President, chief executive officer

Dean O. Morton
Executive vice president, chief operating officer

Richard C. Alberding
Executive vice president, Marketing and International

John L. Doyle
Executive vice president, Business Development

Richard A. Hackborn
Executive vice president, Computer Products Organization

Lewis E. Platt
Executive vice president, Computer Systems Organization

©1991 Dataquest Incorporated October—Reproduction Prohibited

William E. Terry
Executive vice president, Measurement Systems

Robert Wayman
Senior vice president, chief financial officer

PRINCIPAL INVESTORS

David Packard—17.1 percent
William R. Hewlett—12.2 percent

FOUNDERS

William R. Hewlett (stepped down as Vice President of board of directors, February 1987)
David Packard

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 4
Balance Sheet
Fiscal Year Ending October 31
(Millions of U.S. Dollars)

Balance Sheet	1986	1987	1988	1989	1990
Cash	1,372	2,645	814	906	1,077
Receivables	1,344	1,561	1,982	2,494	2,883
Marketable Securities	0	0	118	20	0
Inventory	981	1,117	1,478	1,947	2,092
Other Current Assets	117	167	170	364	458
Total Current Assets	3,814	5,490	4,562	5,731	6,510
Net Property, Plants	2,236	2,328	2,516	2,893	3,201
Other Assets	237	315	780	1,451	1,684
Total Assets	6,287	8,133	7,858	10,075	11,395
Total Current Liabilities	1,518	2,735	2,589	3,743	4,443
Long-Term Debt	110	88	392	474	139
Other Liabilities	285	288	344	412	450
Total Liabilities	1,913	3,111	3,325	4,629	5,032
Converted Preferred Stock	0	0	0	0	0
Common Stock	712	776	234	459	739
Other Equity	0	0	0	0	0
Retained Earnings	3,662	4,246	4,299	4,987	5,624
Total Shareholders' Equity	4,374	5,022	4,533	5,446	6,363
Total Liabilities and Shareholders' Equity	6,287	8,133	7,858	10,075	11,395

Source: Hewlett-Packard Company Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 5
Consolidated Income Statement
Fiscal Year Ending October 31
(Millions of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1986	1987	1988	1989	1990
Revenue	7,102	8,090	9,831	11,899	13,233
U.S. Revenue	3,812	4,122	4,763	5,561	6,025
Non-U.S. Revenue	3,290	3,968	5,068	6,338	7,208
Cost of Sales	3,353	3,785	4,832	6,091	6,993
R&D Expense	824	901	1,056	1,269	1,367
SG&A Expense	2,145	2,442	2,859	3,327	3,711
Capital Expense	497	510	648	857	955
Pretax Income	780	962	1,142	1,151	1,056
Pretax Margin (%)	10.98	11.89	11.62	9.67	7.98
Effective Tax Rate (%)	33.90	33.10	28.50	28.00	0
Net Income	516	644	816	829	739
Shares Outstanding, Millions	256	257	234	238	244
Per Share Data					
Earnings	2.02	2.50	3.36	3.52	3.06
Dividend	0.22	0.23	0.28	0.36	0.42
Book Value	17.09	19.54	19.37	22.88	26.08

Source: Hewlett-Packard Company
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 6
Key Financial Ratios
Fiscal Year Ending October 31

Key Financial Ratios	1986	1987	1988	1989	1990
Liquidity					
Current (Times)	2.51	2.01	1.76	1.53	1.47
Total Assets/Equity (%)	143.74	161.95	173.35	185.00	179.08
Current Liabilities/Equity (%)	34.71	54.46	57.11	68.73	69.83
Total Liabilities/Equity (%)	43.74	61.95	73.35	85.00	79.08
Profitability (%)					
Return on Assets	8.21	7.92	10.38	8.23	6.49
Return on Equity	11.80	12.82	18.00	15.22	11.61
Profit Margin	7.27	7.96	8.30	6.97	5.58
Other Key Ratios					
R&D Spending % of Revenue	11.60	11.14	10.74	10.66	10.33
Capital Spending % of Revenue	7.00	6.30	6.59	7.20	7.22
Employees	82,000	82,000	87,000	95,000	92,000
Revenue ($K)/Employee	86.61	98.66	113.00	125.25	143.84
Capital Spending % of Assets	7.91	6.27	8.25	8.51	8.38

Source: Hewlett-Packard Company
Annual Reports
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

International Business Machines Corporation

Corporate Headquarters
Old Orchard Road
Armonk, New York 10504
Telephone: (914) 765-1900
Fax: (914) 765-4190, 765-4191
Dun's Number: 00-136-8083

Date Founded: 1911

CORPORATE STRATEGIC DIRECTION

International Business Machines (IBM) Corporation was founded in 1911 as the Computing-Tabulating-Recording Company. In 1924, the company merged with International Business Machines Corporation and retained the IBM name. Today, the company is the world's largest manufacturer of data processing machines and information-handling systems.

Acknowledged as the largest computer systems vendor in the world, IBM designs, manufactures, sells, and supports an array of information processing systems. IBM's product line includes the following:

- Mainframes
- Superminicomputers
- Mini- and microcomputers
- Workstations
- Personal computers
- Systems software
- Display terminals
- Computer storage devices
- Communications systems
- Printers
- Typewriters
- Educational and training materials
- Related supplies and services

In addition to offering these products, IBM is a major systems integration vendor, providing clients with complete solutions to information processing needs.

IBM is pursuing a three-part strategy of operations, which is designed to establish the company as a leader in emerging areas of technology while enhancing its strength in the traditional markets. This strategy includes an increased customer focus, a strengthened product line with more competitive offerings, and a pledge toward improved efficiency and market-driven quality.

In meeting its goal of intensifying the company's focus on the customer, IBM has added over 28,000 marketing and service people in the last five years. This increased service force has taken aim at increasing responsiveness to the customer's needs, taking steps such as increasing continuity in support and increasing attention to the special needs of international customers.

IBM significantly strengthened its product line in 1990 with a number of notable new products. Foremost on the list was the introduction of the System/390 family, hailed by IBM as the most successful introduction in company history. The System/390 family provides customers with increased processing power, better network management, and improved communication among multivendor systems. Also introduced in 1990 were the RISC System/6000 family of high-performance workstations; entry-level models of the Application System/400 processors for small and medium-size businesses or departments; two high-end models of the Personal Computer/2 (PS/2); the PS/1 home computer; and new software products such as CallPath Services Architecture, an integration tool for voice and data communications, and the ImagePlus High Performance Transaction System, which converts documents into electronic images that can be transmitted, stored, retrieved, and printed.

In the interest of company efficiency, IBM has been undergoing a number of changes in the past several years, designed to compensate for changing market conditions and user demand. IBM has trimmed

©1991 Dataquest Incorporated November—Reproduction Prohibited

employee and administrative costs and sold off several subsidiaries, enabling the company to concentrate on its core businesses. In the last five years, IBM has reduced its worldwide employee population by over 33,000 people. At the end of fiscal 1990, the employee total was reduced to 373,816, down almost 10,000 from the 1989 year-end total of 383,220.

In a major alliance between the world's two largest personal computer manufacturers, IBM and Apple Computer Inc. announced in July of 1991 that they aim to jointly develop and market new technologies that will integrate into their existing and future products. The major points in this letter of intent are as follows:

- IBM and Apple intend to create a new open system software platform that will be based on object-oriented technology. To market this platform, IBM and Apple will form a new systems software company that will be jointly owned and independently managed. Software will be offered for sale on IBM and Apple computers as well as for other vendors' systems.
- The Apple Macintosh computer will be integrated into IBM's new enterprise client/server environment. The two companies will develop, market, and support networking and communications products for this environment. IBM and Apple will also develop and market an enhanced version of IBM's AIX operating system that will integrate the best features of the AIX and Macintosh operating systems. The application range for the operating system will span from desktops to servers.
- Apple intends to adopt future single-chip implementations of IBM's RS/6000 POWER architecture. Motorola and IBM will use their expertise to design and manufacture this new family of POWER PC chips, with Motorola acting as a source for the chips.
- IBM and Apple plan to work together to create and license a multimedia platform-independent software environment.

Both companies hope to complete and sign contracts for the announced partnership by the end of 1991.

IBM began to see the fruits of the company's efforts to streamline its operations in the financial results of 1990. IBM's revenue for the fiscal year ending December 31, 1990, totaled $69.0 billion, up 10.0 percent from the 1989 year-end revenue of $62.7 billion. Net income rose 60.2 percent to $6.0 billion in 1990, up from the $3.8 billion total in 1989. The company points to the effects of the strategic restructurings as a major reason for the increased profitability.

International sales revenue reached an all-time high in 1990, totaling $41.9 billion in 1990 and accounting for 60.7 percent of total sales. U.S. sales increased 5.4 percent in 1990 to $27.1 billion, accounting for 39.3 percent of total revenue.

IBM spent $6.6 billion on research and development in 1990, representing 9.5 percent of total revenue. Capital expenses totaled $27.2 billion, also representing 39.5 percent of total revenue.

IBM divides its operations into the following primary operating units: seven Lines of Business (LOBs), consisting of Application Business Systems, Application Solutions, Networking Systems, Enterprise Systems, Personal Systems, Programming Systems, and Technology Products; IBM United States, which provides marketing services and support to customers in the United States; IBM World Trade, which provides service and support to international customers, as well as working closely with the LOBs to develop and manufacture products on an international level; Research, which engages in the research and development of new products; and the IBM Credit Corporation, which provides both customer and dealer financing for IBM products and services in the United States.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information on revenue by distribution channel is not available. Tables 3 through 5, at the end of this backgrounder, present comprehensive financial information.

BUSINESS SEGMENT STRATEGIC DIRECTION

The structure of IBM's seven LOBs is as follows:

- Personal Systems—Desktop systems, typewriters, displays, printers

©1991 Dataquest Incorporated November—Reproduction Prohibited

- Application Business Systems—Midrange systems, storage devices
- Enterprise Systems—All System/390 products, high-volume printers, storage subsystems
- Technology Products—Worldwide development and U.S. manufacturing of logic and memory technology and the electronic packaging used throughout the IBM product line
- Networking Systems—Communications products, information network services
- Programming Systems—Development of data management and application development software, development and implementation of Systems Application Architecture (SAA)
- Application Solutions—Hardware, software, and service solutions for customers in a broad range of businesses, including the manufacturing, finance, and public sectors

In fiscal 1990, 97.2 percent of IBM's consolidated revenue came from its Information Technology (IT) segment. The IT segment is made up of six classification groups: Processors, Workstations, Peripherals, Software, Maintenance Services, and Other. The Processors classification is defined by user-programmable equipment having the capability of manipulating data arithmetically or logically and making calculations in a manner directly addressable by the user through the operation of a stored program. IBM defines Workstations as personal systems, typewriters, and other display-based terminals. Peripherals includes printers, storage, and telecommunications devices. Software consists of both applications and systems software, and "Other" consists mainly of customer solution services, financing revenue, and supplies.

The following lists Dataquest's industry segmentation of IBM's product lines:

- Microcomputer systems, consisting of PC hardware
- Business computer systems, consisting of mainframe, midrange, superminicomputers and minicomputers for business applications
- Technical computers, technical workstations, and supercomputers
- Telecommunications, consisting of communications controllers, networking and telecommunications products
- Display terminals
- Electronic printers
- Computer storage
- Office systems
- Software
- Semiconductors
- CAD/CAM

Microcomputer Systems

IBM continued to be the worldwide leader in the personal computer market in 1990 with strong sales of its PS/2 products. Dataquest estimates that IBM held 15.25 percent of the 1990 worldwide PC market based on factory revenue and 11.85 percent based on total shipments. The PS/2 Model 55SX was the leading model in 1990, netting $2.1 million in factory revenue and a 4.12 percent market share, according to Dataquest estimates. In the North American PC market, IBM also remained the market leader with a 16.92 percent market share based on revenue and a 13.29 percent share based on units shipped. During 1990, IBM announced two new high-end models of the PS/2 computer, as well as the PS/1 personal home computer.

Business Computer Systems

IBM remains the number one manufacturer and supplier in the business computer marketplace. Sales of the popular AS/400 line of business computers remained strong in 1990, and the new Enterprise System/9000 family was also well received.

In the business mainframe segment, IBM retained its leading position in 1990, amassing $15.2 billion in factory revenue and controlling a 58.69 percent market share. IBM looks to strengthen its position further in this market with the release of six new high-end models of the Enterprise System/9000 family late in 1991.

IBM's superminicomputer line was enhanced with the April 1991 introduction of the AS/400 9404 D10, D20, and D25 models. These low-end models of the AS/400 line offer significant improvement over the C10, C20, and C30 models introduced in early 1990. IBM estimates that relative system performance in the 9404 D models is increased by as much as 55 percent over the 9404 C models. Improvements in the D models include increased processor performance, additional main storage capacity, and a standard 525MB 1/4-inch tape drive for system backup.

Technical Computers

Dataquest estimates that IBM was the market leader in the technical mainframe market with a market share of 20.8 percent and $2.5 billion in factory

©1991 Dataquest Incorporated November—Reproduction Prohibited

revenue. IBM also ranked second in the worldwide supercomputing market with a 21.6 percent market share, based on estimated sales of $380.0 million. This sales total represents a 27.1 percent increase over the 1989 sales revenue of $299.0 million. IBM has continued to emphasize the importance of the rapidly emerging supercomputer market, scheduling releases of new high-end Enterprise System/9000 models for mid-1991.

IBM ranked fourth in 1990 in both the superworkstation market and the traditional workstation market, with respective market shares of 8.1 percent and 10.1 percent. IBM took a major step toward strengthening its workstation product line with the introduction of the RS/6000 series in the first quarter of 1990. Using IBM's proprietary RISC microprocessor and the AIX version of the UNIX operating system, the RS/6000 offers an impressive price/performance ratio and a wide variety of software applications. The RS/6000 series is designed for customers seeking high-performance systems capable of running applications developed for a UNIX operating system. With the 1991 introduction of the POWERserver 950, the RS/6000 family includes 13 models at various performance levels.

Telecommunications

In 1990, IBM continued to assert itself as a solid contributor to the telecommunications market with the release of CallPath Services Architecture, a system providing customers with a framework with which to integrate voice and data communications. CallPath effectively integrates telephone communications on the 9750 Business Communications System with transaction processing on the Enterprise Systems host. As a result, users can quickly access customer profiles, streamline incoming call processing, track caller information, improve customer service, and reduce costs.

In other telecommunications applications, IBM retained its market-leading position atop the North American token-ring network information center (NIC) LAN market with a 76.8 percent market share, based on 639,000 units shipped. IBM also ranked fifth in the United States modem market, with a market share of 8.0 percent and $81.0 million in factory revenue.

Display Terminals

Dataquest estimates that IBM retained its lock on the worldwide display terminal market in 1990, with a 22.6 percent market share based on unit shipments of 1.4 million. IBM continues to dominate the 3270 and 5250 display terminal markets, with market shares of 49.9 percent and 71.1 percent, respectively. IBM also ranks fourth in the emerging X Window terminal market with an 8.9 percent market share.

Electronic Printers

IBM ranked second in the 1990 North American overall printer market, with market share of 12.4 percent, based on factory revenue totaling $1.1 billion. In the line printer segment, IBM maintained its market leadership in 1990 with a 34.7 percent market share and $269.6 million in end-user revenue. The company also ranked first in the impact, SIDM-18 wire/pin, LIFF, and 21- to 30-pages-per-minute (ppm) PNPP printer segments, with respective market shares of 18.2, 58.2, 67.2, and 43.4 percent.

IBM's printer offerings are segmented into nonimpact and impact products. The nonimpact line includes the 3800, 3900, and 4000 series of printers, with speeds varying from 10 to 229 ppm. At the low end, IBM offers the 4028 Page Printer, a 10-ppm desktop page printer that offers letter-quality text through the use of an internal RISC processor. At the high end is the 3900 Advanced Function Printer, a channel-attached, high-speed fanfold printer that uses an electrophotographic printing process to print at speeds of up to 229 ppm.

IBM's line of impact printers includes the 4248, 4245, 3262, and 6262 printers, with rated speeds of 600 to 4,000 lines per minute (lpm). The 4248 Printer Model 2 uses hammer magnet technology and an etched-steel print band to print at multiple speeds of 2200, 3200, and 4000 lpm. The 4245 and 6262 series offer a wide range of medium-to-high speed impact band printers. On the low end, the 3262 Line Printer offers flexibility and price/performance for users with low- to midrange print requirements.

Computer Storage

IBM's product line in the mainframe disk storage device area consists of the 3380 and 3390 Direct Access Storage Device (DASD), first introduced in 1989. The 3390 is a 14-inch rigid disk drive system that provides up to 22.7-billion-byte capacity and 4.2 MB/sec. transfer rate. IBM's 3390 is one of the

©1991 Dataquest Incorporated November—Reproduction Prohibited

fastest, largest-capacity mainframe disk storage devices currently available. Accordingly, Dataquest estimates that IBM was the market leader in the 1990 8-to-14-inch rigid disk drive market, with a market share of 21.2 percent.

In the area of magnetic tape drives, IBM's latest offering is the 3490 Magnetic Tape Subsystem. The 3490 is a 1/2-inch tape cartridge product, with a cartridge capacity of 200MB and a transfer rate of 3 MB/sec. Dataquest estimates that IBM ranks second in the total 1/2-inch tape drive market, with a market share of 27.9 percent.

In the 1990 rigid disk storage markets, IBM held onto its third place position in the overall market with an 8.9 percent market share. In the 3.5-inch market, which IBM led as recently as 1988, the company dropped from third place in 1989 to fourth place in 1990, behind Conner Peripherals, Seagate Technology, and Quantum Corp. IBM's unit shipments remained relatively constant in 1990, increasing 9.1 percent to 2.4 million units. The company's market share dropped from 19.0 percent in 1989 to 10.9 percent in 1990, however, reflecting a 50 percent growth rate in the overall market.

Office Systems

IBM continues to rank among the market leaders in integrated office systems (IOS). IBM's main offering in this product area is the OfficeVision family, a series of office systems first introduced in 1989. OfficeVision is an SAA-compliant office system that offers a wide range of office applications for mail, address book, calendar management, library services, document processing, and decision support. OfficeVision is supported on IBM's MVS, VM, OS/400, and OS/2 LAN. The LAN version uses OS/2 Extended Edition to provide its graphical user interface, multitasking capabilities, and program-to-program communications. Through OfficeVision, IBM continues to emphasize its SAA commitment to provide a consistent platform for the development of easy-to-use, well-connected systems and applications.

Software

The emergence of the first of a series of products under IBM's SAA first occurred in 1989. The SAA strategy was designed to provide users with a common interface and connectivity across all IBM operating environments. This strategy is the cornerstone of IBM's product plans for the next decade. IBM will use SAA to integrate current product platforms with future products, unifying all software under a single architecture.

OfficeVision was the first application to incorporate the SAA guidelines. Another SAA-based product that has prospered since its introduction in 1989 is CIM Advantage, a family of products for use in manufacturing operations. IBM has continued to emphasize the importance of the SAA environment, with recent releases such as the AD/Cycle product, a set of application development tools for use with the MVS systems environment that further supports the SAA framework. In addition, IBM's SAA standard has been endorsed by more than 100 other software companies that have committed to developing products using the SAA guidelines.

IBM also strengthened its commitment to the Open Software Foundation (OSF) and the UNIX operating system marketplace. In March 1990, IBM began shipments of the AIX operating system on PS/2 products. IBM has also stepped up AIX development through its IBM business partners program. The announcement of the AIX CASE Version 3 for the RS/6000 computer erased any lingering doubts about IBM's commitment to UNIX. Version 3 of AIX CASE offers a set of software solutions and products that support the software development process for engineering, scientific, and commercial applications.

According to IBM estimates, software revenue totaled $9.95 billion in 1990, up 18.1 percent from the 1989 total of $8.4 billion. The 1990 figure represented 14.4 percent of total revenue. IBM has continued to emphasize its role as a leader in the software industry through software agreements with companies such as Apple Computer Inc., Borland International Inc., GO Corporation, Hewlett-Packard Company, Interleaf Inc., Lotus Development Corp., and Software Artistry Inc.

Semiconductors

Traditionally, IBM has not been a merchant supplier of semiconductors, and the total extent of the company's semiconductor manufacturing has been unknown. Dataquest estimates that IBM supplies at least one-half of its own semiconductors and would rank among the top three manufacturers worldwide. The July 1991 agreement with Apple Computer Inc. has opened the door on what could be a major shift in

©1991 Dataquest Incorporated November—Reproduction Prohibited

IBM's semiconductor strategy. One aspect of the deal is sale of IBM's R6000 RISC microprocessor to Apple, which IBM has admitted could be the beginning of future sales of semiconductor products to other companies.

IBM has also shifted its semiconductor strategy in the past couple of years by entering technology exchange and research agreements with other companies. In a major alignment in 1990, IBM and Siemens AG teamed up to develop and market 64Mb DRAM technologies. IBM is also working with Motorola on the use of X-ray lithography technology.

In mid-1990, IBM completed construction on its new $750 million Advanced Semiconductor Technology Center (ASTC) in East Fishkill, New York. Two-thirds of the center is devoted to general chip manufacturing research, while the remaining third of the center will be utilized in IBM's research on the use of X-ray lithography technology. IBM feels that the ASTC is critical to the company's ability to develop and fabricate future generations of high-density computer chips. The company continues to emphasize the importance of the center through the allocation of over $1 billion annually in semiconductor R&D spending.

CAD/CAM

IBM remained the market leader in the overall CAD/CAM/CAE market with factory revenue of $1.8 billion and a market share of 12.4 percent. IBM was strongest in the host/server segment of the market, garnering a 35.6 percent market share with revenue totaling $1.4 billion. CIM Advantage, the company's service providing over 50 computer-integrated-manufacturing (CIM) products and applications, continued to prosper in 1990. The offering comprises hardware and software products that integrate design, engineering, production planning, and plant operations with business planning, marketing, and distribution.

Further Information

For further information about the company's business segments, please contact the appropriate industry service.

©1991 Dataquest Incorporated November—Reproduction Prohibited

Table 1
Five-Year Corporate Highlights (Millions of U.S. Dollars)

	1986	1987	1988	1989	1990
Five-Year Revenue	51,250.0	54,217.0	59,681.0	62,710.0	69,018.0
Percent Change	2.39	5.79	10.08	5.08	10.06
Capital Expenditure	21,310.0	22,967.0	23,426.0	24,943.0	27,241.0
Percent of Revenue	41.58	42.36	39.25	39.78	39.47
R&D Expenditure	5,221.0	5,434.0	5,925.0	6,827.0	6,554.0
Percent of Revenue	10.19	10.02	9.93	10.89	9.50
Number of Employees	403,508	389,348	387,112	383,220	373,816
Revenue ($K)/Employee	127.01	139.25	154.17	163.64	184.63
Net Income	4,789.0	5,258.0	5,806.0	3,758.0	6,020.0
Percent Change	(26.94)	9.79	10.42	(35.27)	60.19

1990 Fiscal Year	Q1	Q2	Q3	Q4
Quarterly Revenue	14,185.0	16,495.0	15,277.0	23,061.0
Quarterly Profit	1,037.0	1,410.0	1,112.0	2,461.0

Source: IBM
Annual Reports
Dataquest (November 1991)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	49.49	45.99	42.43	41.05	39.31
International	50.51	54.01	57.57	58.95	60.69

Source: IBM
Annual Reports
Dataquest (November 1991)

©1991 Dataquest Incorporated November—Reproduction Prohibited

1991 SALES OFFICE LOCATIONS

North America—280
Japan—Not available
Europe—Not available
Asia/Pacific—Not available
ROW—Not available

MANUFACTURING LOCATIONS

North America

Boca Raton, Florida
PS/2 workstations, displays, printers, typewriters, publishing and consumer systems, and related operating systems software
Boulder, Colorado
PS/2 workstations, displays, printers, typewriters, publishing and consumer systems, and related operating systems software
Charlotte, North Carolina
PS/2 workstations, displays, printers, typewriters, publishing and consumer systems, and related operating systems software
Danbury, Connecticut
Circuit packaging, intermediate processors, and printers; develops programming systems
Essex Junction, Vermont
Major manufacturing facility; direct products not available
Hopewell Junction, New York
PS/2 workstations, displays, printers, typewriters, publishing and consumer systems, and related operating systems software
Lexington, Kentucky
Major manufacturing facility; direct products not available
Raleigh, North Carolina
Communications products and related operating systems software
San Jose, California
Electronic data processing systems, storage systems, mass storage systems, tape disk drive products
Somers, New York
Communications products and related operating systems software
White Plains, New York
Small and intermediate systems, general-purpose systems and related programming, direct access storage devices, typewriters, printers, copiers, logic memory, special semiconductor devices, and multilayer ceramics

Europe

Greenloch, Scotland
Personal computers

SUBSIDIARIES

North America

Canada Limited (Canada)
IBM Americas/Far East Systems Corp. (United States)
IBM Credit Corp. (United States)
IBM Credit Leasing Corp. (United States)
IBM Foreign Sales Corp. Ltd. (United States)
IBM International Corp. (United States)
IBM Roece Inc. (United States)
IBM Southeast Asia Services Ltd. (United States)
IBM World Trade Corp. (United States)
IBM World Trade Europe/Middle East/Africa Corp. (United States)
Satellite Transponder Leasing Corp. (United States)
WTC Insurance Corp. Ltd. (United States)

Japan

IBM Japan Ltd.
IBM World Trade Asia Corp.

Europe

Compagnie IBM France S.A. (France)
Companhia IBM Portuguesa S.A. (Portugal)
IBM Danmark A/S (Denmark)
IBM Deutschland GmbH (Netherlands)
IBM Distribution and Support S.A. (Spain)
IBM Eurocoordination S.A. (Spain)
IBM Europe S.A. (Spain)
IBM Hellas Information Handling Systems S.A. (Spain)
IBM Ireland Ltd. (Ireland)
IBM Italia Ltd. S.p.A. (Italy)
IBM Latin American Region S.A. (Spain)
IBM Nederland N.V. (Netherlands)
IBM Oesterreich Internationale Bueromaschinen Gessellschaft GmbH (West Germany)
IBM of Belgium S.A. (Belgium)
IBM S.A.E. (Spain)
IBM Svenska Aktiebolag (Sweden)
IBM Switzerland (Switzerland)
IBM Trade Development S.A. (Spain)

©1991 Dataquest Incorporated November—Reproduction Prohibited

IBM United Kingdom Holdings Ltd. (United Kingdom)
Oy IBM AB (Finland)

Asia/Pacific

IBM Australia Ltd. (Australia)
IBM China/Hong Kong Corp. (Hong Kong)
IBM Korea Inc. (Korea)
IBM Korea Systems Corp. (Korea)
IBM New Zealand Ltd. (New Zealand)
IBM Philippines Inc. (Philippines)
IBM Singapore Pte. Ltd. (Singapore)
IBM Taiwan Corp. (Taiwan)
IBM Thailand Co. Ltd. (Thailand)
Thai Systems Corp. Ltd. (Thailand)

ROW

IBM Argentina S.A. (Argentina)
IBM Bahamas Ltd. (Bahamas)
IBM Brasil-Industria, Maquinas E Servicos Ltda. (Brazil)
IBM De Bolivia S.A. (Bolivia)
IBM De Chile S.A.C. (Chile)
IBM De Colombia S.A. (Colombia)
IBM De Costa Rica S.A. (Costa Rica)
IBM De Guatemala S.A. (Guatemala)
IBM De Honduras S.A. (Honduras)
IBM Del Ecuador C.A. (Ecuador)
IBM Del Peru S.A. (Peru)
IBM Del Uruguay S.A. (Uruguay)
IBM De Mexico S.A. (Mexico)
IBM De Panama S.A. (Panama)
IBM De Venezuela S.A. (Venezuela)
IBM Israel Ltd. (Israel)
IBM Turk Ltd. Sirketi (Turkey)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1991

Apple Computer Inc.
IBM and Apple signed a landmark agreement to develop and market new technologies that will integrate with their existing and future products.

Borland International Inc.
IBM and Borland agreed to adapt current Borland tools and languages to run on IBM's OS/2 2.0 operating system.

K-C Computer Services Corp.
IBM and K-CCS signed a licensing agreement and will jointly market CSP/Application Development Enabler, a K-CCS product that enhances IBM's Cross System product.

Lotus Development Corporation
IBM agreed to market Lotus' Notes software into its Office Vision office automation platform.

Micrografx Inc.
IBM and Micrografx signed a licensing and development agreement designed to improve the compatibility and performance of OS/2.

Motorola
IBM and Motorola signed a licensing agreement covering integrated circuit chip mounting technologies.

Novell Inc.
The two companies agreed to a product licensing, distribution, and support relationship in which IBM will include Novell's NetWare products in its family of network offerings.

Siemens AG
Siemens and IBM signed a technology agreement involving the development and marketing of 64Mb DRAM technologies.

Tandon Corporation
The two companies will jointly develop and cross-license PC technoloogy.

Valid Logic Systems Inc.
The two companies signed an agreement in which Valid will develop an integrated process for system-level electronic design at IBM development labs worldwide.

Wang Laboratories Inc.
IBM and Wang signed a deal in which Wang will market IBM computers, assisting Wang customers in replacing their Wang minicomputers with IBM models.

1990

3Com Corporation
IBM and 3Com entered a joint development agreement that will define a new set of network management specifications for mixed-media local area networks.

©1991 Dataquest Incorporated November—Reproduction Prohibited

Delphi Technology Inc.
IBM and Delphi signed an agreement in which IBM will manufacture automated photo machines (APMs) for Delphi.

Diebold Inc.
IBM and Diebold formed a joint venture that will provide self-service banking systems worldwide.

Digitalk Inc.
The two companies signed a development and licensing agreement that licenses Digitalk's OS/2 implementation of Smalltalk/V and future Digitalk offerings for prototyping and product development.

GO Corporation
IBM and GO signed a software licensing agreement under which GO will provide IBM with software technology for the development of future computers that are operated by a pen.

Hewlett-Packard Company
IBM and HP signed a licensing agreement for technology related to computer-aided software engineering (CASE).

Index Technology Corporation
IBM and Index entered into new agreements to develop AD/Cycle business tools that use IBM's Repository Manager/MVS host product, PS/2, and OS/2 EE workstation platforms.

Interleaf Inc.
IBM and Interleaf entered into a joint development agreement to create a Japanese version of Interleaf software for use on the IBM RS/6000.

Micro Focus Inc.
IBM and Micro Focus announced a distribution agreement that will offer users of IBM's Customer Information Control System (CICS) a more efficient way to develop and test CICS applications by using the CICS OS/2 operating system.

Rockwell International Corp.
IBM's Systems Integration Division and Rockwell's Collins Defense Communications business entered into an agreement to produce advanced digital signal processing devices containing VHSIC technology.

Software Artistry Inc.
IBM named Software Artistry as an IBM Cooperative Software Supplier under the IBM Cooperative Software program. The three products specifically targeted in the agreement are Software Artistry's PC Expert Professional, Application Software Expert, and the Knowledge Engine.

Sun Microsystems Inc.
Sun and IBM signed a patent cross-license agreement, granting each company a worldwide, nonexclusive license covering patents having an effective filing date before July 1, 1995.

U.S. Trust Corp.
IBM and U.S. Trust Corporation formed a joint venture that will provide integrated information systems solutions to trust banks and other customers in the financial services industry.

1989

Toshiba Corporation
IBM and Toshiba entered into a joint venture to produce lightweight computer screens.

NCR Corporation
IBM and NCR entered into an MCA licensing agreement.

Wang Laboratories
IBM and Wang entered into an MCA licensing agreement.

Haushahn GmbH
IBM and Haushahn GmbH will be jointly developing an automated tape-drive library.

Samsung Electronics Company Ltd.
The companies entered into a patent cross-licensing agreement.

Baxter International
IBM and Baxter International are codeveloping computer products and services for the rapidly growing health-care information management market.

Motorola Incorporated
IBM and Motorola entered into a joint development of a national X-ray lithography program.

Micron Technology Inc.
IBM has licensed 4Mb DRAM technology from Micron Technology.

Microsoft Corporation
IBM and Microsoft Corporation are codeveloping an open industry standard for multimedia personal computing systems.

Chips & Technologies Inc.
IBM and Chips & Technologies are codeveloping and marketing chip sets that are used in busmasters and other Micro Channel adapter cards.

©1991 Dataquest Incorporated November—Reproduction Prohibited

Intel Corporation
IBM and Intel are codeveloping and marketing Micro Channel chip sets.

Modicon
IBM and Modicon have signed a development and marketing alliance in which Modicon will support mutual development of products that move Modicon controller and communication products and IBM industrial computer products.

1988

Siemens AG
IBM and Siemens have joined forces to compete in the global PBX and private networking markets. (As a part of this agreement, IBM sold its ROLM subsidiary to Siemens.)

MERGERS AND ACQUISITIONS

1991

Metaphor Computer Systems Inc.
IBM acquired Metaphor to provide graphical user interface technology for the new Apple/IBM venture.

KEY OFFICERS

John F. Akers
Chairman of the board, chief executive officer

Jack D. Kuehler
President

***C. Michael Armstrong**
Chairman of the board, senior vice president, and president of World Trade Corporation

Walton E. Burdick
Senior vice president of Personnel

George H. Conrades
Senior vice president and general manager of IBM U.S.

Carl J. Conti
Senior vice president and general manager, Enterprise Systems

Donato A. Evangelista
Senior vice president and general counsel

***Terry R. Lautenbach**
Senior vice president

David E. McKinney
Senior vice president

***Frank A. Metz, Jr.**
Senior vice president, Finance and Planning

Stephen B. Schwartz
Senior vice president, market-driven quality

Patrick A. Toole
Senior vice president and general manager, worldwide manufacturing and development operations

Earl F. Wheeler
Senior vice president and general manager, Programming Systems

*Members of management committee

©1991 Dataquest Incorporated November—Reproduction Prohibited

Table 3
Balance Sheet
Fiscal Year Ending in December
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1986	1987	1988	1989	1990
Cash	755.0	770.0	1,072.0	741.0	1,189.0
Receivables	10,825.0	13,849.0	18,100.0	20,164.0	22,644.0
Marketable Securities	6,502.0	6,197.0	5,051.0	1,261.0	698.0
Inventory	8,039.0	8,645.0	9,565.0	9,463.0	10,108.0
Other Current Assets	1,628.0	1,559.0	1,555.0	4,246.0	4,281.0
Total Current Assets	27,749.0	31,020.0	35,343.0	35,875.0	38,920.0
Net Property, Plants	21,268.0	22,922.0	23,426.0	24,943.0	27,241.0
Other Assets	8,797.0	9,746.0	14,268.0	16,916.0	21,407.0
Total Assets	57,814.0	63,688.0	73,037.0	77,734.0	87,568.0
Total Current Liabilities	12,743.0	13,377.0	17,387.0	21,700.0	25,276.0
Long-Term Debt	4,169.0	3,858.0	8,518.0	10,825.0	11,943.0
Other Liabilities	6,528.0	8,190.0	7,623.0	6,700.0	7,517.0
Total Liabilities	23,440.0	25,425.0	33,528.0	39,225.0	44,736.0
Converted Preferred Stock	0	0	0	0	0
Capital Stock	6,321.0	6,417.0	6,442.0	6,341.0	6,357.0
Other Equity	219.0	2,830.0	1,917.0	1,691.0	3,241.0
Retained Earnings	27,834.0	29,016.0	31,150.0	30,477.0	33,234.0
Total Shareholders' Equity	34,374.0	38,263.0	39,509.0	38,509.0	42,832.0
Total Liabilities and Shareholders' Equity	57,814.0	63,688.0	73,037.0	77,734.0	87,568.0

Source: IBM
Annual Reports
Dataquest (November 1991)

©1991 Dataquest Incorporated November—Reproduction Prohibited

Table 4
Consolidated Income Statement
Fiscal Year Ending in December
(Millions of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1986	1987	1988	1989	1990
Revenue	51,250.0	54,217.0	59,681.0	62,710.0	69,018.0
U.S. Revenue	25,362.0	24,937.0	25,320.0	25,745.0	27,132.0
Non-U.S. Revenue	25,888.0	29,280.0	34,361.0	36,965.0	41,886.0
Cost of Sales	16,197.0	17,332.0	25,648.0	27,701.0	30,723.0
R&D Expense	5,221.0	5,434.0	5,925.0	6,827.0	6,554.0
SG&A Expense	15,464.0	16,431.0	19,362.0	21,289.0	20,709.0
Capital Expense	21,310.0	22,967.0	23,426.00	24,943.0	27,241.0
Pretax Income	8,389.0	8,609.0	8,746.0	6,645.0	10,203.0
Pretax Margin (%)	16.37	15.88	14.65	10.60	14.78
Effective Tax Rate (%)	42.90	38.90	39.20	43.4	41.0
Net Income	4,789.0	5,258.0	5,806.0	3,758.0	6,020.0
Shares Outstanding, Millions	612.8	602.9	592.4	581.1	572.6
Per Share Data					
Earnings	7.81	8.72	9.27	6.47	10.51
Dividend	4.40	4.40	4.40	4.73	4.84
Book Value	56.09	63.46	66.69	66.27	74.80

Source: IBM
Annual Reports
Dataquest (November 1991)

Table 5
Key Financial Ratios
Fiscal Year Ending in December

Key Financial Ratios	1986	1987	1988	1989	1990
Liquidity					
Current (Times)	2.18	2.32	2.03	1.65	1.54
Total Assets/Equity (%)	168.19	166.45	184.86	64.77	204.45
Current Liabilities/Equity (%)	37.07	34.96	44.01	56.35	59.01
Total Liabilities/Equity (%)	68.19	66.45	84.86	201.86	104.45
Profitability (%)					
Return on Assets	8.28	8.26	7.95	4.83	6.87
Return on Equity	13.93	13.74	14.70	9.76	14.05
Profit Margin	9.34	9.70	9.73	5.99	8.72
Other Key Ratios					
R&D Spending % of Revenue	10.19	10.02	9.93	10.89	9.50
Capital Spending % of Revenue	41.58	42.36	39.25	39.78	39.47
Employees	403,508	389,348	387,112	383,220	373,816
Revenue ($K)/Employee	127.01	139.25	154.17	163.64	184.63
Capital Spending % of Assets	36.86	36.06	32.07	32.09	31.11

Source: IBM
Annual Reports
Dataquest (November 1991)

©1991 Dataquest Incorporated November—Reproduction Prohibited

NEC Corporation

33-1 Shiba 5-chome
Minato-ku, Tokyo 108, Japan
Telephone: (03) 454-1111
Fax: (03) 452-6351
Dun's Number: 00-183-6014

Date Founded: July 1899

CORPORATE STRATEGIC DIRECTION

NEC Corporation (known as Nippon Electric Company Ltd. prior to April 1, 1983) was founded in 1899 to manufacture telephone sets and switchboards. NEC is a leading global supplier of a broad range of communications systems and equipment, computers and industrial electronic systems, electron devices, consumer electronics, and information services. The company bases its activities on the synergistic integration of computers and communications systems.

NEC divides its operations into five main product groups: Communications Systems and Equipment, Computers and Industrial Electronic Systems, Electron Devices, Home Electronic Products, and Other Operations. In 1990, the Computers and Industrial Electronic Systems group remained the largest in terms of percentage of total revenue, with sales totaling ¥1.5 trillion (U.S.$9.5 billion), which accounted for 43.7 percent of total revenue. (Percentage changes refer only to ¥ amounts; U.S.$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) This figure was up 13 percent from the group's 1989 revenue of ¥1.3 trillion (U.S.$8.4 billion). The biggest rate of increase in 1990 came from the Other Operations group, whose 1990 revenue of ¥192.9 billion represented a 23.7 percent increase over the 1989 total of ¥155.9 billion.

NEC reported consolidated revenue for fiscal year ending March 31, 1990, of ¥3.44 trillion, or approximately U.S.$22.2 billion, up 11.7 percent from fiscal 1989's total of ¥3.08 trillion (U.S.$19.5 billion). Net income rose 32.1 percent from ¥64.48 billion (U.S.$408.1 million) in fiscal 1989 to ¥85.22 billion (U.S.$539.4 million) in fiscal 1990.

NEC points to the strength of the domestic Japanese economy as a major contributor to its strong operating results. NEC operates 56 consolidated subsidiaries, 62 manufacturing plants, and more than 300 sales offices in Japan. Domestic sales in 1990 totaled ¥2.55 trillion, accounting for 74.0 percent of total sales. Overseas, NEC markets its products through a network of 68 subsidiaries and affiliates in 28 countries. Overseas sales increased 15.0 percent in 1990, climbing to ¥892.1 billion, or 25.9 percent of total revenue.

Capital expenditure increased 20.3 percent during fiscal 1990 to ¥343.8 billion, representing 10 percent of total revenue. Research and development expenditure totaled ¥552.9 billion for fiscal 1990, representing 16.1 percent of revenue.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Information on revenue by distribution channel is not available. Tables 3 through 5, at the end of this backgrounder, present comprehensive financial information.

BUSINESS SEGMENT STRATEGIC DIRECTION

Computers and Industrial Electronic Systems

NEC's Computers and Industrial Electronic Systems group manufactures, designs, and markets a diverse product line of mainframe computers, personal computers, small business computers, peripherals, software, and industrial electronics systems. In 1990, sales of computers and industrial electronic systems rose 13.1 percent to ¥1.51 trillion, accounting for 43.8 percent of total sales.

NEC introduced a number of new products designed to strengthen and expand its product line in 1990. In

©1991 Dataquest Incorporated October—Reproduction Prohibited

February, NEC released the NEC System 3600 series of large-scale mainframe computers, a series featuring bipolar complementary metal oxide semiconductors (BiCMOS) to increase processing speed and reduce power consumption. NEC also added 12 new models to its popular PC-9800 series. Designed for scientific and engineering calculations, image processing, and communication that requires high-speed processing, the PC-H98 features new extended standard architecture, a 32-bit bus architecture offering a faster data transfer rate. Other PC-9800 series additions include the PC-9801N NOTE laptop and a new addition to the PC PowerMate series that adopts the extendeed industry standard architecture. In the software market, NEC released SPECDESSIN, a development support system for business-application software that improves efficiency in system design for mainframes.

NEC's PC product line centers around the PC-9800 and PowerMate series. According to Dataquest estimates, the PC-9801 XXXX was the sixth-rated model in the 1990 worldwide desktop computer market, with a market share of 2.09 percent based on 312,000 units shipped. NEC ranked third in the 1990 worldwide desktop market, trailing only IBM Corporation and Apple Computer Inc. NEC garnered 7.85 percent of the market with sales totaling $2.5 billion. The PC-9801 N/NV laptop computer was the leading model in the 1990 worldwide laptop D/C market, bringing in $319.9 million in factory revenue and an 8.11 percent market share. NEC ranked second overall in the 1990 worldwide laptop D/C market with an 18.17 percent market share and $715.6 million in factory revenue. NEC is also active in the computer storage market; Dataquest estimates that NEC ranked sixth in the total rigid disk drive market, with 2.1 million units shipped in 1990 and a 7.1 percent market share. The company's strongest entry in the storage market is 8- to 14-inch disk drives; NEC ranked third in the worldwide market in 1990 with a 13.8 percent market share.

Electron Devices

NEC is active in the production of various memories, microcontrollers, microcomponents, integrated circuits (ICs), gate arrays, and logic devices through its Electron Devices product group. The group's sales increased 7.1 percent to ¥605.9 billion in 1990, comprising 17.6 percent of total revenue. Dataquest estimates that NEC was the world leader in semiconductor sales in 1990, possessing an 8.4 percent market share based on $4.9 billion in factory revenue. NEC was also the worldwide market leader in 1990 in the total IC, the MOS Digital, and the MOS Logic markets with respective market shares of 8.9, 10.8, and 11.3 percent.

During fiscal 1990, NEC began production of 4Mb DRAMs at its manufacturing facilities in Yamaguchi and Kyushu. Production of 4Mb DRAMs also began in 1990 at NEC's new Hiroshima manufacturing plant. Other major accomplishments for the group in 1990 included a joint venture with AT&T Microelectronics of the United States, involving cooperation on semiconductor technologies such as gate arrays; the development of the world's fastest 4Mb SRAM; the introduction of the company's first 32-bit RISC products, the VR3000 and the VR3010; the release of a 75mW helium-neon (He-Ne) laser designed for spectral analysis and holography; and the release of a new gallium arsenide prescaler IC for VSATs that responds at frequencies up to 14 GHz.

Communications Systems and Equipment

Communications systems are an integral part of NEC's vision of "C&C," the company's corporate strategy of integrating computers and communication. NEC's product line in the communications industry includes digital switching systems, fiber-optic and radio transmission systems, space electronics, mobile communications systems, customer premises equipment, and broadcast equipment. The Communications Systems and Equipment group's revenue increased 9.1 percent in 1990 to ¥875 billion, representing 25.4 percent of total revenue.

Dataquest estimates that NEC ranked fifth in the 1990 North American PBX systems market with 309,400 lines installed and a 6.9 percent market share. NEC also ranked third in 1990 in Segment 5 of the North American facsimile equipment market with a 7.8 percent market share.

Major contracts in 1990 included an order for an optical submarine cable system, which will link Japan, Hong Kong, and the Republic of Korea. Two NEC satellites were released in 1990 by Japan's National AeroSpace Development Agency: the Momo-1b marine observation satellite and the Fuji 2 amateur radio satellite. NEC also strengthened its Integrated Services Digital Network (ISDN) product line in fiscal 1990 with the introduction of two new products: the G4 facsimile NEFAX D800, designed to meet the needs of ISDN services primarily in domestic financial institutions and local government, and the Advanced DK Series digital key telephone system.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Home Electronics Products

Home electronics products in NEC's portfolio include color TV receivers and projectors, VCRs, videodisk players, and other small home electronics devices such as electronic diaries. The group's sales increased 16.8 percent to ¥264 billion in 1990, and accounted for 7.7 percent of total revenue. NEC has been active in the introduction of the state-of-the-art broadcast satellite visual audio home entertainment system. In 1990, the PARABOLA series of home-use direct broadcast satellite receiver systems was released, consisting of antennas, tuners, televisions, VCRs, and projection televisions using the new tuning systems.

Other Operations

Other services offered by NEC include value-added network (VAN) information services, electrical connectors, and measuring and testing systems. The Other Operations group was NEC's fastest-rising group in terms of revenue in fiscal 1990. The group's revenue increased 23.7 percent to ¥193 billion, representing 5.6 percent of total revenue.

The VAN information system has continued to gain widespread acceptance both in Japan and internationally. The number of subscribers to the company's PC-based VAN service doubled during 1990; the current total is more than 100,000 subscribers. In 1990, NEC released the C&C Marine VAN Service, which provides ships at sea with the same communications services offered to onshore subscribers. NEC also released the AF-8410P memory testing system in 1990, which boasts the world's highest test rate of 500 MHz.

Further Information

For further information about the company's business segments, please contact the appropriate industry service.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 1
Five-Year Corporate Highlights (Millions of U.S. Dollars)

	1986	1987	1988	1989	1990
Five-Year Revenue	13,501	17,159	22,220	23,510	22,179
Percent Change	46.24	27.09	29.49	5.81	(5.66)
Capital Expenditure	1,648	1,326	2,016	2,148	2,176
Percent of Revenue	12.20	7.73	9.07	9.14	9.81
R&D Expenditure	1,836	2,629	3,496	3,657	3,499
Percent of Revenue	13.60	15.32	15.73	15.56	15.78
Number of Employees	95,796	101,227	102,452	104,022	104,022
Revenue ($K)/Employee	140.94	169.51	216.88	226.01	213.22
Net Income	153	103	205	485	539
Percent Change	(42.92)	(32.55)	98.54	137.07	11.26

1990 Fiscal Year	Q1	Q2	Q3	Q4
Quarterly Revenue	N/A	NA	NA	NA
Quarterly Profit	NA	NA	NA	NA

NA = Not available

Source: NEC Corporation
Annual Reports
Dataquest (October 1991)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
Japan	67.00	72.00	73.00	75.00	74.00
All Others	33.00	28.00	27.00	25.00	26.00

Source: NEC Corporation
Annual Reports
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

1990 SALES OFFICE LOCATIONS

Japan—More than 300
Overseas—170

MANUFACTURING LOCATIONS

Japan

Ando Electric
Measuring and testing systems
Anelva Corp.
Semiconductor manufacturing equipment, vacuum equipment
Anritsu Corp.
Communications and electronic equipment, measuring instruments
Anten Kogyo
Antennas, related equipment
Japan Aviation Electronics
Electrical connectors, electronic equipment
Kaijo Denki
Industrial marine equipment
NEC Akita
ICs, discrete semiconductor devices
NEC Data Terminals
Computer terminals
NEC Fukui
ICs, discrete semiconductor devices
NEC Fukuoka
ICs
NEC Fukushima
Communications equipment, related components
NEC Gunma
Computers, related systems
NEC Hiroshima
4Mb DRAMs
NEC Home Electronics
TVs, home electronic appliances, electronic parts
NEC Hyogo
Communications equipment parts
NEC Ibaraki
Computers, related systems
NEC Kagoshima
Electronic devices
NEC Kansai
ICs, discrete semiconductor devices, electronic devices
NEC Kofu
Development of computers
NEC Kumamoto
ICs
NEC Kyushu
ICs
NEC Miyagi
Communications equipment, related components
NEC Nagano
Home electrical appliances
NEC Niigata
Computers, related systems
NEC Oita
ICs
NEC Radio & Electronics
Communications equipment, related components
NEC Saitama
Communications equipment, related components
NEC San-ei Instruments
Medical electronic equipment, industrial measuring systems
NEC Shizuoka
Communications equipment, computer terminals
NEC Tohoku
Communications equipment, computer terminals
NEC Toyama
Electronic devices
NEC Yamagata
ICs, discrete semiconductor devices
NEC Yamaguchi
ICs
NEC Yonezawa
Communications equipment, computer terminals
Nico Electronics
Special communications equipment, vending machines
Nippon Avionics
Electronic equipment for aircraft
Nippon Electric Glass
CRTs, other glass products
Nippon Electric Industry
Electrical machinery, precision instruments
Nitsuko Ltd.
Communications equipment and parts
Showa Koki Seizo
Optical precision instruments
Takasago Ltd.
Telephones, communications equipment
Tama Electric
Resistors
Tohoku Metal Industries
Magnetic materials
Tokin Corp.
Magnetic materials, electric parts
Toyo Communication Equipment
Communications equipment and parts

©1991 Dataquest Incorporated October—Reproduction Prohibited

North America

NEC America
  Faxes, printers, magnetic disk drives
NEC Electronics
  256K DRAMs
NEC Home Electronics
  Home electronic products, laptop PCs
NEC Information Systems
  Office computers, printers, etc.
NEC Research Institute
  R&D center

Europe

NEC Ireland
  ICs
NEC Semiconductor, United Kingdom
  256K DRAMs
NEC Technologies, United Kingdom
  VCRs, printers, car telephones, faxes

Asia/Pacific

NEC Electronics Singapore
  Linear ICs, 256K DRAMs
NEC Home Electronics, Malaysia
  Home electronic products
NEC Semiconductor, Malaysia
  ICs, discrete semiconductor devices
NEC Technologies, Thailand
  Telephones
PERNAS NEC Telecommunications, Malaysia
  Communications equipment
Siam NEC Company (Thailand)
  Color TVs
Taiwan Telecommunications Ind.
  Communications equipment

ROW

NEC Australia
  ICs
NEC de Mexico
  Communications equipment
NEC do Brazil
  Telephone switching systems, radio equipment electronics
NEC Home Electronics, Australia
  Color TVs
PECOM-NEC, Argentina
  Digital electronic switching
Philco Argentina
  TVs, radios, etc.

SUBSIDIARIES

Japan

ANELVA Corporation
Ando Electric Company Ltd.
Japan Aviation Electronics Industry Ltd.
NEC Akita Ltd.
NEC Data Terminals Ltd.
NEC Engineering Ltd.
NEC Factory Engineering Ltd.
NEC Field Service Ltd.
NEC Fukui Ltd.
NEC Fukuoka Ltd.
NEC Fukushima Ltd.
NEC Gunma Ltd.
NEC Home Electronics Ltd.
NEC Hyogo Ltd.
NEC Ibaraki Ltd.
NEC Information Service Ltd.
NEC Kagoshima Ltd.
NEC Kansai Ltd.
NEC Kumamoto Ltd.
NEC Kyushu Ltd.
NEC Miyagi Ltd.
NEC Nagano Ltd.
NEC Niigata Ltd.
NEC Oita Ltd.
NEC Radio & Electronics Ltd.
NEC Saitama Ltd.
NEC San-ei Instruments Ltd.
NEC Shizuoka Ltd.
NEC Software Ltd.
NEC System Integration & Construction Ltd.
NEC Tohoku Ltd.
NEC-Toshiba Information Systems Inc.
NEC Toyama Ltd.
NEC Warehouse and Distribution Ltd.
NEC Yamagata Ltd.
NEC Yamaguchi Ltd.
NEC Yonezawa Ltd.
Nippon Avionics Co. Ltd.

North America

HNSX Supercomputers Inc. (United States)
NEC America Inc. (United States)
NEC Business Communication Systems (United States)
NEC Canada Inc. (Canada)
NEC Electronics Inc. (United States)
NEC Industries Inc. (United States)
NEC Logistics America Inc. (United States)
NEC Research Institute Inc. (United States)

©1991 Dataquest Incorporated October—Reproduction Prohibited

NEC USA Inc. (United States)
NMI Corporation (United States)

Europe

NEC Business Systems (Italiana) s.r.l. (Italy)
NEC Deutschland GmbH (Germany)
NEC Electronics (Europe) GmbH (Germany)
NEC Electronics (France) S.A. (France)
NEC Electronics (Germany) GmbH (Germany)
NEC Electronics Italiana s.r.l. (Italy)
NEC Electronics (UK) Limited (United Kingdom)
NEC Finland OY (Finland)
NEC France S.A. (France)
NEC Electronics GmbH (West Germany)
NEC Iberia S.A. (Spain)
NEC Industries Netherlands B.V. (Netherlands)
NEC Scandinavia AB (Sweden)
NEC Semiconductors Ireland Limited (Ireland)
NEC Semiconductors (UK) Limited (United Kingdom)
NEC Technologies (UK) Ltd. (United Kingdom)
NEC (UK) Ltd. (United Kingdom)

ROW

Home Electronics Co. Ltd. (Thailand)
NEC Argentina S.A. (Argentina)
NEC Australia Pty. Ltd. (Australia)
NEC do Brasil S.A. (Brazil)
NEC Chile S.A. (Chile)
NEC Colombia S.A. (Colombia)
NEC Communication Systems (Thailand) Co. Ltd. (Thailand)
NEC Customer Services (Australia) Pty. Ltd. (Australia)
NEC Electronics Hong Kong Limited (Hong Kong)
NEC Electronics Singapore Pte. Ltd. (Singapore)
NEC Electronics Taiwan Limited (Taiwan)
NEC Engineering (Thailand) Co. Ltd. (Thailand)
NEC Home Electronics Australia Pty. Ltd. (Australia)
NEC Home Electronics (Malaysia) Sdn. Bhd. (Malaysia)
NEC Hong Kong Limited (Hong Kong)
NEC Information Systems Australia Pty. Ltd. (Australia)
NEC de Mexico, S.A. de C.V. (Mexico)
NEC Nigeria Limited (Nigeria)
NEC Sales (Malaysia) Sdn. Bhd. (Malaysia)
NEC Saudi Arabia Limited (Saudi Arabia)
NEC Semiconductors Sdn. Bhd. (Malaysia)
NEC Singapore Pte. Ltd. (Singapore)
NEC Taiwan Ltd. (Taiwan)
NEC Technologies Hong Kong Limited (Hong Kong)
NEC Technologies Philippines Inc. (Philippines)
NEC Technologies (Thailand) Co. Ltd. (Thailand)
NEC (Thailand) Ltd. (Thailand)
NEC de Venezuela (Venezuela)
New Zealand Telecommunications Systems Support Centre Limited (New Zealand)
PERNAS NEC Telecommunications Sdn. Bhd. (Malaysia)
Siam NEC Co. Ltd. (Thailand)
Taiwan Telecommunication Industry Co. Ltd. (Taiwan)
Tianjin NEC Telecommunications Engineering Co. Ltd. (China)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1991

AT&T Corporation
The two companies agreed to jointly produce digital car telephone systems targeted at Japanese communications companies. In a separate agreement, the two companies also agreed to jointly develop 0.35-micron CMOS technologies.

Robert Bosch GmbH
The two companies signed an agreement giving NEC worldwide rights to design, develop, and market large-scale integrated circuits that conform with Bosch's Controller Area Network specification.

DEC Corporation
NEC joined DEC's PowerFrame Synergy Programme, a union of 23 companies designed to promote industry standards in ASIC design.

IBM Japan Ltd.
NEC and IBM Japan signed an agreement whereby IBM Japan will market NEC's SX-3 supercomputer.

NTT Corporation
NEC and NTT signed a joint technology agreement dealing with the joint development of a digital portable telephone with a volume of only 195cc.

Otsuka Shokai and Matra Datavision K.K.
NEC and Otsuka Shokai made an agreement with Matra Datavision K.K., under which NEC and Otsuka Shokai will market a version of Matra Datavision's EUCLID-IS 3-D mechanical CAD/CAM/CAE software.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Sanyo Corporation
Sanyo entered the UNIX engineering market by signing a technology agreement with NEC that allows Sanyo to sell NEC's EWS4800 Series engineering workstations.

Valid Logic Systems Inc.
Valid Logic Systems signed a $1 million technology development agreement with NEC for the development of analog IC tools.

1990

Hughes Aircraft Company
Hughes Aircraft licensed NEC to build C-Nite night-attack fire control equipment for Japanese Ground Self Defense Force AH-1S antitank helicopters.

Philips NV
NEC and Philips signed a licensing agreement to manufacture and market chips using Philips I(2)C-bus system technology.

Texas Instruments Inc. (TI)
NEC and TI renewed their five-year semiconductor patent cross-licensing agreement.

1989

MIPS Computer Systems Inc.
MIPS entered into a royalty-bearing technology exchange with Siemens and NEC for its RISC MPUs. NEC plans to manufacture the R2000A and R3000 devices and peripherals in Japan and Europe. Siemens will manufacture in Europe.

1988

Optoelectronics Research Labs
Photodiodes

Summit Microcircuits
64K/256K fast SRAMS

Enabling Technologies Inc.
Enabling Technologies entered into a strategic alliance with NEC Home Electronics (United States) to develop products and explore new technologies in graphics manipulation, animation, and optical media.

British Telecom U.K.
NEC's U.K. subsidiary, NEC Technologies, manufactures jointly developed car telephones for British Telecom.

Honeywell Bull
NEC Computer Systems and Honeywell Bull will cooperate in R&D of artificial intelligence.

Corvus Systems
NEC and Corvus Systems are involved in joint development of a CMOS single-chip controller.

Digital Research Incorporated
NEC has a joint-marketing agreement with Digital Research regarding a CP/M operating system for the V Series.

Oki
NEC has developed a CMOS signal processor (uPD77C20) with Oki.

Sharp Electronics Corporation
NEC and Sharp agreed to jointly develop and produce V Series microperipherals. Under the agreement, NEC will provide its original microperipherals to Sharp on an OEM basis, and Sharp will develop new microprocessors for NEC.

Sharp and Sony
Sharp and Sony have been announced as second sources for the NEC V Series.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Kenzo Nakamura
Chairman of the board

Tadahiro Sekimoto
President

Yoshiteru Ishii
Senior executive vice president

Koji Maeda
Senior executive vice president

Toshiro Kunihiro
Senior executive vice president

©1991 Dataquest Incorporated October—Reproduction Prohibited

PRINCIPAL INVESTORS

Sumitomo Life Insurance
Sumitomo Trust & Banking
Sumitomo Bank
Mitsubishi Trust & Banking
Nippon Life Insurance
Dai-ichi Mutual Life Insurance
Sumitomo Marine & Fire Insurance
Toyo Trust & Banking
Sumitomo Electric Industries
Sumitomo Corporation

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 3
Balance Sheet
Fiscal Year Ending March 31
(Millions of U.S. Dollars)

Balance Sheet	1986	1987	1988	1989	1990
Cash	822.6	1,229.0	1,685.9	2,930.5	2,230.8
Receivables	3,635.7	4,670.8	5,987.3	6,568.7	6,329.5
Marketable Securities	437.0	558.8	404.9	442.9	424.3
Inventory	3,087.9	4,100.2	5,243.0	5,140.1	4,657.6
Other Current Assets	748.1	1,493.4	1,436.5	889.2	516.6
Total Current Assets	8,731.3	12,052.2	14,757.6	15,971.4	14,158.8
Long-Term Receivables and Investments	1,563.9	1,662.1	2,101.1	2,247.4	1,970.4
Net Property, Plants	3,621.0	4,395.2	5,490.5	5,787.7	6,061.6
Other Assets	612.8	834.9	1,077.5	1,154.6	1,125.6
Total Assets	14,529.0	18,944.4	23,426.7	25,161.1	23,316.4
Total Current Liabilities	7,987.6	10,162.9	12,878.5	13,234.8	12,408.9
Long-Term Debt	3,579.7	5,052.8	5,480.4	6,431.1	5,478.8
Other Liabilities	163.7	206.4	283.9	311.9	332.6
Total Liabilities	11,731.0	15,422.1	18,642.8	19,977.8	18,220.3
Common Stock	600.0	784.3	1,184.9	1,202.8	1,109.8
Additional Paid-In Capital	953.6	1220.0	1716.7	1842.9	1,700.9
Other Equity	44.9	49.1	64.0	75.1	289.8
Retained Earnings	1,199.7	1,470.0	1,818.8	2,068.9	1,995.7
Treasury Stock	(0.1)	(0.8)	(0.2)	(6.5)	(0.1)
Total Shareholders' Equity	2,798.2	3,523.4	4,784.4	5,189.7	5,096.2
Total Liabilities and Shareholders' Equity	14,529.1	18,944.7	23,427.0	25,161.0	23,316.4

Source: NEC Corporation
Annual Reports
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 4
Consolidated Income Statement
Fiscal Year Ending March 31
(Millions of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1986	1987	1988	1989	1990
Revenue	13,501.3	17,159.1	22,219.5	23,509.5	22,179.2
Cost of Sales	8,868.7	1,1654.5	15,120.0	15,778.2	14,451.6
R&D Expense	1,836.2	2,629.2	3,495.7	3,657.4	3,499.3
SG&A Expense	3,422.9	4,492.3	5,863.0	6,011.2	5,869.9
Capital Expense	1,647.7	1,326.2	2,016.0	2,148.3	2,175.8
Pretax Income	661.9	397.6	566.0	993.9	1,099.6
Pretax Margin (%)	4.90	2.32	2.55	4.23	4.96
Effective Tax Rate (%)	58.00	58.00	56.00	56.00	54.00
Net Income	152.7	103.0	204.5	484.8	539.4
Shares Outstanding, Millions	1,387	1,408	1,469	1,494	1,520
Per Share Data					
Earnings	0.11	0.07	0.14	0.31	0.33
Dividend	0.05	0.06	0.07	0.07	0.07
Book Value	2.02	2.50	3.26	3.47	3.35
Exchange Rate (U.S.$1=¥)	178	146	124	133	158

Source: NEC Corporation
Annual Reports
Dataquest (October 1991)

Table 5
Key Financial Ratios
Fiscal Year Ending March 31

Key Financial Ratios	1986	1987	1988	1989	1990
Liquidity					
Current (Times)	1.09	1.19	1.15	1.21	1.14
Total Assets/Equity (%)	519.23	537.67	489.65	484.83	457.53
Current Liabilities/Equity (%)	285.45	288.44	269.18	255.02	243.49
Total Liabilities/Equity (%)	419.23	437.71	389.66	384.95	357.53
Profitability (%)					
Return on Assets	1.05	0.54	0.87	1.93	2.31
Return on Equity	4.56	2.92	4.27	9.34	10.58
Profit Margin	1.13	0.60	0.92	2.06	2.43
Other Key Ratios					
R&D Spending % of Revenue	13.60	15.32	15.73	15.56	15.78
Capital Spending % of Revenue	12.20	7.73	9.07	9.14	9.81
Employees	95,796	101,227	102,452	104,022	104,022
Revenue ($K)/Employee	140.94	169.51	216.88	226.01	213.22
Capital Spending % of Assets	11.34	7.00	8.61	8.54	9.33
Exchange Rate (U.S.$1=¥)	178	146	124	133	158

Source: NEC Corporation
Annual Reports
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Schlumberger Ltd.

227 Park Avenue
New York, New York 10172
Telephone: (212) 350-9400
Fax: (212) 354-9457
Dun's Number: 00-185-4546

Date Founded: 1919

CORPORATE STRATEGIC DIRECTION

In the late 1910s, two French brothers, Conrad and Marcel Schlumberger, invented an electrical coring device that detected underground oil and gas by measuring electrical resistance on the earth's surface. As a result of the brothers' innovation, Schlumberger Ltd. was founded in 1919 and quickly became a global leader in the emerging petroleum industry. Today, Schlumberger is the largest oil field service company in the world, with operations in more than 100 countries. Over the years, Schlumberger has expanded into such fields as electricity, gas, and water metering; electronic transactions; computer-aided design/computer-aided manufacturing (CAD/CAM); and automatic testing of semiconductor circuits.

Schlumberger comprises two divisions: Measurements and Systems and Oilfield Services. Measurement and Systems includes the Schlumberger Industries and Schlumberger Technologies companies. Schlumberger Industries oversees activities with electricity, water, and gas meters, as well as with transducers for measuring pressure, temperature, flow rate, and mass in industrial applications. Schlumberger Technologies includes such services as electronic transactions; automatic test equipment for integrated circuits, printed circuit boards, and telecommunications; and CAD/CAM solutions for engineering design and manufacturing processes.

The Oilfield Services Division includes Wireline, Testing, and Seismic Services and the Drilling and Pumping Services. Services under the Wireline, Testing, and Seismic Services include evaluation services, testing and production services, data services, and seismic services provided by the GECO-PRAKLA joint venture. Drilling and Pumping Services is composed of three major businesses: Sedco Forex for drilling services; Anadrill for measurements while drilling and directional drilling; and Dowell Schlumberger for pumping services such as well cementing and stimulation.

Revenue for 1990 cleared $5 billion* for the first time in company history at $5.3 billion, an increase of 13.2 percent over total 1989 revenue of $4.7 billion. Oilfield Services accounted for 61.1 percent of total revenue with $3.2 billion, and Measurement and Systems was responsible for 38.9 percent of revenue with $2.1 billion. Oilfield Services' revenue increased 20.2 percent over the 1989 figure of $2.7 billion, and Measurement and Systems' revenue increased 3.8 percent over the 1989 figure of $2.0 billion.

Net income in 1990 totaled $570.3 million, an increase of 29.2 percent over the 1989 figure of $441.5 million.

R&D expenditure increased 9.9 percent in 1990 to $372.7 million, representing 7.0 percent of revenue. The 1989 figure of $339.1 million represented 7.2 percent of revenue. Oilfield Services garnered 58.1 percent of R&D expenditure, receiving $217 million. According to Schlumberger, since 1985 the Oilfield Services Division has invested more in R&D than all of its competitors combined.

Capital expenditure totaled $675 million in 1990, representing 12.4 percent of revenue. Of this capital expenditure, 83.0 percent, or $560 million, came from the Oilfield Services Division, while 16.7 percent, or $113 million, came from the Measurement and Systems Division. Capital spending increased 23.0 percent in 1990, up from the 1989 figure of $549 million.

*All dollar amounts are in U.S. dollars.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Schlumberger employed 50,000 people worldwide in 1990, an increase of 8.0 percent over the 1989 figure of 46,000.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information about revenue by distribution channel is not available. Tables 3 and 4, comprehensive financial statements, are at the end of this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

Measurement and Systems

Schlumberger's Measurement and Systems Division's products include measurement and metering equipment for residential and commercial applications; electronic transaction hardware; automatic test equipment (ATE); and CAD/CAM solutions for design and manufacturing processes. Measurement and Systems is segmented into two divisions: Schlumberger Technologies and Schlumberger Industries.

Schlumberger Technologies

Schlumberger Technologies is composed of four divisions: Computer-Aided Design/Computer-Aided Manufacturing, Electronic Transactions, Automatic Test Equipment Components, and ATE Systems.

CAD/CAM. The CAD/CAM division develops software applications for computer-aided design and manufacturing. Products range from BRAVO3, a leading mechanical design automation software system to MacBRAVO!, a family of CAD products for the Macintosh. Dataquest ranked Schlumberger 14th in the overall worldwide mechanical CAD/CAM market, maintaining a 1.9 percent market share in 1990. Schlumberger is most noted for its mechanical CAD/CAM software; Dataquest ranked it 8th in this category in 1990, with a 2.7 percent market share.

Electronic Transactions. The Electronic Transactions division provides consumers and retailers with electronic payment and transaction recording services. The Retail Petroleum Systems unit is Europe's largest supplier of petroleum service station equipment, including card payment, fuel dispensers, and point-of-sale payment systems. In 1990, the Smart Cards and Systems unit manufactured its 100 millionth smart card, a version of the plastic credit card embedded with a semiconductor chip that allows such uses as public pay phones, bank account access, security control for buildings, and parking meters.

ATE Components. Schlumberger's ATE Components division offers testing and diagnostic systems for use in the semiconductor industry. The major product lines offered by this division are the IDS 5000 PLUS Integrated Diagnostic System and the smaller, portable IDS 3000 Probestation, both of which use an electron beam that allows engineers to spot and diagnose problems efficiently.

ATE Systems. ATE Systems offers engineering workstations for testing and diagnosis of printed circuit boards, wired and wireless communication systems, and mechanical vibration. In 1990, Schlumberger introduced the S790 printed circuit board test system, which features the industry's first computer-aided test engineering (CATE) workstation. This CATE workstation provides sophisticated, UNIX-based graphic software to link electronic design and testing.

Schlumberger Technologies showed a 3 percent increase in revenue in 1990. Electronic Transactions recorded a major 48 percent increase in revenue, which was offset by slight declines in revenue by ATE Components, ATE Systems, and CAD/CAM.

Schlumberger Industries

Schlumberger Industries provides utility companies, manufacturers, and government agencies with the means to measure, process, and transmit data primarily in the areas of electricity, gas, and water. The company is the leading manufacturer of electric, gas, and water meters in the world and is the only company that offers metering systems for all three applications. Schlumberger Industries is composed of three main businesses: Electricity Management; Water and Gas; and Production, Electronics, and Systems.

Electricity Management. Electricity Management designs and manufactures equipment that measures and records voltage, current, and power for application at any stage of a power system.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Schlumberger pioneered the introduction of the first solid-state residential electricity meters, which use a semiconductor chip for measurement instead of the traditional electromechanical measuring device. The company also provides metering systems that help utilities regulate electricity consumption by helping curtail peak demand, thereby smoothing out daily or seasonal peaks. One of the more innovative products in this area is the company's multitariff meter for rate control, which charges consumers less for power used at off-peak times.

Water and Gas. The Water and Gas business produces a wide variety of water and gas metering systems. Different types of water meters offered include volumetric meters for domestic use; velocity meters for commercial and industrial use; helix meters capable of handling sizable volumes of water; and thermal meters to record energy consumption in hot-water heating systems. The gas meter product line offers distribution meters, industrial meters, and mass metering systems with measurement principles varying from diaphragm to turbine to volumetric. The company also manufactures pressure regulation stations with a wide range of safety functions.

Production, Electronics, and Systems. The Production, Electronics, and Systems business offers a complete range of transducers and sensors that measure pressure, temperature, flow rate, and mass in industrial applications. These sensors also convert data into standardized electrical signals and are used in such applications as aircraft engine and rocket motor control, dimensional verification of automobile components, and measurement of oil and gas production rates.

Other services offered by Schlumberger Industries include automatic meter-reading systems, data acquisition and recording, and security and control equipment.

Schlumberger Industries' revenue increased 17 percent in 1990; Water and Gas led the way with a 20 percent increase in revenue.

Oilfield Services

Schlumberger's Oilfield Services Divison provides technical services that help oil companies find and produce oil and gas efficiently and safely. Located in more than 100 countries, Schlumberger Oilfield Services is comprised of two groups: Wireline, Testing, and Seismic Services and Drilling and Pumping Services.

Wireline, Testing, and Seismic Services

GECO-PRAKLA, Schlumberger's Seismic Service business, provides seismic data acquisition and processing services for both land and marine environments. Sound pulses, generated at the surface and reflected from deep rock layers, are recorded on the surface. These data are converted to depth measurements and processed to form the basis of geologic structure maps used to determine the prospective location of oil and gas.

The Wireline and Testing Services business provides products that measure in situ static and dynamic reservoir parameters. Applications include electronic, acoustic, and radioactive sensor systems, which are lowered into drilled wells on an electric cable and measure the physical parameters of the rock formations that surround the well to determine the presence of hydrocarbons. Testing and Production Services makes in-well dynamic measurements to determine reservoir potential flow rate, actual flow rate, and efficiency.

Revenue in the Wireline, Testing, and Seismic Services group in 1990 increased 18 percent over 1989, with improvements in all sectors. The GECO-PRAKLA business evidenced the largest increase in revenue, increasing by 56 percent over 1989 revenue, largely because of increased marine and land acquisition activity.

Drilling and Pumping Services

Drilling and Pumping Services provides drilling services and well-completion services to oil companies worldwide. Schlumberger has three main businesses listed under this division: Sedco Forex, Anadrill, and Dowell Schlumberger.

Sedco Forex. Sedco Forex is the largest drilling contractor in the world, with more than 79 drilling rigs worldwide. Sedco Forex has led the industry in the conversion from the traditional rotary floor drives for rotating the drill string to the new top-drive systems. The new top-drive rigs are more efficient in offshore drilling situations in which deviated or horizontal wells are required. Sedco Forex has also pioneered the use of semisubmersible rigs in the offshore tender-assisted drilling market.

In 1990, Sedco Forex introduced the MDS semisubmersible rig system, featuring below-deck vertical storage of all marine risers, drill pipes, and drill collars as well as a patented, fully mechanized handling system for moving pipe and marine risers to

©1991 Dataquest Incorporated October—Reproduction Prohibited

the rig floor. Sedco Forex is positioning itself to be the leader in the implementation of true automation to all rig functions, eliminating the hazardous human work currently involved.

Anadrill. Anadrill is a drilling services business providing directional drilling and real-time downhole and surface information throughout the drilling process. Anadrill was the industry pioneer in the use of computers to analyze drilling and geological data in real time, providing the opportunity for instantaneous informed decisions to improve drilling safety and efficiency. Anadrill uses Measurement While Drilling (MWD) tools, which are housed in the drill collars, to continuously measure such factors as natural formation radioactivity, temperature, weight and torque on the drill bit, and inclination and direction of the borehole.

Anadrill's two latest MWD systems, M3 and SLIM 1, offer different choices to oil and gas companies, depending on the needs of the well. The M3 is a solid, multipurpose MWD system that has the fastest data transmission rate on the market. The SLIM 1 is specifically designed for directional drilling and is only 1.75 inches in diameter, making it a cost-effective solution for the often costly problem of directional drilling.

Dowell Schlumberger. Dowell Schlumberger provides the pumping services required after a well has been drilled and confirmed. Specifically, Dowell Schlumberger provides oil and gas companies with cementing, stimulation, sand control, and coiled tubing services designed to increase well productivity. Dowell Schlumberger is an innovator in product design in the industry. Among product innovations by the business are CemCADE, a cementing design program; GASBLOK, an additive that prevents gas migration; and FracCADE, a design program that uses fracture mechanics and geometry models to simulate fracture propagation.

Drilling and Pumping Services' 1990 revenue increased 25 percent over 1989 revenue, with Anadrill leading the way with a 34 percent increase in revenue.

Further Information

For further information about the company's business segments, please contact the Dataquest CAD/CAM industry service.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 1
Five-Year Corporate Highlights (Millions of U.S. Dollars)

	1986	1987	1988	1989	1990
Five-Year Revenue	4,938.4	4,727.0	4,924.5	4,686.0	5,306.2
Percent Change	-24.69	-4.28	4.18	-4.84	13.24
Capital Expenditure	447.0	276.0	1,617.0	549.0	675.0
Percent of Revenue	9.05	5.84	32.84	11.72	12.72
R&D Expenditure	387.5	351.8	352.6	339.1	372.7
Percent of Revenue	7.85	7.44	7.16	7.24	7.02
Number of Employees	49,661	50,000	48,000	46,000	50,000
Revenue ($K)/Employee	99	95	103	102	106
Net Income	-2,017.6	352.6	476.2	441.5	570.3
Percent Change	-674.76	-117.48	35.05	-7.29	29.17
Exchange Rate (US$1=F)	F 2.45	F 2.03	F 1.98	F 2.13	F 1.68

1990 Fiscal Year	Q1	Q2	Q3	Q4
Quarterly Revenue	1,222.00	1,292.00	1,324.00	1,468.00
Quarterly Profit	357.00	388.00	403.00	427.00

Source: Schlumberger Ltd.
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	27.30	28.20	29.89	27.23	24.09
International	72.70	71.80	70.11	72.77	75.91

Source: Schlumberger Ltd.
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

1990 SALES OFFICE LOCATIONS

North America—21
Europe—20

MANUFACTURING LOCATIONS

North America

Ann Arbor, Michigan
CAD/CAM regional headquarters
Atlanta, Georgia
CAD/CAM regional headquarters

Europe

Volketswil, Switzerland
CAD/CAM European headquarters

SUBSIDIARIES

North America

Anadrill Inc. Texas (United States)
Dowell Schlumberger Inc. Delaware (50 percent owned) (United States)
GECO Geophysical Company Inc. Texas (United States)
Schlumberger Canada Ltd. (Canada)
Schlumberger Industries Inc. Delaware (United States)
Schlumberger Technology Corporation, Texas (United States)

Europe

BVI Holdings Ltd. B.V.I. (Netherlands)
Dowell Schlumberger Corporation B.V.I. (50 percent owned) (Netherlands)
Flopetrol S.A. Franc (France)
GECO A.S. (Norway)
MC&C Holdings Ltd. B.V.I. (Netherlands)
Nepfor Ltd. Netherlands Antilles (Netherlands)
Netherlands Antilles (Netherlands)
Schlumberger Holdings Ltd. B.V.I. (Netherlands)
Schlumberger Industries (France)
Schlumberger Measurement and Systems Ltd. U.K. (United Kingdom)
Societe De Prospection Electrique Schlumberger Franc (France)

Japan

Schlumberger K.K.

ROW

Anadrill International S.A. (Panama)
Kintore Investments Ltd. (Bermuda)
Schlumberger Offshore Services Ltd. (Panama)
Schlumberger Overseas S.A. (Panama)
Schlumberger Surenco S.S. (Panama)
Sedco Forex International Inc. (Panama)
Triton Industries Inc. (Panama)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1991

Hewlett-Packard
Schlumberger and HP signed a $30 million agreement whereby Schlumberger will resell HP's Apollo 9000 Series 400 and Series 700 workstations bundled with its DesktopBRAVO! family of CAD/CAM software.

1990

Bailey Controls Group
Schlumberger Industries (France) sold a controlling stake in its Industrial Controls Division.

Bharat Electronics (BE)
BE will supply software products specializing in CAD, graphics, real-time systems, signal processing, and automatic testing to be marketed by Schlumberger.

Ericsson Telecom AB
Schlumberger Technologies and Ericsson Telecom announced that Ericsson will base its worldwide manufacturing test systems for circuit boards on a new family of testers developed by Schlumberger.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Ganz Arammerogyar
Schlumberger Industries, along with the Bank of Budapest, Budapest Holding, and Electricity of Hungary, formed a joint venture meter company called Ganz Arammerogyar or Ganz Meter.

1989

Digital Equipment Corporation
Digital signed a distribution agreement with Schlumberger Technologies' CAD/CAM Division for its BRAVO3 CAD/CAM/CAE software.

Nippon Telegraph & Telephone (NTT)
NTT and Schlumberger entered into a joint venture, forming Verisys. Verisys makes circuit testers for application-specific integrated circuits (ASICs).

Parametric Technology Corporation (PTC)
PTC and Schlumberger CAD/CAM announced that PTC's Pro/ENGINEER mechanical engineering automation tools are now available as an addition to Schlumberger's BRAVO3 family.

Remex
Schlumberger Technologies' CAD/CAM unit will market Remex's distributed products in its integrated computer-aided systems.

MERGERS AND ACQUISITIONS

1991

Finder Graphics
Schlumberger acquired Finder Graphics, a producer of database management system software for the oil industry.

JB Rombach
Schlumberger purchased 60 percent of the stock of JB Rombach, a supplier of measuring and controlling installations for the gas industry.

Prakla Seismos AG
Schlumberger acquired 50 percent of this German-owned oil exploration group, reserving an option to fully purchase the company by January 1993. Prakla, which is strong in the land seismic field, will provide a complement to Schlumberger's GECO organization, which is an industry leader in the marine seismic market.

1989

Thorn-EMI
Schlumberger acquired Thorn-EMI's gas metering business in the United Kingdom.

KEY OFFICERS

Euan Baird
Chairman and chief executive officer

Arthur Lindenauer
Executive vice president, chief financial officer

Roland Genin
Vice chairman of the board

Michel Gouilloud
Executive vice president

PRINCIPAL INVESTORS

Schlumberger Ltd. has no principal investors.

FOUNDERS

Conrad Schlumberger
Marcel Schlumberger

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 3
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1986	1987	1988	1989	1990
Total Current Assets	5,412.0	4,418.3	3,222.6	3,030.8	3,246.5
Cash	45.2	57.1	41.7	53.9	47.9
Receivables	974.7	1,099.1	1,129.6	1,103.6	1,259.1
Marketable Securities	3,765.1	2,511.5	1,407.4	1,299.6	1,276.5
Inventory	560.0	575.9	583.3	509.9	570.6
Other Current Assets	66.9	174.7	60.6	63.8	92.4
Net Property, Plants	1,832.5	1,670.4	1,616.7	1,647.8	1,911.4
Other Assets	767.3	652.3	760.9	808.2	1,017.7
Total Assets	8,011.8	6,741.0	5,600.2	5,481.8	6,175.6
Total Current Liabilities	3,293.2	2,657.1	2,511.8	2,146.7	2,434.7
Long-Term Debt	504.3	125.3	191.5	292.5	331.7
Other Liabilities	91.0	122.7	141.9	145.0	154.4
Minority Interests	-	-	-	-	-
Total Liabilities	3,888.5	2,905.1	2,845.2	2,583.9	2,920.8
Total Shareholders' Equity	4,123.3	3,835.9	2,755.0	2,897.9	3,254.8
Common Stock	421.1	423.8	432.9	410.3	437.5
Other Equity	-837.3	-1,148.1	-2,399.2	-2,389.8	-2,344.6
Retained Earnings	4,539.4	4,560.2	4,721.3	4,877.4	5,161.9
Total Liabilities and Shareholders' Equity	8,011.8	6,741.0	5,600.2	5,481.8	6,175.6

Source: Schlumberger Ltd.
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 4
Consolidated Income Statement
Fiscal Year Ending December 31
(Millions of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1986	1987	1988	1989	1990
Revenue	4,938.4	4,727.0	4,924.5	4,686.0	5,306.2
U.S. Revenue	1,348.0	1,333.0	1,531.0	1,490.0	1,278.0
Non-U.S. Revenue	3,590.4	3,394.0	3,393.5	3,196.0	4,028.2
Cost of Sales	3,510.3	3,273.0	3,528.1	3,342.1	3,731.5
R&D Expense	387.5	351.8	352.6	339.1	372.7
SG&A Expense	2,695.2	345.7	830.8	742.5	759.2
Capital Expense	447.0	276.0	1,617.0	549.0	675.0
Pretax Income	-1,549.0	619.0	589.0	531.0	698.4
Pretax Margin (%)	-31.37	13.09	11.96	11.33	13.16
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	-2,017.6	352.6	476.2	441.5	570.3
Shares Outstanding, Millions	287.3	277.1	264.2	237.9	238.1
Per Share Data					
Earnings	-7.02	1.27	1.80	1.86	2.40
Dividend	1.20	1.20	1.20	1.20	1.20
Book Value	14.35	13.84	10.43	12.18	13.67
Exchange Rate (US$1=F)	F 2.45	F 2.03	F 1.98	F 2.13	F 1.68

NA = Not available

Source: Schlumberger Ltd.
Annual Reports and Forms 10-K.
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 5
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of Guilders, except Per Share Data)

Balance Sheet	1986	1987	1988	1989	1990
Total Current Assets	13,259.3	8,969.1	6,380.7	6,455.6	5,445.3
Cash	110.8	115.9	82.6	114.3	80.3
Receivables	2,388.0	2,231.2	2,236.6	2,339.6	2,111.9
Marketable Securities	9,224.5	5,098.3	2,786.7	2,756.0	2,141.0
Inventory	1,372.1	1,169.1	1,154.9	1,081.0	957.1
Other Current Assets	163.9	354.6	120.0	135.3	155.0
Net Property, Plants	4,489.5	3,390.9	3,201.1	3,493.3	3,206.0
Other Assets	1,879.9	1,324.1	1,506.6	1,702.6	1,707.0
Total Assets	19,628.8	13,684.1	11,088.4	11,622.1	10,358.2
Total Current Liabilities	8,068.3	5,393.9	4,973.4	4,551.0	4,083.7
Long-Term Debt	1,235.6	254.4	379.2	620.1	556.4
Other Liabilities	222.9	249.1	281.0	307.4	259.0
Minority Interests	-	-	-	-	-
Total Liabilities	9,526.8	5,897.4	5,633.5	5,478.5	4,899.0
Total Shareholders' Equity	10,102.0	7,786.9	5,454.9	6,143.5	5,459.2
Common Stock	1,031.7	860.3	857.1	869.8	733.8
Other Equity	-2,051.3	-2,330.6	-4,750.4	-5,066.4	-3,932.6
Retained Earnings	11,121.6	9,257.2	9,348.2	10,340.1	8,658.0
Total Liabilities and Shareholders' Equity	19,628.8	13,684.2	11,088.4	11,622.1	10,358.2

Source: Schlumberger Ltd.
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 6
Consolidated Income Statement
Fiscal Year Ending December 31
(Millions of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1986	1987	1988	1989	1990
Revenue	12,099.1	9,595.8	9,750.5	9,934.3	8,900.0
U.S. Revenue	3,302.6	2,706.0	3,031.4	3,158.8	2,143.6
Non-U.S. Revenue	8,796.5	6,889.8	6,719.1	6,775.5	6,756.4
Cost of Sales	8,600.2	6,644.2	6,985.6	7,085.3	6,258.8
R&D Expense	949.4	714.2	698.1	718.9	625.1
SG&A Expense	6,603.2	701.8	1,645.0	1,574.1	1,273.1
Capital Expense	1,095.2	560.3	3,201.7	1,163.9	1,132.2
Pretax Income	-3,795.1	1,256.6	1,166.2	1,125.7	1,171.4
Pretax Margin (%)	-31.37	13.09	11.96	11.33	13.16
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	-4,943.1	715.8	942.9	936.0	956.6
Shares Outstanding, Millions	287.3	277.1	264.2	237.9	399.4
Per Share Data					
Earnings	-17.20	2.58	3.56	3.94	4.03
Dividend	2.94	2.44	2.38	2.54	2.01
Book Value	35.16	57.05	20.65	25.82	22.93

Source: Schlumberger Ltd.
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 7
Key Financial Ratios
Fiscal Year Ending in December 31

Key Financial Ratios	1986	1987	1988	1989	1990
Liquidity					
Current (Times)	1.64	1.66	1.28	1.41	1.33
Total Assets/Equity (%)	194.31	175.73	203.27	189.16	189.74
Current Liabilities/Equity (%)	79.87	69.27	91.17	74.08	74.80
Total Liabilities/Equity (%)	94.31	75.73	103.27	89.16	89.74
Profitability (%)					
Return on Assets	-25.18	5.23	8.50	8.05	9.23
Return on Equity	-48.93	9.19	17.28	15.24	17.52
Profit Margin	-40.86	7.46	9.67	9.42	10.75
Other Key Ratios					
R&D Spending % of Revenue	7.85	7.44	7.16	7.24	7.02
Capital Spending % of Revenue	9.05	5.84	32.84	11.72	12.72
Employees	49,661	50,000	48,000	46,000	50,000
Revenue (F K)/Employee	244	192	203	216	178
Capital Spending % of Assets	5.58	4.09	28.87	10.01	10.93
Exchange Rate (US1=F)	2.45	2.03	1.98	2.13	1.68

NA = Not available

Source: Schlumberger Ltd.
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Silicon Graphics Inc.

2011 North Shoreline Boulevard
Mountain View, California 94039
Telephone: (415) 960-1980
Fax: (415) 961-0595
Dun's Number: 02-403-9778

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Silicon Graphics Inc., designs, manufactures, markets, and services high-performance workstations that are used by engineers, scientists, and other professionals to develop, analyze, and simulate complex three-dimensional (3-D) objects and phenomena. Silicon Graphics primarily targets four industries: manufacturing, visual simulation, general scientific and research, and graphic arts and animation.

The company is trying to expand into these markets and also become the provider of technical computing solutions.

Silicon Graphics designs its workstations to meet the needs of 3-D applications. Currently, the company's systems are used in applications such as mechanical computer-aided engineering (CAE), animation, visual simulation, and various scientific applications including molecular modeling and computational fluid dynamics.

In April 1991, Silicon Graphics joined 20 other companies in the computer industry to create an industry initiative called the Advanced Computing Environment (ACE). This organization of hardware and software vendors is committed to providing application software portability across a wide range of hardware devices that use two different hardware architectures and extend across two operating environments.

The company's total revenue increased 59 percent to $419.8 million* in fiscal 1990 from $263.7 million in fiscal 1989. Net income increased 180.77 percent in fiscal 1990 from a decrease of 8 percent to $12 million in fiscal 1989. This substantial increase was mainly due to the improvement of the company's products' gross margins, which included new product introductions (specifically the introduction of the Personal IRIS and IRIS POWER Series), manufacturing efficiencies, and a decline in component costs. Silicon Graphics employs 2,500 people worldwide.

In fiscal 1990, R&D expenditure totaled $45.6 million, representing almost 11 percent of revenue. The company's R&D program focused on four primary areas: higher graphics performance, higher computing performance, graphics system cost reduction, and software development.

In April 1991, Silicon Graphics announced a strategic relationship with Compaq Computer Corporation. This includes a technology exchange and the joint technical development of future products. The products realized under this exchange effort may be manufactured and marketed by both companies. The agreement provides $50 million to be used primarily for R&D funding. In total, Compaq will invest $185 million, which represents approximately a 13 percent equity in the company.

Also in April 1991, Silicon Graphics and Microsoft Corporation announced a key technology agreement to work together and make 3-D graphics technology available to PC users. Specifically, this agreement will allow Microsoft to integrate Silicon Graphics' IRIS Graphics Library technology with Microsoft systems and applications software offerings.

In February 1990, the company listed its common stock on the New York Stock Exchange under the symbol "SGI."

More detailed information is available in Tables 1 through 3, which appear after "Business Segment

*All dollar amounts are in U.S. dollars.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Tables 4 through 6 at the end of this backgrounder present comprehensive financial information.

BUSINESS SEGMENT STRATEGIC DIRECTION

High-Performance Workstations

Silicon Graphic's IRIS 4D product line includes the Personal IRIS and IRIS POWER Series, the company's industry-leading line of project supercomputing workstation and servers. The IRIS 4D products use the R3000 and R3000A 32-bit RISC microprocessors developed by MIPS Computer Systems Inc. These RISC microprocessors are binary-compatible, meaning that software applications run without modification across this entire product line.

The POWERVISION Series uses new, proprietary, custom-VLSI, programmable graphic engines to provide 1.0 million antialiased vectors, 1.0 million antialiased polygons, and 1.5 million antialiased pixels-per-second performance. To ensure imaging quality, each pixel is defined as a minimum of 140 bits to a maximum of 268 bits per pixel.

According to Dataquest, in 1990, Silicon Graphics maintained 5.4 percent of the high-performance workstation market or revenue of $397.7 million.

The DISTRIBUTED GRAPHICS LIBRARY (DGL) is a standard feature on all workstations. It allows users to view and interact with graphics applications running on remote compute servers.

Graphics Subsystems

Silicon Graphics also markets specialized graphics subsystems to other computer manufacturers and systems integrators. Under this program, Silicon Graphics manufactures and sells or licenses a graphics subsystem to selected customers to enhance the graphics performance of other computer systems. Companies such as IBM have agreed to purchase subsystems and/or license software from Silicon Graphics under such an arrangement. In addition to the revenue from subsystem sales, Silicon Graphics believes that this program will increase the IRIS Graphics Library-based applications software available for use on its workstations.

Peripherals

Silicon Graphics' workstations support a wide range of peripheral and input/output devices as options, including a variety of disk storage devices, a 1/4-inch cartridge tape or a 1/2-inch tape for backup storage, black-and-white or color printers, electrostatic color plotters, laser printers, and film recorders to create hard-copy reproductions of workstation screen images.

Services

Silicon Graphics provides a wide array of training, consulting, maintenance, and repair services to customers using its products.

Software

The Personal IRIS and IRIS POWER Series use IRIX, a company-developed version of the AT&T UNIX System V, Release 3 operating system.

To take full advantage of its special-purpose graphics hardware and encourage the development of applications software, Silicon Graphics provides the IRIS Graphics Library as a standard component of its workstations. The company has licensed its Graphics Library to IBM Corporation, which has the right to use the Graphics Library in its products. Silicon Graphics believes that this will stimulate the development of applications packages by third-party software developers. As of June 1991, Silicon Graphics has 1,142 software packages available for use on their systems.

Silicon Graphics also licenses and markets certain horizontal and software packages, including database, computational, desktop publishing, modeling, and rendering products. For other requirements, customers using the company's workstations must either develop the software necessary to address their particular needs or purchase it from a third party.

©1991 Dataquest Incorporated October—Reproduction Prohibited

In January 1991, the company announced the Software Express program designed to provide a distribution service and marketing support for developers of low-priced application software. According to Silicon Graphics, they are the first UNIX hardware company to provide mass-market distribution support that is patterned after the PC and Macintosh dealer model.

Further Information

For more information about the company's business segments, please contact the Dataquest Computer Systems industry service.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 1
Five-Year Corporate Highlights (Thousands of U.S. Dollars)

	1986	1987	1988	1989	1990
Five-Year Revenue	41,506.0	86,278.0	152,594.0	263,776.0	419,769.0
Percent Change	92.64	107.87	76.86	72.86	59.14
Capital Expenditure	0	0	0	0	29,602.0
Percent of Revenue	0	0	0	0	7.05
R&D Expenditure	7,205.0	14,542.0	24,168.0	31,365.0	45,631.0
Percent of Revenue	17.36	16.85	14.13	11.10	10.87
Number of Employees	330	605	1,053	1,483	2,099
Revenue ($K)/Employee	125.78	142.61	162.44	190.59	200
Net Income	1,902.0	10,250.0	12,529.0	11,490.0	32,261.0
Percent Change	(139.35)	438.91	22.23	(8.29)	180.77

1990 Fiscal Year (US$M)	Q1	Q2	Q3	Q4
Quarterly Revenue	86,431	103,010	110,007	120,321
Quarterly Profit	5,209	7,183	8,675	11,194

Source: Silicon Graphics Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	87	83	84	72	65
Europe	3	7	6	28	25
Asia/Pacific	10	10	10	10	10
ROW	0	0	0	0	0

Source: Silicon Graphics Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1989	1990
Direct Sales	69	74
Indirect Sales	31	26

Source: Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

1990 SALES OFFICE LOCATIONS

North America—48
Japan—2
Europe—23
ROW—4

MANUFACTURING LOCATIONS

North America

Mountain View, California
Activities primarily involve assembling proprietary printed circuit boards and high-level systems and testing major purchased subassemblies. The company significantly increased their manufacturing capacity in fiscal 1988 and 1989.

Europe

Neuchatel, Switzerland
With the growth of international sales, the company has established this European manufacturing and support center.

SUBSIDIARIES

North America

Silicon Graphics Canada Inc. (Canada)
Silicon Graphics ApS (Denmark)
Silicon Graphics Federal Sales Corp. (United States)
Silicon Graphics International (United States)
Silicon Graphics World Trade Corp. (United States)

Japan

Nihon Silicon Graphics K.K.

Europe

Silicon Graphics AB (Sweden)
Silicon Graphics ApS (Denmark)
Silicon Graphics A/S (Norway)
Silicon Graphics B.V. (The Netherlands)
Silicon Graphics Computer Systems Ltd. (Israel)
Silicon Graphics GmbH (West Germany)
Silicon Graphics Ltd. (England)
Silicon Graphics Manufacturing S.A. (Switzerland)
Silicon Graphics OY (Finland)
Silicon Graphics S.A. (Spain)
Silicon Graphics N.V./S.A. (Belgium)
Silicon Graphics S.A.R.L. (France)
Silicon Graphics S.p.A. (Italy)

ROW

Silicon Graphics Pte Ltd. (Singapore)
Silicon Graphics Pty Ltd. (Australia)
Silicon Graphics Ltd. (Hong Kong)
Silicon Graphics Ltd. (Beijing)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1991

Compaq Computer Corporation
Silicon Graphics and Compaq have announced a strategic relationship. Their joint plans include a technology exchange, development, and financial investment. In addition, the agreement provides $50 million, which will be used for research and development. A total investment of $185 million represents an equity stake of approximately 13 percent.

Microsoft Corporation
Silicon Graphics and Microsoft Corporation have announced a key technology agreement to work together and make 3-D graphics technology available to PC users. The purpose is to integrate technology from the IRIS Graphics Library with appropriate future Microsoft software products.

Hitachi Zosen Information Systems Ltd.
Silicon Graphics and Hitachi Zosen Information Systems Ltd. Japan (HZS) have signed a value-added reseller agreement allowing HZS to resell Silicon Graphics' servers and Personal IRIS workstations in Japan. HZS will purchase Personal IRIS workstations during the next year totaling $5 million.

1990

Nihon Kokan (NKK)
Silicon Graphics and Nihon Kokan (NKK) of Tokyo Japan signed a strategic-partnership agreement. NKK invested $35 million in newly issued

©1991 Dataquest Incorporated October—Reproduction Prohibited

Silicon Graphics' Convertible Preferred Stock. This makes NKK a 3.84 principal investor in the company. NKK, in return, will become a distributor and value-added reseller of Silicon Graphics workstations in Japan. NKK will work with the company's subsidiary in Japan, Nihon Silicon Graphics K.K.

Adobe Systems

Silicon Graphics and Adobe Systems signed a licensing agreement that will produce the first 32-bit display using a PostScript implementation. One of the key features will be 3-D graphics capabilities.

Informix Software Inc.

Silicon Graphics and Informix Software Inc. signed a strategic OEM agreement to connect the Informix Wingz, a graphic spreadsheet program and Informix On-Line to the entire line of IRIS 4D workstations and servers. Wingz will include a new interactive 3-D feature called Wingz in Motion, which will be available exclusively on Silicon Graphics systems.

Groupe Bull

Silicon Graphics and Groupe Bull signed an OEM agreement. Groupe Bull will use Silicon Graphics' IRIS 4D design to develop its design and engineering platform for its computer-integrated manufacturing (CIM) architecture.

1989

Protocol Engines Inc. (PEI)

Silicon Graphics and PEI entered into a $5.5 million joint marketing agreement. The project is to implement the Xpress Transfer Protocol (XTP) in VLSI. XTP is an innovative, lightweight local area network (LAN) transport protocol that will deliver more effective throughput, real-time response, and lower CPU utilization than traditional transport protocols.

Oracle Corporation

Silicon Graphics and Oracle entered into an OEM agreement under which Silicon Graphics is to market Oracle's relational database products for use with Silicon Graphics' entire range of binary-compatible IRIS 4D workstations and server products.

Nixdorf Computer Corporation

Silicon Graphics and Nixdorf entered into an OEM agreement under which Nixdorf is to use Silicon Graphics' IRIS 4D workstations as the desired platform for its CAD/CAM projects. The workstations and servers are to be used for design, analysis, and drafting, along with simulation of computer numerical control (CNC) tool paths and robotic trajectories.

Frame Technology Corporation

Silicon Graphics and Frame Technology entered into an OEM agreement under which Silicon Graphics is to sell Framemaker, Frame's leading computer software, worldwide on its complete line of IRIS 4D workstations.

BioDesign

Silicon Graphics and BioDesign entered into a joint marketing agreement under which the two firms will cooperate to market BioDesign software to scientific end users. BioDesign makes Biograph, a design and simulation software package for the biotechnology and pharmaceutical research sectors. It also produces Polygraf, a molecular modeling and simulation package for polymer research scientists.

Full Color Computing

Silicon Graphics and Full Color Computing entered into a marketing agreement under which Silicon Graphics is to jointly market Full Color Computing's new image processing and presentation product. Designed for graphic workstations, the new Full Color Publisher features full-color image manipulation, text handling, page layout, photo retouch, and special effects.

Control Data Japan

Silicon Graphics and Control Data Japan, entered into an agreement under which Control Data Japan will market Silicon Graphics' IRIS 4D. It will be marketed under Control Data's "Cyber" brand name. Control Data plans on marketing the workstation for use in CAD systems and in creating animated computer graphics.

CADKEY, Sigma Designs

Silicon Graphics, CADKEY, and Sigma Designs entered into a licensing agreement under which CADKEY and Sigma Designs are to market Silicon Graphics' Personal IRIS 4D workstations.

The Eagle Technology Group Limited

Silicon Graphics and Eagle Technology entered into an agreement under which Eagle Technology is to be Silicon Graphics' distributor for New Zealand. Initially, Eagle Technology is to focus on selling Silicon Graphics products to the education, manufacturing, scientific, and architectural markets.

©1991 Dataquest Incorporated October—Reproduction Prohibited

Xyvision Design Systems
Silicon Graphics and Xyvision Design Systems entered an OEM agreement under which Xyvision is to bundle Silicon Graphics' IRIS systems with its own proprietary software. Xyvision is a leading developer and marketer of computer graphics systems for consumer product companies, design firms, and packaging manufacturers.

1988

MacNeal-Schwendler Corporation (MSC)
Silicon Graphics and MSC entered into an agreement under which MSC is to jointly market MSC/NASTRAN on Silicon Graphics IRIS 4D workstations. MSC is a leading supplier of structural analysis software and engineering services used in the automotive, aerospace, defense, and general manufacturing industries.

IBM Corporation
Silicon Graphics and IBM entered into an agreement under which IBM is to sell Silicon Graphics' 4D IRIS Graphics Library software for its Entry System Division. IBM also is to buy Silicon Graphics' 4D IRIS graphics cards.

PDA Engineering
Silicon Graphics and the PATRAN Software Products Division of PDA Engineering entered into a joint-marketing and development agreement under which PATRAN is to support Silicon Graphics' IRIS 4D workstations with its PATRAN MCAE design and analysis software packages. Through PDA Engineering's Hardware Partner Product Optimization Program, PDA and Silicon Graphics have established a joint-development team dedicated to ensuring that PDA's customers are capable of fully utilizing all the latest features and benefits of the IRIS 4D workstations. This product optimization program is one of the first in the industry dedicated to specially tuning software to take advantage of the unique features of a specific hardware platform.

Informix Software Inc.
Silicon Graphics and Informix Software entered an OEM agreement offering the first relational database management system for Silicon Graphics' family of 3-D superworkstations. Under the agreement, Informix-SQL, -4GL, -ESQL/C, -ESQL/COBOL, and C-ISAM are to be available on Silicon Graphics' IRIS 3100 and IRIS 4D families of superworkstation products.

Biosym Technologies
Silicon Graphics and Biosym entered into an agreement under which Biosym is to integrate its Discover and Insight molecular simulation and modeling software with Silicon Graphics' IRIS superworkstations.

Bechtel Software
Silicon Graphics and Bechtel Software entered into a VAR agreement under which Bechtel Software is to resell Silicon Graphics' IRIS 3100 and 4D Series workstations in a one-year pact, renewable yearly by mutual consent. The Bechtel Group subsidiary is to sell the superworkstations together with its Walkthru 3-D modeling software.

MERGERS AND ACQUISITIONS

There were no mergers or acquisitions in 1988, 1989, or 1990.

KEY OFFICERS

James H. Clark
Chairman of the board

Edward McCracken
President and chief executive officer

Mark Perry
Executive vice president

Stanley J. Merresman
Senior vice president, Finance and chief financial officer

Thomas A. Jermoluk
Vice president and general manager, Advanced Systems Division

Michael Ramsey
Vice president and general manager, Entry Systems

Forest Baskett
Senior vice president, Research and Development

Robert Bishop
President, Silicon Graphics International

Gary L. Lauer
Vice president, North America Field Operations

©1991 Dataquest Incorporated October—Reproduction Prohibited

Kenneth L. Coleman
Senior vice president, Business Development and Administration

Al Coe
Vice president, Manufacturing

Rajesh Parekh
Vice president, Personal Systems Division

Deborah G. Miller
Vice president, Marketing

PRINCIPAL INVESTORS

FMR Corporation—9.64 percent
NKK, U.S.A. Corporation—3.84 percent
Compaq Corporation—13.00 percent

FOUNDERS

Kurt Ackeley
Jim Clerk
Tom Davis
Mark Grossman
Mark Hannah
Charles Rhodes

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 4
Balance Sheet
Fiscal Year Ending in June
(Thousands of U.S. Dollars)

Balance Sheet	1986	1987	1988	1989	1990
Cash	6,915.0	58,276.0	51,086.0	70,865.0	70,558.0
Receivables	10,148.0	19,678.0	44,616.0	82,649.0	128,811.0
Marketable Securities	-	-	24,740.0	23,652.0	15,502.0
Inventory	6,280.0	15,201.0	44,577.0	49,662.0	65,843.0
Other Current Assets	729.0	1,252.0	5,182.0	10,851.0	17,359.0
Total Current Assets	24,072.0	94,407.0	170,201.0	237,679.0	298,073.0
Net Property, Plants	4,666.0	11,038.0	25,429.0	37,056.0	50,120.0
Other Assets	325.0	1,792.0	11,307.0	16,293.0	16,119.0
Total Assets	29,063.0	107,237.0	206,937.0	291,028.0	364,312.0
Total Current Liabilities	8,088.0	20,169.0	32,151.0	46,512.0	83,532.0
Long-Term Debt	1,069.0	35,562.0	35,081.0	87,785.0	36,445.0
Other Liabilities	-	-	-	-	-
Total Liabilities	9,157.0	55,731.0	67,232.0	134,297.0	119,977.0
Converted Preferred Stock	31,652.0	-	-	-	-
Common Stock	3.0	12.0	16.0	16.0	17.0
Other Equity	240.0	53,233.0	128,899.0	134,435.0	190,223.0
Retained Earnings	(11,989.0)	(1,739.0)	10,790.0	22,280.0	54,095.0
Total Shareholders' Equity	19,906.0	50,668.0	139,705.0	156,731.0	244,335.0
Total Liabilities and Shareholders' Equity	29,063.0	107,237.0	206,937.0	291,028.0	364,312.0

Source: Silicon Graphics Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table 5
Consolidated Income Statement
Fiscal Year Ending in December
(Million of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1986	1987	1988	1989	1990
Revenue	41,506.0	86,278.0	152,594.0	263,776.0	419,769.0
U.S. Revenue	36,110.0	71,611.0	128,323.0	187,683.0	
Non-U.S. Revenue	5,396.0	14,667.0	24,271.0	76,093.0	
Cost of Sales	17,850.0	35,908.0	70,218.0	134,412.0	189,164.0
R&D Expense	7,205.0	14,542.0	24,168.0	31,365.0	45,631.0
SG&A Expense	14,830.0	25,657.0	42,716.0	83,388.0	137,973.0
Capital Expense	-	-	-	-	29,602.0
Pretax Income	1,926.0	11,295.0	17,072.0	16,414.0	48,150.0
Pretax Margin (%)	4.64	13.09	11.19	6.22	11.47
Effective Tax Rate (%)	-	50.00	29.00	30.00	33.0
Net Income	1,902.0	10,250.0	12,529.0	11,490.0	32,261.0
Shares Outstanding, Thousands	10,537.0	12,561.0	14,341.0	17,211.0	19,939.0
Per Share Data					
Earnings	0.18	0.82	0.87	0.67	1.69
Dividend	-	-	-	-	-
Book Value	1.89	4.03	9.74	9.11	12.25

Source: Silicon Graphics Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 6
Key Financial Ratios
Fiscal Year Ending in December

Key Financial Ratios	1986	1987	1988	1989	1990
Liquidity					
Current (Times)	2.98	4.68	5.29	5.11	3.57
Quick (Times)	2.20	3.93	3.91	4.04	149.10
Fixed Assets/Equity (%)	23.44	21.43	18.20	23.64	34.19
Current Liabilities/Equity (%)	40.63	39.16	23.01	29.68	34.19
Total Liabilities/Equity (%)	46.00	108.20	48.12	85.69	49.10
Profitability (%)					
Return on Assets	7.89	15.04	7.98	4.61	9.85
Return on Equity	10.82	28.71	13.10	7.75	13.20
Profit Margin	4.58	11.88	8.21	4.36	7.69
Other Key Ratios					
R&D Spending % of Revenue	17.36	16.85	15.84	11.89	10.87
Capital Spending % of Revenue	0	0	0	0	7.05
Employees	330	605	1,053	1,483	1,483
Revenue ($K)/Employee	$125.78	$142.61	$144.91	$117.87	283.05
Capital Spending % of Assets	0	0	0	0	8.13

Source: Silicon Graphics Inc.
Annual Reports and Forms 10-K
Dataquest (October 1991)

©1991 Dataquest Incorporated October—Reproduction Prohibited

Table of Contents

CAD/CAM/CAE INDUSTRY SERVICE

COMPANY BACKGROUNDERS

Company	Fiscal Year-End
Apple Computer, Inc.	September
Autodesk, Inc.	January
Cadence Design Systems, Inc.	December
Compaq Computer Corporation	December
Control Data Corporation	December
Digital Equipment Corporation	June
Environmental Systems Research Institute Inc. (ESRI)	Private
Fujitsu Limited	March
Hewlett-Packard Company	October
Intergraph Corporation	December
International Business Machines Corporation (IBM)	December
The MacNeal-Schwendler Corporation	January
McDonnell Douglas Corporation	December
Mentor Graphics Corporation	December
NEC Corporation	March
Prime Computer Inc.	Private
Racal Electronics Plc	March
Schlumberger, Ltd.	December
Sun Microsystems, Inc.	June
Valid Logic Systems, Inc.	December

HARTIS Corp. >

1/24/94 Silicon Graphics

©1990 Dataquest Incorporated

Company Backgrounders by Dataquest

Please make your selection below.

A

- ☐ 3COM Corp
- ☐ 3M (Minnesota Mining & Mfg Co)
- ☐ AEG-Olympia International
- ☐ Acer Technologies Corp (Altos)
- ☐ Adobe Systems Inc
- ☐ Advanced Micro Devices Inc
- ☐ Advanced Microelectronic Products Inc
- ☐ Air Products & Chemicals Inc
- ☐ Alcatel NV
- ☐ Aldus Corp
- ☐ Alpha Microsystems
- ☐ Alpharel Inc
- ☐ Alps Electric Co Ltd
- ☐ AM International Inc
- ☐ Amdahl Corp
- ☐ American Information Technologies Corp
- ☐ American Peripheral Industries Inc
- ☐ American Telephone & Telegraph Co
- ☐ Amstrad Plc
- ☐ Analog Devices Inc
- ☐ Anelva Corp
- ☐ Apple Computer Inc
- ☐ Applied Digital Data Systems Inc
- ☐ Applied Materials Inc
- ☐ Applix Inc
- ☐ Archive Corp
- ☐ ARIX Corp
- ☐ Ashton-Tate Corp
- ☐ ASM International NV
- ☐ AST Research Inc
- ☐ Atari Corp
- ☐ Atex Systems Inc (Eastman Kodak)
- ☐ Autodesk Inc

B

- ☐ Bell Atlantic Corp
- ☐ Bell & Howell Co
- ☐ BellSouth Corp
- ☐ Bitstream Inc
- ☐ Boeing Co
- ☐ Borland Intl Inc
- ☐ British Telecommunications Plc

B

- ☐ Brother Industries Ltd
- ☐ Burr-Brown Corp

C

- ☐ C Itoh & Co Ltd
- ☐ Cadence Design Systems Inc
- ☐ CalComp Inc (Lockheed)
- ☐ Canon Inc
- ☐ Casio Computer Co Ltd
- ☐ Centigram Corp
- ☐ Central Point Software Inc
- ☐ Chartered Semiconductor Pte Ltd
- ☐ Chips & Technologies Inc
- ☐ Citizen America Corp
- ☐ Commodore International Ltd
- ☐ CPT
- ☐ Compaq Computer Corp
- ☐ Comparex
- ☐ Computer Associates International Inc
- ☐ Compugraphics Corp
- ☐ Concurrent Computer Corp
- ☐ Conner Peripherals Inc
- ☐ Control Data Corp
- ☐ CONVEX Computer Corp
- ☐ Copyer Co
- ☐ Cray Research Inc
- ☐ Cypress Semiconductor Corp

D

- ☐ Daewoo Telecommunications Co Ltd
- ☐ DataEase International
- ☐ Data General Corp
- ☐ Datapoint Corp
- ☐ Data Translation Inc
- ☐ Decision Data Inc
- ☐ Dell Computer Corp
- ☐ Delphax Systems (Unit Xerox)
- ☐ Digital Equipment Corp
- ☐ Digital Microwave Corp
- ☐ Digital Research Inc

D

- ☐ DSC Communications Corp
- ☐ Dowty Plc
- ☐ DS America
- ☐ Du Pont E I (Crosfield)

E

- ☐ Eastman Kodak Co
- ☐ ESRI (Environ Sys Research Inst)
- ☐ Esprit Systems Inc
- ☐ E-Systems Inc
- ☐ Evans & Sutherland Computer Co
- ☐ Executone Information Systems Inc

F

- ☐ Facit AB
- ☐ Falco Data Products Inc
- ☐ Ferranti Intl Signal Plc
- ☐ FileNet Corp
- ☐ Foxboro Co
- ☐ Fuji Electric Co Ltd
- ☐ Fuji Xerox
- ☐ Fujitsu Ltd

G

- ☐ General DataComm Industries Inc
- ☐ General Dynamics Corp
- ☐ General Electric Co Plc (A B Dick)
- ☐ General Electric Corp
- ☐ General Signal Corp
- ☐ Genicom Corp
- ☐ Gestetner Plc
- ☐ GM Hughes Electronics Corp
- ☐ Goldstar Electronics Co Ltd
- ☐ GPT
- ☐ Groupe Bull
- ☐ Grumman Corp
- ☐ GTE Corp

Company Backgrounders by Dataquest

Please make your selection below.

H

- ❒ Harris Corp
- ❒ Hewlett-Packard Co
- ❒ Hitachi Ltd (Dataproducts)
- ❒ HMC (Hualon Microelectronics Co)
- ❒ Hoechst AG
- ❒ Hyundai Electronics Co Ltd

I

- ❒ IDEAssociates
- ❒ IMNET Corp
- ❒ Informix Software Inc
- ❒ Infotron System Corp
- ❒ Intel Corp
- ❒ Integrated Device Technology Inc
- ❒ Intergraph Corp
- ❒ Integrated Automation Inc
- ❒ Interleaf Inc
- ❒ International Business Machines Corp
- ❒ International Computers
- ❒ International Telephone & Telegraph
- ❒ Intuit
- ❒ Italtel Group

K

- ❒ KLA Instruments Corp
- ❒ Konica Corp
- ❒ Korea Electronics Co Ltd (KEC)
- ❒ Kyocera Corp

L

- ❒ LAM Research Corp
- ❒ Laser Data Corp
- ❒ Laser Magnetic Storage International
- ❒ Letraset
- ❒ LM Ericsson Co
- ❒ LSI Logic Corp
- ❒ Linotype Co
- ❒ Lockheed Corp
- ❒ Loral Corp
- ❒ Lotus Development Corp

M

- ❒ MAI Basic Four Inc
- ❒ MacNeal Schwendler Corp
- ❒ MCI Communications Corp
- ❒ McDonnell Douglas Corp
- ❒ Mannesmann Kienzle GmbH
- ❒ Matra SA
- ❒ Martin Marietta Corp
- ❒ Matsushita Elec Industrial Co Ltd
- ❒ Maxtor Corp
- ❒ Memorex Telex NV
- ❒ Mentor Graphics Corp
- ❒ Micro Dynamics
- ❒ Micron Technology Inc
- ❒ Micropolis Corp
- ❒ Microrim Inc
- ❒ Microsoft Corp
- ❒ Minolta Camera Company Ltd
- ❒ Mita International Co
- ❒ Mitac Electronics Ltd
- ❒ Mitel Corp
- ❒ Mitsubishi Electric Corp
- ❒ Monotype Inc
- ❒ Monroe Systems for Business Inc
- ❒ Motorola Inc

N

- ❒ NCR Corp
- ❒ NEC Corp
- ❒ Nakimichi (Mountain Computer)
- ❒ Nashua Corp
- ❒ National Semiconductor Corp
- ❒ Network Computing Devices
- ❒ Network Equipment Technologies Inc
- ❒ Nikon Corp
- ❒ Nippon Telegraph & Telephone Corp
- ❒ Nippondenso Co Ltd
- ❒ Nippon Sanso
- ❒ Nixdorf Computer AG
- ❒ Nokia Corp
- ❒ Norsk Data AS
- ❒ Northern Telecom LTD

N

- ❒ Northrop Corp
- ❒ Novell Inc
- ❒ NV Phillips
- ❒ NYNEX Corp

O

- ❒ Oce-van der Grinten NV
- ❒ Octel Communications Corp
- ❒ Oki Electric Industries Co Ltd
- ❒ Olin Corp
- ❒ Olivetti & Co SpA C Ing
- ❒ Omron Tateisi Electronics Co
- ❒ Osaka Titanium Co
- ❒ Oracle Systems Corp

P

- ❒ Pacific Telesis Group
- ❒ Packard Bell
- ❒ Pitney Bowes Inc
- ❒ Plessey Co Plc
- ❒ Prime Computer Inc
- ❒ Printronix Inc

Q

- ❒ QMS Inc
- ❒ Quadratron Systems Inc
- ❒ Quantum Corp
- ❒ Qume Corp

R

- ❒ Racal Electronics Plc
- ❒ Radius Inc
- ❒ Ramtek Corp
- ❒ Rank Xerox
- ❒ Raytheon Co
- ❒ Recognition Equipment Inc
- ❒ Robert Bosch GmbH
- ❒ Ricoh Co Ltd
- ❒ Rockwell International Corp
- ❒ Rohm Co Ltd

Company Backgrounders by Dataquest

Please make your selection below.

S

- ❒ STC Plc (ICL)
- ❒ Samna Corp
- ❒ Samsung Electronics Co Ltd
- ❒ Sanken Electronic Co Ltd
- ❒ Sanyo Electric Co Ltd
- ❒ Savin Corp
- ❒ Schlumberger Industries
- ❒ Scitex America Corp
- ❒ Seagate Technology Co
- ❒ Seiko Epson Corp
- ❒ Sequent Computer Systems Inc
- ❒ Sequoia Systems Inc
- ❒ SGS-Thompson Microelectronics
- ❒ Sharp Corp
- ❒ Shin-Etsu Chemical Co Ltd
- ❒ Siemens AG
- ❒ Sigma Designs
- ❒ Silicon Graphics Inc
- ❒ Silicon Valley Group Inc
- ❒ Software Publishers Corp
- ❒ Sony Corp
- ❒ Southwestern Bell Tel Corp
- ❒ Star Micronics
- ❒ Star Technologies Inc
- ❒ Storage Technology Inc
- ❒ Stratus Computer Inc
- ❒ Sun Microsystems Inc
- ❒ Supermac
- ❒ Summit Software
- ❒ Symantec Corp

T

- ❒ TAB Products Co
- ❒ Tandem Computers Inc
- ❒ Tandon Corp
- ❒ Tandy Corp
- ❒ Tagea-Varityper Inc
- ❒ Tektronix Inc
- ❒ Telefonica
- ❒ Telenorma
- ❒ Telefunken Elektronic GmbH
- ❒ TeleVideo Systems Inc

T

- ❒ Texas Instruments Inc
- ❒ Thomson SA
- ❒ Thorn-EMI Plc
- ❒ Tokyo Electron Ltd
- ❒ Tokyo Ohka Kogyo
- ❒ Toshiba Corp
- ❒ TRW Inc
- ❒ TSMC (Taiwan Semiconductor Mfg Co)

U

- ❒ Ultimate Corp
- ❒ Uniplex Integration Systems Inc
- ❒ Union Carbide Corp
- ❒ Unisys Corp
- ❒ United Microelectronics Corp
- ❒ United Telecommunications Inc
- ❒ US West Inc

V

- ❒ Valid Logic Systems Inc
- ❒ Varian Associates Inc
- ❒ VLSI Technology Inc
- ❒ VMX Inc

W

- ❒ Wang Laboratories Inc
- ❒ Western Digital Corp
- ❒ Westinghouse Electric Corp
- ❒ Winbond Electronics Corp
- ❒ Wordstar International Inc
- ❒ WordPerfect Corp
- ❒ Wyse Technology Inc

X

- ❒ Xerox Corp

Company Backgrounders
by Dataquest

Note: We require a minimum of 5 ***Company Backgrounders*** per order.

# Backgrounders	Price/Backgrounder
1-20	$30 each
21-100	$27 each
101 or more	$24 each
Entire set	$3,995 (*save 50%!*)

Additional: A binder to conveniently hold your ***Company Backgrounders*** can be purchased for an additional $25 (3 binders free with purchase of entire set).

Three ways you can order ***Company Backgrounders by Dataquest:***

By Phone .....Call the Technology Products Group toll free at 800-624-3282.
By Fax .....Complete this order form and fax it to Dataquest's Technology Products Group at 408-437-0292.
By Mail .....Complete this order form and mail it to:

Technology Products Group
Dataquest Inc., Dept. 1703,
P.O. Box 610000
San Francisco, CA 94161

Bill to: _____
_____
_____
_____
Attn: _____
Telephone: _____

Ship to: _____
_____
_____
_____
_____
Attn: _____
Telephone: _____

Payment or purchase order number must accompany order.
New credit customers subject to credit check prior to shipment.
Make check payable to Dataquest Incorporated.

☐ Check ☐ Money Order ☐ P.O. #_____

☐ MasterCard ☐ VISA ☐ American Express

Card #_____

Exp. date_____

Signature_____

☐ Send me a free Dataquest Directory of Publications.

IMPORTANT: Attach your selection of Company Backgrounders to this order form!

Title	Quantity	Price Per Unit	Total
Company Backgrounders by Dataquest			
Binder		$25	
Entire set (including 3 free binders)	All	$3,995	
		Subtotal	
		Add $15 per order outside USA/Canada	
		CA, CT, IL, MA, MN, and NY residents add applicable sales tax	
		Total	

Source: XA

Apple Computer, Inc.

20525 Mariani Avenue
Cupertino, California 95014
Telephone: (408) 996-1010
Fax: (408) 973-2483
Dun's Number: 06-070-4780

Date Founded: 1977

CORPORATE STRATEGIC DIRECTION

Apple Computer, Inc., designs, develops, manufactures, and markets personal computer systems for use in business, science, education, engineering, and government. Because of product innovation in the areas of computer hardware and system software design, Apple products have become the accepted alternative to the world of MS-DOS.

Total revenue increased 30.0 percent to $5.3 billion* in fiscal year 1989, up from $4.1 billion in fiscal year 1988. Net income totaled $454.0 million during fiscal year 1989, resulting in a 13.4 percent increase over fiscal year 1988. Apple attributed the growth to the success in sales of two of its newest personal computers, the Macintosh IIcx and the Macintosh SE/30.

Apple principally sells its products to the business market through independent resellers, direct sales to national accounts, value-added resellers (VARs), and systems integrators. Apple markets its products to the home market through independent resellers and to the educational market through direct sales and independent resellers. Throughout the years, the domestic market has accounted for the greatest portion of Apple's total revenue. During 1989, 1988, and 1987, international sales represented 35.6, 32.1, and 27.1 percent, respectively, of total revenue. Europe accounted for 22.9, 21.1, and 17.6 percent of international revenue during fiscal years 1989, 1988, and 1987 respectively. Apple plans to continue to focus and build its infrastructure on the European and Asia/Pacific areas through Apple Europe and Apple Pacific. Apple's aim is to make Europe a $1 billion to $2 billion arena.

Apple maintains a continuing research and development (R&D) program to remain adaptable to the dynamic personal computer industry. Apple currently is developing new products and enhancing existing products in the areas of hardware and peripherals, system software, and networking and communications. During fiscal years 1989, 1988, and 1987, R&D expenditure equaled $420.0 million, $272.5 million, and $191.5 million, respectively. These amounts accounted for 8.0, 6.7, and 7.2 percent, respectively, of total revenue.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

*All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

Apple has numerous products and product lines. The following paragraphs summarize Apple's principal products.

Personal Computers

Macintosh Plus

The Macintosh Plus is an entry-level personal computer that offers ease of use, a graphics-based interface, and transportability. It can function as a standalone office productivity system or a cost-effective node in a network environment. The Macintosh Plus has a 3.5-inch 800KB internal floppy disk drive and a small-computer system interface (SCSI) port for connecting a variety of peripherals such as hard disk drives, CD-ROM drives, scanners, or laser printers.

©1990 Dataquest Incorporated

Macintosh SE

The Macintosh SE personal computer combines the compact design of the Macintosh Plus with increased power, quicker file access, and greater flexibility. It includes an internal expansion slot that enables the user to customize a system with products such as accelerator cards, external monitor adapters, MS-DOS coprocessor cards, networking cards, communications cards, or a 5.25-inch MS-DOS disk drive controller card. The Macintosh SE offers three options for built-in storage: an FDHD drive together with a second FDHD floppy disk drive, a Macintosh Internal Hard Disk 20SC, or a Macintosh Internal Hard Disk 40SC. The Macintosh SE uses the Apple FDHD Internal Drive, a high-capacity 3.5-inch floppy disk drive capable of reading 400K, 800K, and 1.4MB Macintosh disks. In addition, the FDHD drive allows the user to read from and write to MS-DOS, OS/2, and ProDOS formatted disks. Apple's multitasking operating system, MultiFinder, lets the user open multiple applications concurrently and perform background tasks such as printing documents on laser printers while the user continues to work in an application. Along with the system software, the Macintosh SE is packaged with Apple's HyperCard. The Macintosh SE is compatible with existing Macintosh hardware and software and allows files to be shared with other members of the Macintosh family of computers.

Macintosh SE/30

The Macintosh SE/30 personal computer provides up to four times the computational speed of the Macintosh SE and runs virtually all current versions of Macintosh software. Like the Macintosh SE, it features a small footprint, easy setup, and transportability. The performance increase of the Macintosh SE/30 stems from the full 32-bit 68030 microprocessor. The 68030 runs at twice the clock speed of the 68000 microprocessor used in the Macintosh SE, and twice as much data can be moved at a time because its external data bus is twice as wide as that of the 68000. It also includes a 68882 floating-point coprocessor for faster processing of complex math functions—an increase of up to 100 times faster than the Macintosh SE. The Macintosh SE/30 uses the Apple FDHD drive, a high-capacity 3.5-inch floppy disk drive capable of reading 400K, 800K, and 1.4MB Macintosh disks. The FDHD lets users read from and write to MS-DOS, OS/2, and ProDOS formatted disks through the Apple File Exchange utility. Expansion options for the Macintosh SE/30 can be accommodated through the 030 Direct Slot. Via the 030 Direct Slot, the Macintosh SE/30 can accept communications cards such as Ethernet and Token-Ring as well as high-performance video cards that support large gray-scale and color monitors.

Macintosh Portable

The Macintosh Portable personal computer provides total Macintosh functionality in a portable design. It is fully compatible with other Macintosh hardware and runs virtually all current versions of Macintosh software. The Macintosh Portable incorporates the central processing unit (CPU), screen, keyboard, pointing device, battery, and disk storage into a single easy-to-carry package. The system can supply 6 to 12 hours of operation, depending on the system configuration and usage. The Macintosh Portable comes standard with 1MB of random-access memory (RAM) and is available in two configurations: with a built-in Apple FDHS SuperDrive or with an Apple FDHD SuperDrive and an internal 40MB hard disk drive. It also has internal expansion slots for adding RAM and a modem.

Macintosh IIcx

The Macintosh IIcx personal computer versatile design allows it to be used in either a vertical or horizontal orientation. The Macintosh IIcx has a full 32-bit 68030 microprocessor with a built-in paged memory management unit, a 68882 floating-point coprocessor, 1MB of RAM, one 1.4MB floppy disk drive, and a mouse. It can be expanded incrementally to 8MB of RAM, and virtually any type of Macintosh IIcx configuration can be created because the system includes three internal NuBus expansion slots to add cards as well as seven external ports to accommodate peripherals and LocalTalk network connections. The Macintosh IIcx offers advanced color and gray-scale graphics capabilities and can be used with a range of monitors. For floppy disk storage, it uses the 1.4MB Apple FDHD SuperDrive. An internal hard disk added and a second floppy disk drive can be connected externally. It is compatible with most Macintosh applications and comes standard with Apple's MultiFinder operating system and HyperCard, a tool for custom software solutions.

Macintosh IIx

The Macintosh IIx offers many of the same performance features of the Macintosh IIcx, including the 68030 microprocessor, the 68882 coprocessor, 1MB

©1990 Dataquest Incorporated

of RAM, and the Apple SuperDrive. The Macintosh IIx has six NuBus expansion slots and can accommodate either a 3.5-inch or a 5.25-inch internal hard disk drive as well as a second internal SuperDrive floppy disk drive.

Macintosh IIci

The Macintosh IIci personal computer has a 25-MHz 68030 microprocessor and performs up to 45 percent faster than the Macintosh IIcx and Macintosh IIx computers. To speed the processing of complex mathematical functions, a 68882 math coprocessor comes standard with the Macintosh IIci. Through installing an optional cache memory card, users can upgrade system performance by an additional 20 to 30 percent for an overall performance improvement of up to 75 percent over the Macintosh IIx and IIcx. It comes with built-in video capability that allows the system to display up to 256 colors or shades of gray simultaneously on a variety of Apple color and gray-scale monitors. The Macintosh IIci includes three internal NuBus expansion slots, space for a 3.5-inch internal hard disk drive, seven standard external ports to accommodate peripherals, the capability of expanding RAM to up to 8MB, and uses the 1.4MB Apple FDHD SuperDrive. It is compatible with most Macintosh applications and comes standard with Apple's MultiFinder operating system and HyperCard, a toll for custom software solutions.

Macintosh IIfx

Introduced in March 1990, the Macintosh IIfx runs up to twice as fast as the 25-MHz Macintosh IIci. It incorporates a 40-MHz 68030 microprocessor, a 32K static RAM cache memory subsystem, a 68882 floating-point coprocessor, and input/output (I/O) processors. These custom-designed application-specific integrated circuits (ASICs) boost system efficiency by managing low-level I/O tasks for the Apple Desktop Bus, floppy disk drives, and serial ports that previously were carried out by the 68030 processor. The Macintosh IIfx contains a small computer system interface/direct memory access (SCSI/DMA) controller and possesses a system memory that can be expanded from 4MB to 8MB. It includes six NuBus expansion slots that can accommodate a variety of Apple and third-party expansion cards, such as additional network interface and graphics cards. A new processor direct slot (PDS) offers a direct interface for third-party hardware options; six external interface ports accommodate peripherals such as hard disks and printers, LocalTalk network connections, and Apple Desktop Bus devices. The Macintosh IIfx utilizes the 1.4MB Apple SuperDrive disk drive, can be configured with up to 160MB of internal hard disk storage, and will accommodate a second SuperDrive.

Storage

Apple External Hard Disks

Apple External Hard Disks provide 20, 40, 80, or 160MB of storage capacity. They provide more storage capacity than a floppy disk and transfer data up to six times faster than floppy disk drives. Macintosh computers equipped with an SCSI port and Apple IIe computers equipped with an Apple II SCSI Interface Card can support external hard disk products.

Apple Tape Backup 40SC

The Apple Tape Backup 40SC uses removable tape cartridges, each of which provides 40MB of backup storage, offering virtually unlimited storage capacity. It is designed for use with all SCSI-based Macintosh systems that include a hard disk.

Modems

Apple Data Modem 2400

The Apple Data Modem 2400 is a standard asynchronous 2,400-bps modem that allows users to exchange information with other standard data modems. It can be used to communicate with other personal computers, minicomputers, and mainframes to send reports and graphics between offices, gain access to databases and commercial information, find out the latest stock prices, and shop and bank from home. The Apple Data Modem 2400 comes with a built-in feature called the Microcom Networking Protocol (MNP) Classes 1-4, which automatically corrects errors that occur while exchanging information over the public telephone system.

Scanners

Apple Scanner

The Apple Scanner allows Apple Macintosh personal computer users to import graphics and images into a variety of software applications. It works with other Apple products—the Macintosh computer, the AppleFax Modem, and the LaserWriter family of printers.

©1990 Dataquest Incorporated

The scanner was designed to integrate with Apple products as well as with third-party page layout and graphics programs. The scanner is based on a flatbed design that allows the user to scan a range of document sizes: letter (8.5 by 11 inches), A4, and legal (8.5 by 14 inches). It supports three composition modes: line, halftone, and gray scale. The user can scan images at 75, 100, 150, 200, and 300 dots per inch (dpi). The Apple Scanner comes with HyperScan software and has a full range of enhancing controls that allows the user to adjust the contrast, brightness, gray map, and halftone pattern of the scanned image.

Printers

LaserWriter IIsc

The Apple LaserWriter IIsc is an entry-level, single-user laser printer for the Macintosh personal computer. It offers full-page, high-resolution (300-dpi) text and graphics print capability and allows printing up to 8 pages per minute through its Motorola 68000 processor. The LaserWriter IIsc comes with four font families: Times, Helvetica, Courier, and Symbol.

LaserWriter IInt

The Apple LaserWriter IInt features 11 font families (35 typefaces): Times, Helvetica, Courier, Symbol, ITC Avant Garde Gothic, ITC Bookman, New Century Schoolbook, Helvetica Narrow, Palatino, ITC Zapf Chancery, and ITC Zapf Dingbats. It provides full-page, high-resolution (300 dpi) text and graphics and allows printing up to eight pages per minute through its Motorola 68000 processor. The LaserWriter IInt is Apple's mainstream network laser printer for both individuals and work groups.

LaserWriter IIntx

The Apple LaserWriter IIntx can be used by individuals or work groups. It offers the same characteristics and ll font families as the LaserWriter IInt; however, it prints up to four times faster than LaserWriter IInt and possesses a Motorola 68020 processor and 2MB of RAM (expandable up to 12MB of RAM).

Further Information

For further information about Apple's business segments, please contact Dataquest's appropriate industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$1,918.3	$1,901.9	$2,661.1	$4,071.4	$5,284.0
Percent Change	-	(0.85)	39.92	53.00	29.78
Capital Expenditure	$54.1	$66.6	$86.1	$144.0	NA
Percent of Revenue	2.82	3.50	3.24	3.54	NA
R&D Expenditure	$72.5	$127.8	$191.5	$272.5	$420.1
Percent of Revenue	3.78	6.72	7.20	6.69	7.95
Number of Employees	4,182	5,600	7,228	10,828	14,517
Revenue ($K)/Employee	$458.70	$339.62	$368.20	$376.00	$363.99
Net Income	$61.2	$154.0	$217.5	$400.3	$454.0
Percent Change	-	151.63	41.23	84.05	13.41

1989 Calendar Year*	Q1	Q2	Q3	Q4
Quarterly Revenue	$1,405.00	$1,247.00	$1,248.00	$1,384.00
Quarterly Profit	$141.00	$56.00	$96.00	$161.00

*Based on fiscal year
NA = Not available

Source: Apple Computer, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	77.69	74.23	72.92	67.94	64.37
International	22.31	25.77	27.09	32.06	35.63
Europe	12.90	15.71	17.55	21.08	22.89
All Others	9.40	10.06	9.54	10.98	12.74

Source: Apple Computer, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	20.00	20.00
Indirect Sales	80.00	80.00
VARs	20.00	20.00
Dealers	60.00	60.00

Source: Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS*

North America—Not available
Japan—Not available
Europe—Not available
Asia/Pacific—Not available
ROW—Not available

MANUFACTURING LOCATIONS

North America

Cambridge, Massachusetts
Programming and advanced development environment
Columbia, Maryland
Advanced development environment
Fremont, California
Macintosh production and peripherals sold outside Europe

Europe

Cork (Ireland)
Macintosh and Apple II products for Europe

Asia/Pacific

Singapore
Apple II, Mac Plus, and Mac SE products for the United States and Asia/Pacific

SUBSIDIARIES

North America

Claris Corporation (United States)
Coral Software Corp. (United States)
Network Innovations Corp. (United States)
Orion Network Systems, Inc. (United States)

Europe

Apple UK Ltd. (United Kingdom)

*130 buildings in North America, Europe, Australia, and the Far East

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

KPMG Peat Marwick
Apple Computers and KPMG Peat Marwick formed a strategic alliance that will provide consulting and systems integration services to companies that implement executive information systems and decision support systems (EIS/DSS) on Macintosh personal computers.

1989

GE Information Services
Apple Computers and GE Information Services (GEIS) signed an agreement for Apple to extend use of GEIS' teleprocessing services as part of AppleLink Version 5.0, Apple's on-line information and communication system for the Apple community.

Falcon Microsystems
Apple Computers and Falcon Microsystems signed a three-year exclusive contract stating that Falcon will continue as exclusive holder of Apple's GSA Schedule C, the official purchasing catalog for personal computing products. The deal is estimated to be worth in excess of $100 million to Apple in its first year and could deliver a total value of $0.5 billion by its expiration date of March 31, 1993.

1988

Digital Equipment Corporation
The companies agreed to provide Mac-to-VAX connectivity by applying common standards for distributed applications, file sharing, printing terminal emulation, electronic mail, conferencing, database access, and networking. They also agreed to jointly develop desktop integration software.

Texas Instruments
TI will be a VAR for Micro Explorer, a LISP-based artificial-intelligence system that incorporates a TI-developed coprocessor board and the Mac II.

1987

Northern Telecom
The companies agreed to jointly develop networking products.

©1990 Dataquest Incorporated

MERGERS AND ACQUISITIONS

1988

Network Innovations Corp.
Apple acquired Network Innovations Corp., a manufacturer of standard connectivity products that connect PC applications with minicomputers and mainframes.

Orion Network Systems, Inc.
Apple acquired Orion, a developer of IBM-compatible Systems Network Architecture software. Both of these acquisitions are consistent with Apple's goal to integrate the Macintosh into industry-standard computing environments.

KEY OFFICERS

John Sculley
Chairman, president, and chief executive officer

Michael H. Spindler
Chief operating officer and executive vice president, temporarily acting president of Apple USA Division

Jean-Louis Gassee
Senior vice president and president of Apple Products Division

Soren Olsson
Senior vice president and president of Apple Europe Division

Ian W. Diery
Senior vice president and president of Apple Pacific Division

Daniel L. Eilers
Vice president, Strategic Investments

PRINCIPAL INVESTORS

A.C. Markkula, Jr.

FOUNDERS

Steven Jobs
Stephen Wozniak

©1990 Dataquest Incorporated

Table 4
Apple Computer, Inc.
Fiscal Year Ending September 27
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$822.1	$1,040.9	$1,307.4	$1,783.0	$2,294.5
Cash	337.0	576.2	565.1	545.7	809.0
Receivables	220.2	263.1	405.6	638.8	792.8
Marketable Securities	0	0	0	0	0
Inventory	167.0	108.7	225.8	461.5	475.4
Other Current Assets	97.9	92.9	110.9	137.0	217.3
Net Property, Plants	$90.4	$107.3	$130.4	$207.4	$334.2
Other Assets	$23.7	$11.9	$40.1	$91.1	$115.2
Total Assets	$936.2	$1,160.1	$1,477.9	$2,082.1	$2,743.9
Total Current Liabilities	$295.4	$328.5	$478.7	$827.1	$895.2
Long-Term Debt	0	0	0	0	0
Other Liabilities	$90.3	$137.5	$162.8	$251.6	$362.9
Total Liabilities	$385.7	$466.0	$641.5	$1,078.7	$1,258.1
Total Shareholders' Equity	$550.5	$694.1	$836.4	$1,003.4	$1,485.8
Converted Preferred Stock	0	0	0	0	0
Common Stock	234.6	227.1	263.9	226.2	315.3
Other Equity	(4.4)	(7.3)	(0.6)	0.7	(5.4)
Retained Earnings	320.3	474.3	573.1	776.5	1,175.9
Total Liabilities and Shareholders' Equity	$936.2	$1,160.1	$1,477.9	$2,082.1	$2,743.9

Income Statement	1985	1986	1987	1988	1989
Revenue	$1,918.3	$1,901.9	$2,661.1	$4,071.4	$5,284.0
U.S. Revenue	1,490.4	1,411.8	1,940.4	2,766.3	3,401.5
Non-U.S. Revenue	427.9	490.1	720.7	1,305.1	1,882.5
Cost of Sales	$117.9	$891.1	$1,296.2	$1,990.9	$2,694.8
R&D Expense	$72.5	$127.8	$191.5	$272.5	$420.1
SG&A Expense	$580.7	$609.5	$801.8	$1,187.6	$1,534.8
Capital Expense	$54.1	$66.6	$86.1	$144.0	NA
Pretax Income	$109.2	$120.0	$309.7	$410.4	$744.3
Pretax Margin (%)	6.30	16.28	15.42	16.12	16.12
Effective Tax Rate (%)	49.00	50.30	47.00	39.00	39.00
Net Income	$61.2	$154.0	$217.5	$400.3	$454.0
Shares Outstanding, Millions	124	129	132	130	129
Per Share Data					
Earnings	$0.99	$1.20	$1.65	$3.08	$3.52
Dividend	0	0	$0.12	$0.32	0.40
Book Value	$4.48	$5.43	$6.35	$7.72	$11.54

©1990 Dataquest Incorporated

Table 4 (Continued)
Apple Computer, Inc.
Fiscal Year Ending September 27
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	2.78	3.17	2.73	2.16	2.59
Quick (Times)	2.22	2.84	2.26	1.60	2.03
Fixed Assets/Equity (%)	16.34	16.42	15.46	15.59	22.49
Current Liabilities/Equity (%)	53.66	47.33	57.23	82.43	60.25
Total Liabilities/Equity (%)	70.06	67.14	76.70	107.50	84.67
Profitability (%)					
Return on Assets	7.10	14.69	16.49	22.49	22.49
Return on Equity	12.06	24.75	28.42	43.52	36.48
Profit Margin (%)	3.19	8.10	8.17	9.83	9.83
Other Key Ratios					
R&D Spending % of Revenue	3.78	6.72	7.20	6.69	6.69
Capital Spending % of Revenue	2.82	3.50	3.24	3.54	3.54
Employees	4,182	5,600	7,228	10,828	14,517
Revenue ($K)/Employee	$458.70	$339.62	$368.20	$376.00	$363.99
Capital Spending % of Assets	5.78	5.74	5.83	6.92	6.92

Source: Apple Computer, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

Autodesk, Inc.

2320 Marinship Way
Sausalito, California 94965
Telephone: (415) 332-2344
Fax: (415) 331-8093
Dun's Number: 06-970-1282

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Autodesk, Inc., designs, develops, markets, and supports computer-aided design (CAD) software for use on leading desktop computers and workstations. Autodesk believes that AutoCAD, the Company's principal product, is the most widely used general-purpose CAD program, with more than 250,000 packages sold through fiscal 1989.

The Company's total revenue increased 48 percent to $117.3 million* in fiscal 1989 from $79.3 million in fiscal 1988. Net income increased 59 percent to $32.7 million in fiscal 1989 from $20.5 million in fiscal 1988. Autodesk employs 576 people worldwide.

Non-U.S. revenue accounted for $47.6 million in fiscal 1989, which accounts for 41 percent of the total, up from 37 percent in fiscal 1988.

Research and development expenditures totaled $10.9 million in fiscal 1989, representing 9 percent of revenue. Autodesk is committed to maintaining an aggressive program for new product development. In 1989, the Company began shipping Animator, a software animation package. It also dramatically reduced the price of the AutoSolid package. In 1988, the Company formed the Autodesk Research Lab, where Autodesk is using technology tracking, research, prototype development, and testing to identify new markets and develop new technology for future products. Also, Autodesk is investing significantly in software applications other than CAD.

Autodesk also is positioning itself for the future through relationships with key strategic partners. During fiscal 1989, Autodesk developed associations to work on new products and market channels with such industry leaders as Apollo Computer, Apple Computer, Compaq, Digital Equipment, IBM, and Sun Microsystems. Autodesk also has teamed up with Aldus, Ashton-Tate, Lotus Development, Microsoft, and WordPerfect to form the Business Software Association (BSA). The BSA, along with Autodesk's own in-house Special Projects Department, promotes antipiracy awareness, education, and legislation.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Application Software

Autodesk's products generally are designed for broad market distribution to users without specialized CAD training. Typical users include mechanical, structural, and electrical engineers, architects, facilities planners, technical illustrators, interior designers, surveyors, electronic systems designers, and educators. The Company's software is available across leading personal computer and workstation environments: Apollo AEGIS, Apple Macintosh, DEC VMS, IBM MS-DOS, and Sun UNIX. Autodesk's CAD software packages are AutoCAD, AutoShade, AutoSketch, and AutoSolid. Dataquest ranked Autodesk among the top 10 CAD/CAM vendors worldwide in 1988.

AutoCAD is Autodesk's major product. It was released in 1982 as a general-purpose design and drafting tool that operates on many different models of desktop computers and workstations and supports

*All dollar amounts are in U.S. dollars.

©1990 Dataquest Incorporated

hundreds of peripheral devices. AutoCAD is currently available in Czech, Danish, English, Finnish, French, German, Italian, Japanese, Norwegian, Polish, Russian, Spanish, and Swedish editions. AutoCAD sales accounted for more than 93 percent of the Company's net revenue in fiscal 1989.

AutoShade is a full-color rendering package for use with AutoCAD that transforms AutoCAD wire frame drawings into three-dimensional shaded images showing perspective, lighting, and specular reflection. AutoShade was released in 1987.

AutoSketch is a low-cost, precision drawing program for personal computers. It is designed for a wide range of drawing applications, including business graphics, architectural drawings, line art for desktop publishing, and technical illustrations. AutoSketch is currently available in Danish, English, Finnish, French, German, Italian, Norwegian, Spanish, and Swedish. More than 90,000 units have been shipped to date.

AutoSolid is a conceptual design package that uses solid modeling technology to create analytical models of three-dimensional components and assemblies. Design information can be used by engineers to perform analysis and determine the acceptability of the design without having to create physical prototypes.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Thousands of U.S. Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$9,874.0	$29,531.0	$52,382.0	$79,257.0	$117,302.0
Percent Change	-	199.08	77.38	51.31	48.00
Capital Expenditure	0	0	0	0	0
Percent of Revenue	0	0	0	0	0
R&D Expenditure	$1,249.0	$1,665.0	$3,366.0	$7,206.0	$10,921.0
Percent of Revenue	12.65	5.64	6.43	9.09	9.31
Number of Employees	145	214	300	414	576
Revenue ($K)/Employee	$68.10	$138.00	$174.61	$191.44	$203.65
Net Income	$1,626.0	$6,521.0	$11,620.0	$20,541.0	$32,695.0
Percent Change	-	301.05	78.19	76.77	59.17

1989 Calendar Year (US$M)	Q1	Q2	Q3	Q4
Quarterly Revenue	$25.75	$27.25	$30.29	$34.00
Quarterly Profit	$7.24	$7.59	$8.50	$9.34

Source: Autodesk, Inc.
Annual Reports and Forms 10-K
Dataquest
1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	88.30	78.06	69.37	63.05	59.40
International	11.70	21.94	30.63	36.95	40.60
Japan	-	1.94	4.63	7.95	11.60
Europe	-	20.00	26.00	29.00	29.00

Source: Autodesk, Inc.
Annual Reports and Forms 10-K
Dataquest
1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	58.00	61.00
Indirect Sales	42.00	39.00
VARs	8.00	9.00
Dealers	34.00	30.00

Source: Dataquest
1990

©1990 Dataquest Incorporated

1989 SALES OFFICES

North America—8
Europe—9
Japan—1
Asia/Pacific—1

MANUFACTURING LOCATIONS

Sausalito, California

Autodesk's production involves duplicating master disks and printing user manuals for the Company's software products. The purchase of blank disks and transfer of the software programs onto these disks for distribution to customers is performed by Autodesk and subcontractors. The Company's user manuals and the packaging materials are produced by outside sources to the Company's specifications. Media for the Company's products, primarily 5 1/4-inch floppy disks and 3 1/2-inch microdiskettes, are available from multiple sources.

SUBSIDIARIES

North America

American Information Exchange (United States)
Generic Software Inc. (United States)
Xanadu Operating Company (United States)

Japan

Autodesk Ltd.

Europe

Autodesk AB (Sweden)
Autodesk AG (Switzerland)
Autodesk Ltd. (England)
Autodesk Softrade AG (Switzerland)

Asia/Pacific

Autodesk Australia Pty. Ltd. (Australia)
Autodesk Ltd. (Australia)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

D-Cubed Ltd., Applied Geometry Corp., Spatial Technology Inc.

Autodesk signed licensing agreements with three software developers. It licensed the DCM dimensional constraint manager for model definition from D-Cubed. Nonexclusive rights to the AGLib library of nonuniform rational B-spline (NURBS) geometry software were obtained from Applied Geometry. Also, Autodesk agreed to license ACIS, a geometric modeler developed by Spatial Technology.

1989

Microsoft Corporation

Autodesk and Microsoft, with two other software companies (Tesseract Corporation and 3Com Corporation), entered into a joint marketing agreement. Under the agreement, the companies will jointly promote their products with Microsoft Excel. The marketing activities will include joint customer presentations, seminars, sales cross-training, and other market development activities. The companies will exchange technical information to assist in the development of stronger customer solutions.

Pixar

Autodesk and Pixar entered into an agreement under which Autodesk acquired nonexclusive rights to integrate Pixar's proprietary photorealistic imaging software into Autodesk's family of CAD and engineering software products. With the agreement, Autodesk becomes the first company to license the technology based on Pixar's RenderMan interface. Initially, Autodesk plans to offer photorealism as a complement to its CAD and rendering products, AutoCAD and AutoShade.

1988

Summagraphics Corporation

Autodesk and Summagraphics entered into an agreement under which Autodesk will bundle AutoSketch with Summagraphics' SummaSketch Plus tablet. This will be a special product offering in North America.

©1990 Dataquest Incorporated

Bridgeport Machines, Inc.
Autodesk and Bridgeport Machines entered into a marketing agreement under which Autodesk will market its AutoCAD software package (version 9) with Bridgeport's EZ-CAM IV software package. EZ-CAM, compatible with almost all computer numerical control (CNC) machine tools, allows for visual verification of parts before they are actually produced.

Sun Microsystems, Inc.
Autodesk and Sun Microsystems entered into an OEM agreement under which AutoShade, AutoCAD, and AutoCAD AEC architectural design module will be available on the Sun-4 and the Sun386i families of workstations. Sun workstations combined with Autodesk's AutoCAD will enable design professionals to run multiple AutoCAD sessions concurrently.

MSC Technologies, Inc.
Autodesk and MSC Technologies entered into an OEM agreement under which MSC's PC Mouse and PC Mouse Bus Plus will be offered with Autodesk's AutoSketch software package.

1987

Timberline Software Corporation
Autodesk and Timberline Software entered into a joint development agreement under which Timberline's Precision Estimating software will be fully interfaced with Autodesk's AutoCAD software package. The interface, which will allow designs created within AutoCAD to be automatically fed into Timberline's Precision Estimating System, will be promoted by both companies.

ACA Pacific, Inc.
Autodesk and ACA Pacific entered into a distribution agreement under which ACA Pacific will distribute Autodesk's products in Southeast Asia, including Singapore, Malaysia, Thailand, Indonesia, Brunei, and the Philippines.

Micro D and Gates Distributing
Autodesk, Micro D, and Gates Distributing entered into a licensing agreement under which Micro D and Gates Distributing will sell Autodesk's AutoSketch entry-level CAD package.

MERGERS AND ACQUISITIONS

1989

Generic Software, Inc.
Autodesk acquired Generic Software, developer of Generic CADD. Generic Software, a low-cost CAD software vendor, will operate as a wholly owned subsidiary of Autodesk.

Xanadu Operating Company
Autodesk acquired an 80 percent equity in Xanadu Operating Company. The Xanadu group is developing new tools for information processing in the work group environment.

American Information Exchange Corporation (AMIX)
Autodesk acquired an 80 percent equity interest in AMIX, a developer of network-management software.

1987

Cadetron
Autodesk acquired Cadetron, providing Autodesk entry into the solid modeling market.

KEY OFFICERS

Alvar Green
Chairman, president, chief executive officer

Daniel Drake
Executive vice president

Malcom Davies
Senior vice president, Marketing and Sales

Volker Kleinn
Vice president, European Operations

Ronald McElhaney
Vice president, Engineering

PRINCIPAL INVESTORS

Equitable Life Assurance Society of the U.S.—9.3 percent
John Walker—8.4 percent

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending January
(Thousands of U.S. Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$4,218.0	$22,841.0	$35,819.0	$113,576.0	$133,055.0
Cash	1,192.0	3,202.0	7,458.0	47,780.0	49,633.0
Receivables	2,588.0	4,910.0	8,130.0	11,353.0	16,354.0
Marketable Securities	-	12,948.0	16,843.0	48,851.0	58,178.0
Inventory	217.0	657.0	1,123.0	1,712.0	2,371.0
Other Current Assets	221.0	1,124.0	1,918.0	3,880.0	6,519.0
Net Property, Plants	$637.0	$1,590.0	$3,498.0	$7,546.0	$13,412.0
Other Assets	$75.0	$253.0	$1,377.0	$4,329.0	$23,426.0
Total Assets	$4,933.0	$24,684.0	$40,347.0	$125,451.0	$169,893.0
Total Current Liabilities	$2,839.0	$3,031.0	$5,555.0	$8,858.0	$18,608.0
Long-Term Debt	-	$362.0	$310.0	-	-
Other Liabilities	$57.0	$120.0	$500.0	$1,828.0	$3,551.0
Total Liabilities	$2,896.0	$3,513.0	$6,365.0	$10,686.0	$22,159.0
Total Shareholders' Equity	$2,007.0	$21,170.0	$33,982.0	$114,765.0	$147,734.0
Converted Preferred Stock	2.0	-	-	-	-
Common Stock	297.0	12,747.0	13,355.0	72,897.0	74,364.0
Other Equity	-	-	-	-	-
Retained Earnings	1,708.0	8,423.0	20,627.0	41,868.0	73,370.0
Total Liabilities and Shareholders' Equity	$4,903.0	$24,683.0	$40,347.0	$125,451.0	$169,893.0

Income Statement	1985	1986	1987	1988	1989
Revenue	$9,874.0	$29,531.0	$52,382.0	$79,257.0	$117,302.0
U.S. Revenue	8,719.0	23,052.0	36,335.0	49,968.0	69,673.0
Non-U.S. Revenue	1,155.0	6,479.0	16,047.0	29,289.0	47,629.0
Cost of Sales	$1,514.0	$4,582.0	$7,864.0	$10,552.0	$14,507.0
R&D Expense	$1,249.0	$1,665.0	$3,366.0	$7,206.0	$10,921.0
SG&A Expense	$4,293.0	$10,891.0	$19,514.0	$30,290.0	$44,957.0
Capital Expense	0	0	0	0	0
Pretax Income	$2,881.0	$13,011.0	$22,925.0	$35,047.0	$54,165.0
Pretax Margin (%)	29.18	44.06	43.77	44.22	46.18
Effective Tax Rate (%)	13.00	22.00	22.00	18.00	18.00
Net Income	$1,626.0	$6,521.0	$11,620.0	$20,541.0	$32,695.0
Shares Outstanding, Millions	16.5	19.0	21.0	23.2	24.1
Per Share Data					
Earnings	$0.10	$0.34	$0.55	$0.89	$1.35
Dividends	-	-	-	-	-
Book Value	$0.12	$1.11	$1.62	$4.95	$6.13

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending January
(Thousands of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	1.49	7.54	6.45	12.82	7.15
Quick (Times)	1.41	7.32	6.25	12.63	7.02
Fixed Assets/Equity (%)	31.89	7.51	10.29	6.58	9.08
Current Liabilities/Equity (%)	141.45	14.32	16.35	7.72	12.60
Total Liabilities/Equity (%)	2,964.37	16.59	18.73	9.31	15.00
Profitability (%)					
Return on Assets	-	44.04	35.55	24.73	22.14
Return on Equity	-	56.27	42.14	27.62	24.91
Profit Margin	16.47	22.08	22.18	25.92	27.87
Other Key Ratios					
R&D Spending % of Revenue	12.65	5.64	6.43	9.09	9.31
Capital Spending % of Revenue	0	0	0	0	0
Employees	145	214	300	414	576
Revenue ($K)/Employee	$68.10	$138.00	$174.61	$191.44	$203.65
Capital Spending % of Assets	0	0	0	0	0

Source: Autodesk, Inc.
Annual Reports and Forms 10-K
Dataquest
1990

©1990 Dataquest Incorporated

Cadence Design Systems, Inc.

555 River Oaks Parkway
San Jose, California 95134
Telephone: (408) 943-1234
Fax: (408) 943-0513
Dun's Number: Not Available

Date Founded: 1988

CORPORATE STRATEGIC DIRECTION

Cadence Design Systems, Inc., developed out of a merger of ECAD, Inc., and SDA Systems, Inc., in May 1988. ECAD was founded in 1982 and SDA Systems in 1983. In early 1990, Cadence merged with Gateway Design Automation Corporation to strengthen its position in systems design and the electronic design automation (EDA) market. Cadence develops, manufactures, and markets EDA software products that automate the design of integrated circuits, circuit boards, and systems. Dataquest believes that Cadence held 1.1 percent market share of the total worldwide CAD/CAM market in terms of 1989 revenue, ranking it 21st among vendors. However, it had 3.4 percent market share of the worldwide CAD/CAM software market in terms of 1989 software revenue.

Total revenue increased 81.7 percent to $142.8 million* in fiscal year 1989, up from $78.6 million in fiscal year 1988. Cadence attributes the growth to the increased acceptance of its products by both semiconductor and electronic systems companies as well as to the expansion of sales offices both domestically and internationally. Net income totaled $27.8 million in fiscal year 1989, representing a 74.1 percent increase over fiscal year 1988. As of May 1990, Cadence employed 1,100 people worldwide.

Over the past five years, Cadence has increased its R&D expenditure; however, the percentage allocated compared with total revenue has greatly decreased from 62.6 percent in fiscal year 1985 to 20.6 percent in fiscal year 1989. During fiscal years 1989, 1988, and 1987, Cadence respectively spent $29.4 million, $14.2 million, and $8.0 million on R&D activities. These figures respectively represented 20.6, 18.1, and 19.8 percent of total revenue. In 1989, Cadence concentrated its R&D activities on three specific areas: preparation of the release of the Opus 4.0 Software, a second-generation Design Framework architecture with a significant number of enhanced and new tools; preparation of the phase two release of the Analog Artist Design System; and development by the Systems Division R&D staff of its first product offering. Cadence's R&D team of experts in database structures and industry-specific algorithm technology work out of facilities located in California, Massachusetts, Canada, India, and Taiwan.

Cadence primarily utilizes a direct sales channel with approximately 223 regional salespeople and applications engineers marketing its products throughout the United States. Cadence has also extended licensing agreements to original equipment manufacturers (OEMs), which accounted for 4 percent of Cadence's total revenue during fiscal years 1989 and 1988. Internationally, Cadence sells its products to the European and Asian markets through six wholly owned subsidiaries. Cadence also sells its products internationally through a manufacturer's representative in Europe (ES2) and full-service distributors in Japan (Innotech), South Korea (Daou Technology), and India (Sapphire Systems and Services Ltd.). During fiscal years 1989, 1988, and 1987, international sales respectively accounted for 8.8, 9.7, and 14.5 percent of total revenue, with Europe representing the majority of sales generated. (These figures are based upon products sold and shipped within international areas.)

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this backgrounder.

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

BUSINESS SEGMENT STRATEGIC DIRECTION

Software

Cadence's core business is IC design automation; however, Cadence recently established four business units. The Systems Division, Analog Division, and Microwave Group use Cadence's core tools and its Design Framework architecture, and target related markets and technologies. The Advanced CAE (ACAE) Division was formed when Gateway Design Automation merged with Cadence.

IC Design Automation Business

Cadence's primary products include Amadeus, Opus, Verilog, Dracula, and Ensemble. The design tools are linked by Design Framework or Design Framework II, a framework architecture that supplies a common database, consistent interface, software portability, and open system architecture. The products currently operate on Digital Equipment Corporation (DEC), HP/Apollo, Intergraph, MIPS, NEC, Sony, and Sun Microsystems engineering workstations.

Amadeus

Introduced in May 1990, the Amadeus Systems Design Series is an EDA solution that focuses on the needs of systems design engineers that are designing advanced electronics products. Amadeus supports the design of very high-performance systems ranging from initial specification in a hardware description language to printed circuit board (PCB) layout. Engineers can use Amadeus to take a design from a high-level description language, architectural description to final PCB, including layout and manufacturing information. Engineers can describe their ASIC and systems using top-down or bottom-up design techniques, then automatically transfer this information to layout both initially and incrementally for engineering change orders (ECOs). The series is based upon Design Framework II and consists of four basic design solutions: Amadeus Composer, Amadeus Analyzer, Amadeus Prance, and the Cadence Verilog-based family of design, analysis, and verification tools. Frame Technology's FrameMaker publication and documentation software, Genrad's System HILO logic simulator, and Synopsys' design synthesis tools are other tools available with Amadeus through either OEM or cooperative marketing.

Opus

The Opus integrated circuit design system allows IC designers with a suite of fully integrated tools to implement all phases of the IC development process from design capture through mask data generation. Opus is based on the Design Framework, which facilitates tool cooperation, allows customization by the engineer, and is portable across all major engineering workstations. Opus tools can be classified into four primary categories: CAE/CAT, cell design, automatic place and route, and design verification.

Verilog

Verilog is a mixed-mode, interactive logic simulator and hardware description language. Verilog combines high-level block descriptions with register transfer level, functional, and gate and switch level circuit representation. Verilog-XL is an accelerated version of Verilog at gate and switch level. Verilog-XL includes Verilog, provides object-oriented access routines, opens gateway design environments, and addresses the need for tight interfaces with third-party CAE tools. Veritime is a timing analyzer that is integrated with Verilog-XL and Verifault-XL. Veritime assists in finding timing problems such as setup, hold, and minimum-pulse-width timing violations; corrects such violations; and predicts circuit performance before layout and tune delay parameters. Veritime offers the option of combining static timing analysis with logic simulation.

Dracula

Cadence's first product, Dracula, is a physical design verification tool for integrated circuits. Dracula ensures that a circuit layout will conform with existing design rules. The Dracula family is divided into three versions: Dracula I, which is targeted toward users designing small circuits; Dracula II, which is aimed at designers of larger circuits in the range of 10,000 to 100,000 transistors; and Dracula III, which uses a hierarchical approach for the design of medium to very large circuits that have significant redundancy in their designs. The Dracula family consists of the following products: Design Rule Checker, Electrical Rules Checker, Layout Versus Schematic, Layout Parameter Extraction, Pattern Generation, Layout Debugger, Parasitic Resistance Extractor, Dracula Access, and Dracula On-Line.

Ensemble

The Cell-based Ensemble solution is a chip assembly environment that is a piece of the Opus family of integrated circuit design automation (ICDA) tools.

©1990 Dataquest Incorporated

The Cell-based Ensemble consists of Cell Ensemble, Block Ensemble, and Floor Planner purchased separately or as a group. It supports all block and mixed standard cell and block designs that use both flat and hierarchical methodologies. Fabrication technologies also supported include CMOS, BiCMOS, ECL, and GaAs.

Systems Division

Cadence's Systems Division's products are planned for introduction in mid-1990. The products will be targeted toward the needs of ASIC and board-level designers in systems companies. The product strategy is focused on supplying design entry, multilevel simulation, and logic synthesis products to support a top-down design style.

Analog Division

In November 1989, Cadence's Analog Division unveiled its Analog Artist Design System, which provides the analog IC designer with a front-to-back design-automated software solution. The Systems and Analog Divisions' products are produced using the Cadence Design Framework architecture and selected core tools from the Opus system. Both divisions change the core tools and develop new tools to satisfy the design needs of their target customers.

Advanced CAE (ACAE) Division

The ACAE Division develops, sells, and supports high-performance ACAE software simulation and analysis products for the design, verification, and testing of complex digital electronic circuits and systems, including ICs and PCBs. The products use software to represent the operation of standard product ICs, application-specific integrated circuits (ASICs), and board-level systems. The strategy of the ACAE Division is to enhance the productivity of developers of electronic components and systems through an integrated family of high-performance CAE tools, based upon a common hardware description language.

Microwave Group

In May 1990, Cadence's Microwave Group introduced the Cadence Microwave Musician Design System. Microwave Musician software was developed to shorten the design time for microwave components for commercial and military applications, including cellular telephones, satellite communication, local area networks, radar systems, and smart weaponry. Microwave Musician is fully integrated within the Cadence Design Framework architecture, provides full front-to-back design capability for monolithic microwave integrated circuits (MMICs) and hybrid devices, and supports complete integration of industry-standard microwave simulators into the system.

Further Information

For more information about Cadence Design Systems' business segments, please contact the appropriate Dataquest industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Thousands of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$13,374.0	$21,609.0	$40,418.0	$78,610	$142,836.0
Percent Change	-	61.57	87.04	94.49	81.70
Capital Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
R&D Expenditure	$8,373.0	$9,368.0	$8,017.0	$14,221.0	$29,376.0
Percent of Revenue	62.61	43.35	19.84	18.09	20.57
Number of Employees	NA	NA	NA	433	978
Revenue ($K)/Employee	NA	NA	NA	$181.55	$146.05
Net Income	($4,805.0)	($4,685.0)	$5,927.0	$15,956.0	$27,776.0
Percent Change	-	2.50	226.51	169.21	74.08

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$29,264.00	$33,534.00	$37,699.00	$42,339.00
Quarterly Profit	$6,262.00	$6,467.00	$7,679.00	$7,368.00

NA = Not available

Source: Cadence Design Systems, Inc. Annual Reports and Forms 10-K Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	73.61	67.23	85.52	90.32	91.25
International	26.39	32.77	14.48	9.68	8.75
Europe	NA	NA	11.21	6.51	6.78
Asia/Pacific	NA	NA	3.27	3.17	1.97

NA = Not available

Source: Cadence Design Systems, Inc. Annual Reports and Forms 10-K Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	96.00	96.00
Indirect Sales	4.00	4.00
OEMs	4.00	4.00

Source: Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS

North America—11
Europe—4
Asia/Pacific—3
Japan—1

MANUFACTURING LOCATIONS

Information is not available.

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Cadre Technologies Inc.
Cadence and Cadre signed an agreement to jointly market hardware-software codesign solutions for builders of electronics systems. Under the agreement, Cadence and Cadre will provide integration between their technologies to allow hardware and software engineering to work together from the system level throughout the whole product development process.

Data I/O Corporation
Cadence signed an OEM agreement with Data I/O that brings programmable logic device (PLD) design synthesis capability to Cadence's Amadeus Systems Design Series. The agreement gives Amadeus users access to Data I/O's ABEL PLD design software.

European Silicon Structures SA (ES2)
Cadence and ES2 announced the formation of a European joint venture company, European CAD Developments Ltd. (EUCAD), which will specialize in R&D activities within the EDA and ASIC design markets.

IBM
Cadence announced that it is porting its entire suite of EDA tools onto IBM's RISC System/6000 family of engineering workstations.

Digital Equipment Corporation (DEC)
Cadence and DEC formed a joint development team to develop next-generation design framework technology. Under the three-year agreement, the two companies will jointly develop and extend Digital's PowerFrame product into a framework technology for the 1990s that automates the total product development process.

1989

Toshiba Corporation
Cadence has made a technical agreement with Toshiba. Cadence will receive development funds from Toshiba to develop CAD software to support the design of analog integrated circuits.

NEC Corporation
NEC will market a version of Cadence's EDGE Systems, a CAD software package for use in the design of advanced PCBs. The software will be ported to the 4800 Series EWSs and the user interface rewritten to accommodate the Japanese language.

Sony Microsystems Company
Sony Microsystems signed an independent software vendor agreement with Cadence. Cadence will provide third-party electronic computer-aided engineering (CAE) software tools for use with Sony's NEWS family of UNIX workstations.

Frame Technology Corporation
Cadence increased the power and flexibility of its design automation system by integrating Frame Technology's computer-publishing software, called FrameMaker.

1988

Mitsubishi Electric Corporation
Cadence and Mitsubishi formed an agreement to cooperate in the development of a CAD system. The following are the terms of the agreement: The firms will jointly develop CAD software that will be used in an integrated large-scale integration (LSI) design system to be developed later; they will modify Cadence's CAD software to run on Mitsubishi's EWS; Mitsubishi will receive interfacing data to connect CAD systems developed by Mitsubishi and Cadence; Mitsubishi will send its

©1990 Dataquest Incorporated

engineers to Cadence to receive technical information; and Mitsubishi will provide Cadence with material on which Cadence can test its CAD software.

MERGERS AND ACQUISITIONS

1990

Automated Systems, Inc.
Cadence and Automated Systems signed an agreement to merge the two companies. Under the terms of the agreement, ASI will merge into Cadence. ASI develops and markets complex PCB design software. Through the merger, Cadence expanded its Systems Division's charter to include advanced PCB design technology.

Gateway Design Automation Corporation
Cadence acquired Gateway Design Automation. Gateway specializes in software for the simulation of circuits and testing of electronic designs and will operate as a division of Cadence.

1989

Tangent Systems
Cadence acquired Tangent Systems.

KEY OFFICERS

Joseph B. Costello
President and chief executive officer

Bruce R. Bourbon
Executive vice president, Marketing

Prabhu Goel
President, Advanced CAE Division

Tim D. Isbell
Vice president, Operations

Michael D. Lack
Vice president and general manager, Systems Division

Donald A. Millers
Executive vice president, Integrated Circuit Research and Development

Michael N. Schuh
Executive vice president, Sales

James E. Solomon
President, Analog Division

PRINCIPAL INVESTORS

Investment Advisors, Inc.—7.5 percent
Harris Corporation—6.6 percent
Intergraph Corporation—5.6 percent

FOUNDERS

Information is not available.

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$16,929.0	$14,957.0	$36,446.0	$64,206.0	$108,931.0
Cash	NA	7,771.0	16,636.0	28,397.0	40,924.0
Receivables	NA	6,757.0	11,979.0	21,272.0	40,873.0
Marketable Securities	NA	NA	6,946.0	12,650.0	21,750.0
Inventory	NA	NA	NA	NA	NA
Other Current Assets	NA	429.0	885.0	1,887.0	5,384.0
Net Property, Plants	NA	$7,422.0	$7,897.0	$13,937.0	$22,365.0
Other Assets	NA	$2,735.0	$7,092.0	$7,273.0	$27,636.0
Total Assets	$16,929.0	$25,114.0	$51,435.0	$85,416.0	$158,932.0
Total Current Liabilities	NA	$6,158.0	$12,373.0	$23,717.0	$40,687.0
Long-Term Debt	NA	$3,477.0	$2,914.0	$2,246.0	$9,352.0
Other Liabilities	NA	$1,137.0	$2,003.0	$1,413.0	$5,144.0
Total Liabilities	$7,743.0	$10,772.0	$17,290.0	$27,376.0	$55,183.0
Total Shareholders' Equity	$9,186.0	$14,342.0	$34,145.0	$58,040.0	$103,749.0
Converted Preferred Stock	NA	7,684.0	NA	NA	NA
Common Stock	NA	19,185.0	206.0	249.0	276.0
Other Equity	NA	(12,527.0)	40,824.0	46,283.0	64,189.0
Retained Earnings	NA	NA	(6,885.0)	11,508.0	39,284.0
Total Liabilities and Shareholders' Equity	$16,929.0	$25,114.0	$51,435.0	$85,416.0	$158,932.0
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$13,374.0	$21,609.0	$40,418.0	$78,610.0	$142,836.0
US Revenue	9,844.0	14,528.0	34,564.0	70,999.0	130,337.0
Non-US Revenue	3,530.0	7,081.0	5,854.0	7,611.0	12,499.0
Cost of Sales	$1,307.0	$3,621.0	$5,141.0	$8,895.0	$18,636.0
R&D Expense	$8,373.0	$9,368.0	$8,017.0	$14,221.0	$29,376.0
SG&A Expense	$8,272.0	$12,500.0	$18,677.0	$31,451.0	$54,086.0
Capital Expense	NA	NA	NA	NA	NA
Pretax Income	($4,288.0)	($3,792.0)	$8,372.0	$23,447.0	$42,341.0
Pretax Margin (%)	(32.06)	(17.55)	20.71	29.83	29.64
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	($4,805.0)	($4,685.0)	$5,927.0	$15,956.0	$27,776.0
Shares Outstanding, Thousands	12,158.0	16,464.0	20,602.0	26,873.0	30,019.0
Per Share Data					
Earnings	($0.40)	($0.28)	$0.29	$0.59	$0.93
Dividend	NA	NA	NA	NA	NA
Book Value	$0.76	$0.87	$1.66	$2.16	$3.46

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	NA	2.43	2.95	2.71	2.68
Quick (Times)	NA	2.43	2.95	2.71	2.68
Fixed Assets/Equity (%)	NA	51.75	23.13	24.01	21.56
Current Liabilities/Equity (%)	NA	42.94	36.24	40.86	39.22
Total Liabilities/Equity (%)	84.29	75.11	50.64	47.17	53.19
Profitability (%)					
Return on Assets	-	(22.29)	15.49	23.32	22.73
Return on Equity	-	(39.82)	24.45	34.62	34.34
Profit Margin	(35.93)	(21.68)	14.66	20.30	19.45
Other Key Ratios					
R&D Spending % of Revenue	62.61	43.35	19.84	18.09	20.57
Capital Spending % of Revenue	NA	NA	NA	NA	NA
Employees	NA	NA	NA	433	978
Revenue ($K)/Employee	NA	NA	NA	$181.55	$146.05
Capital Spending % of Assets	NA	NA	NA	NA	NA

NA = Not available

Source: Cadence Design Systems, Inc. *Annual Reports and Forms 10-K* Dataquest (1990)

©1990 Dataquest Incorporated

Compaq Computer Corporation

20555 SH 249
Houston, Texas 77070
Telephone: (713) 370-0670
Fax: (713) 374-1740
Dun's Number: 00-389-7733

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Since its inception in 1982, Compaq Computer Corporation has been a technology leader in the manufacturing and marketing of industry standard personal computers. Dataquest estimates that for the year ended December 31, 1989, Compaq had a worldwide unit market share of 14 percent in the portable PC market and 3 percent for all PCs. In April 1990, Compaq was ranked 157 in *Fortune* magazine's list of top 500 manufacturing companies.

The slow growth of the PC market affected Compaq's sales and earnings in 1989. Compaq posted its first-ever earnings drop during the fourth quarter ended December 31. In that quarter, the Company's sales increased 18 percent; however, earnings dropped 14 percent from the same quarter in 1988. Overall, Compaq's sales for 1989 grew 39 percent over 1988 levels to $2.9 billion,* and earnings were up 31 percent to $333 million. International sales, principally in Europe, accounted for 45 percent of revenue, growing 62 percent in 1989 to $1.3 billion. North American revenue increased 24 percent over 1988 levels, to $1.6 billion in 1989.

With low-end PC sales slowing, Compaq believes that its future lies in the high-end systems market. Dataquest estimates that worldwide shipments of PCs will grow between 12 percent and 15 percent in 1990 compared with 20 percent in 1989. Compaq expects its revenue to run 3 percent to 5 percent ahead of estimated unit market levels because of sales of high-end 386- and 486-based products.

Originally focused on the portables market, Compaq currently offers a full line of personal computers, including notebook, portable, and desktop systems. As the personal computer market developed, Compaq concentrated its efforts in the high-performance end of the market and focused on business and professional users. Compaq's strategy requires the Company to continue to introduce new products that offer technological advances and features beyond those of its competitors. The Company believes that its products' performance features are a more important factor than price in the purchase decisions of its target market.

Compaq sells its products exclusively through independent, full-service computer specialty dealers for resale to end users. The Company provides training and support programs to over 3,000 Authorized Dealers in 64 countries worldwide. Because of the increasingly complex and sophisticated nature of the Compaq product line, the company has expanded its dealer support programs. Under the SalesPaq program, Compaq has included incentives for resellers to participate in advanced technical training and improve service capabilities. In response, Compaq resellers have enhanced their level of service, employing approximately 3,500 systems engineers and 10,000 service technicians to support new product sales. In addition, Compaq has opened a service and repair center in Stirling, Scotland, to support its European market base.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Desktop Computers

Compaq's products consist of notebook, portable, and desktop personal computers and PC systems. These computers incorporate microprocessors developed by Intel Corporation, with the first portable product

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

based on the Intel 8088. With each subsequent microprocessor family—the 8086, 80286, 80386, 80386SX, and 80486—Compaq has added increased performance to its products while maintaining compatibility with its earlier computers. In keeping with its commitment to industry standards, Compaq supports the Extended Industry Standard Architecture (EISA), which is used to accommodate high-performance 32-bit expansion boards.

For 1989, desktop products provided the bulk of Compaq's sales. Product offerings in the desktop line include the Deskpro 286N, the Deskpro 286e, the Deskpro 386 series, and the recently introduced Deskpro 486/25 and Systempro. During 1989, the 386-based personal computers exceeded sales of the 286-based product, accounting for approximately 72 percent of Compaq's desktop PC unit sales according to Dataquest estimates.

During the fourth quarter of 1989, Compaq introduced the Deskpro 486/25 and the Systempro personal computer system. The Deskpro 486/25 uses Intel's 486 microprocessor teamed with the EISA 32-bit I/O bus architecture. With its optional UNIX operating system and 15-mips performance rating, the Deskpro is targeted to markets that require high performance, such as CAD, software development, and portfolio management. Although announced in 1989, the product was unavailable for delivery until 1990.

The Systempro PC System is based on Intel 386 and 486 processors and the EISA bus. The product actually comprises a range of machines running on one or two 386 or 486 chips. It is available with multidisk arrays containing up to eight disks for a total storage capacity of 4.28GB. The system is designed to handle multiple users and can act as a hub for up to 100 PCs in a network environment. Performance speeds range from 8 to 40 mips. Compaq has positioned the Systempro as a cost-effective alternative to minicomputers for multiuser applications.

With the introduction of the Deskpro 486/25 and Systempro products, Compaq products are moving beyond the normal classification of the personal computer market. Although there were no sales of these products in 1989, Dataquest expects both products to have an impact in the minicomputer and PC LAN market segments. The Deskpro also is expected to affect the low-end workstation market in the area of CAD/CAE and software development applications.

Portable Computers

In its portable line, the Compaq SLT/286 led sales for 1989, representing over 68 percent of Compaq's portable unit sales for the year. Overall, portable products accounted for 24 percent of Compaq's unit sales during the year. Currently, the portable product line includes the 80286-based Compaq Portable III and the Compaq Portable 386. In October 1989, Compaq introduced the Compaq LTE and LTE/286 notebook-sized personal computers. These six-pound notebook products offer 20MB and 40MB internal fixed disk drives and use a 3.5-inch diskette drive. The notebook products are targeted toward professionals who travel frequently, such as executives, sales and service representatives, and journalists.

Other Investments and Activities

Compaq currently has a cross-license agreement with IBM that includes Micro Channel patents; however, there are no plans at this time to develop an MCA product. In addition to its agreements with IBM, Compaq signed an agreement with Novell, Inc., in February 1990 to jointly develop enhanced network-system fault tolerance for use in PC network environments.

Compaq has maintained its investment in Conner Peripherals, Inc., which it began in 1986. As of December 1989, Compaq controlled nearly 31 percent of Conner's equity securities. Compaq continues to buy disk drives from Conner with purchases of $204 million during 1989.

In March 1990, Compaq made an estimated $5 million to $10 million investment in Nexgen Microsystems. Nexgen currently is developing a microprocessor product that is expected to compete with the Intel 80486. Although the product is not yet available, Nexgen reports that the chip will be compatible with the existing Intel 486 design, allowing users to run existing software on systems incorporating the Nexgen chip.

Further Information

For further information about the Company's business segments, please contact the appropriate industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Thousands of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$503,880	$620,138	$1,224.1	$2,065.5	$2,876,062
Percent Change	53.15	23.07	96.00	68.74	-
Capital Expenditure	$36,492	$50,402	$104,393	$273,477	$367,645
Percent of Revenue	7.24	8.13	8.53	13.24	10.0
R&D Expenditure	$15,996	$26,594	$47,104	$74,859	$132,474
Percent of Revenue	3.17	4.29	3.85	3.62	4.6
Number of Employees	1,860	2,200	6,900	8,000	9,700
Revenue ($K)/Employee	$270.90	$281.88	$177.41	$258.19	$296.50
Net Income	$26,595	$42,897	$136,267	$255,242	$333,300
Percent Change	106.71	61.30	217.66	87.31	-

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$682.90	$722.08	$683.00	$788.1
Quarterly Profit	$83.21	$83.94	$87.00	$79.0

Source: Compaq Computer Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	89.80	81.00	74.00	61.40	55.0
International	10.20	19.00	26.00	38.60	45.0
Europe	10.00	17.50	23.80	35.60	41.8
ROW	0.20	1.50	2.20	3.00	3.2

Source: Compaq Computer Corporation
Annual Reports and Forms 10-K
Dataquest (July 1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1987
Direct Sales	-	-
Indirect Sales	100.00	100.00
Dealers	100.00	100.00

Source: Compaq Computer Corporation
Forms 10-K

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS

North America—17
Europe—17
Asia/Pacific—1

MANUFACTURING LOCATIONS

North America

Houston, Texas
Personal computers, surface-mount printed circuit boards

Europe

Erskine, Scotland
Personal computers

Asia/Pacific

Singapore
Printed circuit boards

SUBSIDIARIES

North America

Compaq Canada Inc./Ubciroiree D/B/A Compaq Canada, Inc. (Canada)
Compaq Finance Corp., Ltd. (United States)
Compaq Foreign Sales Corp. (United States)
Compaq International Corp. (United States)
Compaq Telecommunication Corp. (United States)

Europe

Compaq Computer AB
Compaq Computer AG (Switzerland)
Compaq Computer A.S. (Denmark)
Compaq Computer B.V. (Netherlands)
Compaq Computer GmbH (W. Germany)
Compaq Computer Group Ltd. (United Kingdom)
Compaq Computer Ltd. (United Kingdom)
Compaq Computer Manufacturing Ltd. (United Kingdom)
Compaq Computer Norway A.S. (Norway)
Compaq Computer N.V./S.A. (Belgium)
Compaq Computer S.A. (Spain)
Compaq Computer S.A.R.L. (France)
Compaq Computer S.p.A. (Italy)
Compaq Scandinavia AB (Sweden)
Deskpro Computer AB (Sweden)

Asia/Pacific

CCA Systems Pty. Ltd. (Australia)
Compaq Computer Asia Pte. Ltd. (Singapore)
Compaq Computer Holding Pte. Ltd. (Singapore)
Compaq Computer New Zealand Ltd. (New Zealand)
Compaq Computer Hong Kong Ltd. (Taiwan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Novell Inc.
In February, Compaq entered into a technology development agreement with Novell, Inc., to apply resources of both companies toward the enhancement of network systems fault tolerance. The purpose of the joint effort is to develop products that take advantage of Novell's system fault tolerance and Compaq's multiprocessing technology to improve reliability for PC-based networks.

1989

IBM
Both companies signed a patent cross-licensing agreement in which both companies granted to one another a worldwide, nonexclusive license covering patents having an effective filing date before July 1, 1993.

1988

Digital Equipment Corporation
A technology exchange agreement to ensure connectivity of the two companies' products. In addition, Digital will provide support for Compaq personal computers on DECnet/OSI networks.

©1990 Dataquest Incorporated

1988

EISA

On September 13, Compaq and eight other personal computer manufacturers entered into EISA Patent License Agreements that cover worldwide patent rights filed prior to October 1995 associated with the EISA I/O subsystems ("EISA Patents"). The list of companies involved in the "EISA Alliance" has since grown to include over 60 manufacturers of personal computers and related products.

Microsoft

Compaq has nonexclusive licenses from Microsoft for the MS-DOS and MS OS/2 operating systems, Microsoft GW-Basic computer language, and other Microsoft software.

KEY OFFICERS

Joseph R. Canion
President and chief executive officer

Eckhard Pfeiffer
President, European and International Division

Daryl J. White
Senior vice president, Finance, and chief financial officer

Michael S. Swavely
President, North American Division

B. Kevin Ellington
Senior vice president, International Development

James M. Harris
Senior vice president, Engineering

Robert E. Vieau
Senior vice president, Corporate Manufacturing

Gary Stimac
Senior vice president, Systems Engineering

PRINCIPAL INVESTORS

Lazard Freres and Co.
Kleiner Perkins et al.
Sevin L J et al.

FOUNDERS

Rod Canion
James M. Harris
William F. Murtro
Seven other former Texas Instruments employees

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$239,682	$259,779	$680,828	$1,114,642	$1,312,499
Cash	76,984	57,133	132,276	281,179	161,313
Receivables	83,624	116,490	254,596	428,338	530,228
Inventory	75,783	81,190	275,988	386,973	559,042
Other Current Assets	3,291	4,966	17,963	18,152	61,916
Investments in Affiliated Companies	0	$9,535	$18,896	$35,731	$58,671
Net Property, Plants	$66,733	$101,975	$192,271	$428,937	$705,475
Other Assets	$5,583	$6,392	$9,040	$10,687	$13,742
Total Assets	$311,998	$377,681	$901,030	$1,589,997	$2,090,387
Total Current Liabilities	$99,253	$118,837	$342,558	$479,847	$563,448
Long-Term Debt	$75,000	$72,809	$148,915	$274,930	$274,434
Other Liabilities	$1,137	$2,733	$10,025	$20,666	$80,872
Total Liabilities	$175,390	$194,379	$501,498	$775,443	$918,754
Total Shareholders' Equity	$136,608	$183,302	$399,532	$814,554	$1,171,635
Converted Preferred Stock	0	0	0	0	0
Common Stock	265	270	342	385	393
Other Equity	96,780	100,572	180,463	340,200	363,973
Retained Earnings	39,563	82,460	218,727	473,969	807,269
Total Liabilities and Shareholders' Equity	$311,998	$377,681	$901,030	$1,589,997	$2,090,389

Income Statement	1985	1986	1987	1988	1989
Revenue	$503,880	$620,138	$1,224.1	$2,065.5	$2,876,062
US Revenue*	452,484	502,312	905,834	1,268.2	-
Non-US Revenue	51,396	117,826	318,266	797,283	-
Cost of Sales	$325,804	$360,698	$717,336	$1,233.3	$1,715,243
R&D Expense	$15,996	$26,594	$47,104	$74,859	$132,474
SG&A Expense	$109,934	$152,043	$225,996	$397,363	$538,721
Capital Expense	$36,492	$50,402	$104,393	$273,477	$367,645
Pretax Income	$8,364	$76,536	$228,065	$366,847	$484,539
Pretax Margin (%)	1.66	12.34	18.63	17.76	-
Effective Tax Rate (%)	39.30	41.70	40.70	32.50	34.1
Net Income	$26,595	$42,897	$136,267	$255,242	$333,300
Shares Outstanding, Millions	26.46	27.04	34.17	38.55	39.35
Per Share Data					
Earnings	$0.90	$1.33	$3.57	$6.27	$7.76
Dividend	0	0	0	0	0
Book Value	$5.16	$6.78	$11.69	$21.13	$29.77

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	2.41	2.19	1.99	0.00	2.33
Quick (Times)	1.65	1.50	1.18	(0.80)	1.34
Fixed Assets/Equity (%)	48.85	55.63	48.12	52.66	60.21
Current Liabilities/Equity (%)	72.66	64.83	85.74	58.91	48.09
Total Liabilities/Equity (%)	128.39	106.04	125.52	95.20	78.42
Profitability (%)					
Return on Assets	9.79	12.44	21.31	56.56	31.86
Return on Equity	21.65	26.82	46.76	42.05	33.56
Profit Margin	5.28	6.92	11.13	12.36	11.59
Other Key Ratios					
R&D Spending % of Revenue	3.17	4.29	3.84	3.60	4.6
Capital Spending % of Revenue	7.24	8.13	8.53	13.24	12.78
Employees	1,860	2,200	6,900	8,000	9,700
Revenue ($K)/Employee	$270.90	$281.88	$177.41	$258.19	$296.5
Capital Spending % of Assets	11.70	13.35	11.59	17.20	17.6

*US revenue should be read as North American revenue. It includes data for the United States and Canada.

Source: Compaq Computer Corporation Annual Reports and Forms 10-K Dataquest (1990)

©1990 Dataquest Incorporated

Control Data Corporation

8100 34th Avenue South
Minneapolis, Minnesota 55440
Telephone: (612) 853-8100
Fax: (612) 853-5300
Dun's Number: 00-625-5996

Date Founded: 1957

CORPORATE STRATEGIC DIRECTION

Until the mid-1980s, Control Data Corporation operated as a highly diversified conglomerate with a wide array of businesses ranging from computers to insurance to agriculture. After a disastrous year in 1985, however, Control Data began a major reorganization to restore profitability. Although Control Data achieved marginal profitability in 1987 and 1988, net income was low. In fact, Control Data's tremendous financial problems throughout the past five years has led to the divestiture and discontinuance of many of its businesses. In 1989, Control Data again experienced a massive loss in the process of reorganizing into eight separate businesses: Computer Products; Empros Systems International; Government Systems; Automated Wagering; Micrognosis, Inc.; Data Services; Business Management Services (BMS); and The Arbitron Company. With a new president, Lawrence Perlman, in charge, Control Data now has adopted a strategy to focus on technology-based data solutions.

Along with restructuring, Control Data is taking significant actions to position itself for the 1990s. These include the following:

- The number of businesses Control Data sold accounted for one-third of its total revenue. Imprimis Technology Inc. was purchased by Seagate Technology for $450 million.* Although Imprimis was an important profit contributor during 1988 and 1989 (representing 31.6 and 25.6 percent, respectively, of total revenue), the sale allowed Control Data to focus its resources on value-added data solutions businesses. Control Data also sold Burke market research; Action Data Services; European third-party computer maintenance, training, and education services; and Ticketron sports and entertainment operations.
- Control Data closed its unprofitable ETA supercomputer operation. ETA faced many problems in getting its systems to market, so its discontinuance allowed Control Data to eliminate a financial drain. The closing resulted in the single largest restructuring charge ever encountered by Control Data.
- The Company changed its Computer Products business strategy to focus on providing its customer base with high-performance computer solutions for engineering and scientific computing and for managing large databases and networks.
- Control Data plans to sell its VTC semiconductor subsidiary in 1990.
- The Company reduced its number of employees from 33,500 at the beginning of 1989 to 18,000 at the end of that year.

Total revenue decreased 19.1 percent from $3.6 billion in fiscal year 1988 to $2.9 billion in fiscal 1989. Net income decreased significantly from a net gain of $1.7 million during fiscal 1988 to a net loss of $680.4 million during fiscal 1989. This loss was caused primarily by Control Data's pretax, net restructuring charges equaling $663.3 million.

Control Data's greatest restructuring cost was incurred from shutting down ETA, the subsidiary involved in the development and manufacturing of supercomputers. Since its founding in 1983, ETA had sustained significant losses and required large cash infusions. Some of the problems ETA encountered in getting its systems to market included longer-than-expected development time, poor system reliability, delays in software development, and a late move to a UNIX operating system. These factors, along with highly uncertain revenue forecasts, led to ETA's termination, resulting in a $335 million restructuring charge for 1989.

During fiscal years 1989, 1988 and 1987, R&D expenditure totaled $250 million, $336 million, and

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

$323 million, respectively. These amounts accounted respectively for 8.5, 9.3, and 9.6 percent of total revenue. R&D activities focus principally on the development and enhancement of computer network technology, operating system and applications software, and manufacturing processes. The decrease in R&D expenses in 1989 resulted primarily from the closing of Control Data's supercomputer operations, the downsizing of its Computer Products operations, and the sale of Imprimis.

Control Data markets and supports its systems and services primarily through its direct sales force. Since Control Data's decentralization, each of its businesses is responsible for its own sales force. During the past five years, international sales have represented approximately one-third of total revenue.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Computer Products

Computer Products offers high-performance computer systems targeted at the computational processing requirements of the engineering and scientific markets. It provides workstations, departmental systems, mainframes, supercomputers and tools for information management, product design, networking, and systems integration.

Computer Products is Control Data's biggest revenue generator, representing 28.5 percent of The Company's total revenue. During fiscal years 1989, 1988, and 1987, Computer Products revenue totaled $835.9 million, $1,058.9 million, and $1,209.4 million, respectively. Approximately 60 percent of the revenue decrease from 1988 to 1989 was because of operations having been sold or discontinued during those years, including third-party maintenance operations in Europe, Control Data Institutes in Europe, and a data processing services business. In January 1990, Computer Products also sold its third-party maintenance operations in the United States and Canada.

Most of Computer Products' revenue comes from the sale or lease of general-purpose CYBER mainframes, which use the Company's proprietary NOS and NOS/VE operating systems. These products are sold to customers that maintain centralized computing environments. The CYBER mainframe line consists of high-performance compatible computers capable of processing a mixed work load on a flexible delivery platform. The CYBER line includes the entry-level, air-cooled CYBER 930 models, the midrange CYBER 960 models, which are air-cooled mainframes with dual-state operating capability, and the high-end CYBER 990 models. During fourth quarter 1989, Computer Products unveiled a new high-end mainframe model, the CYBER 2000, which will be available in late 1990. The CYBER 2000 is air-cooled, uses a 14,000-gate ECL logic chip, supplies twice the power of the CYBER 990, and runs the Company's NOS/VE operating system.

Computer Products also provides the CYBER 910 line of integrated graphics workstations and the CYBER 920 line of network servers designed to provide file- and compute-serving for CYBER 910 workstations. CYBER 910 and 920 products are UNIX-based and are produced for the Company by Silicon Graphics, Inc. In early 1990, Computer Products also introduced the Control Data 4000 series of departmental computers, which incorporate reduced-instruction-set computing (RISC) processors designed by MIPS Computer Systems, Inc.

Empros Systems International

Empros Systems International, formerly known as Energy Management Systems, provides information systems for managing electrical power generation, transmission, and distribution for larger electric utilities worldwide. During fiscal 1989, Empros' revenue contributed 3.2 percent of Control Data's total revenue. Most of Empros revenue comes from relatively long-term contracts for the sale of turnkey systems for managing electrical power transmission. These systems incorporate Control Data hardware and that of other vendors with proprietary application software. Although Empros experienced an increase in international sales from fiscal 1988 to fiscal 1989, it experienced a decrease in US sales. Empros believes that the decreased demand in the US market reflected increasing competitive pressures on electric utilities due to deregulation, continuing price/performance improvements in workstations and smaller computer

©1990 Dataquest Incorporated

systems, and a domestic trend toward expanding and evolving existing systems rather than replacing them. Therefore, Empros anticipates that international activity will represent a larger proportion of its power transmission systems business and that greater resources will be directed toward supplying smaller systems for managing the distribution of electrical power from substations to individual utility customers.

Government Systems

Accounting for 12.5 percent of Control Data's total revenue, Government Systems provides computer systems, hardware, software, and related services that target the needs of the defense and space industries worldwide. Government Systems' US operations focus on the following products: avionic computers, including the AN/AYK-14 standard Navy airborne computer; the UYH-3 and MMSD standard Navy shipboard disk drives; storage management subsystems; advanced parallel processing computer systems; and space computers. Government Systems' Canadian operations, Computing Devices of Canada, produces display products, antisubmarine warfare subsystems, and ground system fire control computers for the US Army M-1 tank and the UK Challenger tank. Government Systems also conducts research, design, and development services in connection with various government-sponsored research and development projects.

Automated Wagering

Control Data's Automated Wagering business markets on-line computer systems for state lotteries, off-track betting operations, and other competitions. These systems were formerly part of the Company's Ticketron division, which Control Data sold at the end of 1989. Revenue from Automated Wagering, together with that from the Ticketron ticketing and reservation operations, accounted for 5.5 percent of Control Data's 1989 total revenue.

Micrognosis, Inc.

The Company's Micrognosis subsidiary designs, manufactures, and installs trading room information distribution systems for banks, securities firms, insurance companies, and the treasury departments of large companies in the United States and various foreign countries. Micrognosis' revenue was $99.1 million in fiscal year 1989, accounting for 3.4 percent of Control Data's total revenue.

Data Services

Control Data's Data Services business provides computer-based services to credit unions for loan and deposit accounting, transaction processing, and financial reporting. Data Services revenue was $106 million for fiscal year 1989, or 3.6 percent of Control Data's total revenue.

Business Management Services (BMS)

BMS provides payroll processing, payroll tax filing, accounting, human resource management, and health claims processing services to a range of businesses throughout the United States. The majority of BMS' revenue is generated from payroll processing services. During fiscal year 1989, BMS' revenue reached $170.5 million, representing 5.8 percent of Control Data's total revenue.

The Arbitron Company

In fiscal year 1989, The Arbitron Company accounted for 9.9 percent of Control Data's total revenue, or $290 million. The Arbitron Company measures radio and television audiences, tracks the sale of packaged goods in supermarkets and drugstores, monitors television and radio commercials, and tracks the sales promotion activities of packaged goods manufacturers and retailers in local markets.

Further Information

For further information about the Control Data's business segments, please contact the appropriate Dataquest industry services.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$3,680.0	$3,347.0	$3,367.0	$3,628.0	$2,935.0
Percent Change	NA	(9.05)	0.59	7.78	(19.12)
Capital Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
R&D Expenditure	$316.0	$314.0	$323.0	$336.0	$250.0
Percent of Revenue	8.59	9.38	9.59	9.25	8.52
Number of Employees	39,500	35,500	34,500	33,500	18,000
Revenue ($K)/Employee	$93.16	$94.27	$97.58	$108.31	$163.03
Net Income	($567.5)	($264.5)	$19.3	$1.7	($680.4)
Percent Change	-	53.39	107.30	(91.19)	(40,123.53)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$843.5	$804.3	$763.0	$523.7
Quarterly Profit	$3.5	($497.3)	$9.8	($196.4)

NA = Not available

Source: Control Data Corporation Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	71.00	70.00	67.00	71.00	67.00
International	29.00	30.00	33.00	29.00	33.00

Source: Control Data Corporation Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	100.00	100.00
Indirect Sales	0	0

Source: Dataquest (1990)

©1990 Dataquest Incorporated

1990 SALES OFFICE LOCATIONS

Control Data Corporation has become a decentralized organization. Each group possesses its own sales office locations; thus, this information is unavailable to report.

MANUFACTURING LOCATIONS

North America

Arden Hills, Minnesota
Computers, hardware and software development/ assembly
Bloomington, Minnesota
Computers, hardware and software development/ assembly, peripheral memories and components
Eden Prairie, Minnesota
Militarized computer hardware
Minneapolis, Minnesota
Computers, hardware and software development/ assembly
Plymouth, Minnesota
Computers, hardware and software development/ assembly
Rockville, Maryland
Militarized computer hardware
Sunnyvale, California
Computers, hardware and software development/ assembly

SUBSIDIARIES

North America

1151 Seven Locks Corp. (United States)
Bancroft Franklin Investors Ltd. (United States)
Bemidji Seed Capital Fund L.P. (United States)
Burke Marketing Services Inc. (United States)
CCC Alternative Energy Venture Inc. (United States)
CYB Systems Inc. (United States)
Computer Support Corp. (United States)
Con Med Inc. (United States)
Control Data Asia Inc. (United States)
Control Data Automated Wagering Inc. (United States)
Control Data Belgium Inc. (United States)
Control Data Canada Ltd. (Canada)
Control Data Caribbean Basin Inc. (United States)
Control Data China Inc. (United States)
Control Data Commerce International Inc. (United States)
Control Data EBAL Inc. (United States)
Control Data Energy Management Systems Inc. (United States)
Control Data Greece Inc. (United States)
Control Data Indo-Asia Co. (United States)
Control Data International Trading Inc. (United States)
Control Data International Sales Corp. (United States)
Control Data Middle East Inc. (United States)
Control Data Optical Drives Inc. (United States)
Control Data Optical Media Inc. (United States)
Control Data Pan American Corp. (United States)
Control Data Properties Inc. (United States)
Control Data Research Inc. (United States)
Control Data Temporary Personnel Services Inc. (United States)
DSC Nortech Inc. (United States)
Earth Energy Systems Inc. (United States)
Financial Information Services International Inc. (United States)
Garid Inc. (United States)
Human Resources Corp. (United States)
INTERMICROS Corp. (United States)
Inference Corp. (United States)
Inter-American Control Data Corp. (United States)
Interactive Computer Modelling Inc. (United States)
Micro-Quartz Technology Corp. (United States)
Microelectronics & Computer Technology Corp. (United States)
Micrognosis, Inc. (United States)
Microtechnology Sources Ltd. (United States)
Minnesota Seed Capital Fund Inc. (United States)
Northside Child Development Center Inc. (United States)
PlanWare Inc. (United States)
Positran Inc. (United States)
Princeton Montrose Corp. (United States)
Radio-TV Reports Inc. (United States)
Ramtek Corp. (United States)
SAMI/Burke Inc. (United States)
The Arbitron Company (United States)
The Service Bureau Corp. (United States)
United School Services of America Inc. (United States)
VTC Inc. (United States)
Wave Technologies Corp. (United States)

Europe

Assigraph S.A. (France)
CD Iberica, S.A. (Spain)
Control Data (Ireland) Ltd. (Ireland)

©1990 Dataquest Incorporated

Control Data A/S (Denmark)
Control Data AB Oy (Finland)
Control Data B.V. (Netherlands)
Control Data Consulting Services Ltd. (Greece)
Control Data France S.A. (France)
Control Data GesmbH (Austria)
Control Data Holding AG (Switzerland)
Control Data Italia S.p.A. (Italy)
Control Data Ltd. (United Kingdom)
Control Data Portuguesa S.A.R.L. (Portugal)
Control Data Services B.V. (Netherlands)
Creation D'Activites Nouvelles S.A., Ste. de (SOCRAN) (Belgium)
Data Plus (France)
Sigha S.A. (France)
Standard Computer Komponentent GmbH (Germany)

Asia/Pacific

Control Data Australia Pty. Ltd. (Australia)
Control Data Hong Kong Ltd. (Hong Kong)
Control Data Indo-Asia Pte. Ltd. (Singapore)
Control Data Japan Ltd. (Japan)
Micrognosis International Ltd. (New Zealand)
Techniche Pty. Ltd. (Australia)

ROW

Circuitos Impresos de Alta Tecnologia S.A. de C.V. (Mexico)
Control Data Brazil Computadores, Ltda. (Brazil)
Control Data Overseas Finance Corp. N.V. (Netherlands Antilles)
ROM Control Data S.R.L. (Romania)
WTG Systems Ltd. (Jamaica)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Storage Technology Corporation
Storage Technology Corporation entered an original equipment manufacturer (OEM) agreement with Control Data's Computer Products Group. Under the terms of the agreement, the Computer Products Group will market StorageTek's high-capacity 4400 Automated Cartridge System (ACS), 4480 Cartridge Subsystem, and Library Server software for use with Control Data's mainframe and departmental computer systems.

MIPS Computer Systems Inc.
Through an OEM agreement signed with MIPS Computer Systems, Control Data will offer a new series of RISC-based departmental computers.

Union of Soviet Socialist Republics
Control Data formed a joint venture in the Soviet Union. Control Data is to export six CYBER mainframes, which will aid safety analysis in the nuclear industry.

1989

Convex Computer Corp.
CDC and Convex announced a joint marketing and sales agreement in which CDC will sell and integrate Convex's C Series family of supercomputers in selected geographic regions, markets, and accounts.

Arix Corporation
Control Data Corporation (CDC) and Arix Corporation signed an an agreement in which CDC will develop software and provide support for Arix's line of UNIX-based multiprocessors.

International Air Transport Association
Control Data licensed its airline yield management software to the International Air Transport Association in a multimillion dollar deal.

Cray Research
CDC and Cray made a joint marketing arrangement in which CDC will resell Cray supercomputers.

MERGERS AND ACQUISITIONS

1989

Seagate Technology
CDC agreed to sell Imprimis Technology to Seagate for $450 million in cash and paper.

Primerica Corp.
CDC sold Action Data Service to Primerica.

Computer Power Group Ltd.
CDC sold its 22 CDC Institutes in Germany and France to Computer Power Group.

1988

Silicon Graphics
CDC acquired 20 percent of the outstanding stock of Silicon Graphics, a leader in the 3-D graphics workstation market, for $68.9 million.

©1990 Dataquest Incorporated

1987

SAMI/Burke Inc.
CDC acquired SAMI/Burke, a market research organization. However, in February 1989, CDC signed a letter of intent to sell its Burke market research business.

KEY OFFICERS

Lawrence Perlman
President, chief executive officer

John R. Eickhoff
Vice president and corporate controller

Jacklyn J. Elverum
Vice president, Business Analysis

Anthony J. Avrichio
President, The Arbitron Company

Catherine M. Hapka
President, Data Services

W. Herbert Plummer
President, Automated Wagering

Robert E. Handberg
President, Government Systems

James E. Ousley
Executive vice president and president, Computer Systems

David P. White
Executive vice president, Information Services

Lois D. Rice
Senior vice president, Government Affairs

PRINCIPAL INVESTORS

Shearson Lehman Hutton Inc.—7.9 percent
Batterymarch Financial Management—5.7 percent

FOUNDERS

Information is not available.

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$1,339.00	$1,540.50	$1,740.00	$1,675.00	$1,273.60
Cash	81.40	400.90	405.20	197.90	524.70
Receivables	566.90	570.00	711.20	709.30	483.20
Inventory	656.40	539.00	598.70	730.90	245.00
Other Current Assets	34.30	30.60	24.90	36.90	20.70
Net Property, Plants	$414.00	$420.70	$457.90	$450.90	$170.50
Other Assets	$1,319.50	$633.70	$440.70	$407.60	$416.60
Total Assets	$3,072.50	$2,594.90	$2,638.60	$2,533.50	$1,860.70
Total Current Liabilities	$1,460.20	$929.60	$1,068.80	$918.90	$842.70
Long-Term Debt	$96.20	$485.60	$384.40	$379.40	$352.30
Other Liabilities	$313.50	$188.60	$137.90	$181.00	$254.20
Total Liabilities	$1,869.90	$1,603.80	$1,591.10	$1,479.30	$1,449.20
Total Shareholders' Equity	$1,202.60	$991.10	$1,047.50	$1,054.20	$411.50
Converted Preferred Stock	11.00	10.90	10.90	10.90	10.90
Common Stock	20.60	20.70	21.10	21.10	21.40
Other Equity	407.10	460.60	497.70	503.20	541.00
Retained Earnings	763.90	498.90	517.80	519.00	(161.80)
Total Liabilities and Shareholders' Equity	$3,072.50	$2,594.90	$2,638.60	$2,533.50	$1,860.70
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$3,679.70	$3,346.70	$3,366.50	$3,628.30	$2,934.50
US Revenue	2,620.60	2,333.80	2,247.20	2,579.20	1,976.50
Non-US Revenue	1,059.10	1,012.90	1,119.30	1,049.10	958.00
Cost of Sales	$2,582.10	$2,263.70	$2,347.30	$2,523.80	$2,046.00
R&D Expense	$316.10	$313.90	$322.80	$335.70	$249.90
SG&A Expense	$752.80	$683.30	$600.80	$643.70	$552.30
Capital Expense	NA	NA	NA	NA	NA
Pretax Income	($484.00)	($280.60)	$57.40	$16.40	($668.30)
Pretax Margin (%)	(13.15)	(8.38)	1.71	0.45	(22.77)
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	($567.50)	($264.50)	$19.30	$1.70	($680.46)
Shares Outstanding, Millions	39.00	40.9	41.5	41.9	42.3
Per Share Data					
Earnings	($14.56)	($6.48)	$0.45	$0.03	($16.11)
Dividend	$0.54	0	0	0	0

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	0.92	1.66	1.63	1.82	1.51
Quick (Times)	0.47	1.08	1.07	1.03	1.22
Fixed Assets/Equity (%)	34.43	42.45	43.71	42.77	41.43
Current Liabilities/Equity (%)	121.42	93.79	102.03	87.17	204.79
Total Liabilities/Equity (%)	155.49	161.82	151.89	140.32	352.17
Profitability (%)					
Return on Assets	-	(9.33)	0.74	0.07	(30.97)
Return on Equity	-	(24.11)	1.89	0.16	(92.84)
Profit Margin	(15.42)	(7.90)	0.57	0.05	(23.19)
Other Key Ratios					
R&D Spending % of Revenue	8.59	9.38	9.59	9.25	8.52
Capital Spending % of Revenue	NA	NA	NA	NA	NA
Employees	39,500	35,500	34,500	33,500	18,000
Revenue ($K)/Employee	$93.16	$94.27	$97.58	$108.31	$163.03
Capital Spending % of Assets	NA	NA	NA	NA	NA

NA = Not available

Source: Control Data Corporation
Annual Reports
Dataquest (1990)

©1990 Dataquest Incorporated

Digital Equipment Corporation

146 Main Street
Maynard, Massachusetts 01754
Telephone: (617) 897-5111
Fax: (508) 493-8780
Dun's Number: 00-103-8066

Date Founded: August 23, 1957

CORPORATE STRATEGIC DIRECTION

Digital Equipment Corporation was founded by Kenneth Olsen, Stanley Olsen, and Harland Anderson, three former employees of MIT's Lincoln Laboratory. Digital has grown from its origin as a manufacturer of computer logic modules into the second largest computer manufacturer in the United States. Digital is a leading supplier of networked computer systems, minicomputer systems, software, and services, including systems integration.

Digital operates in the United States and 82 other countries around the world, manufacturing, selling, and servicing computers, peripheral equipment, software, and supplies. Digital's product portfolio includes desktop, time sharing, transaction processing, and scientific systems that address a broad range of information processing needs. The Company's corporate mission is to provide solutions that help organizations become more productive and more competitive.

In his president's letter at the beginning of the report to stockholders of September 1, 1989, Kenneth Olsen states: "Digital is committed to integrating existing desktop computer systems into corporate networks while increasing our share of the terminal, personal computer, and workstation market; developing distributed transaction processing systems and applications; becoming a leader in integrating the products of different manufacturers by building a network of alliances with software developers, other manufacturers, and with systems integrators."

Digital's total revenue increased 11.0 percent to $12.7 billion* for the fiscal year ended July 1, 1989, up from $11.4 billion in fiscal 1988. Net income decreased by 17.8 percent to $1.1 billion in fiscal 1989, down from $1.3 billion in fiscal 1988. Flat year-to-year sales in the United States and a higher level of operating expenses led to the decline. The Company's profit margin also decreased to 8.4 percent in fiscal 1989, down from 11.4 percent in fiscal 1988. This figure is representative of the industry as a whole, which is suffering from decreasing profit margins due to pricing competition and higher operating expenses.

North America was Digital's largest single market, representing 46.0 percent of total revenue, and Europe accounts for 40.3 percent of total revenue. Digital has maintained constant growth in sales and income growth rate in markets outside the United States. In 1989, 54.0 percent of Digital's revenue came from foreign markets, up nearly 5.0 percent from the 1988 figure of 49.4 percent. Digital has approximately 500 worldwide sales offices; 53.0 percent are located in the United States.

In fiscal 1989, $4.5 billion or 35.7 percent of revenue came from service and other revenue, which include maintenance, software support, consulting services, customer training, and the sale of replacement parts. This sector of Digital's revenue has been increasing steadily for the last 10 years at a slightly faster pace than product sales. Digital attributes this increase to high levels of customer satisfaction and a comprehensive portfolio of customer services.

Research and development (R&D) increased 16.7 percent to $1.5 billion in fiscal 1989 compared with $1.3 billion in fiscal 1988. Much of this increase was spent on software support. Digital recognizes that it must excel in software support to satisfy its existing clients' needs and lure future clients. Digital will be announcing major programs within fiscal 1990 for end-user software support. The Company also entered

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

into a comprehensive technology exchange agreement with MIPS Computer for current and future RISC technology and designs. With the addition of ULTRIX/OSF systems using RISC technology, the Company is able to offer customers more versatility in matching technology to application demands. These two developments partially accounted for R&D reaching 12.0 percent of revenue.

Capital expenditures decreased from $1.5 billion in 1988 to $1.2 billion in 1989, which represented 9.6 percent of revenue. The Company has discontinued leases and canceled plans for a $100 million technical center in Britain as part of its strategy to reduce capital spending levels. Nevertheless, the Company added approximately 3.8 million square feet of building space in 1989, bringing the total amount of space to 42.3 million square feet. However, nearly two-thirds of this expenditure was for the purchase of machinery and equipment to be used to support continued advances in technology. Digital employed approximately 125,800 people worldwide in 1989.

Digital's Customer Services Organization is the primary provider of service, support, and education to the Company's customer base. This operation has traditionally focused on delivering a variety of total service solutions in a way that is often rendered transparent to the user and constitutes a key element in Digital's overall business strategy. Digital employs approximately 35,000 service professionals in support organizations that span 450 locations in 64 countries. During 1989, Digital reassigned several thousand employees from its manufacturing operations to be trained and appointed to service and sales duties. This move supports the new strategy, which relies heavily on sales and support.

Digital ranks first in integrated office systems (IOS), with an estimated 55.2 percent market share based on the number of users worldwide. Digital ranks second, with 21.5 percent of IOS licenses sold worldwide, behind IBM's 32.0 percent in 1989. However, Digital ranks first in US shipments of integrated office systems with 42.3 percent of 1989 market share. ALL-IN-1 office system sales increased 30.6 percent in Europe and maintain a 15.7 percent share of the market behind IBM and Nixdorf.

Digital emphasized its commitment to UNIX in 1989 by introducing its RISC/ULTRIX product offerings. Dataquest estimates that Digital ranks third in technical workstation markets with sales of $960 million, and fifth in the UNIX operating systems market with $672 million in sales of ULTRIX and UNIX products.

In the United States, Digital has been operating for some time as nine regional sales organizations supported by matrixed industry and channel marketing groups. However, 1989 saw a restructuring of US sales and marketing into teams focused on vertical industries and specific major accounts within each industry. This is the reaction to sluggish demand in the US market and increasingly effective competition from IBM and others with more finely tuned sales and support staffs.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Technical Computers

For the year ended December 31, 1989, Dataquest estimated Digital's worldwide revenue market share to be 18.9 percent for the total technical computer market. This market share places Digital less than 1.0 percent behind IBM in the total technical computing market. In the technical superminicomputer segment Dataquest ranks Digital in first place with a 50.4 percent revenue market share. In the technical workstation market, Digital earned a revenue market share of 15.6 percent, ranking third behind Sun and HP/Apollo.

In January 1989, Digital introduced the DECstation 3100, a RISC-based UNIX workstation, that is source-code compatible with Digital's ULTRIX. Developed at Digital's Palo Alto, California, facility, the 3100 has expanded to include a family of DECstation products based on the MIPS Computer Systems R2000 and R3000 microprocessors. Digital currently offers a full range of RISC products with performance ratings from 10 to 36 mips. Using the

©1990 Dataquest Incorporated

ability to absorb lower margins on workstations because of its larger VAX business and an aggressive pricing strategy, Digital's future in the workstation market is limited only by the current lack of DECstation application software.

In September 1989, Digital announced a new multichip packaging technology. It uses wafer-scale technology to replace the printed circuit board (PCB), which minimizes the interboard connections and distance between chips. By minimizing the distance between chips, performance can be doubled, according to the Company. In addition, this new packaging technology can accommodate in one 5-inch package the quantity of logic that is on four VAX 8800 PCBs.

In November 1989, Digital introduced the much-anticipated VAX 9000 using the new multichip product. The VAX 9000 offers a peak floating-point speed of 500 mflops and transfer rates of up to 320MB per second with up to 220GB of storage capacity. Dataquest believes that this technology may provide Digital with the price/performance leverage that is required for high-end VAX VMS systems to succeed.

Business Computers

The introduction of DECtp in 1989 strengthened Digital's product offerings for transaction-processing applications, one of the fastest-growing segments of the minicomputer market. Major components of the DECtp system package are a new transaction monitor, a relational database monitor, a storage array, large disk systems, and special installation services. In February 1990, Digital introduced the VAXft fault-tolerant system, along with DECtpa, further enhancing its product offerings for fault-tolerant and transaction-processing use.

Digital also introduced several new products, expanding its superminicomputer market for business applications. In January 1989, Digital announced the VAX 6300 Systems, a series of expandable multiprocessor systems that can support up to 600 users for office applications. In July 1989, Digital introduced the VAX 6000 model 400 systems along with changes in the 200 and 300 models, further extending the range of the VAX family in both the high and low ends of the market.

Digital's VAX and MicroVAX systems are designed to integrate the complete customer environment, from large distributed clusters to individual desktops. Application areas include scientific research, computation, communications, education, data analysis, industrial control, time sharing, commercial data processing, graphic arts, word processing, office automation, health care, instrumentation, engineering, and simulation.

Microcomputer Systems

In a radical departure from its previous practice, Digital announced OEM agreements in October 1988 with Tandy and Ing. C. Olivetti to resell their PCs with the Digital label in North America and Europe, respectively. Digital's goal with the PC product line is to generate sales opportunities for Digital minicomputers, workstations, and local area networks (LANs) in the form of complete solutions packages. In addition, Digital hopes to increase its level of service sales in general by servicing Digital and other brands of PCs.

In January 1989, Digital introduced the DECstation 210, 316, and 320 personal computers. Based on Intel's 80286 and 80386 microprocessors, the systems are IBM-compatible and supported on Digital's PCLANserver 2000 and by VAX/VMS Services for MS-DOS configured VAX systems. Sales of the new PCs were slow for 1989. Dataquest believes that this sluggishness was due primarily to the lack of software ported to DECwindows, Digital's graphical user interface for desktop-to-mainframe operating environments.

Software

Digital provides several operating system environments including MS-DOS, UNIX, and VMS. In July 1989, Digital introduced VMS version 5.2 with enhancements to its VAXcluster software, security, and systems management features. Digital incorporated UNIX into its technical computer products in 1983 and currently offers users of both business and technical systems choices between VMS and ULTRIX (Digital's version of the UNIX operating system).

Digital has worked closely with other hardware and software vendors to develop guidelines for an open systems environment, and the ULTRIX software is compliant with open systems standards developed by OSF. ULTRIX also is an integral part of Network

©1990 Dataquest Incorporated

Application Support (NAS), Digital's plan for application integration in a distributed, multivendor environment.

In 1990, Digital is continuing expansion of its independent software vendor (ISV) program. Under the NAS program, Digital has over 500 software vendors developing approximately 700 applications. The mission statement of the Digital Independent Software Vendor group is to provide a broad-based portfolio of applications for Digital's desktop VMS and ULTRIX environments to customers worldwide.

Telecommunications

Digital remains the number-one vendor of LAN systems based on an estimated $900 million in sales of LAN products in 1989. Digital supplies a full range of networking products, from host computers, network interface units, gateways, wide area networks (WANs), and local Ethernet networks, to terminals and workstations. Highlights of the year included the introduction of the File/Server 3100 models for network systems environments and Digital's announcement of DECnet support for OS/2.

Display Terminals

In 1989, Digital maintained its position among the top five display terminal vendors worldwide. Dataquest estimates that Digital ranks fourth worldwide based on unit shipments of 484,100 and third in North America with an 8.9 percent unit market share. Currently, Digital derives approximately 47.0 percent of its display terminal product revenue from international markets, with strong sales of the VT320, which sold approximately 230,000 units in 1989.

In May 1990, Digital introduced the VT420 Text Video Terminal for use in office applications such as word processing, on-line transaction processing, and data management. Dataquest believes that if Digital can link its display terminal hardware strategy with its applications software strategy, the VT420 will be a useful tool for presentation management. In conjunction with the VT420 announcement, the VT330+ and VT340+ text and graphics terminals also were introduced, providing improved performance over the earlier VT330/340 models.

Graphics

Digital's goal is to expand its range of desktop display offerings. It sees X Window displays as part of a diverse group of products that will compete for desktop space. In March 1990, Digital formally entered the X Window terminal market with the announcement of its VT1000. Using a ROM-based X server, the VT1000 is designed to access terminal, DECwindows, and X Window applications on VMS, ULTRIX, and UNIX systems.

Printers

Digital's worldwide printer strategy is to provide a comprehensive range of user solutions regardless of user applications or operating systems. It is following through on this strategy by buying print engines from other vendors and then enhancing or adding value to the product. The Company adds value by providing user transparency through DECPrint, paper handling, and user-service ability.

In the first half of 1989, Digital added ULTRIX/UNIX support to its PrintServer 40, upgraded its ScriptPrinter with new V.2 software, reduced line printer pricing, added quantity discounts, and introduced tiered pricing through its distribution channels to increase shipments of printer products. In November, Digital introduced the LA324 Multiprinter, a 300-cps, 24-wire, color optional printer.

In May 1990, Digital added DECprint utility for PostScript to Sixel printing in a VMS environment. At the same time it also introduced a new SIDM printer model, the LA70, an entry-level, 9-wire, 200-cps, narrow-carriage printer.

CAD/CAM/CAE

Dataquest estimates that in 1989 Digital's worldwide market share of the CAD/CAM/CAE market was 7.0 percent based on end-user revenue (OEM revenue excluded). In March 1989, in response to end-user demands for smaller, workstation-based systems, Digital extended its CAD/CAM product offerings with the introduction of the DECsystem 3100. The 3100 models represent a change for Digital from large, VMS-based systems to the UNIX-based workstation format.

Digital's strategy in the CAD/CAM/CAE market is to develop strategic relationships with key vendors of software applications and create pull-through demand for the Digital hardware platform. Digital continues to build these relationships and has developed the System Cooperative Marketing Program and the Cooperative Marketing Program to focus on applications development.

©1990 Dataquest Incorporated

According to Dataquest estimates, Digital ranks second in the worldwide computer integrated manufacturing (CIM) market with an 8.0 percent revenue market share. This number represents a 14.9 percent growth over 1988 levels. One of the highlights in 1989 was Digital's announcement of support for Manufacturing Automation Protocol (MAP) 3.0 guidelines.

CSIS

In 1989, Digital maintained its first place ranking in the 1/2-inch tape-drive market with an estimated 14 percent revenue market share. Although the overall 12-inch tape-drive market experienced a decline, Digital had strong sales of its 1/2-inch cartridge products as users switched from reel-to-reel to cartridge tape drives.

In September 1989, Digital announced a removable disk drive product, the RF30 and RF71 removable storage element (RSEs). The RSE is based on Digital's DSSI architecture which encloses the disk drive and controller in a single 5.25-inch package called an integrated storage element. Storage capacity ranges from 150MB up to 400MB in the RF71 RSE.

In October 1989, Digital also announced expanded storage capacity for the MicroVAX 3300, 3400, and 3800 systems. Mass storage capacity was tripled to 7.2GB for the MicroVAX 3800. Mass storage for the MicroVAX 3400 and 3300 was expanded to 7.2GB and 6.3GB, respectively. In March 1990, Digital announced that it will be incorporating 4mm digital audio tape (DAT) storage into its product line later this year.

Further Information

For further information about the Company's business segments, please contact the Client Inquiry Center or appropriate industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$6,686	$7,590	$9,389	$11,475	$12,742
Percent Change	-	13.52	23.70	22.22	11.04
Capital Expenditures	$572	$564	$748	$1,518	$1,223
Percent of Revenue	8.56	7.43	7.97	13.23	9.60
R&D Expenditures	$717	$814	$1,010	$1,307	$1,525
Percent of Revenue	10.72	10.72	10.76	11.39	11.97
Number of Employees	89,000	94,700	110,500	121,500	125,800
Revenue ($K)/Employee	$75.10	$80.10	$85.00	$89.10	$102.00
Net Income	$447	$617	$1,147	$1,306	$1,073
Percent Change	35.86	38.03	84.27	14.86	(17.84)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$2,941.8	$3,179.5	$3,125.8	$3,494.9
Quarterly Profit	$223.4	$279.6	$256.4	$313.2

Source: Digital Equipment Corp.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	61.00	58.90	53.40	50.60	45.91
International	39.00	41.10	46.60	49.40	54.11
Japan	NA	NA	NA	NA	NA
Europe	29.10	29.8	34.60	36.80	40.26
Asia/Pacific	NA	NA	NA	NA	NA
ROW	NA	NA	NA	NA	NA

NA = Not available

Source: Digital Equipment Corp.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988*	1989*
Direct Sales	50.00	50.00
Indirect Sales	50.00	50.00
Distributors	3.00	3.00
Dealers	1.00	1.00
OEMs	46.00	46.00

*Computer systems only

Source: Digital Equipment Corp.
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES AND SERVICE OFFICE LOCATIONS

North America—263
Japan—29
Europe—117
Asia/Pacific—31
ROW—54

MANUFACTURING LOCATIONS

North America

Albuquerque, New Mexico
  Video displays
Augusta, Maine
  CPU expansion cabinets
Boston, Massachusetts
  Keyboards
Burlington, Vermont
  Computers
Colorado Springs, Colorado
  Disk drives
Greenville, South Carolina
  Printed wiring boards
Hudson, Massachusetts
  Custom ICs, network interface boards
Kanata, Q.A., Canada
  Computers, backplanes, subassemblies
Marlboro, Massachusetts
  VAX systems
Maynard, Massachusetts
  Module production
Merrimack, New Hampshire
  Software development, special systems
Nashua, New Hampshire
  Software development, special systems
Phoenix, Arizona
  Video displays, character printers
Salem, New Hampshire
  Special systems
Shrewsbury, Massachusetts
  Thin film heads, disk and tape drives
Springfield, Massachusetts
  Disk drives
Westfield, Massachusetts
  Computers
Westminster, Massachusetts
  Software

Europe

Annecy, France
  Field service, special computer systems
Ayr, Scotland
  Components, subassemblies
Connel, Ireland
  Power supplies, communications products
Dublin, Ireland
  Computers, power supplies
Galway, Ireland
  VAX systems and supplies
Kaufbeuren, West Germany
  Storage arrays
South Queensferry, Scotland
  Custom ICs
Valbonne, France
  Terminals

Asia/Pacific

Hong Kong
  Terminals
Singapore
  Disk drives, heads
Tachi, Taiwan
  Terminals

ROW

Aguadilla, Puerto Rico
  CPU manufacturing, printed wiring boards
Chihuahua, Mexico
  Power supplies
San German, Puerto Rico
  Electronic cards

SUBSIDIARIES

North America

Computer Insurance Company Limited
Digital Equipment Caribbean, Inc. (United States)
Digital Equipment Co. Limited (United States)
Digital Equipment Corporation International (United States)
Digital Equipment (DEC) Limited (United States)
Digital Equipment Filipinas Inc. (United States)
Digital Equipment Finance Corporation (United States)
Digital Equipment International Limited (United States)

©1990 Dataquest Incorporated

Digital Equipment of Canada Limited/Digital Equipment Du Canada Limite (Canada)
Digital Equipment Services, Inc. (United States)
Digital Growth, Inc. (United States)
Digital Incorporated (United States)
Digital International Sales Corporation (United States)
Old Colony Insurance Ltd. (United States)

Japan

Nihon Digital Equipment Corporation KK

Europe

Digital Equipment Aktiebolag (Sweden)
Digital Equipment B.V. (Netherlands)
Digital Equipment Betriebliche Altersversorgungsgesellschaft mbH (West Germany)
Digital Equipment Centre Technique (Europe) SARL
Digital Equipment Corporation A/S (Denmark)
Digital Equipment Corporation A/S (Norway)
Digital Equipment Corporation Espana, S.A. (Spain)
Digital Equipment Corporation Finance B.V. (Netherlands)
Digital Equipment Corporation Gesellschaft mbH (West Germany)
Digital Equipment Corporation International (Europe)
Digital Equipment Corporation Ireland Limited (Ireland)
Digital Equipment Corporation Oy (Finland)
Digital Equipment Corporation S.A./A/G (West Germany)
Digital Equipment Corporation Services (Europe)
Digital Equipment Foreign Sales Corporation B.V. (Netherlands)
Digital Equipment France (France)
Digital Equipment GmbH (West Germany)
Digital Equipment Hellas Ltd. (Greece)
Digital Equipment (Holdings) B.V. (Netherlands)
Digital Equipment International B.V. (Netherlands)
Digital Equipment Int. Betriebliche Altersversorgungsgesellschaft mbH (West Germany)
Digital Equipment International GmbH (West Germany)
Digital Equipment N.V./S.A. (Belgium)
Digital Equipment Overseas Finance N.V. (Netherlands)
Digital Equipment Parts Center B.V. (Netherlands)
Digital Equipment PLC Limited (United Kingdom)
Digital Equipment Portugal, Limitada (Portugal)
Digital Equipment Scotland Limited (Scotland)
Digital Equipment S.p.A. (Italy)

Asia/Pacific

Digital Computer Taiwan Limited (Taiwan)
Digital Equipment China, Inc. (China)
Digital Equipment Corporation Limited (New Zealand)
Digital Equipment Corporation Pty. Ltd. (Australia)
Digital Equipment Hong Kong Limited (China)
Digital Equipment Inc. (Korea)
Digital Equipment Sdn. Bhd. (Malaysia)
Digital Equipment Singapore (Pte) Limited (Singapore)
Digital Equipment Ltd. (Thailand)
Digital Equipment Taiwan Limited (Taiwan)

ROW

Digital Equipment de Brazil Ltda. (Brazil)
Digital Equipment Corporation de Puerto Rico (Puerto Rico)
Digital Equipment (DEC) Technical Center Limited (Israel)
Digital Equipment de Mexico, S.A. De C.V. (Mexico)
Digital Equipment Panama, Inc. (Panama)
Kam Hon Development Company, Limited

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Joint Marketing Alliances

Automated Systems Inc.
Digital to supply workstations, networks; ASI to supply Prance GT software in a cooperative marketing program

Combustion Engineering
Plant systems joint marketing

Cullinet
Voice-processing products; VAX/IBM communications

Calma
MicroVAX II-based mechanical CAD systems

Cincinnati Bell
Billing management systems for cellular nets

Daisy Systems
MicroVAX II-based workstations for CAE

©1990 Dataquest Incorporated

Datap
Marketing of real-time data management systems

Eastman Kodak Co.
Market the fastest PostScript networked printer

Ericsson Systems
Integration and marketing of banking systems

Prime Computer
VAX-based MEDUSA CAD/CAM systems

Tektronix
MicroVAX II-based CAD/CAE systems

Technology Licensing Agreements

Elebra Computadores
License to manufacture VAX 11/750s in Brazil

Planar Systems
OEM agreement to resell EL flat-panel displays

Relational Technologies
Bundling Ingres RDBMS with ULTRIX licenses

RSA Data Security
License for RSA data encryption and security software

Tandy Corporation
OEM agreement to resell Tandy PCs

Product Development Agreements

Alberta Telecom
Joint development of optic research projects

Allen-Bradley
Industrial control and management systems

Alcatel
Display terminals development

Apollo Computer
Joint development, licensing of NCS software

Apple Computer
DECnet-Appletalk communications interfaces

Ashton-Tate
Multiuser database product development

CAI
Utility software development

Codex
Development of DEC EMA access modules

Cray Research
VAX/CRAY high-performance interface

Digital Comm Assoc.
Development of DEC EMA access modules

DSC Communications
Development of network service control systems

EDA Systems
Design management software

Evans & Sutherland
Development of workstation products

Insignia
VAXpc, PC emulation software running under VMS

Locus Computing
Connectivity software development

Lotus Development
VAX application software development

MIPS
OEM agreement to buy/manufacture MIPS RISC chip set

Motorola
Jointly design a fiber distributed data interface (FDDI) chip set

Northern Telecom
Development of integrated voice/data products

Olivetti
PC-DECnet interface technology exchange

Open Software Found.
UNIX development standards group

Phoenix Technology
BIOS port to MicroVAX

Schlumberger
Develop Bravo3 CAD/CAM software under VMS

Scientific Calc.
Digital minority interest in CAD software company

Siemens AG
Development of DEC EMA access modules

Siemens AG
Development of gateways for packetswitching

SPEC
Standards group for workstations and minis

©1990 Dataquest Incorporated

StrataCom Inc.
Development of DEC EMA access modules

3Com
OS/2 and DOS connectivity to VAX/VMS

Timeplex Inc.
Development of DEC EMA access modules

TSB International
Development of DEC EMA access modules

Valid Logic
CAD/CAE system software

Vitalink Comm
Remote LAN bridges; develop EMA access modules

X/Open
Software standards consortium

KEY OFFICERS

Kenneth H. Olsen
President

Winston R. Hindle, Jr.
Senior vice president, Corporate Operations

John J. Shields
Senior vice president, Sales and Service, Marketing and International

John F. Smith
Senior vice president, Engineering, Manufacturing, Product Marketing

George A. Chamberlain III
Vice president, Manufacturing, Engineering, and Marketing Finance

Pier Carlo Falotti
Vice president, president, and CEO, Europe

FOUNDERS

Kenneth H. Olsen (MIT)
Stanley C. Olsen (MIT)
Harland Anderson (MIT)

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending June
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$4,638	$5,306	$6,201	$6,930	$6,894
Cash	1,080	1,911	2,118	2,164	1,665
Receivables	1,539	1,903	2,312	2,592	2,965
Marketable Securities	0	0	0	0	0
Inventory	1,756	1,200	1,453	1,575	1,638
Other Current Assets	263	292	318	599	636
Net Property, Plants	$1,731	$1,867	$2,127	$3,095	$3,646
Other Assets	0	0	$79	$87	127
Total Assets	$6,369	$7,173	$8,407	$10,112	$10,667
Total Current Liabilities	$943	$1,083	$1,825	$2,414	$2,394
Long-Term Debt	$837	$333	$269	$124	$136
Other Liabilities	$34	$29	$20	$63	$102
Total Liabilities	$1,814	$1,445	$2,114	$2,601	$2,632
Total Shareholders' Equity	$4,555	$5,728	$6,293	$7,511	$8,036
Converted Preferred Stock	0	0	0	0	0
Common Stock	59	129	130	130	130
Other Equity	1,738	2,224	1,753	1,917	1,540
Retained Earnings	2,758	3,375	4,410	5,464	6,366
Total Liabilities and Shareholders' Equity	$6,369	$7,173	$8,407	$10,112	$10,668

Income Statement	1985	1986	1987	1988	1989
Revenue	$6,686	$7,590	$9,389	$11,475	$12,742
US Revenue	4,078	4,411	4,976	5,746	5,849
Non-US Revenue	2,642	3,179	4,413	5,730	6,893
Cost of Sales	$4,088	$4,282	$4,514	$5,468	$6,242
R&D Expense	$717	$814	$1,010	$1,307	$1,525
SG&A Expense	$1,432	$1,665	$2,253	$3,066	$3,639
Capital Expense	$572	$564	$748	$1,518	$1,223
Pretax Income	$431	$858	$1,689	$1,740	$1,421
Pretax Margin (%)	6.45	11.30	17.99	15.16	11.15
Effective Tax Rate (%)	NA	28.00	32.70	25.00	24.50
Net Income	$447	$617	$1,137	$1,306	$1,073
Shares Outstanding, Millions	124.1	130.8	133.3	131.9	122.0
Per Share Data					
Earnings	$3.71	$4.81	$8.53	$9.90	$8.45
Dividend	0	0	0	0	0
Book Value	$76.87	$44.50	$47.21	$56.94	$56.94

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending June
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	4.92	4.90	3.40	2.87	2.88
Quick (Times)	3.06	3.79	2.60	2.22	2.20
Fixed Assets/Equity (%)	38.00	32.59	33.80	41.21	45.37
Current Liabilities/Equity (%)	20.70	18.91	29.00	32.14	29.79
Total Liabilities/Equity (%)	39.82	25.23	33.59	34.63	32.75
Profitability (%)					
Return on Assets	-	9.11	14.60	14.10	10.33
Return on Equity	-	12.00	18.92	18.92	13.80
Profit Margin	6.69	8.13	12.11	11.38	8.42
Other Key Ratios					
R&D Spending % of Revenue	10.72	10.72	10.76	11.39	11.97
Capital Spending % of Revenue	8.56	7.43	7.97	13.23	9.60
Employees	89,000	94,700	110,500	121,500	125,800
Revenue ($K)/Employee	$75.10	$80.10	$85.00	$89.10	$102.00
Capital Spending % of Assets	8.98	7.86	8.90	15.01	11.47

NA = Not available

Source: Digital Equipment Corp. Annual Reports
Dataquest (1990)

©1990 Dataquest Incorporated

Environmental Systems Research Institute Inc. (ESRI)

380 New York Street
Redlands, California 92373
Telephone: (714) 793-2853
Fax: (714) 793-5953
Dun's Number: 06-313-4175

Date Founded: 1969

CORPORATE STRATEGIC DIRECTION

Environmental Systems Research Institute Inc. (ESRI) is the world's leading supplier of geographic information systems (GIS) software. Dataquest ranks ESRI as one of the leading vendors of mapping industry software, with an estimated $40.2 million* in factory revenue for 1989. Founded by Jack Dangermond in 1969 as a research group devoted to improving methods for handling geographic data, ESRI was a pioneer in the development and application of software products and services for use in geographic analysis and mapping.

ESRI developed the first database-oriented GIS product, ARC/INFO, combining cartographic capabilities of traditional mapping systems, with an analysis system built around a relational data base management system (RDBMS). ARC/INFO is the most mature GIS software system on the market and is available on the widest array of hardware platforms in the CAD/CAM industry.

The Company markets its products to government agencies, municipal and state governments, and forestry, petroleum, and utility industries for mapping purposes. ESRI products are also used in environmental monitoring, natural resource management, transportation and site planning, and by commercial retail companies. In 1989, ESRI was awarded a $5.6 million contract from the US Environmental Protection Agency, and a $10 million contract for software and services from the Defense Mapping Agency.

ESRI is a privately held company employing approximately 400 people in its eight regional offices in the United States and foreign offices in Australia, Canada, France, Italy, and Germany. In addition, ESRI has 30 distributors worldwide and over 50 distributors in the United States.

In-depth financial information for ESRI is not publicly available at this time; therefore, financial tables are not included in this report.

BUSINESS SEGMENT STRATEGIC DIRECTION

ESRI develops, distributes, and supports a set of automated geographic information systems software for storing, managing, analyzing, and displaying spatially oriented geographical data. The ARC/INFO system, a vector-based GIS, provides full data entry, management, analysis, and display capabilities.

The ARC/INFO system is made up of two "subsystems." The ARC system, developed by ESRI, is used for storing cartographic data, and INFO, an RDBMS, is used for storing attribute data. This system can also be interfaced with other Stet databases through a generic RDBMS "handshake" permitting the integration of ARC/INFO software with other commercially available RDBMS products.

ESRI sells ARC/INFO as a standalone package and as part of a turnkey system (including hardware). ARC/INFO software will run on mainframe, minicomputer, workstation, and PC platforms made by Data General, Digital Equipment Corporation (DEC), HP/Apollo, IBM, Intergraph, Olivetti, Prime, Sun Microsystems, and Tektronix. ARC/INFO software is designed not only to run on various platforms, but also to maintain consistency across those platforms for data transfer.

During 1989, ESRI introduced version 5.0 of ARC/INFO. This release included expanded macro language capabilities, improved graphic user interface, and new data conversion programs, in addition to other enhanced features. In 1990, ESRI introduced

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

the 3.4D version of ARC/INFO, which allows PC ARC/INFO to be used with Ashton-Tate's dBASE database management system.

Further Information

For further information about the Company's business segments, please contact Dataquest's CAD/CAM Industry Service.

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Redlands, California
Development and production of software packages

SUBSIDIARIES

The Company has no subsidiaries.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Oracle Corporation
Oracle Corporation and ESRI renewed and expanded their value-added relicenser agreement. Under the agreement, ESRI will continue to resell ORACLE RDBMS, support services, and training with its ARC/INFO product. The agreement also covers licenses for Oracle's SQL suite of software products.

1989

Ingres (Relational Technology, Inc.)
Ingres (Relational Technology, Inc.) and ESRI announced an agreement to provide interfacing of INGRES (RDBI-I) to ARC/INFO GIS software.

Digital Equipment Corporation (DEC)
DEC and ESRI signed a Cooperative Marketing Program agreement under which the two companies will work together to market ESRI's ARC/INFO software on DEC's computers and workstations. ESRI has licensed to DEC the use of ARC/INFO for demonstrations, marketing, and sales promotions. In return, DEC provides ESRI with technical information on DEC platforms for ESRI's use in developing ARC/INFO solutions on DEC computers.

Hewlett-Packard (HP)
HP and ESRI announced that ESRI will market ARC/INFO for the full line of HP 9000 UNIX system workstations through HP's Software Supplier Program. ESRI will sell complete hardware and software GIS packages using HP workstations and ARC/INFO.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Jack Dangermond
President

Laura Dangermond
Vice president and secretary

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Jack Dangermond

©1990 Dataquest Incorporated

Fujitsu Limited

6-1, Marunouchi 2-chome
Chiyoda-du, Tokyo 100, Japan
Telephone: 03-216-3211
Fax: 03-216-9365
Dun's Number: 08-292-1644

Date Founded: 1935

CORPORATE STRATEGIC DIRECTION

Fujitsu Limited, founded in 1935 as a spin-off of the Communications Division of Fuji Electric Company, Ltd., is a multinational Japanese firm with 73 wholly owned, consolidated subsidiaries. Fujitsu designs, manufactures, and markets computer and data processing systems, telecommunications equipment, electronic devices, and other electronic products such as car stereos and digital audiotape (DAT) players. To organize and unify such a diverse product offering, Fujitsu has segmented its corporate structure into four main divisions by each of the four aforementioned product types. Approximately 60 percent of Fujitsu's revenue is derived from the Computer and Data Processing Systems Division.

Fujitsu currently is one of the largest companies in Japan with over ¥2.39 trillion (US$18.6 billion) in revenue and over ¥2.62 trillion (US$19.0 billion) in total assets. However, because it is a large, diverse, multinational company, Fujitsu is confronted with some very complex issues. Two main issues are the geographical expansion of the world's markets and the unification the European Community (EC). With the opening to trade of certain Eastern European countries and the economic development of several third-world countries, as well as the unification of the EC, new markets and subsequently new opportunities are emerging rapidly.

Fujitsu is responding to these issues by increasing its global presence at a local level. The Company is pursuing this strategy by increasing its foreign investment and by globally establishing local subsidiaries. As a consequence of this strategy, Fujitsu hopes to obtain an early foothold in the new markets and thereby position itself to take full advantage of emerging opportunities as the new markets evolve. Furthermore, Fujitsu will be in closer contact with the individual consumer so that it can respond in an appropriate and timely manner to local market demands.

In 1990, Fujitsu took a major step toward increasing its global presence by acquiring an 80 percent share in ICL, Ltd., a computer unit of STC Plc. The merger makes Fujitsu the second largest computer vendor in the world. The merger also gives Fujitsu a 43 percent share of the mainframe market in Great Britain.

Along with global expansion and unification issues, the Company is confronted with an adverse exchange rate. Since 1985, the value of the yen has risen approximately 70 percent against the US dollar, thereby decreasing profit margins on exported goods. In response, Fujitsu is streamlining its organization, reducing costs, and de-emphasizing cross-border transactions. The Company implemented a "Fresh Fujitsu '88" campaign focused toward redefining management roles for consolidating certain duties and centralizing responsibility, thereby increasing managerial efficiency. Also, the Company has begun to increase raw material sourcing and product development from within local markets in which it has manufacturing plants, thereby reducing cross-border transactions and effectively reducing the Company's exposure to adverse movement in the exchange rate.

The results of these strategies are reflected in the Company's financial performance. Net sales increased 6.8 percent to ¥2.6 trillion (US$17.9 billion) in the fiscal year ending March 31, 1990, from ¥2.4 trillion (US$18.6 billion) in fiscal 1989. (Percentage changes refer only to ¥ amounts; US$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) International sales increased 15.4 percent to ¥609.4 billion (US$4.2 billion) in fiscal 1990 from ¥528.3 billion (US$4.1 billion) in fiscal 1989. International sales accounted for 23.9 percent and 22.1 percent of the Company's total revenue in fiscal 1990 and 1989, respectively. Net income increased 24.0 percent to ¥86.6 billion (US$607.0 million) in fiscal 1990 from ¥69.9 billion (US$545.0 million) in fiscal 1989. The

©1990 Dataquest Incorporated

preceding 1990 financial figures were published prior to Fujitsu's Annual Report. Specific financial figures have not yet been made available. Consequently, 1990 figures are not included in the financial tables, which are located at the end of this profile.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information on revenue by distribution channels is not available. Tables 3 and 4, comprehensive financial statements, are at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Computers and Data Processing

Dataquest estimates that Fujitsu was one of the five largest information systems manufacturers in the world and the largest in Japan in the calendar year 1989. The Computer and Data Processing Division's net sales increased approximately 7 percent to ¥1.69 trillion (US$11.86 billion) in fiscal 1990, accounting for 66.1 percent of the Company's total net sales. The division's product offerings include computer systems, office automation equipment, VAN services, computer storage, electronic printers, CAD/CAM/CAE, and software. Fujitsu's main competitors, in order of their degree of competitiveness with Fujitsu, are IBM, Digital, Hewlett-Packard, Groupe Bull, NEC, Unisys, and Hitachi.

Computer Systems

Within the computer systems product line, Fujitsu offers supercomputers, retail automation systems, and general-purpose computers. The following occurred for Fujitsu during fiscal 1989:

- It introduced eight new models of the VP-2000 Series supercomputers, which offer one of the world's highest vector processing powers at 4 Gflops (floating-point operations per second).
- It made strong gains in the point-of-sale (POS) market with the FAST Series of retail automation systems.
- It released the FACT III Series, an automated teller and cash-dispensing machine.
- It enjoyed increased demand for its M Series general-purpose computers, with substantial orders from the Tokyo and Osaka stock exchanges.

Office Automation

Within the office automation product line, Fujitsu offers small business computers, workstations, word processors, and personal computers, including business, hypermedia, desktop, portable, and laptop. The following occurred for Fujitsu during fiscal 1989:

- It released the K-600 Series and K-100 Series of small business computers as office processors for strategic information systems.
- It released the Fujitsu S Family of engineering workstations in response to the growing need for UNIX.
- It introduced the OASYS Series of Japanese-language word processors with improved document production generation and graphics functions.
- It released new machines in the FM R Series of business computers, completing the lineup of desktop, portable, and laptop models.
- It introduced the FM TOWNS hypermedia personal computer, an Intel 80386-based multimedia computer system with a CD-ROM drive, featuring a bit-mapped graphical user interface (GUI) with pull-down menus and icons.

VAN Services

Within the VAN services product line, Fujitsu offers industry VANs, local VANs, corporate VANs, and personal communication services. The following occurred for Fujitsu during fiscal 1989:

- It expanded the FENICS VAN service by offering an industry VAN for application-specific services such as sending and receiving orders, a local VAN to increase the efficiency of local distribution in a common network, and a corporate VAN to expand corporate data services and telecommunications networks.
- It offered new personal computer communications services, including CompuServe, which provides an easy way to communicate with the United States through international telecommunication lines, and NIFTY-Serve, which offers various services using the FENICS network.

Computer Storage

Dataquest estimates that Fujitsu acquired a 10 percent share of the worldwide rigid disk market (by revenue) and a 6 percent share of the worldwide tape drive market in calendar year 1989. Fujitsu produces 1/2-inch reel-to-reel, start-stop, and streaming tape drives. In the rigid disk drive market, the Company produces 3.5-inch fixed drives ranging in size up to 100MB.

©1990 Dataquest Incorporated

Electronic Printers

The Company manufactures and markets line-impacted, fully formed printers, serial impact dot matrix printers, baud printers, and laser printers.

CAD/CAM/CAE

Fujitsu strengthened its position in the CAD/CAM/CAE market in 1989, with revenue growing by 13.7 percent to a US dollar equivalent of $269 million. The Company continues to be among the major OEMs of Sun Microsystems workstations. The key strategic issue to be resolved concerns the recent IBM acquisition of Cadam, which develops Fujitsu's primary CAD/CAM product. IBM has honored all contractural commitments to date. However, a continued long-term relationship is unlikely.

Software

Within the software product line, Fujitsu offers operating system software, application software, translation support systems, and architectures. The following occurred for Fujitsu during fiscal 1989:

- It introduced the MSP-EX operating system, which is targeted toward the heavy-use demands of host computers.
- It developed application programs targeted for computer use in individual companies.
- It released the ATLAS-G Japanese-English translation support system, which runs on the M Series general-purpose computers.
- It experienced increased sales of the knowledge system architecture and applications, released in the prior year.

Telecommunication

The Telecommunications Division's product line is ISDN systems, corporate information network systems (COINS), switching systems, and transmission systems. In fiscal 1990, the division recorded net sales of $394.3 billion, an increase of approximately 5.0 percent over fiscal 1989. Net sales of the division accounted for 15.5 percent of total net sales.

Integrated Services Digital Network (ISDN) Services

Within the ISDN services, Fujitsu offers various facsimile equipment, ISDN terminals, moving image television phones, handwriting communication terminals, and key telephones. During fiscal 1989, Fujitsu introduced the F1865A Facsimile Connection Unit. This device functions as a facsimile machine, as a printer with laser printer-quality output, and as a data entry terminal with support for handwritten optical character recognition (OCR). It is designed for use on a Fujitsu Network Architecture around an M Series mainframe.

Corporate Information Network System (COINS)

COINS is a corporate informations network system that is receiving significant interest from companies as a multimedia network with excellent economy and extensibility.

Switching Systems

Within the switching systems product line, Fujitsu offers central office switching systems and digital PBX switching systems. The following occurred for Fujitsu during calendar year 1989:

- It introduced five new models of the FETEX-5000A Series, which is compatible with ISDN and supports 1.5MB per second transmission between packet-switching systems and long packets (up to 4,096 octets).
- It introduced the Starlog Business Management Package, which expands the cost management and user analysis capabilities of the Starlog PBX system, enabling telecommunications managers to better supervise use of telephone and related facilities within their companies.
- It announced expansion of its F9600 PBX product into a strategic ISDN PBX platform supporting as many as 10,000 lines or as few as 100 lines.
- It introduced the 300A Series digital PBX information switching system.

Transmission Systems

Within the transmission systems product line, Fujitsu offers digital communications equipment and earth station systems for satellite communication. During fiscal 1989, Fujitsu supplied some of the equipment for the the Transpacific Cable No. 3 (TPC-3), and supplied mobile and portable earth stations to Telecom SAT and VIDEO SAT.

Electronic Devices

Dataquest estimates that Fujitsu was the fifth largest (by revenue) semiconductor vendor in the worldwide market in calendar year 1989, with a US dollar equivalent of $2.96 billion in net sales. Net sales increased 6.7 percent over the previous year. The division accounted for 14.0 percent of total net sales

©1990 Dataquest Incorporated

with ¥356.8 billion, (US$2.8 billion). The semiconductor product line can be broken down into IC memories (MOS and bipolar technology), ASICs (MOS and bipolar technology), LSIs, and electronic components.

IC Memories

In fiscal 1989, IC memory sales grew dramatically, reflecting the growth of computers, office automation equipment, and telecommunications equipment. Domestic and international demand for the 1MB DRAM and the 4MB DRAM increased. Fujitsu also began production of BiCMOS memories.

ASICs

In fiscal 1989, the Company increased its product offering by introducing the following:

- ASIC Design Kits, which are developed specifically for the Daisy/Cadnetix Inc. (DAZIX) design environment on the Sun-4 family of workstations running UNIX (SunOS 4.0.3)
- Two new ECL gate arrays, E10040VHM and E10160VHR, which offer on-chip memory and are the newest additions to the Company's VH series of ECL arrays
- A new series of BiCMOS gate arrays, the BC-H series, which provides bipolar performance and high-current drive with low power dissipation

LSIs

During fiscal 1989, Fujitsu announced the development of 54,000-gate ultralarge-scale integration ECL gate arrays that use a substrate power supply structure, and the development of a 64MB DRAM memory cell.

Electronic Components

The Company offers a range of products from plasma display panels and membrane keyboards to connectors and relays. Hybrid ICs and other new products that use advances in thin-film technology are developed in this division.

Others

Other operations range from products such as car stereos to automatic vehicle monitors. This division accounted for only 4.3 percent of total net sales. However, sales did increase 10.1 percent to ¥109 billion (US$765 million) in fiscal 1990.

Further Information

For further information pertaining to the Company's business segments, please contact the appropriate Dataquest industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$6,415	$7,646	$11,218	$14,829	$18,616
Percent Change	-	19.19	46.70	32.19	25.54
Capital Expenditure	$1,998	$1,559	$1,964	$3,161	$4,167
Percent of Revenue	31.14	20.39	17.51	21.32	22.39
R&D Expenditure	$545	$710	$1,043	$1,377	$1,925
Percent of Revenue	8.49	9.28	9.30	9.29	10.34
Number of Employees	74,187	84,277	89,293	94,825	104,503
Revenue ($K)/Employee	$86	$91	$126	$156	$178
Net Income	$366	$176	$135	$305	$545
Percent Change	-	(51.88)	(23.00)	125.24	78.75
Exchange Rate (US$=¥)	¥243.53	¥221.26	¥159.51	¥138.02	¥128.25

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	NA	NA	NA	NA
Quarterly Profit	NA	NA	NA	NA

NA = Not available

Source: Fujitsu Limited
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
Asia/Pacific	73.06	76.29	78.06	77.89	77.87
Japan	73.06	76.29	78.06	77.89	77.87
International	26.94	23.71	21.94	22.11	22.13

Source: Fujitsu Limited
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS

North America—3
Europe—4
Asia/Pacific—90
  Japan—82
ROW—3

MANUFACTURING LOCATIONS

North America

Amdahl Corporation
  Communications and information processing equipment
Fujitsu America
  Communications and information processing equipment, development of software
Fujitsu Business Communications of America
  Communications equipment
Fujitsu-GTE Business Systems
  Development of large PBXs
Fujitsu Microelectronics
  Semiconductor devices (256K DRAMs, 1MB DRAMs, ASICs)
Intellistor, Inc.
  Development of information processing equipment

Europe

Anamartic Ltd. (United Kingdom)
  Semiconductor memories
Fujitsu Espana (Spain)
  Communications and information processing equipment
Fujitsu Microelectronics (Ireland)
  Semiconductor devices (256K DRAMs, 1MB DRAMs)
Fujitsu Microelectronics (United Kingdom)
  Development of ASICs

Asia/Pacific

Advantest Corporation (Japan)
  Measuring instruments, IC testers
FKL-Dongwa (South Korea)
  Magnetic floppy disk drive heads
Fanuc Ltd. (Japan)
  CNC equipment, applied machines
Fuji Electrochemical (Japan)
  Ferrites, electronic equipment, dry batteries
Fuji Facom (Japan)
  Development of computer systems for control
Fujitsu (Singapore)
  Electronic parts (digital switching systems)
Fujitsu Australia (Australia)
  Digital key telephones, digital PBXs
Fujitsu Automation (Japan)
  Automation equipment
Fujitsu Buhin (Japan)
  Electronic parts
Fujitsu Component (Malaysia)
  Electronic parts (relays, keyboards, connectors)
Fujitsu Computer Technology (Japan)
  Development of LSIs, software for information processing equipment
Fujitsu Denso (Japan)
  Communications/electronic equipment
Fujitsu General (Japan)
  Home electric appliances, communications equipment, data processing equipment
Fujitsu Isotec (Japan)
  Peripherals
Fujitsu Kasei (Japan)
  Plastic products for communications equipment
Fujitsu Kiden (Japan)
  Data processing equipment, indicators, molds
Fujitsu Microelectronics Asia (Singapore)
  Semiconductor devices (plans 1MB DRAM production)
Fujitsu Microelectronics (Malaysia)
  MOS memories, linear ICs, standard logic
Fujitsu Miyagi Electronics (Japan)
  Semiconductor devices
Fujitsu Peripherals (Japan)
  Peripherals
Fujitsu TEN (Japan)
  Car radios, stereos
Fujitsu Thailand (Thailand)
  Magnetic disk drive heads, magnetic heads for printers
Fujitsu Tohoku Electronics (Japan)
  Semiconductor devices
Fujitsu VLSI (Japan)
  Development of semiconductor devices
Fujitsu Yamanashi Electronics (Japan)
  Semiconductor devices
Hasegawa Electric (Japan)
  Communications equipment
Kyushu Fujitsu Electronics (Japan)
  Semiconductor devices
Nihon Dengyon (Japan)
  Radio and digital communications equipment
PFU Ltd. (Japan)
  Microcomputers, peripherals
Shinano Fujitsu (Japan)
  Electronic parts

©1990 Dataquest Incorporated

Shinko Electric Industries (Japan)
Semiconductor parts
Takamisawa Electric (Japan)
Switching systems, parts
Towa Electron (Japan)
Capacitors, hybrid ICs
Yamagata Fujitsu (Japan)
Peripherals

SUBSIDIARIES

North America

Fujitsu America, Inc. (United States)
Fujitsu Business Communication Systems Inc. (United States)
Fujitsu Canada, Inc. (Canada)
Fujitsu Component of America, Inc. (United States)
Fujitsu Customer Service of America, Inc. (United States)
Fujitsu Imaging Systems of America, Inc. (United States)
Fujitsu Microelectronics, Inc. (United States)
Fujitsu Microsystems of America, Inc. (United States)
Fujitsu Network Switching of America, Inc. (United States)
Fujitsu Systems of America, Inc. (United States)
Fujitsu Systems Engineering of America, Inc. (United States)
Intelligensor, Inc. (United States)
Intellistor, Inc. (Canada)

Europe

Fujitsu Deutschland GmbH (Germany)
Fujitsu Espana S.A. (Spain)
Fujitsu Europe Ltd. (England)
Fujitsu Finance (U.K.) Plc (United Kingdom)
Fujitsu International Finance B.V. (Netherlands)
Fujitsu Italia S.p.A. (Italy)
Fujitsu Microelectronics Ireland Ltd. (Ireland)
Fujitsu Microelectronics Italia S.r.l. (Italy)
Fujitsu Microelectronics Ltd. (England)
Fujitsu Mikroelektronik GmbH (Germany)
Fujitsu Nordic AB (Sweden)

Asia/Pacific

Fuji Electrochemical Co. Ltd. (Japan)
Fujitsu (Singapore) Pte. Ltd. (Singapore)
Fujitsu (Thailand) Co. Ltd (Thailand)
Fujitsu Advanced Printing and Publishing Co. Ltd. (Japan)
Fujitsu Aichi Engineering Limited (Japan)
Fujitsu Australia Ltd. (Australia)
Fujitsu Australia Software Technology Pty. Ltd. (Australia)
Fujitsu Australia Wholesale Pty. Ltd. (Australia)
Fujitsu Automation Limited (Japan)
Fujitsu Basic Software Corporation (Japan)
Fujitsu Buhin Limited (Japan)
Fujitsu Business Systems Limited (Japan)
Fujitsu Component (Malaysia) Sdn. Bhd. (Malaysia)
Fujitsu Dai-ichi Communication Software Limited (Japan)
Fujitsu Dai-ichi System Engineering Limited (Japan)
Fujitsu Denso Ltd. (Japan)
Fujitsu Digital Technology Limited (Japan)
Fujitsu Distribution Systems Engineering Limited (Japan)
Fujitsu Documents Service Limited (Japan)
Fujitsu Electronics (Singapore) Pte. Ltd. (Singapore)
Fujitsu FACOM Information Processing Corporation (Japan)
Fujitsu Financial Information Systems Limited (Japan)
Fujitsu Financial Systems Engineering Limited (Japan)
Fujitsu Fudosan Ltd. (Japan)
Fujitsu Hong Kong Ltd. (Hong Kong)
Fujitsu Isotec Limited (Japan)
Fujitsu Kansai Communication Systems Limited (Japan)
Fujitsu Kansai System Engineering Limited (Japan)
Fujitsu Kasei Ltd. (Japan)
Fujitsu Keihin Systems Engineering Limited (Japan)
Fujitsu Kiden Ltd. (Japan)
Fujitsu Korea Ltd. (Korea)
Fujitsu Kosan Limited (Japan)
Fujitsu Kyushu Communication Systems Limited (Japan)
Fujitsu Kyushu Systems Engineering Ltd. (Japan)
Fujitsu Laboratories Ltd. (Japan)
Fujitsu Logistics Limited (Japan)
Fujitsu Microcomputer Systems Limited (Japan)
Fujitsu Microdevices Ltd. (Japan)
Fujitsu Microelectronics Asia Pte. Ltd. (Singapore)
Fujitsu Microelectronics (Malaysia) Sdn. Bhd. (Malaysia)
Fujitsu Microelectronics Pacific Asia Ltd. (Hong Kong)
Fujitsu Minami-Kyushu Systems Engineering Limited (Japan)
Fujitsu Miyagi Electronics Ltd. (Japan)
Fujitsu Nagano Systems Engineering Limited (Japan)
Fujitsu Network Engineering Limited (Japan)
Fujitsu New Zealand Holdings Ltd. (New Zealand)
Fujitsu New Zealand Ltd. (New Zealand)
Fujitsu OA Limited (Japan)

©1990 Dataquest Incorporated

Fujitsu Office Machines Limited (Japan)
Fujitsu Oita Software Laboratories Limited (Japan)
Fujitsu Peripherals Limited (Japan)
Fujitsu Program Laboratories Limited (Japan)
Fujitsu Shikoku Infortec Limited (Japan)
Fujitsu Shizuoka Engineering Limited (Japan)
Fujitsu Sinter Limited (Japan)
Fujitsu Social Science Laboratory Limited (Japan)
Fujitsu Social Systems Engineering Limited (Japan)
Fujitsu Supplies Limited (Japan)
Fujitsu System Integration Laboratories Ltd. (Japan)
Fujitsu TEN Limited (Japan)
Fujitsu Technosystems Limited (Japan)
Fujitsu Tohoku Electronics Ltd. (Japan)
Fujitsu Tohoku Systems Engineering Limited (Japan)
Fujitsu Tokia Systems Engineering Limited (Japan)
Fujitsu Trading Ltd. (Japan)
Fujitsu VLSI Limited (Japan)
Fujitsu Yamanashi Electronics Limited (Japan)
Gunma Fujitsu Limited (Japan)
Hasegawa Electric Co. Ltd. (Japan)
Ishikawa Fujitsu Software Limited (Japan)
Iwaka Densi Ltd. (Japan)
Kyushu Fujitsu Electronics Ltd. (Japan)
Nihon Dengyo Limited (Japan)
Okinawa Fujitsu Systems Engineering Ltd. (Japan)
PFU Limited (Japan)
Shinano Fujitsu Ltd. (Japan)
Shinko Electric Industries Co. Ltd. (Japan)
Ten Onkyo Ltd. (Japan)
Totalizator Engineering Limited (Japan)
Yamagata Fujitsu Limited (Japan)

ROW

Fujitsu de Brasil Limitada (Brazil)
Fujitsu Vitonia Computadores e Servicos Ltda (Brazil)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Novell K.K.
A joint marketing venture to sell Netware products in Japan was formed with Novell and six partners, Fujitsu being one of them.

Isuzu
The two companies have formed an automotive electronics venture and currently are attempting to get General Motors to join.

Matsushita
The companies have set up an OEM agreement whereby Fujitsu will receive the M550 and M600 series of 32-bit desktop personal computers from Matsushita and will give Matsushita its high-end laptop and desktop 32-bit PCs.

Poquet Computer
Fujitsu will produce and market Poquet Computer's pocket-sized computer under license. The companies will build a joint plant in Japan and Fujitsu will sell the computer worldwide.

Nokia Data Systems Oy
An agreement has been made whereby Nokia will OEM digital PBX systems (the F-620 and F-640) for Fujitsu.

Matsushita Electric Industrial
The two companies plan to strengthen their business relationship by mutually supplying their computers on an OEM basis.

UNIX International
Fujitsu has joined a new marketing group comprising 21 other high-tech companies. The group will promote UNIX's System V release 4 and further standard developments.

Molecular Design Ltd. and IBM
Fujitsu has formed a relationship with the two companies to ensure that Molecular Design software for managing and communicating scientific information will run on their computers.

Mitsui Bank Research Institute
The two companies have agreed to establish a system consulting service.

MEDIAGENIC
MEDIAGENIC has agreed to develop entertainment software for the Fujitsu FM TOWNS.

Daisy/Cadnetix Inc.
The companies jointly produced an ASIC design kit developed for the DAZIX design environment on the Sun-4 family of workstations running on UNIX.

Vitesse Semiconductor Corporation
The companies have entered into an alternated source agreement with regard to Vitesse's Fury gallium arsenide (GaAs) VLSI gate-array family.

1989

Japan Tobacco Inc.
Fujitsu formed a tie-up agreement with Japan Tobacco whereby Fujitsu will market two of Japan Tobacco's software modules.

©1990 Dataquest Incorporated

The Australian National University in Canberra
The two organizations signed an R&D agreement for two three-year projects. One project is to develop a small image processing system; the other is to develop software for parallel processors.

Vitesse Semiconductor
The two agreed to jointly develop GaAs gate arrays.

Southern New England Telecommunications Systems
Southern New England Telecommunications agreed to market Fujitsu's ISDN telecommunications equipment in the United States on an exclusive basis. The list of products includes digital telephones and terminal adapters.

NTT Data Communications Systems
The two companies will jointly market their respective logic chip design software products as a total CAE design system.

Sony
The two companies jointly developed a trial common rule to develop CD-ROM XA software for their personal computers.

Bell Atlantic Optical Network (SONET)
Fujitsu agreed to sell Bell Atlantic's transmission products under a two-year, $2 million contract. Fujitsu will provide its FLM 50/150 Fiber LOOP Multiplexer for deployment in Bell Atlantic areas.

Poquet Computer Corporate
An agreement provides Poquet with funding and credit guarantees; the companies made a cooperative technology agreement allowing for mutual adaptation of technologies and joint development of new technology.

Sun Microsystems
Sun and Fujitsu will jointly develop a high-speed RISC chip.

1988

Telecom Australia
Telecom Australia agreed to sell Fujitsu's digital PBXs in Australia; the companies established a sales joint-venture, Information Switching Technology.

Daisy Systems
Fujitsu's FAME was made available on Daisy's Advansys Series of CAD/CAE systems.

Hitachi
The two companies agreed to cooperate on the development of a 32-bit MPU and peripheral LSI family based on TRON architecture.

1987

Texas Instruments
The two companies signed a semiconductor device cross-licensing agreement.

Motorola
The two companies signed a semiconductor device cross-licensing agreement.

Hyundai Electronics Industries
The two companies signed a facsimile licensing agreement.

Fujian Province, PRC
Software for digital switching systems will be developed under a joint venture.

MERGERS AND ACQUISITIONS

ICL, Ltd.
Fujitsu purchased 80 percent of ICL, a subsidiary of STC Plc. The merger increases Fujitsu's global presence and makes it the second largest computer manufacturer in the world.

KEY OFFICERS

Takuma Yamamoto
President

Matami Yasufuku
Executive vice president

Kazuo Watanabe
Executive director

Mamoru Mitsugi
Executive director

Yusaku Onaga
Executive director

Akira Ohguro
Executive director

Mikio Ohtsuki
Executive director

Tadashi Sekizawa
Executive director

Mutujiro Shiromizup
Executive director

©1990 Dataquest Incorporated

PRINCIPAL INVESTORS

Fuji Electric—14.3 percent
Asahi Mutual Life Insurance—6.9 percent

FOUNDERS

Information is not available.

©1990 Dataquest Incorporated

Table 3
Comprehensive Financial Statement
Fiscal Year Ending March
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$3,877	$4,555	$7,035	$9,818	$11,369
Cash	654	660	1,125	1,764	2,379
Receivables	1,515	1,888	2,903	3,644	4,615
Marketable Securities	149	65	137	648	189
Inventory	1,451	1,763	2,562	3,353	3,734
Other Current Assets	108	179	307	408	452
Net Property, Plants	$2,043	$2,504	$3,424	$4,288	$5,481
Other Assets	$1,146	$1,400	$2,067	$2,677	$3,617
Total Assets	$7,066	$8,459	$12,526	$16,783	$20,467
Total Current Liabilities	$2,922	$3,211	$4,991	$7,058	$8,581
Long-Term Debt	$1,037	$1,609	$2,117	$2,185	$2,467
Other Liabilities	$609	$763	$1,153	$1,548	$1,924
Total Liabilities	$4,567	$5,583	$8,261	$10,792	$12,973
Total Shareholders' Equity	$2,499	$2,876	$4,265	$5,992	$7,495
Common Stock	1,182	1,348	2,115	3,364	4,252
Other Equity	37	46	71	92	110
Retained Earnings	1,280	1,482	2,080	2,536	3,133
Total Liabilities and Shareholders' Equity	$7,066	$8,459	$12,526	$16,783	$20,467
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$6,415	$7,646	$11,218	$14,829	$18,616
Japanese Revenue	4,687	5,833	8,756	11,550	14,496
Non-Japanese Revenue	1,728	1,813	2,461	3,279	4,120
Cost of Sales	$3,939	$5,156	$7,728	$9,702	$11,914
R&D Expense	$545	$710	$1,043	$1,377	$1,925
SG&A Expense	$1,133	$14,010	$2,057	$2,883	$3,328
Capital Expense	$1,998	$1,559	$1,964	$3,161	$4,167
Pretax Income	$734	$230	$301	$768	$1,210
Pretax Margin (%)	11.43	3.01	2.68	5.18	6.50
Net Income	$366	$176	$135	$305	$545
Shares Outstanding, Millions	1,299.5	1,438.6	1,593.3	1,710.0	1,760.1
Per Share Data					
Earnings	$64.70	$25.40	$13.40	$23.50	$36.80
Dividend	$9.00	$8.00	$8.00	$8.00	$9.00
Book Value	$1.92	$2.00	$2.68	$3.50	$4.26
Exchange Rate (US$1=¥)	¥243.53	¥221.26	¥159.51	¥138.02	¥128.25

Source: Fujitsu Limited
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending March
(Millions of Yen, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	¥944,189	¥1,007,841	¥1,122,175	¥1,355,124	¥1,458,057
Cash	159,225	146,000	179,409	243,492	305,166
Receivables	368,821	417,806	463,150	503,035	591,815
Marketable Securities	36,374	14,399	21,863	89,402	24,219
Inventory	353,394	390,103	408,718	462,869	478,840
Other Current Assets	26,375	39,533	49,035	56,326	58,017
Net Property, Plants	¥497,449	¥554,082	¥546,233	¥591,921	¥702,988
Other Assets	¥279,007	¥309,808	¥329,779	¥369,549	¥463,882
Total Assets	¥1,720,645	¥1,871,731	¥1,998,187	¥2,316,594	¥2,624,927
Total Current Liabilities	¥711,485	¥710,479	¥796,143	¥974,268	¥1,100,577
Long-Term Debt	¥252,484	¥356,051	¥337,660	¥301,618	¥316,395
Other Liabilities	¥148,209	¥168,862	¥183,980	¥213,685	¥246,778
Total Liabilities	¥1,112,178	¥1,235,392	¥1,317,783	¥1,489,571	¥1,663,750
Total Shareholders' Equity	¥608,467	¥636,339	¥680,404	¥827,023	¥961,177
Common Stock	287,824	298,187	337,308	464,365	545,369
Other Equity	8,929	10,153	11,359	12,659	14,050
Retained Earnings	311,714	327,999	331,737	349,999	401,758
Total Liabilities and Shareholders' Equity	¥1,720,645	¥1,871,731	¥1,998,187	¥2,316,594	¥2,624,927
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	¥1,562,260	¥1,691,826	¥1,789,417	¥2,046,802	¥2,387,442
Japanese Revenue	1,141,387	1,290,694	1,396,819	1,594,254	1,859,101
Non-Japanese Revenue	420,872.8	401,131.9	392,598.1	452,547.9	528,340.9
Cost of Sales	¥959,282	¥1,140,728	¥1,232,722	¥1,339,183	¥1,527,908
R&D Expense	¥132,708	¥157,028	¥166,342	¥190,130	¥246,906
SG&A Expense	¥275,791	¥3,099,940	¥328,184	¥397,968	¥426,779
Capital Expense	¥486,471	¥344,903	¥313,330	¥436,354	¥534,447
Pretax Income	¥178,635	¥50,920	¥48,012	¥106,048	¥155,152
Pretax Margin (%)	11.43	3.01	2.68	5.18	6.50
Net Income	¥89,028	¥38,926	¥21,609	¥42,115	¥69,948
Shares Outstanding, Millions	1,299.5	1,438.6	1,593.3	1,710.0	1,760.1
Per Share Data					
Earnings	¥64.70	¥25.40	¥13.40	¥23.50	¥36.80
Dividend	¥9.00	¥8.00	¥8.00	¥8.00	¥9.00
Book Value	¥468.23	¥442.33	¥427.04	¥483.64	¥546.09

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending March
(Millions of Yen, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	1.33	1.42	1.41	1.39	1.32
Quick (Times)	0.83	0.87	0.90	0.92	0.89
Fixed Assets/Equity (%)	81.75	87.07	80.28	71.57	73.14
Current Liabilities/Equity (%)	116.93	111.65	117.01	117.80	114.50
Total Liabilities/Equity (%)	182.78	194.14	193.68	180.11	173.10
Profitability (%)					
Return on Assets	5.63	2.17	1.12	1.95	2.83
Return on Equity	16.22	6.25	3.28	5.59	7.82
Profit Margin	5.70	2.30	1.21	2.06	2.93
Other Key Ratios					
R&D Spending % of Revenue	8.49	9.28	9.30	9.29	10.34
Capital Spending % of Revenue	31.14	20.39	17.51	21.32	22.39
Employees	74,187	84,277	89,293	94,825	104,503
Revenue (¥)/Employee	¥21,058	¥20,075	¥20,040	¥21,585	¥22,846
Capital Spending % of Assets	28.27	18.43	15.68	18.84	20.36
Exchange Rate (US$1=&yen)	¥243.53	¥221.26	¥159.51	¥138.02	¥128.25

Source: Fujitsu Limited
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

Harris Corporation

1025 W. NASA Boulevard
Melbourne, Florida 32919
Telephone: (407) 727-9100
Fax: (407) 727-9344
Dun's Number: 00-420-3337

Date Founded: 1926

CORPORATE STRATEGIC DIRECTION

Harris Corporation was incorporated in Delaware in 1926 as the successor to three companies founded in the 1890s. Today, Harris consists of four major business sectors: Electronic Systems, Semiconductor, Communications, and Lanier Worldwide (a worldwide office-equipment distribution network).

Fiscal 1989 marked a change for Harris. The Company underwent restructuring as a result of repositioning itself for the 1990s. Harris made several key acquisitions throughout the year including the acquisition of GE Solid State (GESS) and GE's Microelectronics Center, which were incorporated into the Harris Semiconductor Sector; the purchase of the outstanding 50 percent interest in the Harris/3M joint venture (which now makes up Lanier Worldwide); and the acquisition of Allied Broadcast Equipment Corporation (ABEC).

Additionally, Harris restructured its business sectors and is in the process of selling businesses not aligned to the long-term strategy. These included Harris' data communications and PC-based office systems businesses. This resulted in an $85 million* restructuring provision.

Electronic Systems is a new sector incorporating the former Government Systems Sector and three divisions from the former Information Systems Sector.

Harris directs approximately one-half of its focus on the commercial sector and the other half on the government sector. The Company's five business strategies for success are as follows:

- A strong market segment orientation and commitment to product differentiation
- Continuing development of its chosen technologies in support of its product programs and the synergisms between them
- Building its globally competitive position
- Making the most of strategic alliances and partnerships
- Pursuing its extensive, corporate-wide programs for continuous improvement

Harris reported fiscal 1989 revenue of $2.2 billion, an increase of 23.1 percent over fiscal 1988 revenue of $1.8 billion. Its net income decreased 78.8 percent to $21.3 million in fiscal 1989 as a result of the aforementioned $85 million restructuring provision.

Research and development expenditure totaled $104 million in fiscal 1989, or 4.7 percent of revenue. The Company's capital expenditure totaled $110 million, or 5.0 percent of revenue. Most of the capital spending is being devoted to the growth of Harris' semiconductor business.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Electronic Systems

The Company's Electronic Systems Sector, with 40 years of experience, accounted for 41 percent of total revenue with 1989 net sales of $914.6 million. This sector engages in R&D, design, and production of a broad range of high-technology systems for government and commercial organizations worldwide. Applications include avionics and space systems; support equipment; command, control, communication, and intelligence (C^3I); energy management;

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

newspaper composition; real-time and relational database computing; and design automation. Harris is a major systems supplier to the US government.

Harris designs and manufactures high-performance computer systems for real-time and relational database applications. Products include the CX superminicomputers and supermicrocomputers, the Harris Night-Hawk supermicrocomputers, and the H-Series superminicomputers, all for the aerospace/defense, business, engineering, and government markets.

Harris' CX computer line comprises 32-bit superminicomputers and supermicrocomputers for UNIX. The Night-Hawk line comprises 32-bit supermicrocomputers for real-time simulation applications based on the MC68030 microprocessor. The H-Series systems support 48 to 224 users and run real-time processing and precision research, and technical applications.

Harris also offers several operating systems including UNIX, CX/UX, CX/RT, Virtual Operating System (VOS), VOS/UNIX Environment (VUE), and Real-Time Virtual Operating System (RT-VOS) and RT-VOS/MP (Multiprocessing).

In the technical computer market, Dataquest estimates that Harris ranks seventh among US vendors based on its 1.6 percent market share and revenue of $387 million in 1989.

Semiconductor

The Semiconductor Sector constitutes 25 percent of Harris' revenue, with 1989 net sales of $542.3 million. Harris specializes in high-performance, application-specific segments such as signal processing and control. The acquisition of GESS has had a significant impact on Harris' position in both the semiconductor and, in particular, analog product markets.

Harris' 1989 revenue from its semiconductor business increased 152 percent over 1988, partially due to the acquisition of GESS. Dataquest estimates that Harris' revenue of $830 million ranks it 21st in the overall worldwide semiconductor market.

Harris' semiconductor revenue comes from bipolar digital (7 percent), MOS devices (52 percent), and analog devices (41 percent). According to a Dataquest estimate, Harris ranks 16th, 23rd, and 14th, respectively, in these three segments.

After the Company's restructuring, six divisions were formed to address the new Company entity: military and aerospace, power products, IC products, application-specific products, marketing, and manufacturing. The military and aerospace division provides standard, semicustom, and custom products for the military and government markets. The power products, commercial products, and commercial application-specific IC (ASIC) divisions manufacture power and integrated smart-power devices, general-purpose standard products for the signal processing and control market, and commercial semicustom and application-specific standard products. Application-specific standard products include circuit development for the automotive and telecommunications markets.

Primary customers include computer, communications, telephone, industrial, medical, and other electronic equipment manufacturers, defense contractors, and US government agencies. Products are marketed directly or through distributors, both domestically and internationally.

Mil/Aero

Harris' GE acquisition expanded its international customer base, particularly in Europe and Southern Asia. Harris believes that this acquisition fits well into its market segment strategy. It also strengthened Harris' position in ASIC and smart-power devices and improved its government/commercial business balance. Dataquest estimates that Harris (GE/RCA) was the number one semiconductor supplier to the military/aerospace market in 1989. Overall, Harris is positioned well for long-term growth.

Communications

The Communications Sector represents 20 percent of the Company's total revenue, with $441.4 million in 1989 net sales. This sector offers comprehensive line equipment and systems for the communications industry. Products span virtually all of the major communications technologies and include microwave, lightwave, two-way radio, broadcast radio, and television systems; digital telephone switches; satellite systems; auxiliary telecommunications products; and turnkey communications systems.

In North America, Harris produces analog and digital microwave systems under its Farinon trademark. Additionally, Harris is a leading supplier of two-way HF, VHF, and UHF radio equipment. It also offers a comprehensive line of products and systems for long and short distance communications and is a worldwide supplier of digital network switching systems and PBXs.

©1990 Dataquest Incorporated

Primary customers include foreign and domestic government and military agencies, business and industrial firms, radio and TV broadcasters, telephone companies, utilities, construction companies, and oil companies. Domestically, it sells products directly to customers through the marketing organizations of the operating divisions. The Company primarily uses dealers, distributors, or sales representatives to market these products internationally.

Lanier Worldwide

Lanier Worldwide, a Harris subsidiary, markets, sells, and services lines of office equipment and business communications products on a global basis. Products include copiers, facsimiles, laser printers, dictating equipment, telephone systems, presentation and document systems, and continuous-recording systems. This division makes up 14 percent of Harris' total revenue, with $315.3 million in 1989 net sales.

Copiers

Dataquest estimates that Harris/3M (now known as Lanier Worldwide) was the eighth ranked copier vendor in the US market based on 1989 shipments of 51,600. Lanier competes in five of the six Dataquest copier segments.

Facsimiles

Dataquest estimates that Harris/3M (now known as Lanier Worldwide) was the number 12 fax vendor based on 1989 shipments of 36,600. This represents 2.5 percent of the fax market.

Further Information

For more information about the Company's business segments, please contact the appropriate Dataquest industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$2,281.2	$2,216.6	$2,079.0	$1,798.1	$2,213.7
Percent Change	-	(2.83)	(6.21)	(13.51)	23.11
Capital Expenditure	$163.0	$99.0	$75.0	$75.3	$110.0
Percent of Revenue	7.15	4.47	3.61	4.19	4.97
R&D Expenditure	$115.7	$117.9	$118.0	$100.0	$104.0
Percent of Revenue	5.07	5.32	5.68	5.56	4.70
Number of Employees	31,400	26,700	24,300	22,600	35,100
Revenue ($K)/Employee	$72.65	$83.02	$85.56	$79.56	$63.07
Net Income	$80.3	$59.6	$84.5	$100.5	$21.3
Percent Change	-	(25.78)	41.78	18.93	(78.81)

1989 Calendar Year*	Q1	Q2	Q3	Q4
Quarterly Revenue	$430.07	$491.19	$524.22	$768.27
Quarterly Profit	$138.09	$160.08	$186.38	$245.15

*Based on fiscal year ended June 30

Source: Harris Corporation Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	86.00	87.00	85.00	92.00	88.00
International	14.00	13.00	15.00	8.00	12.00

Source: Harris Corporation Annual Reports
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988*
Direct Sales	27.94
Indirect Sales	72.06
OEMs	65.64
Distributors	6.42

*Computer systems only

Source: Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Atlanta, Georgia
Copiers, facsimiles, digital and analog dictation systems, PBXs, electronic key systems, recording systems, document processing systems, office systems
Camarillo, California
Voice paging systems, subscriber-loop test systems and tools, Integrated Services Digital Network (ISDN) terminal adapters
Fort Lauderdale, Florida
Computer systems
Melbourne, Florida (6)
Communications and information processing systems, telecommunications networks, software, semiconductors
Mountain View, California
Systems
Novato, California
Digital voice and data network switches, PBXs, telephone sets
Orlando, Florida
Application software
Quincy, Illinois
Radio, television broadcast equipment
Rochester, New York
HF, VHF, UHF, radio equipment and systems
San Carlos, California
Microwave and lightwave transmission systems
Somerville, New Jersey
Semiconductors, power devices
Syosset, New York
Simulation systems

SUBSIDIARIES

North America

Allied Broadcast Equipment Canada Ltd. (Canada)
Allied Broadcast Equipment Corp. (United States)
Executive Conference Center Inc. (United States)
Gemco Electronics Inc. (United States)
Harris Data Communications Inc. (United States)
Harris Farinon Canada Ltd. (United States)
Harris Foreign Sales Corp. Inc. (United States)
Harris Installation Corp. (United States)
Harris International Sales Corp. (United States)
Harris International Telecommunications Inc. (United States)
Harris/Intersil Inc. (United States)
Harris Investment of Delaware Inc. (United States)
Harris Semiconductor (Florida) Inc. (United States)
Harris Semiconductor Inc. (United States)
Harris Semiconductor International Inc. (United States)
Harris Semiconductor (New Jersey) Inc. (United States)
Harris Semiconductor (Ohio) Inc. (United States)
Harris Semiconductor Patents Inc. (United States)
Harris Semiconductor (Pennsylvania) Inc. (United States)
Harris Solid State Inc. (United States)
Harris Southwest Properties Inc. (United States)
Harris Space Systems Corp. (United States)
Harris Systems Ltd. (Canada)
Harris Technical Services Corp. (United States)
Harris/3M Document Products de Puerto Rico (Puerto Rico)
Harris/3M Document Products (Canada) Inc. (Canada)
Lanier Financial Services Inc. (United States)
Lanier Worldwide Inc. (United States)
Scientific Calculations Inc. (United States)

Europe

ECCO Ltd. (Ireland)
GE (USA) Solid State SARL (France)
Harris A.B. (Sweden)
Harris Corp. B.V. (Netherlands)
Harris GmbH (Germany)
Harris S.A. (Belgium)
Harris SARL (France)
Harris Semiconductor Ltd. (England)
Harris Semiconductor B.V. (Netherlands)
Harris Semiconductor GmbH (Germany)
Harris SRL (Italy)
Harris Systems Ltd. (England)
Harris/3M Document Products A/S (Norway)
Harris/3M Document Products B.V. (Netherlands)
Harris/3M Document Products C. & I.S.A. (Greece)
Lanier (Schweiz) A.G. (Switzerland)
Lanier Denmark S/A (Denmark)
Lanier Deutschland GmbH (Germany)
Lanier Espana S.A. (Spain)
Lanier Europe B.V. (Netherlands)
Lanier France S.A. (France)
Lanier Italia S.p.A. (Italy)

©1990 Dataquest Incorporated

Lanier Oy (Finland)
Lanier Svenska A.B. (Sweden)
Lanier United Kingdom Ltd. (United Kingdom)
Lanier Worldwide Inc. GmbH (Austria)
RCA GmbH (Germany)

Asia/Pacific

Harris Advanced Technology Sdn. Bhd. (Malaysia)
Harris Far East Ltd. (Taiwan)
Harris K.K. (Japan)
Harris Semiconductor HK Ltd. (China)
Harris Semiconductor (Malaysia) Sdn. Bhd. (Malaysia)
Harris Semiconductor (Singapore) Pte. Ltd. (Singapore)
Harris Semiconductor (Taiwan) Ltd. (Taiwan)
Harris Solid State (Malaysia) Sdn. Bhd. (Malaysia)
Harris/3M Document Products (Australia) Pty. Ltd. (Australia)
Intersil (India) Ltd. (India)
Intersil (Singapore) Ptd. Ltd. (Singapore)
Lanier (Australia) Pty. Ltd. (Australia)
Lanier Holding Pty. Ltd. (Singapore)
Lanier (NZ) Inc. (New Zealand)

ROW

Harris Broadcast Systems (Nigeria)
Harris S.A. de C.V. (Mexico)
Harris Saudi Arabia Ltd. (Saudi Arabia)
Harris/3M Documento Productos de Costa Rica S.A. (Costa Rica)
Harris/3M Documentos Productos de el Salvador S.A. (El Salvador)
Harris/3M Documentos y Productos S.A. (Columbia)
Harris/3M Document Products de Argentina S.A. (Argentina)
Harris/3M Document Product de Chile S.A.N.V. (Chile)
Harris/3M Document Products de Dominicana S.A. (Dominican Republic)
Harris/3M Document Products de Guatemala S.A. (Guatemala)
Harris/3M Document Products de Panama S.A. (Panama)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Logic Modeling Systems, Inc.
Logic Modeling Systems announced an OEM relationship with Harris' Scientific Calculations Division for sales and distribution of the LM-1000 industry-standard hardware modeling system.

Siemens A.G. and Toshiba
Fourteen new analog support functions are now available for the HSC4000 ADVANCELL library, a joint project whose partners include Harris, Siemens, and Toshiba.

Autodesk, Inc.
Harris' Scientific Calculations Division signed a value-added reseller (VAR) agreement with Autodesk to resell the AutoCAD drafting and documentation package with an interface to the Scicards package for printed circuit board and hybrid design through AutoCAD's DXF format.

Language Processors, Inc. (LPI)
LPI and Harris' Computer Systems Division announced the availability of LPI's COBOL and its debugger, Code Watch, on the Harris Night-Hawk family of real-time multiprocessing computer systems.

1989

Tennessee Valley Authority (TVA)
Harris' Government Electronic Systems Division was selected to be system manager and integrator for the TVA's Nuclear Telecommunications System Project.

VERDIX Corporation
VERDIX announced the signing of an OEM agreement with Harris Computer Systems, a division of Harris Corporation, for the resale of the VERDIX Secure Local Area Network (VSLAN) product worldwide.

1988

Cipher Data
Cipher Data announced that Harris' Computer Systems Division signed a two-year contract valued at $42.4 million for Cipher's ST150S 1/4-inch cartridge tape drives and the Microstreamer and CacheTape 1/2-inch reel-to-reel tape drives.

1987

Alloy Computer Products
Alloy and Harris entered a joint agreement under which Harris would offer a broad range of third-party support services to Alloy customers.

©1990 Dataquest Incorporated

MERGERS AND ACQUISITIONS

1989

Teleprobe Systems
Harris acquired Teleprobe Systems of Rochester, New York, which specializes in microprocessor-based systems to test subscriber loops for telcos. The purchase price was $2 million. Teleprobe's operations will form part of Harris' Dracon Division in Camarillo, California.

Harris/3M Document Products, Inc.
Harris acquired the outstanding 50 percent interest in the Harris/3M joint venture and renamed it Lanier Worldwide. Lanier is now a wholly owned subsidiary of Harris.

Allied Broadcast Equipment Corporation (ABEC)
During fiscal 1989, Harris acquired ABEC, the largest US distributor to the international radiobroadcasting industry.

GE's Microelectronics Center (MEC)
Harris acquired MEC in July 1989. MEC specializes in high-density gate-array and standard-cell ASICs based on advanced process technologies.

1988

General Electric Solid State (GESS)
Harris purchased the net assets of GESS from General Electric for approximately $203 million in cash. GESS, which produces semiconductor products for both commercial and government markets, will operate in Harris' Semiconductor Sector.

KEY OFFICERS

John T. Hartley
Chairman, president, chief executive officer

Wesley E. Cantrell
President, Lanier Worldwide

James R. Oyler
Senior vice president

Bryan R. Roub
Senior vice president, Finance

Fayette Brown III
Vice president, Corporate Development

W. Peter Carney
Vice president, Corporate Relations

Ricardo A. Diaz
Vice president, Manufacturing Programs

Robert W. Fay
Vice president, treasurer

John A. Hubner
Vice president, controller

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending June 30
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$1,064.9	$1,041.8	$1,082.8	$836.4	$1,533.5
Cash	45.1	98.4	88.2	38.9	100.7
Receivables	414.3	381.2	376.5	316.9	582.8
Marketable Securities	11.2	9.4	87.2	53.8	87.8
Inventory	364.6	279.9	263.0	169.2	419.4
Other Current Assets	229.7	272.9	267.9	257.6	342.8
Net Property, Plants	$517.3	$498.5	$466.8	$415.9	$616.2
Other Assets	$206.3	$252.8	$246.9	$365.9	$408.1
Total Assets	$1,788	$1,793.1	$1,796.5	$1,618.2	$2,557.8
Total Current Liabilities	$585.6	$549.7	$559.2	$443.7	$1,237.8
Long-Term Debt	$190.2	$182.6	$145.9	$157.0	$314.6
Other Liabilities	$145.1	$159.8	$106.9	$45.3	$58.3
Total Liabilities	$920.9	$892.1	$812.0	$646.0	$1,610.7
Total Shareholders' Equity	$867.6	$901.0	$984.5	$972.2	$947.1
Common Stock	40.3	40.3	41.7	41.8	38.7
Other Equity	124.0	133.2	166.7	89.2	156.4
Retained Earnings	703.3	727.5	776.1	841.2	752.0
Total Liabilities and Shareholders' Equity	$1,788.5	$1,793.1	$1,796.5	$1,618.2	$2,557.7
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$2,281.2	$2,216.6	$2,079.0	$1,798.1	$2,213.7
US Revenue	1,969.2	1,937.6	1,767.1	1,693.3	1,953.5
Non-US Revenue	312.0	279.0	311.9	104.8	260.2
Cost of Sales	$1,503.9	$1,488.6	$1,362.9	$1,199.9	$1,483.9
R&D Expense	$115.7	$117.9	$118.0	$100.0	$104.0
SG&A Expense	$677.7	$654.8	$610.6	$481.6	$565.1
Capital Expense	$163.0	$99.0	$75.0	$75.3	$110.0
Pretax Income	$99.9	$60.7	$122.4	$127.5	$167.2
Pretax Margin (%)	4.38	2.74	5.89	7.09	7.55
Effective Tax Rate (%)	19.70	1.80	31.00	30.70	30.50
Net Income	$80.3	$59.6	$84.5	$100.5	$21.3
Shares Outstanding, Millions	40.3	40.3	41.7	41.8	38.7
Per Share Data					
Earnings	$0.88	$0.88	$0.88	$0.88	$0.88
Dividend	$2.00	$1.48	$2.05	$2.50	$0.55
Book Value	$21.53	$22.36	$23.61	$23.26	$24.47

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending June 30
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	1.82	1.90	1.94	1.89	1.24
Quick (Times)	1.20	1.39	1.47	1.50	0.90
Fixed Assets/Equity (%)	59.62	55.33	47.41	42.78	65.06
Current Liabilities/Equity (%)	67.50	61.01	56.80	45.64	130.69
Total Liabilities/Equity (%)	106.14	99.02	82.48	66.45	170.06
Profitability (%)					
Return on Assets	-	3.33	4.71	5.89	1.01
Return on Equity	-	6.74	8.96	10.27	2.22
Profit Margin	3.52	2.69	4.06	5.59	0.96
Other Key Ratios					
R&D Spending % of Revenue	5.07	5.32	5.68	5.56	4.70
Capital Spending % of Revenue	7.15	4.47	3.61	4.19	4.97
Employees	31,400	26,700	24,300	22,600	35,100
Revenue ($K)/Employee	$72.65	$83.02	$85.56	$79.56	$63.07
Capital Spending % of Assets	9.11	5.52	4.18	4.65	4.30

Source: Harris Corporation Annual Reports
Dataquest (1990)

©1990 Dataquest Incorporated

Hewlett-Packard Company

3000 Hanover Street
Palo Alto, California 94303
Telephone: (415) 857-1501
Fax: (415) 857-5518
Dun's Number: 00-912-2532

Date Founded: January 1, 1939

CORPORATE STRATEGIC DIRECTION

Hewlett-Packard Company (HP) is engaged worldwide in the design, manufacture, and servicing of a broad array of precision electronic instruments and systems for measurement, analysis, and computation. HP offers integrated systems solutions to specific customer problems. Founded in 1939 by William R. Hewlett and David Packard, HP currently employs 93,000 people worldwide and had revenue of $11.9 billion* during fiscal year 1989.

Fiscal 1989's $11.9 billion revenue was a 21.0 percent increase over fiscal 1988's $9.8 billion total revenue. Net income increased 1.6 percent to $826 million in fiscal 1989 from $816 million in fiscal 1988.

During fiscal years 1989, 1988, and 1987, domestic sales totaled $5.6 billion, $4.8 billion, and $4.1 billion, respectively. International sales reached $6.3 billion, $5.1 billion, and $4.0 billion in fiscal years 1989, 1988, and 1987, representing 53.0, 52.0, and 49.0 percent, respectively, of total revenue. The majority of international orders were from customers other than foreign governments. Approximately 60, 65, and 67 percent of the international orders were derived from Europe during fiscal years 1989, 1988, and 1987, respectively. The majority of Hewlett-Packard sales in international markets are made by foreign sales subsidiaries.

During 1983, HP made several structural changes. Among them was the restructuring of its computer organization. Begun in late 1982, the computer reorganization was undertaken to respond to a marketplace that was looking for more packaged software applications, networks to link systems and workstations, and coordinated support and service. HP also consolidated its growing personal computer activities into one product group designed for what the Company feels is greater marketing, engineering, and manufacturing efficiency.

Hewlett-Packard operates in six business segments, all of which are engaged in the design and manufacture of precision electronic equipment for measurement, analysis, and computation. These segments are Measurement; Peripherals and Network Products; Service for Equipment, Systems, and Peripherals; Medical Electronic Equipment and Service; Analytical Instrumentation and Service; and Electronic Components.

The Company has more than 428 sales and service offices in approximately 160 cities throughout the United States and in 102 countries. Approximately 29 percent of the sales and service offices are located in the United States. In areas where HP has no sales or service offices, it markets through more than 145 distributorships located in 65 countries.

Hewlett-Packard markets approximately 60 percent of its products directly through its own sales organization. Marketing operations are supported by approximately 36,000 individuals, including field service engineers, service personnel, and administrative support staff. The remaining revenue is obtained through value-added resale channels including dealers and original equipment manufacturers (OEMs).

Currently, Hewlett-Packard offers more than 10,000 products, which range from scientific measuring instruments to hand-held calculators. The Company's principal offerings in the business computer market are the HP 3000 line, several workstations, and personal computers such as the Vectra. The HP 3000 line

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

includes models in the following Dataquest segments: business unit, large department, and small department. In 1987, HP introduced two models in this line based on reduced-instruction-set computing (RISC) technology, which the Company calls HP Precision Architecture.

Traditionally, HP's key areas of strength have been test and measurement equipment and minicomputers. Now, the Company is successfully established (after some delay) in the UNIX workstation market. HP possesses the key ingredients to be a major force in computer-integrated manufacturing (CIM), with its high-performance instruments, peripheral products, UNIX platforms, and networking products. Local R&D has allowed HP to adapt its products quickly to suit local European markets. In addition, HP will benefit from the telecommunications market deregulation, with its specialist measurement instruments for that market.

In 1987, HP began shipping Precision Architecture computers. Today, both the massive RISC-based computer architecture project (the HP 3000 Series (MPE operating system)—and the HP 9000 Series—UNIX—computers are successful product lines.

Hewlett-Packard sells and distributes its products into the business, technical, scientific, medical, and educational markets.

In November 1989, Hewlett-Packard introduced HP NewWave Office. It is an integrated office system that enables users to share data and information—even with computers and software from different vendors. With HP NewWave Office, Hewlett-Packard also unveiled its office-systems strategy and vision for office computing in the 1990s. HP's strategy is to deliver a complete office system that combines industry standards with emerging technologies, allowing customers to quickly and easily receive the information they need. A major part of the strategy is to integrate existing applications and systems from multiple vendors to protect customers' computing investments. Over 60 software developers and resellers are supporting HP NewWave Office with a full range of word processing, spreadsheet, database, graphics, communications, and multimedia applications as well as vertical market solutions.

With its introduction of HP NewWave 3.0 in May 1990, Hewlett-Packard extended its HP NewWave Computing strategy based on industry standards. This strategy allows customers to select the best available products from HP or other vendors and link them into open, cooperative networks that make information easier to acquire, share, and manage.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

With $3.2 billion in revenue, Hewlett-Packard held 4.8 percent market share of the 1989 worldwide multiuser systems market.

Supercomputers and Visualization Systems

Hewlett-Packard, through its Apollo Systems Division, offers the Apollo Series 10000 personal supercomputers and visualization systems designed for graphics-intensive applications. Both systems incorporate multiprocessing capabilities, parallel-instruction dispatch and extension, advanced-compiler technology, a RISC-based instruction set, and the capability to be configured with the IBM Token-Ring network or Ethernet as native networks. During 1990, every major component of the supercomputer-class, multiprocessing Series 10000 computer will receive the following upgrades: a new PRISM CPU that doubles computer power from 22 mips to 44 mips (12 mflops) per processor; parallelizing and vectorizing compilers that increase system performance two to four times; a specialized software-development environment for parallel programs and an interactive scientific-software computation and visualization environment; main memory capacity expanded by a factor of four; disk capacity improved by a factor of six; and local area network (LAN) bandwidth increased by a factor of 10.

Technical Computers

Hewlett-Packard's small- to medium-scale, general-purpose computers include the HP 1000 Series, designed for factory automation and real-time data acquisition. This series includes the E Series, F Series, A600, A700, and A900. Although HP has

©1990 Dataquest Incorporated

phased out these products since it introduced the HP 9000 Series, it will continue to provide support and services for them through the 1990s.

The HP 9000 Series includes desktop-size workstations and multiuser systems originally intended to be used by scientists and engineers. The HP 9000 family includes the 300 and 800 Series. HP's workstation products range from the low-end HP9000 340M, which is focused at 2-D monochrome applications, to the HP9000 935 Turbo SRX, which addresses 3-D high-performance graphics. The HP9000 800 Series of superminicomputers is oriented toward technical and real-time computing in the manufacturing sector and toward general-purpose UNIX computing in the government and commercial markets. Hewlett-Packard recently added five new HP 9000 systems based on its HP Precision Architecture (HP-PA) RISC technology. The new Models 870S/100 and 870S/200 are the first HP 9000 systems based on an advanced submicron CMOS implementation of HP-PA. The 870S/200 has two-way multiprocessing and offers up to 95-mips performance. The uniprocessor 870S/100 is rated at 50 mips. With the new Model 870 computers, Hewlett-Packard has expanded the system memory to offer 768 Mbytes and the disk-storage capacity to 83 Gbytes. The Models 845S and 845SE, rated at 23-mips performance, are small modular systems that may be used for applications requiring high performance for departments of 16 to 100 users. The Model 832S offers midrange performance of 15 mips and supports 32 to 64 users.

During January 1990, Hewlett-Packard introduced two new 3-D RISC workstations, the model 834SRX and model 834 TurboSRX. Both have system-processing power of 14 mips (2.02 mflops) and increased power in the graphics subsystems for engineers performing mechanical computer-aided engineering (CAE) applications, such as SDRC's IDEAS and PDA's PATRAN. The workstations come standard with 8 Mbytes of ECC RAM (expandable to 96 Mbytes), a 19-inch color monitor with a resolution of 1,280 x 1,024, a keyboard, and a mouse. They are able to connect simultaneously to seven human-interface devices.

In April 1989, HP acquired Apollo Computer for $500 million. The acquisition gave HP an installed base of about 84,000 Apollo machines at almost 3,000 sites and another proprietary RISC architecture.

Business Computers

The HP 3000 Series of superminicomputer systems span a broad performance range and is designed for business data processing applications. Introduced in 1970, the HP 3000 series is suited for on-line transaction processing (OLTP) and distributed processing and is compatible throughout the product line. The HP 3000 family shares the MPE operating system and uses HP's Precision Architecture in the higher-end systems. The HP 3000 family includes the HP MICRO 3000LX and 3000GX systems, the Series 925 and 935 systems, Series 70 system, and Series 950 and 955 systems. All HP 3000 computers use an "open network computer" philosophy for customers with a multivendor or multiarchitecture environment.

Hewlett-Packard unveiled eight new multiuser HP 3000 systems in January 1990. They consist of the following: 980/100, 980/200, 949, 922LX, 922RX, 922, 932, and MICRO 3000RX. The Series 980/100 and 980/200 are the first systems to use advanced CMOS (complementary metal-oxide semiconductor) technology on a single VLSI chip. The 980/100 is expected to operate at 60 to 70 transactions per second (tps). The 980/200 offers fully symmetric two-way multiprocessing and is expected to operate at more than 100 tps. The 922LX, 922RX, 922, and 932 provide OLTP performance of 7.7 tps, and the 932 provides 60 percent greater performance than the 922. They support 16 to 240 users and are designed for small to medium-size businesses, departments of large corporations, or branch offices. The HP MICRO 3000RX is a complete entry-level business system that can support up to 24 users. It is fully compatible with the HP 3000 product line and includes a system disk, tape cartridge, console, 16 terminal ports, operating system, database and HP Easytime, and a menu-driven interface.

Personal Computers

Since its entry into the PC business, HP has been a high-end PC vendor aiming at the business market. The Company's strategy in the PC market traditionally has been that of catering to the overall PC needs of small and large accounts. However, its PC products competed in somewhat limited environments during 1987.

During 1987, the HP150 was sold mainly as an intelligent terminal to existing HP corporate clients. This somewhat restricted positioning was the consequence of the machine's limited success within other

©1990 Dataquest Incorporated

market segments. The HP150 was MS-DOS but not PC-DOS compatible in a market that increasingly stressed the IBM compatibility issue.

The 286 Vectra, one of the first IBM AT compatibles available on the market, met with significant success in 1986, when it was the number-two product in Europe at this end of the market, after IBM's AT. In 1987, however, with the increased availability of price/performance AT compatibles, it lost market share. Although most 286 Vectra sales were within the corporate market, the Vectra also reemphasized HP's presence in advanced/technical niches of the market, in particular as part of CAD/CAM and desktop publishing solutions.

The HP Vectra 486 personal computer is the highest-performing member of the HP Vectra family. It is a floor-standing unit based on the Intel i486 microprocessor. It uses the extended industry standard architecture (EISA), and the design optimizes performance for high-end personal computing (e.g., PC CAD multiuser, LAN serve) and provides the speed for high-powered single-user applications. The 486 supports up to 64 Mbytes of RAM on a single memory board, 1.3 Gbytes of mass storage, and a video graphics adapter. It comes standard with 2 Mbytes of random-access memory (RAM); one 5.25-inch, 1.2-Mbyte flexible-disk drive; two serial (RS-232-C) ports; one parallel (Centronics) port; connections for four flexible disks and tow-embedded hard disks; keyboard (Mini-DIN) and mouse (Mini-DIN) ports; HP disk-cache software; and memory-management software. It also offers an array of hard-disk drives, memory, and video products.

On May 14, 1990, Hewlett-Packard introduced the HP Vectra 286/12 PC, a lower-priced desktop machine that replaces the HP Vectra ES/12 PC. The HP Vectra 286/12 PC is a 12-MHz, 80286-based computer with 1 Mbyte of zero wait-state memory. It features HP's surface-mount technology (SMT4); embedded controller hard-disk drives; an extended-resolution, integrated, super-VGA video controller; and reduced parts and power requirements. It supports the industry-standard (fully backward-compatible) VGA resolution of 640 x 480 as well as super-VGA resolution of 800 x 600.

Software

Although HP offers a selection of software for business and technical applications, a vital part of its Cooperative Computing Environment is the NewWave environment, which has attracted much attention and positive acceptance. In May 1990, Hewlett-Packard introduced the HP NewWave 3.0, a software-applications environment that runs on any industry-compatible MS-DOS PC with an Intel 80286 or 80386 microprocessor. The HP NewWave 3.0 utilizes the enhancements made by Microsoft to Windows, including improvements to memory management and the user interface. From this, HP NewWave 3.0 requires only 2 Mbytes instead of 3 Mbytes of extended memory to run several applications. Over 100 independent software vendors, including Micrografx Inc. and Microsoft Corporation, have committed resources to develop HP NewWave applications. FutureSoft Engineering Inc., Lotus Development Corporation, New Media Graphics Corporation, and VideoLogic have begun shipping it. Hewlett-Packard also has signed licensing agreements for HP NewWave with AT&T Computer Systems Inc., Canon, Data General, and NCR.

The HP LAN Manager/X software for HP 9000 technical computers began shipping in September 1989. It will be accompanied by HP LAN Manager/X software for HP-UX system-based HP Vectra personal computers in the future.

During January 1990, Hewlett-Packard came out with a series of new software products as well as enhancing and extending some of its existing software products. New software products were HP VPLUS/Windows, HP OpenMFG, and HP CASEdge. Hewlett-Packard also made available SoftPC Synthetic Hardware, Release 2.0, which is an advanced PC software emulator that allows UNIX system users to run MS-DOS applications in a workstation's high-performance windowed environment. Major enhancements were made to HP Manufacturing Management II (HP MM II). It is Hewlett-Packard's solution for manufacturing resources planning (MRP II) applications for medium to large manufacturers. Among the new features in HP MM II are modular enhancements to HP Materials Management/Advanced Version, HP Maintenance Management, and a new financial software solution, HP Financial Management.

Peripherals

HP's peripherals products include video display terminals, magnetic disk and tape drives, plotters, and laser printers. HP's laser printers were first introduced in 1975. Technology exchanges and license agreements with Canon led to HP's 2680 laser printer series, which includes the 2689, an IBM-compatible version.

©1990 Dataquest Incorporated

The Company added to its printer offering in 1989 with the introduction of the HP LaserJet IIP and two low-priced, laser-quality ink jet printers—the DeskJet Plus and the Apple-compatible HP DeskWriter. Hewlett-Packard also introduced the HP 700/X family of X Window System graphics terminals. The HP 700/X family consists of a comprehensive set of color and monochrome network-based graphics terminals based on the industry-standard X Window System from Massachusetts Institute of Technology (MIT). The terminals are designed to operate in multivendor networked environments, and provide the equivalent graphics and LAN performance of an entry-level workstation configured as an X-server.

Telecommunications

HP's vision of future information technology is called the "Cooperative Computing Environment." Its goal is to develop "smart networks of both general-purpose and specialized computers working together as a single, integrated system—no matter where they're located, who made them, or what operating system they use." These "smart" networks will manage the simultaneous transmission of voices, data, and video. The resulting distributed system, which can integrate diverse applications, environments, and computers, will allow managers to manage information more effectively.

In October 1989, Hewlett-Packard, through its Apollo Division, introduced fiber distributed-data interface (FDDI) network-controller boards based on the American National Standards Institute's (ANSI's) standards. FDDI is a high-speed data network with the capability to support up to 200 Mbits per second (Mbps). The new controller board will be available initially on the Apollo Series 10000 personal supercomputers.

Semiconductors

According to Dataquest, Hewlett-Packard ranked thirty-second in the worldwide semiconductor market during 1989.

Hewlett-Packard manufactures a number of dedicated integrated circuits (ICs) for internal consumption only. These are supported by a wide range of optoelectronic devices (both components and modules) that are generally available on the merchant market, together with several specialized diode and transistor products.

The prime driving force has been to support the Company's internal requirements, and the product range reflects this priority. Merchant sales have thus been primarily an ancillary business for semiconductor operations. With the current trend of traditionally captive suppliers moving into the merchant semiconductor market (e.g., AT&T, Honeywell, and NCR), coupled with HP's leadership position in state-of-the-art IC technology, this stance has changed. The Company is responding to an industry trend toward integrated-design and factory-automation systems, with reduced-instruction-set computing (RISC) computers. In early 1986, HP announced that it was pulling out of the US market for semiconductor manufacturing automation systems, although it would still support the worldwide installed base for at least five years.

Computer Storage

In 1989, Hewlett-Packard introduced a family of 5.25-inch hard-disk storage systems for entry-level through high-end HP computer systems, two digital-data-storage (DDS) format tape drives for HP computer systems, and a family of mass-storage systems that combine a high-capacity hard-disk mechanism with a choice of two additional drives (digital audio tape drive, compact-disc read-only-memory (ROM) device, rewritable-optical disk drive, and/or additional hard-disk drives).

Further Information

For further information about the Company's business segments, please contact the appropriate industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$6,505	$7,102	$8,090	$9,831	$11,899
Percent Change	-	9.18	13.91	21.52	21.04
Capital Expenditure	$9,631	$497	$510	$649	$857
Percent of Revenue	148.06	7.00	6.30	6.60	7.20
R&D Expenditure	$685	$824	$901	$1,019	$1,269
Percent of Revenue	10.53	11.60	11.14	10.37	10.66
Number of Employees	84,000	82,000	82,000	87,000	95,000
Revenue ($K)/Employee	$77.44	$86.60	$98.65	$113.00	$113.00
Net Income	$489	$516	$644	$816	$829
Percent Change	-	5.52	24.81	26.71	1.59

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$2,657.00	$2,864.00	$3,001.00	$3,377.00
Quarterly Profit	$193.0	$203.00	$187.00	$246.0

Source: Hewlett-Packard Co.
Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	57.00	54.00	51.00	48.00	47.00
International	43.00	46.00	49.00	52.00	53.00
Europe	27.00	31.00	33.00	34.00	35.00
All Others	16.00	15.00	16.00	18.00	18.00

Source: Hewlett-Packard Co.
Annual Reports
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988*	1989*
Direct Sales	60.00	60.00
Indirect Sales	40.00	40.00
Distributors	1.00	NA
Dealers	1.00	NA
OEMs	38.00	NA

*Computer systems only
NA = Not available

Source: Hewlett-Packard Co.
Annual Reports
Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES AND SERVICE OFFICE LOCATIONS

North America—126
Japan—26
Europe—105
Asia/Pacific—43
ROW—128

MANUFACTURING LOCATIONS

North America

Aguadilla, Puerto Rico
Terminals
Andover, Massachusetts
Medical equipment
Avondale, Pennsylvania
Electronic instruments
Boise, Idaho
Disk drives, printers
Colorado Springs, Colorado
Electronic test instruments, telecom test equipment
Corvallis, Oregon
Calculators, workstations, ASICs, floating-point microprocessors
Cupertino, California
Minicomputers
Everett, Washington
Electronic instruments
Fort Collins, Colorado
Workstations, network controllers, ASICs, RISC microprocessors
Greeley, Colorado
Printers, tape drives
Loveland, Colorado
Logic design systems
McMinnville, Oregon
Medical equipment
Palo Alto, California
Test equipment
Rockaway, New Jersey
Test equipment
Rohnert Park, California
Test equipment
Roseville, California
Network products, personal computers
San Diego, California
Plotters
San Jose, California
Microwave, opto, diodes, transistors
Santa Clara, California
Electronic instruments, ASICs
Santa Rosa, California
Microwave test equipment, microwave, opto, diodes, transistors
Spokane, Washington
Test equipment
Sunnyvale, California
CIM systems, workstation systems integration, PCs, workstations
Vancouver, Washington
Printers
Waltham, Massachusetts
Medical equipment
Waterloo, Ontario, Canada
Industrial terminals

Japan

Tokyo
Software, business computers, component and semiconductor measurement instruments and systems
Yokogawa
Instruments, peripherals

Europe

Barcelona, Spain
Printers, drives
Berkshire, England
Office automation software
Boeblingen, West Germany
Workstations, midrange computers, analytical instruments, medical instruments
Bristol, England
Disk drives
Eybens, France
PCs, terminals, communications hardware and software
Grenoble, France
Networking products, personal computers
Lyon, France
Midrange computers
South Queensferry, Scotland
Telecom test equipment, microwave test equipment
Villefontaine, France
A-series and various industrial automation and medical products, networks, telecommunication products
Waldbronn, West Germany
Analytical instruments

©1990 Dataquest Incorporated

Asia/Pacific

Penang, Malaysia
Semiconductor devices
Singapore
Software networks, printers, graphics imaging components, calculators, keyboards, terminals, optoelectronic LED components
South Korea, Seoul
Instruments, peripherals
Taipei, Taiwan
Asian language PC products

ROW

Guadalajara, Mexico
PCs, multiuser systems
Ringwood, Australia
Application development tools

SUBSIDIARIES

North America

Apollo Computers (United States)
Conductus Company (United States)
Fleet Systems Inc. (United States)
Hewlett-Packard Atlantic Inc. (United States)
Hewlett-Packard (Canada) Ltd. (Canada)
Hewlett-Packard Delaware Inc. (United States)
Hewlett-Packard Delaware Trading Inc. (United States)
Hewlett-Packard Export Trade Co. (United States)
Hewlett-Packard Finance Company (United States)
Hewlett-Packard Hellas Inc. (United States)
Hewlett-Packard Inter-Americas Western Hemisphere Trade Corp. (United States)
Hewlett-Packard Pipeline Co. (United States)
Hewlett-Packard Puerto Rico
Octel Communications Co. (United States)

Japan

Yokogawa-Hewlett-Packard Ltd. (Japan)

Europe

Geneva Investments N.V. (Netherlands Antilles)
Hewlett-Packard A/S (Denmark)
Hewlett-Packard Belgium S.A./N.V. (Belgium)
Hewlett-Packard Benelux B.V. (Netherlands)
Hewlett-Packard Equipment Leasing Ltd. (United Kingdom)
Hewlett-Packard Espanola S.A. (Spain)
Hewlett-Packard Finance Ltd. (United Kingdom)
Hewlett-Packard France S.A. (France)
Hewlett-Packard Ges.m.b.H. (Austria)
Hewlett-Packard GmbH (West Germany)
Hewlett-Packard International Sales Corporation N.V. (Netherlands)
Hewlett-Packard Ireland Ltd. (Republic of Ireland)
Hewlett-Packard Leasing Ltd. (United Kingdom)
Hewlett-Packard Ltd. (United Kingdom)
Hewlett-Packard Nederland B.V. (Netherlands)
Hewlett-Packard Norge A/S (Norway)
Hewlett-Packard Oy (Finland)
Hewlett-Packard Product Leasing Ltd. (United Kingdom)
Hewlett-Packard S.A. (Switzerland)
Hewlett-Packard (Schweiz) AG (Switzerland)
Hewlett-Packard Sverige AB (Sweden)
Hewlett-Packard (Technical) B.V. (Netherlands)
Hewlett-Packard Trading S.A. (Switzerland)

Asia/Pacific

Australia Moriya Pty. Ltd. (Australia)
China-Hewlett-Packard Ltd. (China)
Hewlett-Packard Asia Ltd. (Hong Kong)
Hewlett-Packard Australia Finance Ltd. (Australia)
Hewlett-Packard Australia Ltd. (Australia)
Hewlett-Packard FPG (China)
Hewlett-Packard Hong Kong Ltd. (Hong Kong)
Hewlett-Packard Malaysia Sdn. Bhd. (Malaysia)
Hewlett-Packard (NZ) Ltd. (New Zealand)
Hewlett-Packard Penang Sdn. Bhd. (Malaysia)
Hewlett-Packard Sales (Malaysia) Sdn. Bhd. (Malaysia)
Hewlett-Packard Singapore (Pte.) Ltd. (Singapore)
Hewlett-Packard Singapore (Sales) Pte. Ltd. (Singapore)
Hewlett-Packard Taiwan Ltd. (China)
Samsung Hewlett-Packard Ltd. (South Korea)

ROW

Arrendadora Hewlett-Packard S.A. de C.V. (Mexico)
Grupo Hewlett-Packard S.A. de C.V. (Mexico)
Hewlett-Packard Argentina S.A. (Argentina)
Hewlett-Packard do Brasil Industria e Comercio Ltds. (Brazil)
Hewlett-Packard do Brasil S.A. (Brazil)
Hewlett-Packard de Mexico S.A. de C.V. (Mexico)
Hewlett-Packard de Venezuela C.A. (Venezuela)
Hewlett-Packard Investment Ltd. (Liberia)
Hewlett-Packard South Africa (Pty.) Ltd. (South Africa)
Sispor Participacoes Ltda. (Brazil)

©1990 Dataquest Incorporated

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

AT&T Computer Systems
Hewlett-Packard signed an agreement to license HP NewWave software to AT&T Computer Systems. Terms of the contract were not disclosed.

Hughes Aircraft Company
Hewlett-Packard and Hughes Aircraft Company signed a strategic agreement to develop and manufacture advanced workstations, personal computers, and other related equipment.

Cascade Microtech Inc.
Hewlett-Packard purchased a minority equity position in Cascade Microtech Inc. and licensed some wafer-probing technology to Cascade.

MAI Basic Four Inc.
MAI Basic Four Inc. became a Hewlett-Packard value-added reseller (VAR). Under the VAR agreement, MAI Basic Four will resell the computers with MANBASE, its MRP II (manufacturing/resource/planning) software solution to manufactures.

Octel Communications Corporation
Hewlett-Packard and Octel Communications Corporation have become strategic partners in bringing high-performance voice-processing equipment to Europe.

McDonnell Douglas Systems Integration Co.
Hewlett-Packard and McDonnell Douglas Systems Integration Co. entered into a three-year, $75 million VAR agreement that allows McDonnell Douglas to resell HP's Motorola- and RISC-based HP 9000 family of workstations with its Unigraphics software.

Actel Corporation
Hewlett-Packard and Actel Corporation announced that they will cooperate in developing, licensing, and manufacturing an advanced family of field-programmable gate arrays (FPGAs). Under the terms of the five-year agreement, HP has immediate access to Actel's FPGA design software and will make a 5 percent equity investment in Actel.

Sequoia Systems Inc.
Hewlett-Packard and Sequoia Systems Inc. announced a strategic relationship that includes a marketing agreement, technology licensing, and an equity investment. Under the technology licensing agreement, HP has the right to use most of Sequoia's fault-tolerance, multiprocessor technology in future HP systems. The agreement also calls for the cross-licensing of any improvements to this technology by either company.

NCR/Data General/Canon
Hewlett-Packard signed an agreement to license the HP NewWave software environment to NCR Corporation, Data General Corporation, and Canon Inc.

Penstock, Inc.
Hewlett-Packard announced that Penstock Inc. has become a distributor of HP RF and microwave components and integrated products in the United States and Canada. Under the terms of the agreement, Penstock will focus on selling devices targeted for applications above 1 GHz and will stock a broad line of silicon and gallium arsenide (GaAs) beam-lead and chip devices, as well as packaged versions of these products. In addition, Penstock will have inventory of selected HP mechanical switches, programmable step attenuators, and fixed coaxial attenuators.

Numetrix Inc.
Hewlett-Packard and Numetrix Inc. signed an agreement in which Numetrix's Schedulex production scheduling software will be ported to HP 9000 Series 800 Precision Architecture (HP-PA) computers and HP Vectra personal computers. HP and Numetrix will market the HP-based Schedulex software solution to process manufacturers in the food, beverage, pulp and paper, chemical, pharmaceutical, and consumer packaged goods industries.

Mentor Graphics Corporation
Hewlett-Packard and Mentor Graphics Corporation announced a multimillion-dollar software-marketing agreement. Under the terms of the agreement, Hewlett-Packard will adapt Mentor Graphics' design and analysis software for board-test applications and will market it with future HP board-test products.

1989

Calera Recognition Systems Inc.
Calera Recognition Systems Inc. signed a distribution agreement with Hewlett-Packard to distribute Calera's TrueScan Model S document recognition product through HP authorized dealers in the United States and Canada.

©1990 Dataquest Incorporated

Aeritalia's Systems and RPVs Group of Italy
Hewlett-Packard, Aeritalia's Systems, and RPVs Group of Italy signed a joint agreement to market EMC measurement systems.

Philips Components
Hewlett-Packard and Philips Components of the Netherlands announced an agreement to develop and make high-voltage optocouplers.

Samsung Electronics Co., Ltd.
Hewlett-Packard and Samsung Electronics Co., Ltd., in Korea formed an agreement for Samsung to develop, manufacture, and resell chip sets, workstations, and other computers using HP's RISC technology.

Nellcor Inc.
Hewlett-Packard was granted a license under Nellcor Inc.'s sensor-coding patents to use Nellcor's oximeter sensors with HP patient-monitoring systems

Compression Labs Inc.
Compression Labs Inc. (CLI) signed an agreement with Hewlett-Packard to provide videoconferencing systems for HP's international communications network. The agreement, worth more than $2 million, calls for CLI to provide 50 videoconferencing systems over a two-year period.

VHA Supply Company Inc.
Hewlett-Packard and VHA Supply Company signed a two-year extension to a three-year purchase agreement signed in 1987, covering a variety of HP medical-electronic and computer products. Under the terms of the agreement, HP will provide critical-care and diagnostic equipment as well as computer systems to VHA's national network of 669 locally owned hospitals and their 177 affiliates. Included in the critical-care equipment are the HP CareVue 9000 clinical information system and the HP Component Monitoring System.

Spatial Technology Inc.
Hewlett-Packard and Spatial Technology Inc. have an agreement to jointly market solid-modeling software for the mechanical computer-aided design and computer-aided manufacturing (CAM) market. HP bought about a 10 percent equity stake in Spatial.

Agfa Compugraphic Division
Hewlett-Packard and Agfa Compugraphic Division have jointly developed Type Director. Type Director is based on Compugraphic's Intellifont font-scaling technology and has been implemented according to Hewlett-Packard's specifications.

Decision Data Inc. (DDI)
Hewlett-Packard (HP) and Decision Data Inc. established an original equipment manufacturer (OEM) agreement in which DDI intends to purchase $20 million of newly developed HP terminals compatible with IBM System/3X and AS/400 computers. The new terminals will be resold by Decision Data Computer Corp., a subsidiary of DDI. The OEM terminals, developed jointly by HP and DDI, are being manufactured at HP's automated facility in Roseville. The terminals will be sold exclusively to DDI.

National Semiconductor Corporation
Hewlett-Packard and National Semiconductor Corporation announced joint development efforts aimed at providing integrated semiconductor and system network products that conform to the IEEE 802.3 10BASE-T network standard.

Sony of America
Sony of America will supply 5.25-inch rewritable optical disk storage products to Hewlett-Packard for the HP C17QA Optical Disk Library System, the first rewritable optical disk autochanger. The Sony drive and controller will also be used for a standalone rewritable optical disk subsystem, the HP C1711A, which is fully compatible with the Optical Disk Library System.

Carlisle Memory Products Group
Hewlett-Packard signed a $4.5 million contract that renews and expands a previous agreement to purchase Carlisle half-inch tape reels in all worldwide locations.

Interphase
Hewlett-Packard, through its Apollo Division, extended its OEM agreement with Interphase for another two years at a value of approximately $2.1 million.

NEC
Hewlett-Packard and NEC announced an agreement to develop comprehensive development tools for several NEC original microprocessors and microcomputers. Under the terms of the agreement, HP will develop, sell, and support HP 64700 series emulators for many of NEC's original microprocessors and microcontrollers.

Blue Star Ltd.
HP has established Hewlett-Packard India Pvt. Ltd., a joint-venture company with Blue Star Ltd., the sole distributor of HP products in India. HP will have 40 percent equity in the venture and Blue Star 20 percent.

©1990 Dataquest Incorporated

Oracle Corp.
HP, through its Apollo Division, announced a marketing agreement with Oracle under which both companies will promote and market the Oracle relational database management systems (DBMSs) software products.

3Com
HP announced a strategic alliance with 3Com, which will license its OS/2-based 3+Open LAN Manager network operating system to HP. HP will sell the product under the name HP3+Open LAN Manager.

Oki Electric Industry Co. Ltd.
The two companies agreed to build and operate a printed circuit board facility in Puerto Rico.

Microsoft Corporation
The two companies are engaging in joint development to port the MS LAN Manager OS/2 technology to the UNIX system environment.

1988

Octel Communications Corporation
Hewlett-Packard and Octel Communications Corporation established an agreement for HP to distribute Octel voice-processing products in Europe and to acquire 10 percent equity interest in Octel.

Conductus Inc.
Hewlett-Packard made a 15 percent equity investment in Conductus Inc. of Palo Alto, California.

STET
Hewlett-Packard signed an agreement with STET to buy 35 percent of Network Control Systems SpA (NECSY) in Padua, Italy.

Sony
HP recruited three digital audiotape (DAT) drive manufacturers to license the DDS format that HP developed with Sony. The new licensees are Aiwa, Alliance, and Mitsumi.

Zenith
The two companies made an OEM agreement for laptop computers.

MERGERS AND ACQUISITIONS

1989

Apollo Computer
This merger gave HP a strong foothold in the networking arena, with a 30.4 percent of the 1988 workstation market. The acquisition gave HP an installed base of about 84,000 Apollo machines at almost 3,000 sites and another proprietary RISC architecture.

Optotech
Hewlett-Packard purchased certain assets of Opotech, a privately held company that designs and develops optical disk drives.

KEY OFFICERS

David Packard
Chairman of the board

John A. Young
President, chief executive officer

Dean O. Morton
Executive vice president, chief operating officer

Harold E. Edmondson
Vice president, director of Corporate Manufacturing

Dick Alberding
Executive vice president of Marketing and International

PRINCIPAL INVESTORS

David Packard—17.1 percent
William R. Hewlett—12.2 percent

FOUNDERS

William R. Hewlett (stepped down as vice president of the board of directors in February 1987)
David Packard

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending October 31
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$3,342	$3,814	$5,490	$4,562	$5,731
Cash	1,020	1,372	2,645	814	906
Receivables	1,249	1,344	1,561	1,982	2,494
Marketable Securities	0	0	0	118	20
Inventory	993	981	1,117	1,478	1,947
Other Current Assets	80	117	167	170	364
Net Property, Plants	$2,149	$2,236	$2,328	$2,516	$2,893
Other Assets	$189	$237	$315	$780	$1,451
Total Assets	$5,680	$6,287	$8,133	$7,858	$10,075
Total Current Liabilities	$1,376	$1,518	$2,735	$2,589	$3,743
Long-Term Debt	$102	$110	$88	$392	$474
Other Liabilities	$220	$285	$288	$344	$412
Total Liabilities	$1,698	$1,913	$3,111	$3,325	$4,629
Total Shareholders' Equity	$3,982	$4,374	$5,022	$4,533	$5,446
Converted Preferred Stock	0	0	0	0	0
Common Stock	780	712	776	234	459
Other Equity	0	0	0	0	0
Retained Earnings	3,202	3,662	4,246	4,299	4,987
Total Liabilities and Shareholders' Equity	$5,680	$6,287	$8,133	$7,858	$10,075

Income Statement	1985	1986	1987	1988	1989
Revenue	$6,505	$7,102	$8,090	$9,831	$11,899
US Revenue	3,696	3,812	4,122	4,763	5,561
Non-US Revenue	2,809	3,290	3,968	5,068	6,338
Cost of Sales	$3,166	$3,353	$3,785	$4,832	$6,091
R&D Expense	$685	$824	$901	$1,056	$1,269
SG&A Expense	$1,896	$2,145	$2,442	$2,859	$3,327
Capital Expense	$9,631	$497	$510	$648	$857
Pretax Income	$758	$780	$962	$1,142	$1,151
Pretax Margin (%)	11.65	10.98	11.89	11.62	9.67
Effective Tax Rate (%)	35.50	33.90	33.10	28.50	28.00
Net Income	$489	$516	$644	$816	$829
Shares Outstanding, Millions	256.9	256.1	257.3	234.2	238.0
Per Share Data					
Earnings	$1.91	$2.02	$2.50	$3.36	$3.52
Dividend	$0.22	$0.22	$0.23	$0.28	$0.36
Book Value	$15.50	$17.08	$19.52	$19.35	$22.88

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending October 31
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	2.43	2.51	2.01	1.76	1.53
Quick (Times)	1.71	1.87	1.60	1.19	1.01
Fixed Assets/Equity (%)	53.97	51.12	46.36	55.50	53.12
Current Liabilities/Equity (%)	34.56	34.71	54.46	57.11	68.73
Total Liabilities/Equity (%)	42.64	43.74	61.95	73.35	85.00
Profitability (%)					
Return on Assets	-	8.62	8.93	10.21	9.25
Return on Equity	-	12.35	13.71	17.08	16.61
Profit Margin	7.52	7.27	7.96	8.30	6.97
Other Key Ratios					
R&D Spending % of Revenue	10.53	11.60	11.14	0.74	10.66
Capital Spending % of Revenue	148.06	7.00	6.30	6.59	7.20
Employees	84,000	82,000	82,000	87,000	95,000
Revenue ($K)/Employee	$77.44	$86.60	$98.65	$113.00	$113.00
Capital Spending % of Assets	169.56	7.91	6.27	8.25	8.51

Source: Hewlett-Packard Co. Annual Reports
Dataquest (1990)

©1990 Dataquest Incorporated

Intergraph Corporation

Huntsville, Alabama 35894-0001
Telephone: (205) 730-2000
Fax: (205) 730-8300
Dun's Number: 05-515-7903

Date Founded: 1969

CORPORATE STRATEGIC DIRECTION

Intergraph Corporation's predominant business is the sale of interactive computer graphics systems—including engineering workstations and applications software. A major player in the CAD/CAM market for more than a decade, Intergraph entered the general-purpose workstation market in 1988. Since then, the Company has decided not to actively pursue this market and has dismantled its workstation sales force in favor of its impressive computer-aided design/computer-aided manufacturing (CAD/CAM) business.

The Company sells graphics and design systems for use by the architectural, engineering, construction, mechanical design, electronic design, electronic publishing, mapping, energy exploration, utilities, and dispatch management fields.

Intergraph's total revenue increased 7.5 percent to $860.0 million* in fiscal 1989 from $800.2 million in fiscal 1988. Sales of the Company's systems totaled $631.3 million, up 7 percent from fiscal 1988. Service revenue increased 9 percent in fiscal 1989 over fiscal 1988. Intergraph Corporation has continued to increase its presence in Europe, which is responsible for 33 percent of revenue, while 14 percent is derived from Rest of World trade. Revenue for the first half of 1990 increased 20 percent over the first half of 1989. The graphics/imaging market incurred the largest growth.

Among individual product lines, the Company's architecture, engineering, and construction (AEC), MicroStation, and mechanical applications software were the areas of primary growth in 1989. AEC revenue was up 33 percent in 1989 on the strength of the Company's new workstation-based products, the Entry Level Sales program, and Plant Design applications. Sales of the MicroStation, the Company's core graphics package for PC and low-end UNIX software products, were up 60 percent in 1989. Mechanical applications software is used in defining mechanical operations.

Net income for fiscal 1989 decreased 9.7 percent to $79.5 million from $88.0 million in fiscal 1988. The decrease in income is largely attributable to a 2.9 percent decrease in gross margins on systems sales, while the service margin decreased 1.9 percent. The margin on systems was affected by the strength of the US dollar in Europe for the first three quarters for fiscal 1989.

R&D expenditure increased 2.5 percent to $91.5 million, representing 10.6 percent of revenue for fiscal 1989. R&D expenditure totaled $89.2 million in fiscal 1988. This included the development costs associated with a major new line of hardware, the Series 6000 workstations and servers.

Capital expenditure for fiscal 1989 totaled $74.1 million, representing 8.6 percent of total revenue. This is an increase of 10.2 percent over the fiscal 1988 figure of $66.5 million. These funds were used for additional buildings to increase production and warehousing capacity and to add administration space. Some of the new buildings will be devoted to Intergraph systems to be used in hardware and software development.

Intergraph employed approximately 8,200 people in 1989.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

CAD/CAM

Dataquest ranks Intergraph fourth in the worldwide CAD/CAM market with 6.9 percent market share and $860.0 million in revenue. Intergraph is ranked first in North America with 10.6 percent and $493.0 million in revenue and fifth in Europe with 6.8 percent market share and $288.4 million in revenue.

Dataquest estimates that Intergraph's CAD/CAM hardware revenue for 1989 totaled $457.2 million with 6.4 percent market share, while its software revenue totaled $169.1 million with 5.0 percent market share. Hardware sales were responsible for 53.2 percent of total revenue; software sales were responsible for 19.7 percent. The remaining 27.1 percent of total revenue is derived from service revenue.

The Company ranks first, according to Dataquest, in the mapping software market with $61.4 million in revenue for 1989. Intergraph is ranked second in the 1989 AEC software market with $46.0 million in revenue. Intergraph also generated $21.7 million in unbundled software revenue.

Intergraph ranks second in the sale of turnkey hardware with $607.1 million in 1989 revenue. Service revenue for 1989 totaled $231.4 million.

Workstations

Recognizing the slowing growth of the CAD/CAM industry, Intergraph reorganized its workstation division as a separate business unit late in 1988, primarily to seize the opportunity in the still-burgeoning workstation industry. Dataquest estimates that Intergraph shipped 16,100 workstations in 1989 with 5.5 percent market share. This ranks the Company fourth in the world in workstation units shipped for 1989. However, the Company decided it was straying from its original CAD/CAM market business and dismantled its reorganization attempts of 1988. The Company no longer has a workstation sales force and is no longer actively pursuing this market.

Microprocessor

Intergraph develops and markets the CLIPPER, a 32-bit microprocessor with a RISC architecture that provides binary compatibility throughout the entire workstation family. Intergraph is not a major player in the microprocessor industry.

Further Information

For further information about the Company's business segments, please contact the appropriate Dataquest industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$526.4	$605.7	$641.1	$800.2	$860.0
Percent Change	-	15.06	5.84	24.82	7.47
Capital Expenditure	$48.6	$78.4	$46.7	$66.5	$74.1
Percent of Revenue	9.23	12.94	7.28	8.31	8.62
R&D Expenditure	$50.7	$57.7	$67.5	$89.2	$91.5
Percent of Revenue	9.63	9.53	10.53	11.15	10.64
Number of Employees	5,100	5,700	6,300	7,300	8,200
Revenue ($K)/Employee	$103.22	$106.26	$101.76	$109.62	$104.88
Net Income	$67.8	$70.4	$69.9	$88.0	$79.5
Percent Change	-	3.83	(0.71)	25.89	(9.66)

1990 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	NA	$219.18	NA	NA
Quarterly Profit	NA	NA	NA	NA

NA = Not available

Source: Intergraph Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	69.00	66.00	58.00	57.00	53.00
International	31.00	34.00	42.00	43.00	47.00
Europe	18.00	22.00	29.00	29.00	33.00
ROW	13.00	12.00	13.00	14.00	14.00

Source: Intergraph Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	100.00	100.00
Indirect Sales	0	0

Source: Intergraph Corporation
Dataquest (1990)

©1990 Dataquest Incorporated

1990 SALES OFFICE LOCATIONS

North America—84
Europe—30
Asia/Pacific—12
ROW—25

MANUFACTURING LOCATIONS

North America

Huntsville, Alabama
Graphics workstations and servers, the InterBus File Processor, Graphics Processor, communications controllers, and standard and high-precision cursors

Europe

Nijmegen, Netherlands
Graphics workstations and servers, the InterBus File Processor, Graphics Processor, communications controllers, and standard and high-precision cursors for the European market

SUBSIDIARIES

North America

Bentley Systems Inc. (United States)
Intergraph Canada Ltd. (Canada)
Intergraph Delaware Inc. (United States)
Intergraph Disc Inc. (United States)
M & S Computing Investment Inc. (United States)
Quintus Computer Systems Inc. (United States)

Europe

Intergraph (Benelux) B.V. (Netherlands)
Intergraph CAD/CAM (Denmark) A/S (Denmark)
Intergraph Computer Services (Turkey)
Intergraph (Deutschland) GmbH (Germany)
Intergraph Espana S.A. (Spain)
Intergraph European Manufacturing B.V. (Netherlands)
Intergraph Europe Inc. (Netherlands)
Intergraph (Finland) Oy (Finland)
Intergraph (France) SARL (France)
Intergraph (Italia) S.p.A. (Italy)
Intergraph Middle East Ltd. (Cyprus)
Intergraph Norge A/S (Norway)
Intergraph (Scandinavia) AB (Scandinavia)
Intergraph Services B.V. (Netherlands)
Intergraph Software Development Center (France)
Intergraph (UK) Ltd. (United Kingdom)

Asia/Pacific

Intergraph China Inc. (China)
Intergraph Corporation (N.Z.) Ltd. (New Zealand)
Intergraph Corporation Pty. Ltd. (Australia)
Intergraph Corporation Taiwan (Taiwan)
Intergraph Graphic (India) Private Ltd. (India)
Intergraph Graphic Systems Asia-Pacific Ltd. (Hong Kong)
Intergraph Graphic Systems Hong Kong Ltd. (Hong Kong)
Intergraph Systems South-East Asia (Pte.) Ltd. (Singapore)
Intergraph Wholesale Pty. Ltd. (Australia)
Nihon Intergraph K.K. (Japan)

ROW

Intergraph de Mexico S.A. De C.V. (Mexico)
Intergraph Services De Venezuela S.A. (Venezuela)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Visual Information Technologies
Intergraph purchased visual Information Technologies' image processing technology that gives users the ability to manipulate photographs on-screen.

Rasna
Rasna and Intergraph have signed a joint development and original equipment manufacturer (OEM) software agreement involving mechanical engineering.

©1990 Dataquest Incorporated

Samsung Semiconductor
Intergraph's Advanced Processor division has signed a second-source agreement with Samsung Semiconductor under which the South Korean firm will manufacture the CLIPPER microprocessor both for sale on the open market and as a foundry for Intergraph.

1989

Pantone Inc.
Intergraph has signed up with Pantone for its color graphic arts software, Matching System, which it will offer on its CLIPPER RISC-based workstations.

Adobe Systems Incorporated
Adobe Systems signed an agreement with Intergraph's Optronics Division. The division will have licensing rights to Adobe's PostScript for implementation in its products.

ALPHA-OMEGA, ECLIPSE, IMPAQ, and Spinnaker Sales
Intergraph's Advanced Processor division signed four manufacturers' representative organizations to sell the Company's CLIPPER 32-bit RISC microprocessor.

Visix Software
Intergraph entered into a software interface marketing arrangement with Visix Software that allows Intergraph to bundle Visix's Looking Glass UNIX interface with all of its workstation and computer server machines.

Swanson Analysis Systems
Intergraph signed a marketing pact to sell Swanson Analysis Systems' ANSYS software on its CLIPPER-based engineering workstations and servers.

Micro Focus
Intergraph and Micro Focus signed a worldwide OEM agreement under which Intergraph will distribute the Micro Focus COBOL/2 native code-generating compiler for Intergraph's CLIPPER family of RISC-based workstations and servers.

Technology Concepts
Intergraph will buy DECnet-compatible communications software from Technology Concepts on an OEM basis.

MacNeal-Schwendler Corporation
A joint marketing agreement makes MSC/NASTRAN available on Intergraph's CLIPPER-based engineering workstation and servers.

EDS Corporation
The companies have a joint project for the production of a high-performance multiprocessor for transaction processing and database management.

IKOS Systems, Inc.
Intergraph will market the IKOS Simulation System worldwide, except in Japan, as part of its electronic computer-aided engineering (CAE) product line.

Quantic Laboratories
The companies have an agreement to provide for the integration of Quantic's Greenfield software with Intergraph's electronic design tools. Intergraph will market the integrated design products through its distribution channels worldwide.

CAD Language Systems, Inc.
The companies have an agreement for the joint development and marketing of an IEEE Standard VHDL-based system that integrates existing design tools with VHDL in the Intergraph design environment.

Cadence Design Systems, Inc.
Cadence will port its integrated circuit design software to Intergraph CLIPPER-based workstations and servers.

MERGERS AND ACQUISITIONS

1989

Quintus Computer Systems
Quintus supplies software development tools based on Prolog (programming in logic), which is a high-level, logic-based programming language employed in forming knowledge-based systems. Intergraph, which will run Quintus as a 100 percent owned subsidiary, will speed up development activities to support its own advanced graphics capacities.

1987

Fairchild Advanced Processor Division
Intergraph acquired this division that develops and markets 32-bit microprocessors based on RISC architecture.

©1990 Dataquest Incorporated

KEY OFFICERS

James W. Meadlock
Chairman of the board, chief executive officer, and director

Elliott James
President and director

Larry J. Laster
Executive vice president, chief financial officer, and director

Nancy B. Meadlock
Executive vice president and director

James F. Taylor, Jr.
Executive vice president and director

Robert E. Thurber
Executive vice president and director

PRINCIPAL INVESTORS

Sanford, C. Berstein & Co., Inc.—14.2 percent
Intergraph Corporation Stock Bonus Plan Trust—14.1 percent
James W. Meadlock—5.9 percent

FOUNDERS

Information is not available.

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$411.7	$450.4	$531.0	$638.0	$573.9
Cash	8.8	123.8	156.5	100.1	62.0
Receivables	155.6	164.4	205.8	271.0	273.2
Marketable Securities	101.7	0	0	80.1	29.1
Inventory	143.2	158.5	160.9	175.9	190.0
Other Current Assets	2.4	3.7	7.8	10.9	19.6
Net Property, Plants	$76.7	$130.2	$144.7	$172.0	$185.1
Other Assets	$22.9	$32.4	$28.3	$20.7	$49.0
Total Assets	$511.3	$613.0	$704.0	$830.7	$808.0
Total Current Liabilities	$94.2	$103.2	$128.6	$157.0	$159.5
Long-Term Debt	$10.6	$13.2	$4.3	$2.8	$7.1
Other Liabilities	$3.6	$0.5	$3.9	$3.8	$11.7
Total Liabilities	$108.4	$116.9	$136.8	$163.6	$178.3
Total Shareholders' Equity	$402.9	$496.1	$567.2	$667.1	$629.7
Common Stock	5.5	5.6	5.7	5.7	5.7
Other Equity	206.8	229.6	230.7	242.6	125.7
Retained Earnings	190.6	260.9	330.8	418.8	498.3
Total Liabilities and Shareholders' Equity	$511.3	$613.0	$704.0	$830.7	$808.0
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$526.4	$605.7	$641.1	$800.2	$860.0
US Revenue	363.2	399.8	371.8	456.1	455.8
Non-US Revenue	163.2	205.9	269.3	344.1	404.2
Cost of Sales	$266.3	$300.3	$317.0	$381.6	$440.2
R&D Expense	$50.7	$57.7	$67.5	$89.2	$91.5
SG&A Expense	$100.1	$133.9	$152.9	$196.9	$236.9
Capital Expense	$48.6	$78.4	$46.7	$66.5	$74.1
Pretax Income	$118.5	$123.5	$115.8	$138.8	$119.4
Pretax Margin (%)	22.51	20.39	18.06	17.35	13.88
Effective Tax Rate (%)	42.82	43.01	39.65	36.61	33.40
Net Income	$67.8	$70.4	$69.9	$88.0	$79.5
Shares Outstanding, Millions	54.3	55.9	56.8	56.8	53.9
Per Share Data					
Earnings	$1.25	$1.26	$1.23	$1.55	$1.48
Dividend	-	-	-	-	-
Book Value	$7.42	$8.87	$9.99	$11.74	$11.68

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	4.37	4.36	4.13	4.06	3.60
Quick (Times)	2.85	2.83	2.88	2.94	2.41
Fixed Assets/Equity (%)	19.04	26.24	25.51	25.78	29.39
Current Liabilities/Equity (%)	23.38	20.80	22.67	23.53	25.33
Total Liabilities/Equity (%)	26.90	23.56	24.12	24.52	28.32
Profitability (%)					
Return on Assets	-	12.52	10.62	11.47	9.70
Return on Equity	-	15.66	13.15	14.26	12.26
Profit Margin	12.88	11.62	10.90	11.00	9.24
Other Key Ratios					
R&D Spending % of Revenue	9.63	9.53	10.53	11.15	10.64
Capital Spending % of Revenue	9.23	12.94	7.28	8.31	8.62
Employees	5,100	5,700	6,300	7,300	8,200
Revenue ($K)/Employee	$103.22	$106.26	$101.76	$109.62	$104.88
Capital Spending % of Assets	9.51	12.79	6.63	8.01	9.17

Source: Intergraph Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

International Business Machines Corporation

Corporate Headquarters
Old Orchard Road
Armonk, New York 10504
Telephone: (914) 765-1900
Fax: (914) 765-4190, 765-4191
Dun's Number: 00-136-8083

Date Founded: 1911

CORPORATE STRATEGIC DIRECTION

International Business Machines Corporation (IBM) was incorporated in New York State in June 1911 as the Computing-Tabulating-Recording Company, a consolidation of four companies. In 1924, the Company merged with International Business Machines Corporation and assumed that company's name. Today it is the world's largest manufacturer of data processing machines and information-handling systems.

Acknowledged as the largest computer systems vendor in the world, IBM designs, manufactures, sells, and supports an array of information processing systems. IBM's product line includes the following:

- Mainframes
- Superminicomputers
- Mini- and microcomputers
- Workstations
- Personal computers
- Systems software
- Display terminals
- Computer storage devices
- Communication systems
- Printers
- Typewriters
- Educational and training materials
- Related supplies and services

In addition to these products, IBM is a major systems integration vendor, offering clients complete solutions to information processing needs.

During the past several years, IBM has been undergoing a number of changes to compensate for shifts in market conditions and user demand. IBM has trimmed employee and administrative costs and sold off several subsidiaries to concentrate on its core businesses whereby it can control costs through economies of scale. This activity supports IBM's strategy of becoming a leaner and more responsive organization. Since 1988, IBM has reduced its work force by 50,000. With just over 383,000 employees at the end of fiscal 1989, IBM expects further reductions of up to 10,000 during 1990.

A major element of IBM's restructuring has been to flatten and streamline the organization. As a result, IBM has set up seven lines of business (LOBs) to simplify the decision-making process and increase responsiveness to its clients' needs. Each LOB is responsible for developing and manufacturing product and services for its customers. IBM has also been working to push decision-making responsibility down to the branch level in an effort to stimulate independence and an entrepreneurial spirit.

Another part of IBM's "reshaping" involves redirecting resources. IBM eliminated nearly 20 percent of its overhead jobs and switched nearly 30,000 positions to operations such as sales, systems engineering, and programming. At the end of 1989, IBM had increased the number of employees in software development to 35,000 and increased the number of worldwide sales and marketing employees to over 70,000. IBM restructured its marketing education program to better address customer needs and to sharpen the focus on industry specialization. Technical support was enhanced by redeploying engineers and product developers from IBM labs to branch offices worldwide to assist in analyzing and solving customer problems.

IBM anticipates that the information systems markets will become more software and service oriented and intends to increase its investments in these areas. Its five-year plan is to have a revenue split of approximately 60 to 40, emphasizing software over

©1990 Dataquest Incorporated

hardware. During 1989, IBM developed equity-based strategic alliances with over 30 software companies in order to provide improved software applications for its customers. The Company also consolidated several manufacturing plants and redirected the activities of some of its development laboratories to respond to increased demand for software and services.

Although IBM maintains its number-one ranking in most of the industries that Dataquest follows, its earnings continue to slow. IBM's total revenue for 1989 increased only 5.1 percent over 1988 levels to $62.7 billion,* despite increased sales. Net earnings for the year ended December 31, 1989, were $3.8 billion compared with $5.8 billion in 1988. Growth continued stronger in non-US sales, up 7.6 percent from 1988 levels to $37 billion. Sales in Europe remain strong, accounting for over 60 percent of IBM's non-US revenue in 1989.

A portion of IBM's earnings loss can be attributed to its ongoing restructuring of US business, which resulted in a $2.4 billion charge during the fourth quarter of 1989. IBM also increased operating lease activity, which contributed to lower earnings for 1989 but should result in increased rental revenue in the future. The Company expects its expense-cutting measures and restructuring to result in a $1 billion expense reduction in 1990.

IBM's computer product lines were the revenue leaders in 1989. The 3090 mainframe, AS/400 minicomputer, and PS/2 personal computer lines achieved double-digit revenue growth in 1989, according to IBM. In the business marketplace, the Company maintained its first-place ranking (based on revenue) according to Dataquest estimates. In the multiuser micro- and minicomputer markets, Dataquest ranked IBM third in 1989, behind Unisys and NEC. In the personal computer market, Dataquest estimates IBM's revenue market share to be 14 percent, remaining the world leader.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

*All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

The structure of IBM's seven LOBs are shown below:

- Personal Systems—Desktop systems, typewriters, displays, printers
- Application Business Systems—Midrange systems, storage devices
- Enterprise Systems—All system/370 products, high-volume printers, storage subsystems
- Technology Products—Worldwide development and US manufacturing of logic and memory technology and the electronic packaging used throughout the IBM product line
- Communication Systems—Communication products, information network services
- Programming Systems—Development of data management and application development software, development and implementation of SAA
- US Marketing and Services—Marketing, customer service, systems integration

Material overlaps and interdependencies exist among IBM's operating units, and, therefore, the information may not be indicative of the financial results or investments in the reported area if they were independent organizations.

IBM classifies its revenue-producing business into two main segments, Information Technology (IT) and Federal Systems. Federal Systems consists of specialized information technology products and services primarily for the United States defense, space, and other government agencies.

Over 90 percent of IBM's consolidated revenue comes from its Information Technology segment. The IT segment is made up of Processors, defined as user-programmable equipment having the capability of manipulating data arithmetically or logically and making calculations in a manner directly addressable by the user through the operation of a stored program. The second classification under IT is Workstations, which IBM defines as personal systems, typewriters, and other display-based terminals. The remaining categories in the IT segment are Peripherals, including printers, storage, and telecommunications devices; Software, both applications and systems software;

©1990 Dataquest Incorporated

Maintenance Services; and "Other," which consists mainly of customer solution services, financing revenue, and supplies.

The following lists Dataquest's industry segmentation of IBM's product lines:

- Microcomputer system for PC hardware and software
- Business computer systems, consisting of mainframe, midrange, supermini and minicomputers for business applications
- Technical computers, technical workstations, and supercomputers
- Telecommunications, consisting of communications controllers, networking and telecommunications products
- Display terminals, electronic printers, and computer storage are considered separately by Dataquest industry services

Microcomputer Systems

IBM remained the number-one seller of personal computers for 1989. Strong sales of its PS/2 products boosted IBM's revenue despite a sagging market. Dataquest estimates the Company's worldwide market share to be 11 percent on units shipped, 14 percent on revenue. In the US market, IBM regained its first-place title, taken over by Apple in 1988, with a 14 percent unit market share and 18 percent revenue market share. This gain is an increase over 1988 levels of 12.4 percent and 15.7 percent, respectively. It is significant because overall revenue for the PC market in the United States were lower for 1989 than the previous year.

In the European market, IBM retained its number-one ranking overall with a 1989 market share of 15.9 percent based on Dataquest's estimates. In the business applications market segment, IBM's market share dropped slightly to 19.7 percent in 1989, down from 20.6 percent in 1988. The Company is working to strengthen sales and distribution in Europe, evidenced by the introduction of IBM Systems Centers for PCs during the summer of 1989. These centers represent the highest-qualified IBM dealers throughout Europe. The Systems Centers will provide a greater level of technical knowledge and enhanced sales and service capabilities to better respond to the needs of IBM's European client base.

During 1989, IBM announced several new offerings to its PS/2 line, including the transportable model P70/386. During the fourth quarter of 1989, IBM was the first vendor to offer products based on Intel's i486 processor. In February 1990, IBM signed an agreement with NeXT Computer Inc. to provide the NeXTStep graphical user interface on PS/2 models. In May 1990, it introduced the PS/2 Model 80, an 80386-based file server, providing greater storage and output capacity in a desktop system. IBM also maintains its commitment to the Open Software Foundation (OSF) and plans to have an OSF/1-compliant product available for the PS/2 by 1991.

Business Computers

IBM remains the number-one manufacturer and supplier in the business computer marketplace. According to Dataquest's Business Computer Systems Industry Service newsletter 1990-8 entitled, "Business Computer Systems: The 1989 Market in Review": "What saved the day for the business computer market was the popularity of IBM's AS/400 . . . . The AS/400 last year accounted for the bulk of the business systems' revenue growth."

Mainframes

In the business mainframe segment, technological hitches within IBM contributed to the market's sluggish growth rate of 3.3 percent. Delayed deliveries of IBM's newly announced 3090S series processors and 3390 disk drives contributed to the slight erosion of IBM's worldwide mainframe factory revenue market share for 1989, an estimated 53.7 percent, down from 54.2 percent in 1988. Dataquest believes that sales in the mainframe segment of the market will continue to slow as users await the introduction of IBM's Summit product slated for 1991.

Superminicomputers

In 1989, the superminicomputer market experienced strong growth over 1988 levels due to the success of the AS/400 line. IBM's revenue market share in this market segment for 1989 is estimated to be 62 percent. Dataquest analysts believe that 1990 sales of the AS/400 product will slow as upgrade and replacement demand is filled. In February 1990, IBM announced three new models to fill out the low-end of the AS/400 line. These models, the C10, C20, and C30, provide increased memory and faster access times than previously available in the B10 and B20 AS/400 models.

©1990 Dataquest Incorporated

In March 1990, IBM announced three new versions to its 9370 product line, Models 10, 12, and 14. Based on an Intel 80386 microprocessor and IBM's Micro Channel Architecture, these models were developed to fill the need for an entry-level version of the 9370. These new models also provide a link between the PS/2 and 9370 product lines.

Mini- and Microcomputers

The minicomputer and microcomputer markets continued to be very competitive in 1989. Dataquest estimates IBM's revenue market share to be 14.4 percent for 1989, behind Unisys and NEC. PCs, superminis, and workstations continued to encroach upon the minicomputer market, contributing to an overall revenue market decline of 38 percent in 1989.

Technical Computing

Dataquest ranks IBM second in the worldwide supercomputing market, based on estimated sales of $299 million. Internal conflicts at Cray Research, and the departure of ETA, Evans and Sutherland, SCS, and other supercomputer vendors from the market, contributed to IBM's increased sales in 1989. Dataquest believes that the high-end IBM 3090/vf line has become a significant contender in the corporate supercomputing market. The success of IBM indicates that supercomputing is gaining acceptance in the industrial environment and that there is strong potential for future growth in the corporate supercomputing market.

An important event in the workstation market was IBM's introduction of the RISC System/6000 series in February 1990. The RS/6000 series consists of nine models with CPU performances ranging from 27.5 to 41.1 mips. Using IBM's proprietary RISC microprocessor and the AIX version of the UNIX operating system, this new product line has an impressive price/performance ratio and an improved number of software applications in comparison with the RT product. Although IBM entered the technical workstation market late in the game, Dataquest believes that there is enough growth potential for IBM to capture a sizable portion of the market.

CAD/CAM

IBM remains number one in the CAD/CAM/CAE market for 1989. Dataquest estimates IBM's revenue market share at 13.9 percent worldwide. The strongest growth in the PC CAD market in 1989 remained in high-end systems.

In November 1989, IBM and Lockheed announced that IBM would be purchasing CADAM, a subsidiary of Lockheed and a major supplier of CAD/CAM software to IBM. CADAM will be positioned as a wholly owned subsidiary reporting to IBM's Industrial Systems sector, in parallel with IBM's own CAD/CAM/CIM marketing group.

Another major announcement in 1989 was IBM's introduction of CIM Advantage, a comprehensive approach to computer-integrated manufacturing. The offering comprises over 50 hardware and software products that integrate design, engineering, production planning, and plant operations with business planning, marketing, and distribution.

Display Terminals

Dataquest estimates IBM's total worldwide market share to be approximately 27 percent for 1989. Overall growth in the display terminals market remained relatively flat for the year.

Display terminal product highlights for 1989 include IBM's introduction of the InfoWindow family of display terminals, the 3151 ASCII display stations, and two new 5250 twin-ax terminals—the 3476 and 3477. In May 1989, IBM announced nine new models of the 3174 Control unit, supporting its continued dedication to the 3270 product line. In conjunction with its announcement of the RS/6000 workstation in February 1990, IBM entered the X Window display market with its XStation 120.

Computer Storage Industry

One of the most significant announcements in the computer storage market in 1989 was IBM's introduction in November of the long-awaited 3390 Direct Access Storage Device (DASD). The 3390 is a 14-inch rigid disk drive system that provides up to 22.7-billion-byte capacity and 4.2MB-per-second transfer rate. IBM's 3390 is one of the fastest, largest-capacity mainframe disk storage devices currently available.

In October 1989, IBM's General Products Division announced the 3490 1/2-inch tape cartridge product. The 3490 provides cartridge capacity of 200MB and a transfer rate of 3MB per second. At the same time, IBM announced the 9348 model, an open-reel, front-loading drive that Dataquest believes will replace the older IBM 2440 model in the lineup of S/370 storage products.

©1990 Dataquest Incorporated

The 1/2-inch tape drive market experienced an overall decline in 1989; however, strong sales of 1/2-inch cartridge products kept IBM listed in the top three vendors with an estimated 7 percent revenue market share in 1989. Dataquest believes that the overall softening of this market is due to weakening sales of midrange computers and declining sales of 1/2-inch reel-to-reel drives, which are being replaced by 1/2-inch cartridge products.

In the PC storage markets, 1989 was a year of change for IBM. The Company moved from first place in the 3.5-inch disk drive market to third, behind Seagate and Conner. Dataquest estimates IBM's share of this market at 19 percent in 1989, based on production of over 2.2 million units and estimated revenue of $640 million. According to Dataquest, in the 5.25-inch disk drive market, IBM ranked fifth worldwide in 1989, with an estimated market share of 4.7 percent.

In April 1989, IBM began marketing a 320MB, 3.5-inch Winchester disk drive to OEM customers. Although the drive will be used in IBM systems, the move to market a leading-edge product to OEMs is highly significant because the company has not been a major player in the OEM channel.

Office System Industry

Although IBM's worldwide market share slipped from 43 percent in 1988 to 34 percent in 1989, it remained the leading proprietary integrated office systems (IOS) vendor in terms of licenses sold, according to Dataquest estimates. In the US market, IBM holds an estimated 36.5 percent share of proprietary IOS software license shipments for 1989. IBM had strong sales of its IOS products in Europe, garnering an estimated 31 percent share of the market in 1989. Increased sales of its AS/400 office package accounted for the majority of its revenue in the IOS market.

On May 16, 1989, IBM announced the components of its long-awaited Systems Application Architecture (SAA) compliant office system called OfficeVision. OfficeVision is supported on IBM's MVS, VM, OS/400, and OS/2 LAN. The LAN version uses OX/2 Extended Edition to provide its graphical user interface, multitasking capabilities, and program-to-program communications. Through OfficeVision, IBM will fulfill its SAA commitment to provide a consistent platform for the development of easy-to-use, well-connected systems and applications. New in 1990 is the February announcement of a Multimedia product for use with the PS/2 product line.

Printers

In the electronic printer market, 1989 was a year of significant activity for IBM, beginning with the introduction in January of the ProPrinter X24E and XL24E dot matrix printers as the successors to the X24 and XL24 models. In April, IBM introduced two new midrange page printers, the 3816 and 3825. The 3816 has a print resolution of 240 dpi and rated printing speed of 24 ppm for letter-size paper. The 3825 is a duplex laser printer rated at 58 ppm and designed for use with IBM's 30XX, 43XX, or 9370 processors. In November, IBM introduced its duplexing version of the 3816 page printer, the 3816-01D.

During the second half of 1989, IBM announced the 4019 laser printer, with a rated speed of 10 ppm. This was its first entry into the low-end page printer market. IBM followed with the introduction in March 1990 of the 4019 LaserPrinter E, a 5-ppm, entry-level version of the 4019 LaserPrinter, and availability of PostScript upgrades for both products.

Although line, impact printer shipments were lower in 1989 than during the previous year, IBM maintained its lead in the market. Dataquest estimates IBM's North American unit market share at approximately 32 percent for 1989. IBM also remained one of the top five vendors of serial and page printers in 1989.

Software

The emergence of the first of a series of products under IBM's Systems Application Architecture (SAA) occurred in 1989. The SAA strategy was designed to provide users with a common interface and connectivity across all IBM operating environments. This strategy is the cornerstone of IBM's product plans for the next decade. IBM will use SAA to integrate current product platforms with future products, unifying all software under a single architecture.

OfficeVision, introduced in May, is the first application to incorporate the SAA guidelines. Another SAA-based product announced in 1989 was CIM Advantage, a family of products for use in manufacturing operations. In November, IBM debuted the AD/Cycle product, a set of application development tools for use with the MVS systems environment that further supports the SAA framework. In addition, IBM's SAA standard has been endorsed by more than 100 other software companies that have committed to developing products using the SAA guidelines.

©1990 Dataquest Incorporated

IBM also strengthened its commitment to the Open Software Foundation (OSF) and the UNIX operating system marketplace. In March, IBM began shipments of the AIX operating system on PS/2 products. IBM has also stepped up AIX development through its IBM business partners program. The announcement of the RS/6000 in February 1990 should erase any lingering doubts about IBM's commitment to UNIX.

IBM increased investments in third-party software development, in continued support of its role as a leader in the software industry. As noted earlier, IBM made equity investments in over 30 software companies during 1989. The Company continues to invest heavily in software development. By the end of 1990, IBM expects to have expanded development by 59 percent over 1986 levels. Software sales accounted for $8.4 billion in revenue for IBM in 1989—roughly 13 percent of total revenue for the year.

Telecommunications

IBM entered into the PBX manufacturing market with the purchase of ROLM, which turned out to be a money-losing operation. It solved this problem by aligning with Siemens in a joint venture. During 1989, the Company completed the sale of Rolm manufacturing and development activities to Siemens AG. A newly formed company, jointly owned by IBM and Siemens, will market and service Siemens telephones, switching systems, and other telecommunications products in the United States. IBM will also remarket Siemens telephone products in Europe and Australia.

Semiconductors

In October 1989, IBM opened the Advanced Semiconductor Technology Center (ASTC) in East Fishkill, New York. This center will develop advanced chip technology for future IBM products. Motorola is participating in IBM's research on the use of X-ray lithography technology, which will be conducted at the ASTC facility. In March 1990, IBM entered into a joint agreement with Siemens to develop 64M DRAM technology. This research also will be carried out at the ASTC, utilizing X-ray lithography technology.

The year 1989 saw the launch of IBM's first products incorporating their proprietary RISC chips. IBM also began shipments of products utilizing its 4-million-bit memory chips. In addition, IBM has licensed its 4M DRAM technology to Micron Technology, Inc., to increase US-based supply of the semiconductor.

Because IBM is not a merchant supplier of semiconductors, the total extent of IBM's semiconductor manufacturing is unknown. Dataquest estimates that IBM supplies at least one-half of its own semiconductor needs and would rank among the top three manufacturers worldwide.

Further Information

For further information about the Company's business segments, please contact the appropriate industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$50,056.0	$51,250.0	$54,217.0	$59,681.0	$62,710.0
Percent Change	8.97	2.39	5.79	10.08	5.08
Capital Expenditure	$6,430.0	$4,620.0	$4,304.0	$5,390.0	$6,414.0
Percent of Revenue	12.85	9.01	7.94	9.03	10.23
R&D Expenditure	$4,723.0	$5,221.0	$5,434.0	$5,925.0	$6,827.0
Percent of Revenue	9.44	10.19	10.02	9.93	10.89
Number of Employees	405,535	403,508	389,348	387,112	383,220
Revenue ($K)/Employee	$123.43	$127.01	$139.25	$154.17	$163.64
Net Income	$6,555.0	$4,789.0	$5,258.0	$5,806.0	$3,758.0
Percent Change	(0.41)	(26.94)	9.79	10.42	(35.27)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$12,730.0	$15,213.0	$14,305.0	$20,462.0
Quarterly Profit	$950.0	$1,340.0	$877.0	$591.0

Source: IBM Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	56.96	49.49	45.99	42.43	43.11
International	43.04	50.51	54.01	57.57	56.89

Source: IBM Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988*	1989*
Direct Sales	70.00	70.00
Indirect Sales	30.00	30.00
VARs	10.00	10.00
Dealers	20.00	20.00

*Dataquest estimate

Source: Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS

North America—280
Japan—Not available
Europe—Not available
Asia/Pacific—Not available
ROW—Not available

MANUFACTURING LOCATIONS

North America

Boca Raton, Florida
PS/2 workstations, displays, printers, typewriters, publishing and consumer systems, and related operating systems software

Boulder, Colorado
PS/2 workstations, displays, printers, typewriters, publishing and consumer systems, and related operating systems software

Charlotte, North Carolina
Personal System/2 workstations, displays, printers, typewriters, publishing and consumer systems, and related operating systems software

Danbury, Connecticut
Circuit packaging, intermediate processors, and printers; develops programming systems

Essex Junction, Vermont
Major manufacturing facility; direct products not available

Hopewell Junction, New York
PS/2 workstations, displays, printers, typewriters, publishing and consumer systems, and related operating systems software

Lexington, Kentucky
Major manufacturing facility; direct products not available

Raleigh, North Carolina
Communications products and related operating systems software

San Jose, California
Electronic data processing systems, storage systems, mass storage systems, tape disk drive products

Somers, New York
Communications products and related operating systems software

White Plains, New York
Small and intermediate systems, general-purpose systems and related programming, direct access storage devices, typewriter printer copiers and associated supplies, logic memory, special semiconductor devices, and multilayer ceramics

Europe

Greenlock, Scotland
Personal computers

SUBSIDIARIES

North America

Canada Limited (Canada)
IBM Americas/Far East Systems Corp. (United States)
IBM Credit Corp. (United States)
IBM Credit Leasing Corp. (United States)
IBM Foreign Sales Corp. Ltd. (United States)
IBM International Corp. (United States)
IBM Roece Inc. (United States)
IBM Southeast Asia Services Ltd. (United States)
IBM World Trade Corp. (United States)
IBM World Trade Europe/Middle East/Africa Corp. (United States)
Satellite Transponder Leasing Corp. (United States)
WTC Insurance Corp. Ltd. (United States)

Japan

IBM Japan Ltd.
IBM World Trade Asia Corp.

Europe

Compagnie IBM France, S.A. (France)
Companhia IBM Portugeuesa, S.A. (Portugal)
IBM Danmark A/S (Denmark)
IBM Deutschland GmbH (Netherlands)
IBM Distribution and Support, S.A. (Spain)
IBM Eurocoordination, S.A. (Spain)
IBM Europe, S.A. (Spain)
IBM Hellas Information Handling Systems S.A. (Spain)

©1990 Dataquest Incorporated

IBM Ireland Ltd. (Ireland)
IBM Italia Ltd. S.p.A. (Italy)
IBM Latin American Region, S.A. (Spain)
IBM Nederland, N.V. (Netherlands)
IBM Oesterreich, Internationale Bueromaschinen Gessellschaft MbH (West Germany)
IBM of Belgium S.A. (Belgium)
IBM S.A.E. (Spain)
IBM Svenska Aktiebolag (Sweden)
IBM Switzerland (Switzerland)
IBM Trade Development, S.A. (Spain)
IBM United Kingdom Holdings Ltd. (United Kingdom)
Oy IBM AB (Finland)

Asia/Pacific

IBM Australia Ltd. (Australia)
IBM China/Hong Kong Corp. (Hong Kong)
IBM Korea, Inc. (Korea)
IBM Korea Systems Corp. (Korea)
IBM New Zealand, Ltd. (New Zealand)
IBM Philippines, Inc. (Philippines)
IBM Singapore Pte. Ltd. (Singapore)
IBM Taiwan Corp. (Taiwan)
IBM Thailand Co. Ltd. (Thailand)
Thai Systems Corp. Ltd. (Thailand)

ROW

IBM Argentina, S.A. (Argentina)
IBM Bahamas Ltd. (Bahamas)
IBM Brasil-Industria, Maquinas E Servicos Ltda. (Brazil)
IBM De Bolivia, S.A. (Bolivia)
IBM De Chile S.A.C. (Chile)
IBM De Colombia, S.A. (Colombia)
IBM De Costa Rica, S.A. (Costa Rica)
IBM De Guatemala, S.A. (Guatemala)
IBM De Honduras, S.A. (Honduras)
IBM Del Ecuador, C.A. (Ecuador)
IBM Del Peru, S.A. (Peru)
IBM Del Uruguay, S.A. (Uruguay)
IBM De Mexico, S.A. (Mexico)
IBM De Panama, S.A. (Panama)
IBM De Venezuela, S.A. (Venezuela)
IBM Israel Ltd. (Israel)
IBM Turk Ltd. Sirketi (Turkey)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Toshiba
Joint venture to produce lightweight computer screens

NCR
MCA licensing agreement

Wang Laboratories
MCA licensing agreement

Haushahn GmbH
Developing automated tape drive library

Samsung
Patent cross-licensing agreement

Baxter International
Codeveloping computer products and services for the rapidly growing health-care information management market

Motorola
Joint development of a national X-ray lithography program

Micron Technology
Licensed Micron's 4Mb DRAM technology

Microsoft
Codeveloping an open industry standard for multimedia personal computing systems

Chips and Technologies
Codeveloping and marketing chip sets that are used in busmasters and other Micro Channel adapter cards

Intel
Codeveloping and marketing Micro Channel chip sets

Modicon
Development and marketing alliance in which Modicon will support mutual development of products that move Modicon controller and communication products and IBM industrial computer products

1988

Siemens AG
Joined forces to compete in the global PBX and private networking markets (As a part of this agreement, IBM sold its ROLM subsidiary to Siemens.)

©1990 Dataquest Incorporated

KEY OFFICERS

John F. Akers
Chairman of the board, chief executive officer

Jack D. Kuehler
President

C. Michael Armstrong
Chairman of the board and president, WTC

George H. Conrades
Senior vice president

Carl J. Conti
Senior vice president and general manager, ES

Terry R. Lautenbach
Senior vice president and general manager, IBM US

David E. McKinney
Chairman, CEO, and president, E/MEA

Frank A. Metz, Jr.
Senior vice president, Corporate Finance and Planning

Patrick A. Toole
Senior vice president

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$26,070.0	$27,749.0	$31,020.0	$35,343.0	$35,875.0
Cash	896.0	755.0	770.0	1,072.0	741.0
Receivables	10,566.0	10,825.0	13,849.0	18,100.0	20,164.0
Marketable Securities	4,726.0	6,502.0	6,197.0	5,051.0	1,261.0
Inventory	8,579.0	8,039.0	8,645.0	9,565.0	9,463.0
Other Current Assets	1,303.0	1,628.0	1,559.0	1,555.0	4,246.0
Net Property, Plants	$19,680.0	$21,268.0	$22,922.0	$23,426.0	$24,943.0
Other Assets	$6,884.0	$8,797.0	$9,746.0	$14,268.0	$16,916.0
Total Assets	$52,634.0	$57,814.0	$63,688.0	$73,037.0	$77,734.0
Total Current Liabilities	$11,433.0	$12,743.0	$13,377.0	$17,387.0	$21,700.0
Long-Term Debt	$3,955.0	$4,169.0	$3,858.0	$8,518.0	$10,825.0
Other Liabilities	$5,256.0	$6,528.0	$8,190.0	$7,623.0	$6,700.0
Total Liabilities	$20,644.0	$23,440.0	$25,425.0	$33,528.0	$39,225.0
Total Shareholders' Equity	$31,990.0	$34,374.0	$38,263.0	$39,509.0	$38,509.0
Converted Preferred Stock	0	0	0	0	0
Capital Stock	6,267.0	6,321.0	6,417.0	6,442.0	6,341.0
Other Equity	(1,511.0)	219.0	2,830.0	1,917.0	1,691.0
Retained Earnings	27,234.0	27,834.0	29,016.0	31,150.0	30,477.0
Total Liabilities and Shareholders' Equity	$52,634.0	$57,814.0	$63,688.0	$73,037.0	$77,734.0

Income Statement	1985	1986	1987	1988	1989
Revenue	$50,056.0	$51,250.0	$54,217.0	$59,681.0	$62,710.0
US Revenue	28,511.0	25,362.0	24,937.0	25,320.0	31,480
Non-US Revenue	21,545.0	25,888.0	29,280.0	34,361.0	31,230
Cost of Sales	$14,911.0	$16,197.0	$17,332.0	$25,648.0	$27,701.0
R&D Expense	$4,723.0	$5,221.0	$5,434.0	$5,925.0	$6,827.0
SG&A Expense	$13,000.0	$15,464.0	$16,431.0	$19,362.0	$21,289.0
Capital Expense	$6,430.0	$4,620.0	$4,304.0	$5,390.0	$6,414.0
Pretax Income	$11,619.0	$8,389.0	$8,609.0	$8,746.0	$6,893.0
Pretax Margin (%)	23.21	16.37	15.88	14.65	10.99
Effective Tax Rate (%)	43.60	42.90	38.90	39.20	43.4
Net Income	$6,555.0	$4,789.0	$5,258.0	$5,806.0	$3,758.0
Shares Outstanding, Millions	614.0	612.8	602.9	592.4	581.1
Per Share Data					
Earnings	$10.67	$7.81	$8.72	$9.27	$6.47
Dividend	$4.40	$4.40	$4.40	$4.40	$4.73
Book Value	$52.10	$56.09	$63.46	$66.69	$66.27

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	2.28	2.18	2.32	2.03	1.65
Quick (Times)	1.53	1.55	1.67	1.48	1.22
Fixed Assets/Equity (%)	61.52	61.87	59.91	59.29	64.77
Current Liabilities/Equity (%)	35.74	37.07	34.96	44.01	56.35
Total Liabilities/Equity (%)	64.53	68.19	66.45	84.86	101.86
Profitability (%)					
Return on Assets	13.74	8.67	8.66	8.49	4.99
Return on Equity	22.42	14.43	14.48	14.93	9.63
Profit Margin	13.10	9.34	9.70	9.73	5.99
Other Key Ratios					
R&D Spending % of Revenue	9.44	10.19	10.02	9.93	10.89
Capital Spending % of Revenue	12.85	9.01	7.94	9.03	10.23
Employees	405,535	403,508	389,348	387,112	383,220
Revenue ($K)/Employee	$123.43	$127.01	$139.25	$154.17	$163.64
Capital Spending % of Assets	12.22	7.99	6.76	7.38	32.09

Source: IBM
Annual Reports
Dataquest (1990)

©1990 Dataquest Incorporated

The MacNeal-Schwendler Corporation

815 Colorado Boulevard
Los Angeles, California 90041
Telephone: (213) 258-9111
Fax: (213) 259-3838
Dun's Number: 00-965-3148

Date Founded: 1963

CORPORATE STRATEGIC DIRECTION

The MacNeal-Schwendler Corporation (MSC) designs, produces, and markets applications software for use in computer-aided engineering (CAE). MacNeal-Schwendler's primary software product is the MSC/NASTRAN, which can be used with a wide variety of computers, ranging from large to minicomputers and microcomputers. MacNeal-Schwendler also develops and markets educational tools designed to train users of MSC/NASTRAN.

Total revenue increased 12.9 percent to $45.0 million* in fiscal year 1990, up from $39.9 million in fiscal 1989. MacNeal-Schwendler attributed the growth to increased use of MSC/NASTRAN and revenue generated from the Engineering/Electromagnetics Applications Department. Net income totaled $9.8 million in fiscal year 1990, representing an increase of 11.1 percent over fiscal 1989. MacNeal-Schwendler employed 306 people during fiscal 1990.

MacNeal-Schwendler sells its products primarily through its own direct sales force. The Company targets its products at major industrial concerns, data center networks, government agencies, and universities. The majority of sales are made domestically; however, international sales have risen slowly from 11.2 percent of total revenue in fiscal year 1986 to 19.9 percent in fiscal 1988, 19.1 percent in fiscal 1989, and 21.8 percent in fiscal 1990. International sales are generated principally from the European market.

Currently, MacNeal-Schwendler is positioning itself to meet the needs of the European Community (EC) in 1992. During 1989, MacNeal-Schwendler established offices in Hamburg and Rome and increased its staffs in Munich and London. It also added a distributor for the Benelux countries and further solidified its distributor relationships in Scandinavia, Israel, France, and Spain.

MacNeal-Schwendler also has been strengthening itself in the Far East through making staff additions to its Tokyo office and establishing an office in Kyoto. The Company opened a Hong Kong office to serve the Taiwanese, South Korean, and Indonesian markets, as well as to help prepare for the anticipated business growth in the People's Republic of China.

During fiscal years 1990, 1989, and 1988, R&D expenditure equaled $8.6 million, $7.0 million, and $5.4 million, respectively. These figures respectively amounted to 19.1, 17.6, and 15.6 percent of total revenue. R&D activities primarily are directed toward enhancing MSC/NASTRAN software or converting it for use on additional computers. Maintenance of MSC/NASTRAN includes systems integration, quality assurance testing, error correction, and modifications to accommodate changes to computer system software.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this backgrounder.

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

BUSINESS SEGMENT STRATEGIC DIRECTION

Software

MSC/NASTRAN

MSC/NASTRAN is a computer software program consisting of over 600,000 source statements. Approximately 98 percent is written in FORTRAN and 2 percent in assembly language. MSC/NASTRAN offers a wide variety of analysis types including statics, buckling, heat transfer, cyclic symmetry, normal modes, transient response, frequency response, response spectrum, random response, and nonlinear statics and dynamics. Advanced analysis features consist of component mode synthesis, design sensitivity, and design optimization. The MSC/NASTRAN program is operational on more than 45 operating system/hardware platform combinations, including those manufactured by Data General, Digital Equipment Corporation (DEC), Hewlett-Packard (HP), IBM, Sun Microsystems, and Unisys. NASTRAN, a computer program owned by the US government and leased to the public, is the predecessor of MSC/NASTRAN. MacNeal-Schwendler acquired the perpetual right to commercial use of those elements of NASTRAN embodied in MSC/NASTRAN.

MSC/NASTRAN is based upon the finite element method (FEM) of analysis. Using FEM, complex structures are divided into small elements that form a finite element model, which then is subjected to computerized analysis. MSC/NASTRAN analyzes structures in order to determine their strength, safety, and performance characteristics. It can be used to improve the design of aircraft, jet, rocket, and other engines, automobiles, trucks, tires, ships, farm equipment, heavy industrial equipment, nuclear containment vessels, helicopters, spacecraft, and various other products and structures. MSC/NASTRAN can also conduct analyses of vibration characteristics, dynamic responses, transient heat transfer, elastic stability, and aeroelastic responses, including flutter. The sequence of calculations required for each analysis is prearranged. The user need provide only a physical description of the problem and the desired output.

New features can be added and obsolete features replaced without disrupting the other modules of the system since MSC/NASTRAN has a modular design. Thus, major changes in computer hardware can be accommodated systematically. For example, the program has been adapted to minicomputers and microcomputers, and the number of computer program source statements has increased from 180,000 to over 600,000, as mentioned above.

In January 1989, MacNeal-Schwendler unveiled version 66 of MSC/NASTRAN, which introduced more than 40 new features, the largest increment of enhancements in the program's history. Version 66's New Executive system offers advanced techniques for managing analysis data and executing program functions. The system utilizes parallel processing and expanded random access memory. An Automatic Restart capability has been added to provide a mechanism for restarting MSC/NASTRAN analyses using different design criteria.

MSC/EMAS

MSC/EMAS is a general-purpose 2-D and 3-D electromagnetic analysis system for electrical engineers that require capabilities for comprehensive analysis. MSC/EMAS solves electronic and magnetic field problems involving linear, nonlinear, and anisotropic materials. With MSC/EMAS, users can analyze the entire range of electromagnetic behavior, from electrostatics and nonlinear magnetostatics to eddy currents and wave propagation. Varied applications can be simulated under one program. MSC/EMAS is built around the MSC/NASTRAN analytical engine. It replicates the processing efficiencies of MSC/NASTRAN while incorporating a formulation of Maxwell's equations for use in electromagnetic applications. MSC/EMAS is available on a wide range of computer platforms ranging from engineering workstations to supercomputers.

MSC/XL

Introduced in February 1989, MSC/XL, which is closely integrated with MSC's analysis products, is an interactive pre- and postprocessor that enables users to build and refine models and display analysis results in a variety of formats. Through MSC/XL, engineers can construct three-dimensional finite element models, simulate their physical characteristics, and analyze them using MSC/NASTRAN without ever leaving the program. Once the MSC/NASTRAN analysis is completed, MSC/XL can graphically display or postprocess the results in a variety of formats. MSC/XL includes menus and commands, a mouse interface, a built-in calculator, and many other features.

©1990 Dataquest Incorporated

MSC/NASTRAN-WS

In October 1989, MacNeal-Schwendler released MSC/NASTRAN-WS, an integrated analytical system designed for engineering workstations. MSC/NASTRAN-WS connects MSC/XL with a subset of MSC/NASTRAN, supplying stress and vibration analysis and graphics. MSC/NASTRAN-WS runs on 386 PCs (Compaq, IBM, PS/2, and compatibles) and Sun 4 (and SPARCstation) workstations.

MSC/DYNA

MSC/DYNA is designed for the simulation and analysis of transient nonlinear structural response. It provides analytical capabilities including geometric and material nonlinear behavior of metals, plastics, composites, and concrete with single and multiple contact surfaces. These features allow engineers to analyze the effect of material breakage and the interaction of individual components as they contact each other. MSC/DYNA is used for vehicle crash analysis, plant component safety analysis, aircraft and helicopter crashworthiness, the seismic response of structures, the performance of munitions and armor, metal forming, and the safety tolerances of nuclear and chemical plant components.

MSC/PISCES

MSC/PISCES is a coupled finite element-finite difference program that analyzes high-speed impact and fluid-structure interactions. The program is suitable for processes such as the ingestion of objects by jet engines, hypervelocity particle impacts on spacecraft, the deployment of airbags in vehicle crashes, accident containment in petrochemical and nuclear facilities, and ballistic armament penetration. MSC/PISCES is based on original research in numerical simulation of high-speed, coupled elastoplastic and hydrodynamic phenomena conducted at several high-energy physics laboratories.

MSC/PROBE

MSC/PROBE offers capabilities in component analysis utilizing the p-version of the finite element method. Hierarchic basis functions, up to polynomial degree 8, enable MSC/PROBE to deliver feedback on the quality of each finite element analysis (FEA) result. MSC/PROBE is fully functional on a wide range of computers from engineering workstations to supercomputers.

PC Products for Engineering Analysis

MSC/pal 2

MSC/pal 2 is an FEA package for the Apple Macintosh and IBM PC. It can analyze 2-D and 3-D models with as many as 2,000 grid points (12,000 degrees of freedom). MSC/pal 2 offers statics, normal modes, transient response, frequency response, and thermal stress analysis. The element library includes beams, plates and membranes, solids, axisymmetric elements, and scalar springs, masses, and dampers. Color graphics output consists of deformed shapes, hidden lines, shrunken elements, and shaded stress contours.

MSC/mod

MSC/mod is a graphics modeling program for use on the IBM PC that enables engineers to create and edit models that can be analyzed on either PCs or mainframes. MSC/mod files can be used directly by MSC/pal 2, MSC/cal, and MSC/NASTRAN. It includes a CAD translator that accepts drawing files from most popular PC computer-aided design (CAD) packages. Features for creating and editing geometric models include 2-D and 3-D meshing, node replication, node mesh smoothing, and merging. MSC/mod also allows users to enter loads, material and element properties, and constraints. It displays hidden elements, shrunken elements, element orientation, and load and constraint directions.

MSC/cal

MSC/cal is a heat transfer program for IBM PCs that performs linear and nonlinear steady-state and transient analyses using the finite element method. The element library includes bars, perfect conductors, and planar, plate, solid, and axisymmetic quadrilateral and triangular elements. MSC/cal models with up to 2,000 nodes can be analyzed and can transmit files directly to MSC/pal 2.

Educational Tools

MacNeal-Schwendler markets several educational tools designed to teach the entry-level user how to use MSC/NASTRAN in structural analysis. PRENASHTRAN is an introductory interactive computer program designed for training as a refresher course in the use of MSC/NASTRAN.

©1990 Dataquest Incorporated

PRENASHTRAN is available for Apollo Domain, IBM, and VAX computers. MacNeal-Schwendler also markets an interactive computer program, a video cassette lecture series, and numerous instruction manuals. The Company provides training seminars worldwide in the use of MSC/NASTRAN for a variety of engineering applications.

Further Information

For more information about The MacNeal-Schwendler Corporation's business segments, please contact Dataquest's CAD/CAM/CAE Industry Service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Thousands of US Dollars)

	1986	1987	1988	1989	1990
Five-Year Revenue	$21,101.0	$27,078.0	$34,530.0	$39,873.0	$45,016.0
Percent Change	-	28.33	27.52	15.47	12.90
Capital Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
R&D Expenditure	$3,032.0	$3,979.0	$5,390.0	$7,006.0	$8,588.0
Percent of Revenue	14.37	14.69	15.61	17.57	19.08
Number of Employees	NA	NA	NA	245	306
Revenue ($K)/Employee	NA	NA	NA	$162.75	$147.11
Net Income	$2,530.0	$7,005.0	$9,069.0	$8,854.0	$9,832.0
Percent Change	-	176.88	29.46	(2.37)	11.05

1990 Calendar Year*	Q1	Q2	Q3	Q4
Quarterly Revenue	$10,690.00	$11,259.00	$11,116.00	$11,951.00
Quarterly Profit	$2,284.00	$2,579.00	$2,283.00	$2,686.00

*Based upon fiscal year
NA = Not available

Source: The MacNeal-Schwendler Corporation Annual Reports and Forms 10-K Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	88.80	85.36	80.08	80.92	78.21
International	11.20	14.64	19.92	19.08	21.79
Europe	11.20	14.64	19.92	19.08	21.79

Source: The MacNeal-Schwendler Corporation Annual Reports and Forms 10-K Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1989	1990
Direct Sales	100.00	100.00
Indirect Sales	0	0

Source: Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS

North America—13
Europe—7
Asia/Pacific—6
  Japan—2
ROW—2

MANUFACTURING LOCATIONS

North America

Los Angeles, California
  All products

SUBSIDIARIES

North America

Noetic Technologies (United States)

Europe

MacNeal-Schwendler GmbH (Germany)
PISCES International B.V. (Netherlands)

Asia/Pacific

MSC Japan Ltd. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Stardent Computer Corporation
MacNeal-Schwendler and Stardent completed joint marketing agreements that call for the conversion and joint marketing of MSC/NASTRAN on the Stellar GS Series and Ardent Titan Series computers.

Matra Datavision
MacNeal-Schwendler and Matra Datavision signed an agreement for MacNeal-Schwendler to provide Matra Datavision with an FEA module to be integrated into Matra Division's Euclid-IS CAD/CAM product. Distributed under the name QuickSolver, this module will be marketed in conjunction with Matra Datavision's Euclid-IS.

Digital Equipment Corporation (DEC)
MacNeal-Schwendler and DEC formed a joint research study exploring the feasibility and performance characteristics of converting its MSC/NASTRAN finite element analysis program to Digital's VAX line of computers supporting vector processing.

Apollo Computer Inc.
MacNeal-Schwendler and Apollo Computer signed a joint marketing agreement to make MSC/NASTRAN finite element analysis software available on Apollo's Series 1000 Personal Supercomputer.

1988

Silicon Graphics Computer Systems
MacNeal-Schwendler and Silicon Graphics signed a joint marketing agreement to sell MSC/NASTRAN on Silicon Graphics' IRIS 4D Series of graphics workstations.

Alliant Computer Systems Corporation
MacNeal-Schwendler and Alliant Computer Systems introduced a parallel version of the MSC/NASTRAN finite element analysis program for Alliant's FX/Series minisupercomputers.

1987

Sun Microsystems, Inc.
MacNeal-Schwendler and Sun Microsystems signed an agreement to convert the MSC/NASTRAN finite element software package to run on Sun-4 technical workstations.

CADAM, Inc.
MacNeal-Schwendler and CADAM announced the availability of an interface linking the CADAM systems to MacNeal-Schwendler's MSC/NASTRAN engineering analysis software.

Alliant Computer Systems Corporation
MacNeal-Schwendler and Alliant Computer Systems will develop a new version of MSC/NASTRAN software for Alliant's FX/Series computers. Under the terms of the agreement, MacNeal-Schwendler will convert its MSC/NASTRAN finite element analysis software for use on Alliant's high-performance parallel processing minisupercomputers.

©1990 Dataquest Incorporated

MERGERS AND ACQUISITIONS

1989

Noetic Technologies
MacNeal-Schwendler acquired Noetic Technologies, which is located in St. Louis, Missouri. Noetic's primary product is PROBE, a computer program used by engineers to perform detailed stress analysis of manufactured parts.

PISCES International B.V.
MacNeal-Schwendler acquired PISCES International of Gouda, the Netherlands, and the related PISCES software product, from Physics International, Inc., of San Leandro, California. PISCES International develops the PISCES software and provides related engineering consulting services in the analysis of high-speed elastoplastic and hydrodynamic phenomena.

KEY OFFICERS

Dr. Richard H. MacNeal
Chairman

Dr. Joseph F. Gloudeman
Chief executive officer and president

Alan R. Curtis
Chief technical officer

Dr. Dennis A. Nagy
Chief marketing officer

Donald M. McLean
Director, Programs Management

PRINCIPAL INVESTORS

Dr. Richard H. MacNeal—9.6 percent
Dr. Joseph F. Gloudeman—3.6 percent

FOUNDERS

Information is not available.

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending January
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1986	1987	1988	1989	1990
Total Current Assets	$18,609.0	$23,776.0	$28,697.0	$30,174.0	$27,826.0
Cash	1,926.0	1,596.0	2,234.0	3,833.0	2,174.0
Receivables	5,271.0	6,894.0	8,565.0	10,129.0	13,482.0
Marketable Securities	10,770.0	14,341.0	16,602.0	14,561.0	9,202.0
Inventory	NA	NA	NA	NA	NA
Other Current Assets	642.0	945.0	1,296.0	1,651.0	2,968.0
Net Property, Plants	$3,611.0	$4,317.0	$5,968.0	$8,311.0	$10,319.0
Other Assets	$1,978.0	$4,234.0	$8,260.0	$11,970.0	$21,482.0
Total Assets	$24,198.0	$32,327.0	$42,925.0	$50,455.0	$59,627.0
Total Current Liabilities	$2,864.0	$4,002.0	$6,540.0	$8,837.0	$10,682.0
Long-Term Debt	$33.0	$1,108.0	$1,937.0	$3,457.0	$5,724.0
Other Liabilities	NA	NA	NA	NA	NA
Total Liabilities	$2,897.0	$5,110.0	$8,477.0	$12,294.0	$16,406.0
Total Shareholders' Equity	$21,301.0	$27,217.0	$34,448.0	$38,161.0	$43,221.0
Common Stock	11,684.0	11,686.0	12,122.0	10,505.0	9,740.0
Other Equity	(100.0)	27.0	196.0	82.0	(77.0)
Retained Earnings	9,717.0	15,504.0	22,130.0	27,574.0	33,558.0
Total Liabilities and Shareholders' Equity	$24,198.0	$32,327.0	$42,925.0	$50,455.0	$59,627.0

Income Statement	1986	1987	1988	1989	1990
Revenue	$21,101.0	$27,078.0	$34,530.0	$39,873.0	$45,016.0
US Revenue	18,738.0	23,113.0	27,653.0	32,265.0	35,208.0
Non-US Revenue	2,363.0	3,965.0	6,877.0	7,608.0	9,808.0
Cost of Sales	$4,361.0	$5,454.0	$7,055.0	$8,235.0	$92,020.0
R&D Expense	$3,032.0	$3,979.0	$5,390.0	$7,006.0	$8,588.0
SG&A Expense	$5,864.0	$7,976.0	$10,732.0	$15,039.0	$17,862.0
Capital Expense	NA	NA	NA	NA	NA
Pretax Income	$8,388.0	$12,692.0	$15,115.0	$13,576.0	$14,897.0
Pretax Margin (%)	39.75	46.87	43.77	34.05	33.09
Effective Tax Rate (%)	46.00	46.00	39.00	34.00	34.00
Net Income	$2,530.0	$7,005.0	$9,069.0	$8,854.0	$9,832.0
Shares Outstanding, Thousands	12,181.0	12,181.0	12,222.0	12,024.0	11,993.0
Per Share Data					
Earnings	$0.21	$0.58	$0.74	$0.73	$0.82
Dividend	NA	NA	NA	NA	NA
Book Value	$1.75	$2.23	$2.82	$3.17	$3.60

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending January
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1986	1987	1988	1989	1990
Liquidity					
Current (Times)	6.50	5.94	4.39	3.41	2.60
Quick (Times)	6.50	5.94	4.39	3.41	2.60
Fixed Assets/Equity (%)	16.95	15.86	17.32	21.78	23.87
Current Liabilities/Equity (%)	13.45	14.70	18.99	23.16	24.71
Total Liabilities/Equity (%)	13.60	18.78	24.61	32.22	37.96
Profitability (%)					
Return on Assets	-	24.79	24.10	18.96	17.86
Return on Equity	-	28.88	29.41	24.39	24.16
Profit Margin	11.99	25.87	26.26	22.21	21.84
Other Key Ratios					
R&D Spending % of Revenue	14.37	14.69	15.61	17.57	19.08
Capital Spending % of Revenue	NA	NA	NA	NA	NA
Employees	NA	NA	NA	245	306
Revenue ($K)/Employee	NA	NA	NA	$162.75	$147.11
Capital Spending % of Assets	NA	NA	NA	NA	NA

NA = Not available

Source: The MacNeal-Schwendler Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

McDonnell Douglas Corporation

P.O. Box 516
Saint Louis, Missouri 63166
Telephone: (314) 232-0232
Fax: (314) 232-0790
Dun's Number: 00-626-5946

Date Founded: 1939

CORPORATE STRATEGIC DIRECTION

McDonnell Douglas Corporation and its divisions and subsidiaries (collectively referred to as MDC) operate principally in five industry segments: combat aircraft, transport aircraft, space systems and missiles, financial services, and information systems. Operations in the first three industry segments are conducted primarily by five principal operating divisions and one principal subsidiary corporation engaged in design, development, and production of the following major products:

- McDonnell Douglas Helicopter Company provides military and commercial transport aircraft and training systems.
- McDonnell Aircraft Company provides commercial and military helicopters and ordnance.
- McDonnell Douglas Missile Systems Company provides missiles.
- McDonnell Douglas Space Systems Company provides space launch vehicles and space station systems and integration.
- McDonnell Douglas Electronic Systems Company provides defense electronics, sensors, and command, control, communications, and intelligence (C3I) systems.

Through its McDonnell Douglas Finance Corporation subsidiary, McDonnell Douglas engages in financing a variety of commercial and industrial equipment and aircraft through lease and note agreements. In the information segment, the McDonnell Douglas Systems Integration Company provides information products and services to targeted industry segments, focusing on systems integration. In 1989, McDonnell Douglas restructured its Systems Integration Company, formerly known as McDonnell Douglas Information Systems, to have a sharper focus on systems integration by selling its computer, communications, and field service units. This included the selling of TYMNET, Public Network Business, E-Mail Service, and electronic data interchange service to British Telecom.

In late 1989, McDonnell Douglas streamlined its organizational structure, cutting the managerial levels between the floor manager and the Company's chief executive officer to 4 or 5 from 11. Furthermore, the Company was restructured along product lines as opposed to functional lines. According to McDonnell Douglas' CEO, John F. McDonnell, the restructuring is designed to implement the Company's commitment to total quality management, which is the speeding and facilitating of communication, decision making, and teamwork with the primary purpose of achieving first-time quality goals.

As of late 1989, MDC was a major Strategic Defense Initiative (SDI) contractor. The Company has contracts valued at close to $1 billion* related to SDI (aka Star Wars) work including a $480 million contract to launch three satellite platforms beginning in 1991. The project is designed to test the neutral particle beam weapon from the platforms in space. The project, known as Integrated Space Experiments, is said to be the largest test project contracted under the program.

In 1989, McDonnell Douglas sold off its Health Services Systems to American Express for $100 million and its Vitek Systems to ABG-Stella Acquisitions for $110 million.

McDonnell Douglas' total revenue decreased 3.2 percent to $14.6 billion in fiscal 1989. Net income decreased 37.4 percent to $219.0 million in fiscal 1989 from $350.0 million in fiscal 1988. McDonnell Douglas employs nearly 128,000 people worldwide.

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

R&D expenditure totaled $617 million in fiscal 1989, representing 4.2 percent of revenue. This is an increase of 1.2 percent over the previous year's figure of $610 million, representing roughly 4.0 percent of total revenue.

Capital expenditure totaled $582 million in fiscal 1989, representing 4.0 percent of total revenue. This is a decrease of nearly 12.3 percent from the fiscal 1988 figure of $654 million, which represented 4.3 percent of revenue.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Combat Aircraft

Through its McDonnell Aircraft Company division, MDC currently is producing the F-15 Eagle, the F/A-18 Hornet, the AV-8B Harrier II, and military training systems.

The F-15 Eagle is a supersonic, tactical fighter, which is currently operated by Israel, Japan, Saudi Arabia, and the US Air Force.

The F/A-18 Hornet is currently produced as a multimission strike fighter primarily for the US Navy and Marine Corps. MDC is the prime contractor for the F/A-18 and Northrop Corporation is the principal subcontractor.

The AV-8B Harrier II vertical/short takeoff and landing (V/STOL) attack aircraft began US Marine service in 1984. The B model aircraft has higher performance capabilities than the AV-8A Harrier, which is also in service with the marine corps. Great Britain and the US government have agreed to the joint development and production of the AV-8B V/STOL aircraft. MDC is the prime contractor, with British Aerospace as principal subcontractor.

The AH-64A Apache advanced attack helicopter for the US Army is the largest single program of the McDonnell Douglas Helicopter Company. This two-place, twin-turbine powered helicopter is equipped with laser, infrared, and other advanced technology subsystems to detect and track enemy armored vehicles under all battle conditions, including night and adverse weather.

Currently, MDC is seeking a contract for the production of 4100 LHX light helicopters that would be produced in the next 15 years. MDC is a participant in one of two teams seeking a full-scale production contract that will be awarded in 1991.

McDonnell Douglas Helicopter Company also produces Model 500 series single-turbine light helicopters for commercial and military use. The 500E and 530F commercial models have various configurations and are sold for private/executive transport, civil government use, remote operations (geological, timber, fishery), and general utility. The 500MG military versions are sold to the free world governments for light attack and antiarmor applications with various armament options, including the MDHC 7.6mm CHAIN GUN and the TOW antiattack missile.

McDonnell Douglas Helicopter Company has announced the availability of two new helicopters employing no-tail-rotor (NOTAR) technology: the MD52ON derivative of the current model 500 series and the MDX, a new eight-place, twin-engine aircraft. Initial production deliveries are scheduled for 1991 and 1993, respectively.

The McDonnell Douglas Helicopter Company also has an ordnance business that includes design, development, and production of gun and ammunition armament systems. The current product line consists of the 7.62mm, 25mm, and 30mm family of CHAIN GUN automatic weapons. Auxiliary products include turret, feed systems, control systems, and rocket launchers.

Transport Aircraft

The Douglas Aircraft Company (DAC), a division of MDC, currently produces commercial and military transport aircraft.

Dataquest estimates that MDC held 19.6 percent of the commercial aircraft market in 1989, down from the 20 percent reported in 1988. Current additions to MDC's civil aircraft line are the MD-80 and -90, upgrades of the DC-9; and the MD-11, an upgrade of the DC-10. Currently, the C-17, MDC's principal military transport aircraft, is in production—210 are being produced at a price tag of $38 billion.

©1990 Dataquest Incorporated

Space Systems and Missiles

MDC is engaged in a wide variety of programs in the electronics, missile, and space fields through the McDonnell Douglas Electronic Systems Company (MDESC), McDonnell Douglas Missile Systems Company (MDMSC), and the McDonnell Douglas Space Systems Company (MDSSC). These three divisional companies were created in 1988 by the restructuring of the former McDonnell Douglas Astronautics Company (MDAC) into companies that are more focused on related product lines. In 1988, MDESC's headquarters moved to Huntington Beach, California.

MDESC provides defense electronics systems and C3I systems. In 1989, MDESC contributed $495 million to MDC's fiscal revenue, a 2.3 percent increase over the previous year's contributed revenue of $484 million.

MDESC also designs, develops, and produces aircraft avionics, electronic components, and ground support equipment. Products include avionic controls and displays for the F-15, F/A-18, an AV-8B aircraft; voice warning systems for military and commercial aircraft; military test equipment; training systems; and special-purpose digital circuits using silicon, gallium arsenide, infrared detection, and hybrid technologies.

MDMSC engages in a wide variety of programs in the tactical missile and combat systems field. MDMSC is the prime contractor for the US Navy's Harpoon antiship missile, which is an all-weather, over-the-horizon missile that can be launched from surface ships, submarines, aircraft, and mobile ground units. The Harpoon is the most widely deployed surface missile system in the navy and has been widely ordered by allied nations. The Standoff Land Attack Missile (SLAM), a derivative of the Harpoon, is currently in production for the navy. SLAM has an extended fuselage and a new guidance system and will be suitable for use on a number of aircraft including MDC's F/A-18 Hornet fighter/attack aircraft.

MDSSC consists of the space transportation, Space Station, and strategic defense businesses. MDSSC provides the Delta II launch vehicle, aimed to boost medium-weight military, civil, and commercial payloads into geosynchronous transfer orbit. The Delta II was selected as the US Air Force medium launch vehicle (MLV) in 1987. MDSSC also provides the Payload Assist Model (PAM), which is a solid-fuel, upper-stage booster that lifts satellites to higher orbits from the shuttle payload bay, from the Delta, or from other expendable launch vehicles. Customers include communications satellite manufacturers, system operators, and government agencies.

Through the Space Station Division (SSD) of MDSSC, MDC signed a contract with NASA in 1988 for the design, development, and production of a major portion of Space Station Freedom, a permanently manned national space center. SSD and its team, consisting of GE, Honeywell, IBM, and Lockheed, are responsible for many primary elements and integrated systems for the Space Station.

Information Systems

McDonnell Douglas Information Systems Company (MDISC) provides information products and services to targeted industry segments. MDISC focuses its operations on systems integration. Dataquest estimates that MDC held 2.3 percent market share of the worldwide CAD/CAM/CAE market based on total revenue of $282.1 million for fiscal 1989. MDC benefited from mechanical applications in the aerospace industry and in the AEC and GIS/mapping market in Europe. Software revenue growth from 1988 to 1989 was over 31 percent, totaling $90.2 million.

Dataquest estimates that MDC recorded $180.4 million in factory revenue from the sale of midrange computer systems in 1989. This is a 26 percent decrease from the previous year's figure of $227.5 million.

In systems integration, MDISC business units include Manufacturing and Engineering, Built Environment Technologies, Integrated Systems Engineering, and Integrated Business Systems. The Manufacturing and Engineering unit markets advanced systems for factory automation, including the Unigraphics CAD/CAM system that provides engineering design analysis and manufacturing automation. Other systems address such applications as direct numerical control, robotics, and manufacturing process control. The Built Environment Technologies unit provides computer graphics applications to architectural and engineering firms to help design buildings, handle engineering analysis, produce drawings, control construction, lay out interiors, and manage finished facilities. The Integrated Systems Engineering unit provides an integrated package of offerings that includes a fourth-generation language technology, a comprehensive application development methodology, and computer-aided software engineering (CASE)

©1990 Dataquest Incorporated

development tools. The Integrated Business Systems unit designs and markets information management systems to banks, insurance companies, and accounting and commercial firms. Products and services include systems to manage deposit data, loan profiles, and billing/processing claims; systems to enroll customers through remote data centers; and application software.

Financial Services

McDonnell Douglas Finance Corporation (MDFC) is a subsidiary engaged in financing and leasing a variety of equipment, including commercial transport aircraft, highway vehicles, railroad cars, shipping containers, computer peripheral equipment and computers, and medical equipment to customers over 60 industries.

Further Information

For more information about the Company's business segments, please contact the appropriate Dataquest industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$11,666.0	$13,089.0	$13,676.0	$15,072.0	$14,589.0
Percent Change	-	12.20	4.48	10.21	(3.20)
Capital Expenditure	NA	$682.0	$674.0	$654.0	$582.0
Percent of Revenue	0	5.21	4.93	4.34	3.99
R&D Expenditure	$423.1	$504.8	$648.0	$610.0	$617.0
Percent of Revenue	3.63	3.86	4.74	4.05	4.23
Number of Employees	97,067	105,696	112,400	121,421	127,926
Revenue ($K)/Employee	$120.19	$123.84	$121.67	$124.13	$114.04
Net Income	$345.7	$277.5	$313.0	$350.0	$219.0
Percent Change	-	(19.73)	12.79	11.82	(37.43)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$3,340.00	$3,476.00	$3,715.00	$4,292.00
Quarterly Profit	$169.00	($48.00)	$38.00	($17.00)

NA = Not available

Source: McDonnell Douglas Corporation Annual Reports and Forms 10-K Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	82.00	81.00	79.00	78.00	80.67
International	18.00	19.00	21.00	22.00	19.33
Europe	9.00	11.00	12.00	14.00	14.00
Asia/Pacific	6.00	6.00	7.00	7.00	4.00
ROW	3.00	2.00	2.00	1.00	1.00

Source: McDonnell Douglas Corporation Annual Reports and Forms 10-K Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	100.00	100.00
Indirect Sales	0	0

Source: Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS (aka Corporate Marketing Outposts)

North America—8
Europe—3
Asia/Pacific—5
  Japan—1
ROW—4
McDonnell Douglas also uses 126 local sales/marketing representatives, consultants, and distributors/service centers in approximately 63 countries.

MANUFACTURING LOCATIONS

North America

McDonnell Aircraft Company (St. Louis, Missouri, and Tulsa, Oklahoma)
Activities include the production, design, development, and support work for combat aircraft, including the F-15C/D, F-15E Eagle, F-15 V/STOL demonstrator, F/A-18 Hornet for the navy and the marine corps, AV-8B Harrier II for the marine corps, and teaming with Northrop on a prototype for the Advanced Tactical Fighter (ATF) designated the F-23A. Engineering for the ATA for the navy is in conjunction with General Dynamics.

McDonnell Douglas Helicopter Company (Mesa, Arizona, and Culver City, California)
Activities include the production of the AH-64 Apache attack helicopter for the US Army and the Army National Guard; production of the 7.62, 25, and 30mm family of CHAIN GUN automatic weapons including the 25mm Vehicle Rapid Fire Weapon System (VRFWS) Bushmaster M242, the primary weapon to the Bradley Fighting Vehicle; and developing an air-to-air attack version of the Apache. Other activities include demonstration of the NOTAR helicopter and competition for the LHX light helicopter contract teamed with Bell Helicopter (Texron).

McDonnell Douglas Electronic Systems (St. Louis, Missouri; Huntington Beach and Monrovia, California; Titusville, Florida; and Pueblo, Colorado)
Activities include the production of the Tomahawk cruise missile, which is sea-launched for the navy and ground-launched for the air force, in conjunction with General Dynamics; an upgraded version of the Dragon antiattack assault weapon and the the Shoulder-Launched Multipurpose Assault Weapon(SMAW) for the Marine Corps; and Mass Mounted Lights (MMS) for the OH-58D Aeroscout helicopters. Other activities include the support and/or development of the Delta II space boosters and launch vehicles, the Inertial Upper Stage (IUS) and Payload Assist Module (PAM), the Harpoon antiship and land attack cruise missile for the navy, a SLAM variant, the Small Ground-Launched Cruise Missile (GLCM) and the Small Air-Launched Cruise Missile (ALCM)—sharing with other producers, High Endoatmospheric Defense Interceptor (HEDI) for the SDI program, laser communication, C3I data networks, payload ground operations for NASA, computer support for the Johnson Space Center, second sourcing for the AGM-129a Advanced Cruise Missile (ACM) for the air force, the GSTS and BM/C3 program for SDI, Beam Experiment Aboard a Rocket (BEAR) and Integrated Space Experiment (ISE) for SDI, and, lastly, the structural framework, airlocks, communications, guidance, navigation, and control systems for the space station in Huntington Beach.

Douglas Aircraft Company (Long Beach, California; Salt Lake City, Utah; and Macon, Georgia)
Activities include the support and/or development of the C-17 strategic transport aircraft, Advanced Concept Ejection Seats (ACES II), and T-45 jet trainers.

New Aircraft Products Division (St. Louis, Missouri)
Activities include the strategic planning and identification of technologies to be pursued for fighter aircraft projects.

SUBSIDIARIES

North America

McDonnell Aircraft Training Systems (MTS) (United States)
McDonnell Douglas Finance Corporation (United States)
McDonnell Douglas Helicopter Company (United States)
McDonnell Douglas Realty Company (United States)

Europe

McDonnell Douglas Bank (United Kingdom)
McDonnell Douglas Information Systems International Ltd. (United Kingdom)

©1990 Dataquest Incorporated

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Digital Equipment Corporation (DEC)
DEC signed a Cooperative Marketing Program (CMP) agreement with McDonnell Douglas Systems Integration Company to cooperatively market Force Management Systems II (FMS II), which is an integrated operator scheduling system that enables telecom management to forecast, schedule, and track telephone operator force levels.

MERGERS AND ACQUISITIONS

1989

Information Systems International (ISI)
ISI, located in Hemel Hampstead, England, was formed by merging McDonnell Douglas' Information Systems International and Information Systems (ISC)—the European distribution and manufacturing operation—with McDonnell Douglas' Computer Systems. ISI will continue to handle the marketing of McDonnell Douglas' computer systems and CAD/CAM line.

1988

Shape Data
Shape Data, located in Cambridge, England, was acquired principally to enter the conceptual design market. Shape Data is one of the ten largest computer companies worldwide and is known for its development of the Romulus solid modeling software and a new package that offers parametric surfaces known as Parasolid. McDonnell Douglas will provide Shape Data with an extensive distribution channel via its own CAD/CAM sales force.

1987

Frampton Computer Systems (Isis)
Frampton Computer Systems (Isis), located in Bristol, England, was acquired to be operated as an integral part of McDonnell Douglas' Information Systems International. Isis is a software company that develops payroll, pension, and personnel systems.

KEY OFFICERS

John F. McDonnell
Chairman and chief executive officer

Gerald A. Johnston
President

Edward C. Aldridge, Jr.
President, McDonnell Douglas Electronic Systems Company

Herbert L. Lanese
President, McDonnell Douglas Helicopter Company

R. Mark Kulhman
President, McDonnell Douglas Informations Systems Company

C. James Dorrenbacher
President, McDonnell Douglas Space Systems Company

William P. Brown
President, McDonnell Douglas Helicopter Company

E. Randolph Jayne II
President, McDonnell Douglas Missiles Systems Company

Robert H. Hood, Jr.
President, Douglas Aircraft Company

William S. Ross
President, McDonnell Douglas Aircraft Company

PRINCIPAL INVESTORS

Bankers Trust Company

FOUNDERS

Information is not available.

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December (Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$4,474.9	$4,941.3	$7,629.0	$8,577.0	$9,870.0
Cash	78.7	77.5	67.0	115.0	119.0
Receivables	1,266.8	1,463.4	1,415.0	1,420.0	1,350.0
Marketable Securities	-	-	2,354.0	2,763.0	-
Inventory	3,056.0	3,294.3	3,793.0	4,279.0	5,128.0
Other Current Assets	73.4	106.1	-	-	3,273.0
Net Property, Plants	$1,700.4	$2,007.6	$2,333.0	$2,542.0	$2,648.0
Other Assets	$1,093.0	$961.8	$662.0	$766.0	$879.0
Total Assets	$7,268.3	$7,910.7	$10,624.0	$11,885.0	$13,397.0
Total Current Liabilities	$4,030.7	$4,306.6	$3,623.0	$3,622.0	$5,175.0
Long-Term Debt	$603.1	$759.3	$3,081.0	$3,628.0	$4,935.0
Other Liabilities	-	-	$950.0	$1,449.0	-
Total Liabilities	$4,633.8	$5,065.9	$7,654.0	$8,699.0	$10,110.0
Total Shareholders' Equity	$2,634.6	$2,845.0	$2,970.0	$3,186.0	$3,287.0
Common Stock	40.3	41.0	41.0	38.0	38.0
Other Equity	399.0	416.0	322.0	289.0	279.0
Retained Earnings	2,195.3	2,388.0	2,607.0	2,859.0	2,970.0
Total Liabilities and Shareholders' Equity	$7,268.4	$7,910.9	$10,624.0	$11,885.0	$13,397.0

Income Statement	1985	1986	1987	1988	1989
Revenue	$11,666.0	$13,089.0	$13,676.0	$15,072.0	$14,589.0
US Revenue	9,566.0	10,602.0	10,804.0	11,756.2	11,769.0
Non-US Revenue	2,100.0	2,487.0	2,872.0	3,315.8	2,820.0
Cost of Sales	$9,415.0	$10,541.0	$10,921.0	$12,108.0	$12,180.0
R&D Expense	$423.1	$504.8	$648.0	$610.0	$617.0
SG&A Expense	$1,191.2	$1,357.0	$1,408.0	$1,508.0	$1,348.0
Capital Expense	NA	$682.0	$674.0	$654.0	$582.0
Pretax Income	NA	$479.0	$457.0	$507.0	($120.0)
Pretax Margin (%)	0	3.66	3.34	3.36	(0.82)
Effective Tax Rate (%)	36.00	42.00	32.00	31.00	-
Net Income	$345.7	$277.5	$313.0	$350.0	$219.0
Shares Outstanding, Millions	40.3	40.6	40.7	38.2	38.2
Per Share Data					
Earnings	$8.60	$6.86	$7.75	$9.13	$5.72
Dividend	NA	NA	$2.32	$2.56	$2.82
Book Value	$65.37	$70.07	$72.97	$83.40	$86.05

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December (Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	1.11	1.15	2.11	2.37	1.91
Quick (Times)	0.35	0.38	1.06	1.19	0.92
Fixed Assets/Equity (%)	64.54	70.57	78.55	79.79	80.56
Current Liabilities/Equity (%)	152.99	151.37	121.99	113.68	157.44
Total Liabilities/Equity (%)	175.88	178.06	257.71	273.04	307.58
Profitability (%)					
Return on Assets	-	3.66	3.38	3.11	1.73
Return on Equity	-	10.13	10.77	11.37	6.77
Profit Margin	2.96	2.12	2.29	2.32	1.50
Other Key Ratios					
R&D Spending % of Revenue	3.63	3.86	4.74	4.05	4.23
Capital Spending % of Revenue	0	5.21	4.93	4.34	3.99
Employees	97,067	105,696	112,400	121,421	127,926
Revenue ($K)/Employee	$120.19	$123.84	$121.67	$124.13	$114.04
Capital Spending % of Assets	0	8.62	6.34	5.50	4.34

NA = Not available

Source: McDonnell Douglas Corporation Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

Mentor Graphics Corporation

8500 S.W. Creekside Place
Beaverton, Oregon 97005-7191
Telephone: (503) 626-7000
Fax: (503) 626-1202
Dun's Number: 03-137-4879

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Mentor Graphics Corporation was established in 1981 to design, manufacture, market, and service electronic design automation (EDA) systems. It was one of the first companies to offer computer-aided engineering (CAE) tools for designing and analyzing electronic circuits, and soon expanded its focus to include computer-aided design (CAD) tools for the physical layout of integrated circuits and printed circuit boards. Mentor Graphics now markets chip board- and system-level EDA tools, as well as software and hardware aimed at other EDA fields including computer-aided publishing (CAP), computer-aided electronic packaging (CAEP), computer-aided software engineering (CASE), and computer-aided testing (CAT). Dataquest estimates that Mentor Graphics held 3 percent share of the CAD/CAM worldwide market, ranking it sixth among CAD/CAM vendors during 1989.

Mentor Graphics' total revenue increased 26.4 percent to $380.0 million* in fiscal 1989 from $300.8 million in fiscal 1988. Net income increased 33.6 percent to $44.8 million in fiscal 1989 from $33.5 million in fiscal 1988. Dataquest believes that Mentor Graphics is the dominant vendor in the EDA application segment. The Company employed approximately 2,100 employees worldwide in 1989.

During fiscal 1989, systems revenue represented 79.6 percent, or $302.5 million, of total revenue, while service and support represented the remaining 20.4 percent. Nineteen eighty-nine systems revenue increased 25 percent over fiscal 1988. Mentor Graphics attributed the growth in systems revenue to continued business growth especially in the European market, along with continued worldwide acceptance of its design automation and analysis tools, and the emergence of its IC design and PCB design products.

*All dollar amounts are in US dollars.

During fiscal years 1989, 1988, and 1987, R&D expenditure was $50.9 million, $33.8 million, and $24.2 million, respectively. This represented 13.4, 11.2, and 10.9 percent, respectively, of total revenue. Mentor Graphics' R&D investment was aimed primarily at its commitment to deliver its software release 8.0. This commitment led to hiring additional engineering staff, increased capital equipment purchases, and facilities expansion. Although the Company plans to continue its large financial commitment to R&D activities, the growth rate for R&D is expected to be moderate in 1990.

Mentor Graphics markets its products principally to Fortune 500 companies in the aerospace, semiconductor, computer, telecommunications, and consumer electronics industries. It uses a direct sales force located throughout the United States, as well as wholly owned marketing subsidiaries located in Western Europe, Canada, Australia, and the Far East. During fiscal years 1989, 1988, and 1987, international sales accounted for 48.5, 47.8, and 45.9 percent, respectively, of total revenue. International revenue has come primarily from the European and Asia/Pacific markets.

Mentor Graphics' strategy is continuous expansion into new industry segments through internal development, acquisition, joint marketing, OEM agreements, and spin-off activity. Three recent developments that contribute to the Company's strategy include the announcement that Mentor Graphics has selected Sun Microsystems as a workstation platform; the acquisition of Silicon Compiler Systems (SCS), creating the Silicon Design Division; and lastly, the announcement of the Concurrent Design Environment based on the Falcon Framework.

Mentor Graphics uses Hewlett-Packard's (HP's) general-purpose 32-bit engineering workstations as the workstation base for its EDA systems. In January

©1990 Dataquest Incorporated

1990, the Company announced its intention to support its software on the Sun hardware platform. Mentor Graphics believes that the use of HP and Sun hardware will further the Company's efforts to specialize in the development of application software while benefiting from HP and Sun's R&D efforts in general-purpose hardware and operating systems software. Mentor Graphics' products may be bought as complete systems, with the software already integrated with the workstations, or as software.

The decision to port to Sun eliminates platform choices as an issue for Mentor Graphics and its customers. Since Sun Microsystems and HP/Apollo combine for more than 80 percent of all new EDA nonproprietary workstations, the decision allows customers to take advantage of Mentor Graphics' technologies and the two most popular engineering workstations.

The acquisition of Silicon Compiler Systems complements Mentor Graphics' line of IC design tools as well as bolstering the Company's simulation technologies for the development of ICs. The acquisition also adds expertise in the Sun development environment, thus complementing Mentor Graphics' decision to port to Sun.

The Concurrent Design Environment is the new generation of the Company's EDA product line. This product line allows for the integration and simultaneous design of different aspects of an electronic system, including hardware and software.

In 1989, Mentor Graphics introduced the OpenDoor program for in-house software developers, application-specific integrated circuit (ASIC) vendors, and third-party design automation vendors. Through this program, participants can develop interfaces between their software tools and Mentor Graphics' software tools. OpenDoor participants can select from a variety of integration technologies and business relationships with Mentor Graphics.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information is not available on revenue by distribution channel. Table 3, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Mentor Graphics currently has seven product divisions, which include the Design and Analysis Division, the Silicon Design Division, the Printed Circuit Board (PCB) Division, the Electronic Packaging and Analysis Division, the Context Division, the Computer-Aided Software Engineering (CASE) Division, and the Advanced Products Division.

Electronic Design Automation (EDA)

According to Dataquest, Mentor Graphics ranked first and held 13.0 percent share of the 1989 worldwide EDA market. Dataquest estimates that Mentor Graphics ranked fifth in IC layout with 9.0 percent share of the worldwide market, and second in the PCB layout market with 12.3 percent share of the worldwide PCB market.

Mentor Graphics has a variety of proprietary application software. This software supports design creation and analysis for integrated circuits and electronic systems, including the systems themselves and the enclosure of the systems, as well as physical layout of semicustom and custom very-large-scale integrated (VLSI) circuits and printed circuit boards. Mentor Graphics provides software for documentation and project communication. It integrates its application software and HP/Apollo and Sun's general-purpose 32-bit workstations into a range of Concurrent Design Environment workstations. These workstations currently are marketed to companies in the aerospace, semiconductor, computer, telecommunications, and consumer electronics industries.

Mentor Graphics also offers optional software and special-purpose hardware to address specific applications within the electronic product development process. These applications include a general-purpose graphics editor that provides a range of graphic elements, text fonts, line styles, and fill patterns; simulation parts models that supply easily accessible and usable software models of electronic components; interactive circuit simulators that provide analytical capabilities for the analog- or transistor-level behavior of circuits; synthesis software; software that simplifies the design of ASICs by

©1990 Dataquest Incorporated

enabling early design stages to be independent of vendors and technology; and products that allow customers to integrate actual VLSI components and semicustom circuits into the logic simulation process.

All Mentor Graphics applications are integrated into the Falcon Framework, which supports all levels of systems design across all design disciplines throughout the entire design cycle. Falcon Framework is aimed at supplying electronic designers with consistent graphics processing, text processing, window management, database management, design and decision management, and a variety of need-specific applications.

Design and Analysis Division (DAD)

DAD provides tools for architectural design; schematic capture; synthesis; digital logic, fault, and timing simulations/testing; and analog simulation/testing.

In May 1990, Mentor Graphics announced two new products, Design Architect and QuickSim II, from DAD. Design Architect is a comprehensive and integrated system for creating designs from the specification and architectural level to logic- and circuit-level descriptions. This product incorporates Mentor Graphics' second-generation network/schematic editor, a symbol editor, and for architectural design, a VHSIC hardware description language (VHDL) editor and compiler. QuickSim II is a high-performance logic simulator for function and performance verification of large, submicron ASIC and printed circuit board designs. Design Architect was specifically engineered to work with QuickSim II, supplying users with fast design iteration time and highly interactive analysis environment for architectural and gate/circuit-level designs.

Mentor Graphics foresees the computer-aided test area of the EDA market to be of strategic importance. Hence, the Company focuses its development activities on products used to create testable designs, develop test patterns, and transfer test-related information from the design engineer to the manufacturing test engineer. Mentor Graphics' test products consist of QuickGrade, a statistical fault grader; and QuickFault, a deterministic fault simulator. Along with these products, Mentor Graphics maintains a joint marketing agreement with Test Systems Strategies, Inc. (TSSI). TSSI develops, manufactures, and markets interfaces between Mentor Graphics' simulators and a variety of commercial integrated circuit and printed circuit board test systems.

Context Division

Designing, manufacturing, marketing, and servicing of Mentor Graphics' computer-aided publishing software is conducted by its Context Division. This division provides documentation systems to make the production and management of publications for electronics design, computer-aided software engineering, and technical publishing groups more efficient and cost-effective. Although Mentor Graphics includes DOC documentation preparation software in its Design Station and higher-level station, the Context Division has focused on the documentation management needs of aerospace, engineering, and manufacturing companies. The Context series of documentation workstations is used primarily in the production of engineering documentation specifications, maintenance documentation, and product manuals. During March 1990, the Context Division introduced BOLD, an on-line electronic data delivery system that allows designers and technical writers to create, access, and maintain on-line information. The BOLD system offers immediate distribution of updated information, has full-text search capability across all documents in the on-line library, and fully supports Hypertext.

Silicon Design Division (SDD)

SDD offers systems and software for interactive and automatic placement and routing, interactive and automatic layout verification, and standard cell and gate-array layout. Mentor Graphics hopes to boost its position in the IC design segment by combining its existing tools with the acquisition of SCS. With the acquisition, Mentor Graphics gains SCS's Belgian facility, which will enhance its presence in the European marketplace.

Dataquest estimates that Mentor Graphics generated $14.3 million in IC layout revenue for 1989, which represents nearly a 15 percent increase over 1988. SCS ranked second in IC layout in 1989 with 14.5 percent market share and $23 million in revenue.

Printed Circuit Board (PCB) Division

The PCB Division offers systems and software for interactive and automatic placement and routing. The division supports analog, surface-mount, ceramic, hybrid layout, traditional through-pin, and other

©1990 Dataquest Incorporated

technologies. According to Mentor Graphics, the PCB Division was the second largest division in revenue for fiscal year 1989.

The Board Station is a PCB design and layout workstation that is fully integrated with the complete line of Mentor Graphics EDA tools, including common databases capturing simulation, electronic packaging, physical layout, test, and documentation.

Introduced in 1990 was the Advanced Dynamic Editor, which combines the power of advanced routing technology with the skills of the PCB designer to offer ten times better performance than that of existing editing techniques.

Electronic Packaging and Analysis Division (EPAD)

EPAD offers modeling tools for enclosure design and analysis, drafting tools for creating engineering drawings, and thermal analysis tools for printed circuit boards. This division sells the Package Station workstation, a design automation tool targeted at the needs of electronic package designers. The Package Station workstation is fully integrated into the Company's workstation environment and offers direct access to the electronic component and layout data developed on its Board Station workstation. The Package Station also consists of software tools that supply engineers with the information needed to reduce heat buildup on printed circuit boards and in electronic packages early in the design process. In June 1990, Mentor Graphics announced the Reliability Predictor, which automates reliability calculation and tracks reliability predictions throughout a product's entire design. The Reliability Predictor can aid in thermal analysis as well as predict reliability using any combination of variables regarding schematic data or assumptions on packaging.

Computer-Aided Software Engineering (CASE) Division

The CASE Division offers tools for the structured analysis and design of software in real-time systems and for compliance with defense software development standards. The CASE Division complements the hardware side of the development cycle supported by Mentor Graphics' other divisions and products.

Mentor Graphics entered the CASE market when it purchased Tektronix's CASE division in April 1988. CASE Station was the first product Mentor Graphics' CASE Division introduced. CASE Station is a combination of the original Tektronix system with EDA tools integrated onto an Apollo platform. During September 1989, the CASE Division announced CodeLink Station, a comprehensive CASE set of tools that addresses software development from initial design through maintenance and allows product development teams to make critical software/hardware design trade-offs early in project development. CodeLink software enables embedded software design teams to observe the behavior of the software and hardware through a debugging tool based on the XRAY debugger developed by Microtec Research.

Advanced Products Division (APD)

APD is the heart of Mentor Graphics' R&D activities, including the design of the Company's Falcon Framework for the Concurrent Design Environment. This division also administers the Company's OpenDoor program, which enables the use of third-party and customer-specific tools in the Mentor Graphics design environment.

R&D alliances that affect the future of Mentor Graphics include the PCB technology transfer and joint development agreement with Ascent Logic as well as the acquisition of the R&D infrastructure of SCS.

Further Information

For further information about the Mentor Graphics' business segments, please contact the appropriate Dataquest industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights
(Thousands of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$136,748	$173,545	$221,823	$300,750	$380,034
Percent Change	-	26.91	27.82	35.58	26.36
Capital Expenditure	$22,537	$10,200	$14,696	$31,205	$39,195
Percent of Revenue	16.48	5.88	6.63	10.38	10.31
R&D Expenditure	$14,538	$16,798	$24,179	$33,814	$50,942
Percent of Revenue	10.63	9.68	10.90	11.24	13.40
Number of Employees	777	900	1,200	1,700	2,100
Revenue ($K)/Employee	$175.99	$192.83	$184.85	$176.91	$180.97
Net Income	$7,989	$11,000	$20,325	$33,540	$44,803
Percent Change	(19.21)	37.69	84.77	65.02	33.58

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$90,495	$94,741	$96,429	$98,369
Quarterly Profit	$10,418	$11,070	$11,527	$11,788

Source: Mentor Graphics Corporation Annual Reports and Forms 10-K Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	66.05	60.82	54.15	52.16	51.53
International	33.95	39.18	45.85	47.84	48.47
Europe	22.30	22.56	25.14	25.76	27.37
Asia/Pacific	11.65	16.62	18.17	22.08	21.10

Source: Mentor Graphics Corporation Annual Reports and Forms 10-K Dataquest (1990)

©1990 Dataquest Incorporated

1990 SALES OFFICE LOCATIONS

North America—30
Europe—18
Asia/Pacific—8
  Japan—3
ROW—1

MANUFACTURING LOCATIONS

North America

San Jose, California
  Develops automated IC and PCB layout products
Beaverton, Oregon
  Manufactures hardware modeling library products and other special hardware products; integrates hardware received from various suppliers, primarily Apollo

SUBSIDIARIES

North America

Context Corporation (United States)
Contour Design Systems (United States)
Tektronix, Inc. (United States)
Trimeter Technologies (United States)
Synergy DataWorks, Inc. (United States)

Europe

Mentor Graphics Netherlands (Netherlands)

Asia/Pacific

Mentor Graphics Japan Co. Ltd. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Hewlett-Packard (HP)
Mentor Graphics and HP signed a marketing agreement calling for HP to integrate future HP 307X products with Mentor Graphics products and resell them.

Ascent Logic
Mentor Graphics and Ascent Logic formed a technology transfer and joint development agreement. The agreement calls for the integration of Ascent Logic's systems engineering technology and products with the tools and the Falcon Framework for Concurrent Design offered by Mentor Graphics. Mentor Graphics also will market and support Ascent Logic's Requirements Driven Development (RDD) products, which will be integrated with Mentor Graphics' Concurrent Design Environment. Under the terms of the agreement, Mentor Graphics also can extensively use the RDD products internally.

Microtec Research, Inc.
Mentor Graphics and Microtec Research formed a strategic partnership that calls for the incorporation of the XRAY high-level debugger in Mentor Graphics' new embedded software development product, CodeLink Station.

Logic Modeling Systems Incorporated
Mentor Graphics and Logic Modeling Systems Incorporated formed an OEM agreement under which Mentor Graphics will market Logic Modeling Systems' LM-1000 hardware modeler with Mentor Graphics' QuickSim simulation environment.

Ikos Systems, Inc.
Mentor Graphics and Ikos Systems, Inc., have a comprehensive, multiple-phase agreement that includes joint development, joint marketing, and distribution for the companies' simulation products. Under the terms of the agreement, the two companies will market the Ikos hardware-based simulators jointly and will integrate the Ikos simulators with Mentor Graphics' logic simulator. Mentor Graphics also will sell Ikos' products in Japan through an OEM agreement.

1989

Cadence Design Systems Inc.
Mentor Graphics signed an OEM agreement to sell Cadence Design Systems' Dracula integrated circuit layout verification tools. The agreement is valued at over $5 million over a two-year period. Mentor Graphics is entitled to renew the agreement annually through 1999.

Logic Automation
Logic Automation extended and expanded its software marketing agreement with Mentor Graphics for two more years. All of Mentor Graphics' IDEA workstations will automatically include Logic Automation's SmartModel simulation tools library.

©1990 Dataquest Incorporated

The initial agreement that allowed Mentor Graphics to sell, distribute, and support Logic Automation products worldwide was formed in 1987.

LSI Logic
Mentor Graphics and LSI Logic announced that they have formed a license agreement for the availability of Co-Design Environment/Mentor Graphics (CDE/MG) software. CDE/MG links Mentor Graphics' IDEA Series design tools operation on current Apollo workstation to key modules of LSI Logic's Modular Design Environment (MDE) CAD tools.

1988

VLSI Technologies
Mentor Graphics entered into an agreement with VLSI Technologies that calls for the companies to work together toward making VLSI's future advanced technologies available on Mentor Graphics workstations and toward the development of design tools to support these ASIC technologies.

CAD
Mentor Graphics participated in the creation of the CAD Framework Initiative, which is investigating how open design automation environments might best be implemented.

Open Software Foundation (OSF)
Mentor Graphics became a member of OSF, which was founded by eight companies including Apollo, Digital, and IBM, and is dedicated to developing a UNIX-based open software environment. There are currently 26 member companies.

Minc Inc.
Mentor Graphics reached an agreement with Minc to incorporate its universal programmable logic device (PLD) synthesis tool into Mentor Graphics' board design and simulation environment. Under the terms of the five-year agreement, Mentor Graphics also has purchased the right to use Minc's PLD synthesis technology.

Tektronix
Mentor Graphics entered into a strategic alliance with Tektronix, a supplier of test and measurement instruments, to cooperate in the production of an integrated set of design and test products.

Test Systems Strategies, Inc. (TSSI)
Mentor Graphics entered into a joint marketing agreement with TSSI pursuant to which TSSI develops, manufactures, and markets interfaces between Mentor Graphics' Simulator and QuickFault products to a wide range of commercial integrated circuit and printed circuit board test systems.

MERGERS AND ACQUISITIONS

1990

Silicon Compiler Systems Corporation (SCS)
Mentor Graphics purchased SCS, a company that provides a broad spectrum of integrated IC design systems on industry-standard Digital Equipment, HP/Apollo, and Sun platforms.

1989

Performance CAD
Mentor Graphics acquired Performance CAD, a developer of integrated circuit timing analysis tools.

Trimeter Technologies
Mentor Graphics acquired Trimeter Technologies, one of the three leading developers in the emerging logic synthesis field, for $3 million cash plus royalties on future products. The combined Design and Analysis Division will work to combine the capabilities of Trimeter's logic synthesis tools with Mentor Graphics' own PLD synthesis and VHSIC hardware description language (VHDL) tools.

1988

Tektronix
Mentor Graphics reached a $5 million agreement with Tektronix to purchase its CASE business and certain CAE-related technologies. The CASE division offers products that create a structured design environment for the production of software. Mentor Graphics' CASE products are designed to operate on DEC VAX and VAXstation computers and on standard Apollo workstations. At the same time, Tektronix elected to leave the design automation business and agreed to work with Mentor Graphics to migrate its customers to Mentor Graphics products. Tektronix also designated Mentor Graphics as a preferred vendor of design automation systems for use with Tektronix products.

Contour Design Systems
Mentor Graphics acquired Contour Design Systems, a leading supplier of analog component libraries and modeling technology. Mentor issued 75,000 shares of common stock in exchange for all outstanding shares of Contour.

©1990 Dataquest Incorporated

KEY OFFICERS

Thomas H. Bruggere
Chairman of the board and chief executive officer

Gerald H. Langeler
President and chief operating officer

David C. Moffenbeier
Executive vice president

David L. Brinker
Vice president and general manager, Asia/Pacific

Jean-Claude Caraes
Vice president and general manager, Europe

Marvin S. Wolfson
Vice president, Product Group

Brian W. Maggs
Vice president, North American Sales

Stephen Swerling
Vice president, Technology

Dale T. Derby
Vice president, Operations

PRINCIPAL INVESTORS

Prudential Insurance of America—5.8 percent

FOUNDERS

Information is not available.

©1990 Dataquest Incorporated

Table 3
Comprehensive Financial Statement
Fiscal Year Ending December
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$157,761	$176,348	$191,677	$224,020	$273,057
Cash	74,160	81,494	26,152	52,377	65,419
Receivables	50,821	59,332	63,423	72,827	97,204
Inventory	29,139	28,867	23,318	20,587	20,042
Other Current Assets	3,641	6,655	78,784	78,229	90,392
Net Property, Plants	$31,117	$29,482	$32,826	$44,124	$61,856
Other Assets	$5,203	$6,191	$4,663	$13,558	$27,033
Total Assets	$194,081	$212,021	$229,166	$281,702	$361,946
Total Current Liabilities	$51,185	$54,001	$39,039	$58,519	$79,159
Long-Term Debt	$2,784	$2,789	$2,603	$1,474	$8,748
Other Liabilities	0	0	0	0	0
Total Liabilities	$53,969	$56,790	$41,642	$59,993	$87,907
Total Shareholders' Equity	$140,112	$155,231	$187,524	$221,709	$274,039
Converted Preferred Stock	0	0	0	0	0
Common Stock	124,123	125,924	132,125	138,752	153,464
Other Equity	823	3,141	8,908	4,607	2,608
Retained Earnings	15,166	26,166	46,491	78,350	117,967
Total Liabilities and Shareholders' Equity	$194,081	$212,021	$229,166	$281,702	$361,946
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$136,748	$173,545	$221,823	$300,750	$380,034
US Revenue	90,328	105,542	120,116	156,879	195,840
Non-US Revenue	46,420	68,003	101,707	143,871	184,194
Cost of Sales	$78,598	$96,470	$109,146	$134,443	$159,503
R&D Expense	$14,538	$16,798	$24,179	$33,814	$50,942
SG&A Expense	$36,022	$47,840	$61,181	$87,614	$110,966
Capital Expense	$22,537	$10,200	$14,696	$31,205	$39,195
Pretax Income	$12,082	$16,545	$31,740	$50,626	$66,233
Pretax Margin (%)	8.84	9.53	14.31	16.83	17.43
Effective Tax Rate (%)	33.90	33.50	36.00	33.70	32.40
Net Income	$7,989	$11,000	$20,325	$33,540	$44,803
Shares Outstanding, Thousands	30,992	32,740	33,962	34,890	36,865
Per Share Data					
Earnings	$0.26	$0.34	$0.60	$0.96	$1.22
Dividend	0	0	0	$0.05	$0.15
Book Value	$4.44	$4.84	$5.70	$6.56	$7.84

©1990 Dataquest Incorporated

Table 3 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	3.08	3.27	4.91	3.83	3.45
Quick (Times)	2.51	2.73	4.31	3.48	3.20
Fixed Assets/Equity (%)	22.21	18.99	17.50	19.90	22.57
Current Liabilities/Equity (%)	36.53	34.79	20.82	26.39	28.89
Total Liabilities/Equity (%)	38.52	36.58	22.21	27.06	32.08
Profitability (%)					
Return on Assets	5.30	5.42	9.21	13.13	13.92
Return on Equity	7.56	7.45	11.86	16.39	18.07
Profit Margin	5.84	6.34	9.16	11.15	11.79
Other Key Ratios					
R&D Spending % of Revenue	10.63	9.68	10.90	11.24	13.40
Capital Spending % of Revenue	16.48	5.88	6.63	10.38	10.31
Employees	777	900	1,200	1,700	2,100
Revenue ($K)/Employee	$175.99	$192.83	$184.85	$176.91	$180.97
Capital Spending % of Assets	11.61	4.81	6.41	11.08	10.83

Source: Mentor Graphics Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

NEC Corporation

33-1 Shiba 5-chome
Minato-ku, Tokyo 108, Japan
Telephone: (03) 454-1111
Fax: (03) 452-6351
Dun's Number: 00-183-6014

Date Founded: July 1899

CORPORATE STRATEGIC DIRECTION

NEC Corporation (known as Nippon Electric Company, Ltd., prior to April 1, 1983) was founded in 1899 as a manufacturer of telephone sets and switchboards. NEC is a leading global supplier of a broad range of communications systems, computer and electronic systems, electronic devices, consumer electronics, and information services.

NEC is divided into five product groups:

- Communications Systems and Equipment (26 percent of net sales)—Carrier transmission, microwave and satellite communications, and mobile communications equipment; digital central office switching systems; facsimiles
- Computers and Industrial Electronic Systems (43 percent of net sales)—Mainframe, personal, and small business computers; building automation and communications network control systems
- Electronic Devices (19 percent of net sales)—Memories, microcomputers and software, linear ICs, gate arrays, standard cells
- Home Electronics Products (7 percent of net sales)—Color TV receivers and projectors, VCRs, videodisc players
- Other Operations (5 percent of net sales)—VAN services, electrical connectors, semiconductor equipment, measuring and testing systems

NEC reported consolidated revenue for fiscal year ending March 31, 1989, of $23.5 billion,* up 6 percent from fiscal 1988. Net income rose 137 percent from $205 million in fiscal 1988 to $485 million in fiscal 1989.

Capital expenditures increased during fiscal 1989 to $2.1 billion, or 9.1 percent of total revenue. Research and development expenditures totaled $3.7 billion for fiscal 1989, representing 15.5 percent of revenue.

In order to increase its market penetration, NEC markets its products aggressively. Dataquest believes that 70 to 80 percent of the Company's products are sold domestically (in Japan) through distributors. NEC has 10 distributors in Japan, the top 4 of which are Ryosan, Sanshin, Satori, and Shinko. Approximately 22 percent of NEC's semiconductor production is consumed internally.

Overseas sales accounted for 25 percent of total sales in fiscal 1989, down from 27 percent and 28 percent in fiscal years 1988 and 1987, respectively.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Semiconductors

For the past two years, NEC has maintained its position as the world leader in semiconductor sales, with approximately 9 percent of the market and $4.5 billion in semiconductor revenue.

Dataquest estimates that 69 percent of NEC's 1988 semiconductor sales were MOS devices, or $3.1 billion in revenue. The largest product family in 1988

*All dollar amounts are in U.S. dollars.

©1990 Dataquest Incorporated

was again MOS memory, with sales of $1.5 billion. MOS memory sales grew 76.7 percent, MOS micro sales grew 39.6 percent, and MOS logic sales grew 40.0 percent in 1988. Optoelectronics sales increased approximately 60.0 percent, from $55 million in fiscal 1987 to $88 million in fiscal 1988.

Computer Systems

During fiscal year ending 1989, 43 percent of NEC's revenue came from products in the Computers and Industrial Electronic Systems Group.

Dataquest estimates that in 1988, NEC slipped one spot to fourth among PC vendors, behind third-ranked Compaq Computers. NEC added six new PC models during 1988 and 1989, including the UltraLite laptop computer; the PowerMate Portable SX computer, the first portable to use Intel's 386SX processor; the ProSpeed 386 modular portable PC, which provides 386-based power and full desktop expandability; the ProSpeed 286 laptop computer; and the PowerMate Portable Plus computer, a 286-based portable. The sixth model, introduced in September 1989, is the ProSpeed CSX personal computer, which is the first color laptop computer available for purchase in the United States.

The newest addition to NEC's supercomputer line was introduced in April 1989, the SX-3. The SX-3 is said to be up to eight times faster than U.S.-made supercomputers.

During 1988, NEC introduced the 3100 and 3050 series of small business computers.

Telecommunications

NEC holds the number five market share position in data communications. The Company is one of the largest suppliers of communications equipment to Nippon Telegraph and Telephone Corporation (NTT), formerly Japan's domestic telecommunications monopoly, as well as to the new common carriers (NCCs) that were created as a result of Japan's market liberalization.

Computer Storage

NEC ranked ninth in the 1988 3.5-inch disk drive market with less than 2 percent of the market. The top three players in this market, IBM, Miniscribe, and Conner, together held 60 percent of the market.

Printers

NEC's overall ranking for 1988 in the printer market by units shipped was eleventh, behind Citizen, Hewlett-Packard, and Seikosha.

Further Information

For further information about the Company's business segments, please contact the appropriate industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Millions of U.S. Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$9,232	$13,501	$17,159	$22,220	$23,510
Percent Change	-	46.24	27.09	29.49	5.81
Capital Expenditure	$1,472	$1,648	$1,326	$2,016	$2,148
Percent of Revenue	15.94	12.20	7.73	9.07	9.14
R&D Expenditure	$1,144	$1,836	$2,629	$3,496	$3,657
Percent of Revenue	12.39	13.60	15.32	15.73	15.56
Number of Employees	90,102	95,796	101,227	102,452	104,022
Revenue ($K)/Employee	$102.46	$140.94	$169.51	$216.88	$226.01
Net Income	$268	$153	$103	$205	$485
Percent Change	-	(42.92)	(32.55)	98.54	137.07

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	N/A	N/A	N/A	N/A
Quarterly Profit	N/A	N/A	N/A	N/A

N/A = Not Available

Source: NEC Corporation Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
Japan	66.00	67.00	72.00	73.00	75.00
All Others	34.00	33.00	28.00	27.00	25.00

Source: Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988
Direct Sales	N/A
Indirect Sales	N/A

N/A = Not Available

Source: Dataquest (1990)

©1990 Dataquest Incorporated

1988 SALES OFFICE LOCATIONS

Japan—More than 200
Overseas—170

MANUFACTURING LOCATIONS

Japan

Ando Electric
Measuring and testing systems
Anelva Corp.
Semiconductor manufacturing equipment, vacuum equipment
Anritsu Corp.
Communications and electronic equipment, measuring instruments
Anten Kogyo
Antennas, related equipment
Japan Aviation Electronics
Electrical connectors, electronic equipment
Kaijo Denki
Industrial marine equipment
NEC Akita
ICs, discrete semiconductor devices
NEC Data Terminals
Computer terminals
NEC Fukui
ICs, discrete semiconductor devices
NEC Fukuoka
ICs
NEC Fukushima
Communications equipment, related components
NEC Gunma
Computers, related systems
NEC Hiroshima
4Mb DRAMs
NEC Home Electronics
TVs, home electronic appliances, electronic parts
NEC Hyogo
Communications equipment parts
NEC Ibaraki
Computers, related systems
NEC Kagoshima
Electronic devices
NEC Kansai
ICs, discrete semiconductor devices, electronic devices
NEC Kofu
Development of computers
NEC Kumamoto
ICs
NEC Kyushu
ICs
NEC Miyagi
Communications equipment, related components
NEC Nagano
Home electrical appliances
NEC Niigata
Computers, related systems
NEC Oita
ICs
NEC Radio & Electronics
Communications equipment, related components
NEC Saitama
Communications equipment, related components
NEC San-ei Instruments
Medical electronic equipment, industrial measuring systems
NEC Shizuoka
Communications equipment, computer terminals
NEC Tohoku
Communications equipment, computer terminals
NEC Toyama
Electronic devices
NEC Yamagata
ICs, discrete semiconductor devices
NEC Yamaguchi
ICs
NEC Yonezawa
Communications equipment, computer terminals
Nico Electronics
Special communications equip, vending machines
Nippon Avionics
Electronic equipment for aircraft
Nippon Electric Glass
CRTs, other glass products
Nippon Electric Industry
Electrical machinery, precision instruments
Nitsuko Ltd.
Communications equipment and parts
Showa Koki Seizo
Optical precision instruments
Takasago Ltd.
Telephones, communications equipment
Tama Electric
Resistors

©1990 Dataquest Incorporated

Tohoku Metal Industries
Magnetic materials
Tokin Corp.
Magnetic materials, electric parts
Toyo Communication Equipment.
Communications equipment and parts

North America

NEC America
Faxes, printers, magnetic disk drives
NEC Electronics
256K DRAMs
NEC Home Electronics
Home electronic products, laptop PCs
NEC Information Systems
Office computers, printers, etc.
NEC Research Institute
R&D center

Europe

NEC Ireland
ICs
NEC Semiconductor, United Kingdom
256K DRAMs
NEC Technologies, United Kingdom
VCRs, printers, car telephones, Faxes

Asia/Pacific

NEC Electronics Singapore
Linear ICs, 256K DRAMs
NEC Home Electronics, Malaysia
Home electronic products
NEC Semiconductor, Malaysia
ICs, discrete semiconductor devices
NEC Technologies, Thailand
Telephones
PERNAS NEC Telecommunications, Malaysia
Communications equipment
Siam NEC Company (Thailand)
Color TVs
Taiwan Telecommunications Ind.
Communications equipment

ROW

NEC Australia
ICs
NEC de Mexico
Communications equipment
NEC do Brazil
Telephone switching systems, radio equipment electronics
NEC Home Electronics, Australia
Color TVs
PECOM-NEC, Argentina
Digital electronic switching
Philco Argentina
TVs, radios, etc.

SUBSIDIARIES

Japan

ANELVA Corporation
Ando Electric Company, Ltd.
Japan Aviation Electronics Industry, Ltd.
NEC Akita, Ltd.
NEC Data Terminals, Ltd.
NEC Engineering, Ltd.
NEC Factory Engineering, Ltd.
NEC Field Service, Ltd.
NEC Fukui, Ltd.
NEC Fukuoka, Ltd.
NEC Fukushima, Ltd.
NEC Gunma, Ltd.
NEC Home Electronics, Ltd.
NEC Hyogo, Ltd.
NEC Ibaraki, Ltd.
NEC Information Service, Ltd.
NEC Kagoshima, Ltd.
NEC Kansai, Ltd.
NEC Kumamoto, Ltd.
NEC Kyushu, Ltd.
NEC Miyagi, Ltd.
NEC Nagano, Ltd.
NEC Niigata, Ltd.
NEC Oita, Ltd.
NEC Radio & Electronics, Ltd.
NEC Saitama, Ltd.
NEC San-ei Instruments, Ltd.
NEC Shizuoka, Ltd.
NEC Software, Ltd.
NEC System Integration & Construction, Ltd.
NEC Tohoku, Ltd.
NEC-Toshiba Information Systems Inc.
NEC Toyama, Ltd.
NEC Warehouse and Distribution, Ltd.
NEC Yamagata, Ltd.
NEC Yamaguchi, Ltd.
NEC Yonezawa, Ltd.
Nippon Avionics Co., Ltd.

©1990 Dataquest Incorporated

North America

NEC America, Inc. (United States)
NEC Electronics, Inc. (United States)
NEC Home Electronics, Inc. (United States)
NEC Industries, Inc. (United States)
NEC Information Systems, Inc. (United States)

Europe

NEC Deutschland GmbH (West Germany)
NEC Electronics GmbH (West Germany)
NEC Semiconductors (United Kingdom) Limited (United Kingdom)
NEC Semiconductors Ireland Limited (Ireland)
NEC (UK) Ltd. (United Kingdom)

Asia/Pacific

NEC Australia Pty. Ltd. (Australia)
NEC Electronics Singapore Pte. Ltd. (Singapore)
NEC Semiconductors Sdn. Bhd. (Malaysia)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

January 1989

MIPS Computer Systems
Siemens MIPS entered into a royalty-bearing technology exchange with Siemens and NEC for its RISC MPUs. NEC plans to manufacture the R2000A and R3000 devices and peripherals in Japan and Europe. Siemens will manufacture in Europe.

December 1988

Optoelectronics Research Labs
Photodiodes

November 1988

Summit Microcircuits
64K/256K fast SRAMS

April 1988

Enabling Technologies, Inc.
Strategic alliance with NEC Home Electronics (United States) to develop products and explore new technologies in graphics manipulation, animation, and optical media.

1988

British Telecom U.K.
Jointly developed car telephones. NEC's U.K. subsidiary, NEC Technologies, manufactures the new products for British Telecom.

Honeywell Bull
NEC Computer Systems and Honeywell Bull will cooperate in R&D of artificial intelligence.

Corvus Systems
NEC and Corvus Systems are involved in joint development of a CMOS single-chip controller.

Digital Research
NEC has a joint-marketing agreement with Digital Research regarding a CP/M operating system for the V Series.

Oki
NEC has developed a CMOS signal processor (uPD77C20) with Oki.

Sharp
NEC and Sharp agreed to jointly develop and produce V Series microperipherals. Under the agreement, NEC will provide its original microperipherals to Sharp on an OEM basis, and Sharp will develop new microprocessors for NEC.

Sharp and Sony
Sharp and Sony have been announced as second sources for the NEC V Series.

November 1987

Matra-Harris
16-bit single-chip MCUs

July 1987

SMC
Peripheral controllers

Cross-Licensing Partners, Patents, and Contract Terms

IBM Corporation
Information processing systems, N/A-12/90

©1990 Dataquest Incorporated

Technology Export, Patents, and Contract Terms

Unisys Corporation
Optical character readers, 6/81-6/89

Honeywell Bull
Supercomputers, 3/84-3/94

Standard Microsystems
Controllers for microcomputers, 7/88-N/A

Indian Telephone Industries

Bharat Electronics
Digital microwave equipment, 8/88-N/A

China
Large-capacity microwave equipment, 9/88-N/A

KEY OFFICERS

Koji Kobayashi
Chairman emeritus

Atsuyoshi Ouchi
Chairman of the board

Kenzo Nakamura
Vice chairman of the board

Tadahiro Sekimoto
President

Yoshiteru Ishii
Senior executive vice president

Koji Maeda
Senior executive vice president

Toshio Egashira
Senior executive vice president

Shozo Shimizu
Senior executive vice president

PRINCIPAL INVESTORS

Sumitomo Life Insurance—7.2 percent
Sumitomo Trust & Banking—5.0 percent
Sumitomo Bank—4.8 percent
Mitsubishi Trust & Banking—3.5 percent
Nippon Life Insurance—3.3 percent
Dai-ichi Mutual Life Insurance—3.1 percent
Sumitomo Marine & Fire Insurance—2.7 percent
Toyo Trust & Banking—2.7 percent
Sumitomo Electric Industries—2.3 percent
Sumitomo Corporation—2.3 percent
Foreign-owned—7.0 percent

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending March 31
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$7,087.3	$8,731.3	$12,052.2	$14,757.6	$15,971.4
Cash	533.0	822.6	1,229.0	1,685.9	2,930.5
Receivables	2,615.7	3,635.7	4,670.8	5,987.3	6,568.7
Marketable Securities	1,214.4	437.0	558.8	404.9	442.9
Inventory	2,096.4	3,087.9	4,100.2	5,243.0	5,140.1
Other Current Assets	627.8	748.1	1,493.4	1,436.5	889.2
Long-Term Receivables and Investments	$1,070.7	$1,563.9	$1,662.1	$2,101.1	$2,247.4
Net Property, Plants	$2,204.4	$3,621.0	$4,395.2	$5,490.5	$5,787.7
Other Assets	$439.0	$612.8	$834.9	$1,077.5	$1,154.6
Total Assets	$10,801.4	$14,529.0	$18,944.4	$23,426.7	$25,161.1
Total Current Liabilities	$6,280.4	$7,987.6	$10,162.9	$12,878.5	$13,234.8
Long-Term Debt	$2,527.4	$3,579.7	$5,052.8	$5,480.4	$6,431.1
Other Liabilities	$92.3	$163.7	$206.4	$283.9	$311.9
Total Liabilities	$8,900.1	$11,731.0	$15,422.1	$18,642.8	$19,977.8
Total Shareholders' Equity	$1,901.5	$2,798.1	$3,522.6	$4,784.2	$5,183.2
Common Stock	405.5	600.0	784.3	1,184.9	1,202.8
Additional Paid-In Capital	646.2	953.6	1220.0	1716.7	1842.9
Other Equity	52.9	44.9	49.1	64.0	75.1
Retained Earnings	797.4	1199.7	1470.0	1818.8	2068.9
Treasury Stock	(0.5)	(0.1)	(0.8)	(0.2)	(6.5)
Total Liabilities and Shareholders' Equity	$10,801.6	$14,529.1	$18,944.7	$23,427.0	$25,161.0

Income Statement	1985	1986	1987	1988	1989
Revenue	$9,232.0	$13,501.3	$17,159.1	$22,219.5	$23,509.5
Cost of Sales	$6,038.2	$8,868.7	$1,1654.5	$15,120.0	$15,778.2
R&D Expense	$1,144.2	$1,836.2	$2,629.2	$3,495.7	$3,657.4
SG&A Expense	$2,250.3	$3,422.9	$4,492.3	$5,863.0	$6,011.2
Capital Expense	$1,472.0	$1,647.7	$1,326.2	$2,016.0	$2,148.3
Pretax Income	$555.9	$661.9	$397.6	$566.0	$993.9
Pretax Margin (%)	6.02	4.90	2.32	2.55	4.23
Effective Tax Rate (%)	58.00	58.00	58.00	56.00	56.00
Net Income	$267.5	$152.7	$103.0	$204.5	$484.8
Shares Outstanding, Millions	1,177	1,309	1,380	1,398	1,438
Per Share Data					
Earnings	$0.19	$0.11	$0.07	$0.14	$0.31
Dividends	$0.03	$0.05	$0.06	$0.07	$0.07
Book Value	$1.62	$2.14	$2.55	$3.42	$3.60

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending March 31
(Millions of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	1.13	1.09	1.19	1.15	1.21
Quick (Times)	0.79	0.71	0.78	0.74	0.82
Fixed Assets/Equity (%)	115.93	129.41	124.77	114.76	111.66
Current Liabilities/Equity (%)	330.29	285.47	288.51	269.19	255.34
Total Liabilities/Equity (%)	468.06	419.25	437.80	389.67	385.43
Profitability (%)					
Return on Assets	-	1.21	0.62	0.97	2.00
Return on Equity	-	6.50	3.26	4.92	9.73
Profit Margin	2.90	1.13	0.60	0.92	2.06
Other Key Ratios					
R&D Spending % of Revenue	12.39	13.60	15.32	15.73	15.56
Capital Spending % of Revenue	15.94	12.20	7.73	9.07	9.14
Employees	90,102	95,796	101,227	102,452	104,022
Revenues($K)/Employee	$102.46	$140.94	$169.51	$216.88	$226.01
Capital Spending % of Assets	13.63	11.34	7.00	8.61	8.54

Source: NEC Corporation
Annual Reports
Dataquest (1990)

©1990 Dataquest Incorporated

Prime Computer, Incorporated

Prime Park
Natick, Massachusetts 01760
Telephone: (508) 655-8000
Fax: (508) 655-8000 ex. 5090
Dun's Number: 05-782-0458

Date Founded: 1972

CORPORATE STRATEGIC DIRECTION

Prime Computer, Incorporated, was founded in 1972 by seven engineers from Honeywell with the goal of creating a faster minicomputer. Today, Prime is a supplier of integrated system solutions to selected end-user markets. Prime's business can be divided into three broad categories: computer-aided design/computer-aided manufacturing/computer-aided engineering (CAD/CAM/CAE), distributed data processing systems, and customer service. Prime is primarily a value-added integrator of computer systems and workstations that can then be combined with application software to solve customers' needs. The Company is also expanding its consulting, training, and services.

In late 1989, Prime announced a new business plan that involved a significant restructuring of the Company. The new plan organizes the Company into profit centers focusing on the needs of Prime's diverse customer base. The profit centers are the Computervision Business Unit, the Computer Systems Business Unit, the Service Business Unit, the Systems Integration Business Unit, and the International Business Unit. The restructuring also calls for a 20 percent reduction in Prime's worldwide work force, with the most of the cuts being made in the United States. The reorganization is expected to streamline R&D programs and to reduce Prime's selling, general, and administrative expenses.

The Systems Integration Business Unit will concentrate on opportunities in the engineering market and database management activities. Services offered by this new unit will be software and hardware integration, systems consulting, project management, and custom systems. These services will be offered worldwide and marketed through Prime's global sales force.

The Computervision Business Unit is the result of Prime's 1988 merger with Computervision Corporation. This merger, along with the acquisition of the Calma Company, has made Prime Computer second only to IBM as a supplier of integrated CAD/CAM/CAE systems. Since the creation of this new business unit, all of Prime's CAD/CAM programs have been united under the name Computervision, regardless of their origin.

Prime intends to continue to be a premier supplier to the CAD/CAM market and to expand its products and services into the computer-integrated manufacturing (CIM) market. Prime also intends to increase its presence in the commercial and public sector with investments in strategic applications such as geographic information systems (GISs).

In the distributed data processing market, Prime will continue to support and expand its proprietary 50 Series line of minicomputers and focus on client-server computing with its UNIX-based EXL line of supermicrocomputers.

The principal markets for the Company's products are manufacturing, government, architectural, engineering, construction, education, financial services, telecommunications, and utilities.

Prime Computer has replaced its distributors with a two-tier MasterVAR-VAR structure. Prime has contracted with its first two MasterVARs—Unicomp (Dallas) and Minicomputer Associates Inc. (Jacksonville, Florida). Prime is attempting to reduce the

©1990 Dataquest Incorporated

number of VARs it uses while increasing support for those that remain. Ultimately, Prime expects the VAR channel to generate at least 50 percent of its UNIX volume.

After a long period of uncertainty, Prime Computer was acquired by DR Acquisition Corporation, an affiliate of J. H. Whitney & Co., a private New York-based investment firm. The acquisition took place in August 1989. Previous takeover attempts by Prime's rival MAI Basic Four, Inc., affected Prime's financial results adversely due to customers' concern and the costs associated with Prime's defense.

Prime's total 1989 revenue was $1.52 billion,* a 4.7 percent decrease from the previous year. This decline was minimized by a strong fourth quarter, which showed a 12.5 percent increase in product revenue over the third quarter. This was made possible by the resolution of MAI Basic Four's takeover threat and the completion of Prime's restructuring.

Research, development, and engineering expenditure, which represented 13 percent of total revenue through the first seven months of 1989, totaled $173.2 million for 1989, down from $174.3 million the previous year. Under Prime's new business plan, R&D will no longer be organized as a corporate function, but rather will operate within each business unit.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this backgrounder. Because Prime became a privately held company when it was acquired by J. H. Whitney & Co. in August 1989, comprehensive financial information is not available after the fiscal year ended December 31, 1988.

BUSINESS SEGMENT STRATEGIC DIRECTION

Computervision Business Unit

As mentioned previously, Prime's Computervision is the second largest worldwide supplier of CAD/CAM solutions, with emphasis on the automotive, industrial equipment, and aerospace markets for mechanical CAD/CAM systems. Manufacturers use Computervision CAD/CAM systems and engineering data management systems to reduce product development time, lower development and manufacturing costs, and improve product quality. Utility companies and government agencies use Computervision GISs to improve service efficiency and asset utilization. In 1989, this business unit accounted for 32 percent of Prime's total revenue.

Computervision has over 50,000 workstation- and minicomputer-based seats installed throughout the world, as well as 100,000 personal computer-based seats installed. In 1989, more than 60 percent of Computervision's revenue was derived from markets outside the United States. Computervision has sales and support offices in 21 countries and distributors in 33 countries.

CADDS software is an integrated CAD/CAM software product line used to design, analyze, and manufacture complex components and assemblies. It provides a solution for manufacturers involved in the entire product development process, from conceptual design to product delivery. It is employed in a variety of industries, including automotive, aerospace, electronics, consumer goods, and defense. CADDS software runs on the Sun SPARCstation in a bundled CADDStation configuration. Over 350 modules provide specific architectural, engineering, and construction (AEC) and mechanical, manufacturing, and electronics design applications.

CADDStation Systems are a complete line of Computervision's family of Motorola 68020-based engineering workstations. The CADDStation is a modified Sun 3/XXX workstation running proprietary high-performance graphics under Dun's version of the UNIX operating system software. The systems are available in bundled configurations for multidiscipline CAD/CAM users.

Prime plans to incorporate its two versions of Medusa (one of which was developed by Prime, the other by Computervision) into a single product under the Computervision brand name. Medusa is a set of CAD/CAM application products used by companies in discrete manufacturing, AEC activities, and facilities management. Its "electronic drawing board"

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

approach is well-suited to customers that prefer to implement CAD incrementally, providing systems to individual engineers or departments over a period of time. Medusa is sold worldwide through a direct sales force.

The Personal Computer Business Unit (PCBU) is a division of Computervision comprising two software product families: Personal Systems and VersaCAD. Personal Systems products are based on CAD/CAM software applications that run on IBM-compatible PCs operating MS-DOS and extended DOS, SUN386i's running UNIX operating systems, and SPARCstations. The packages include Personal Designer for 3-D mechanical design input, geometric modeling, and surface design, and the Personal Machinist for extracting and combining design data from the Personal Designer for numerical control programming and distributed numerical control.

Versacad software runs on IBM-compatible PCs, the Apple Macintosh, and UNIX workstations from Sun and HP/Apollo. It is used for a variety of applications, including AEC, mechanical design, facilities design and management, and mapping.

Other Computervision products include the Product Design Graphic System (PDGS) and the Calma product family. PDGS is used to design complex sculptured surfaces such as automobile bodies. The Calma product family is used in mechanical and AEC industries. It includes Prism/DDM software, an integrated analytic solids, surface, and wireframe modeler; and Dimension III, a software package used by companies in the AEC industry. Dimension III provides 3-D design applications for piping, structural steel, concrete, civil site layout, and electrical layout. It is used to design oil refineries, electrical power generation plants, offshore oil platforms, and other complex facilities.

Prime markets the Computervision GIS product line including mapping products, civil engineering solutions, and the GIS System 9 geoprocessing applications. These products are sold primarily to municipal and federal government agencies and public transportation and utility companies.

Prime experienced moderate growth in its 1989 CAD/CAM business. Revenue increased to $890 million, 5 percent over 1988's revenue of $850 million. Dataquest estimates that in 1989 Prime's Computervision Unit held 7.0 percent of the worldwide CAD/CAM/CAE market. In the worldwide mechanical CAD/CAM market segment, Prime captured 12.4 percent and ranked second. Prime ranks fourth among the worldwide AEC CAD/CAM vendors with 6.4 percent of the market. Dataquest further estimates that, in the worldwide PCB layout CAD/CAM market, Prime ranks sixth with 4.5 percent share.

DR Acquisition Corporation is considering selling Prime's Computervision Unit by the middle of the 1990s.

Computer Systems Business Unit

The Computer Systems Business Unit accounted for approximately 28 percent of Prime's total 1989 revenue. This unit comprises the 50 Series and PRIME EXL hardware product lines, database management software products, and communications and networking products.

Prime's 50 Series is a line of compatible, 32-bit superminicomputers that run on the Company's proprietary PRIMOS operating system. The nine systems in this product line range in size from office-installable machines to computer-room systems. Prevalent applications include accounting systems, administration, manufacturing management, order processing, and distribution. The two newest models in the 50 Series, the 6450 and the dual 6650, increase the line's performance range up to 29 percent in multiuser applications. The new models, introduced in 1990, are built in VLSI ECL technology.

Dataquest estimates that Prime ranked 13th in the worldwide midrange computer market with approximately 1.7 percent market share based on revenue of $489.3 million.

The PRIME EXL Series is a family of supermicrocomputers based on the industry-standard Intel 386 family of microprocessors and running a version of the UNIX operating system. These multiuser, multitasking systems offer users ease of development or delivery, transparent PC and file access to DOS applications, and departmental solutions. The EXL Series also runs MS-DOS and PICK applications, and can communicate with 50 Series systems, IBM PCs, and other compatibles. Within the PRIME EXL Series,

©1990 Dataquest Incorporated

the entry-level PRIME EXL MBX and midrange 300 Series are single-processor systems. The midrange to high-end 1200 Series products are multiprocessor configurations with 8 to 32 processors.

Database-related products include Prime INFORMATION and ORACLE. Prime INFORMATION is a flexible relational-based data management system that has a prominent position in the PICK database market. Prime's version of ORACLE is compatible with all ORACLE-based applications. It offers users a complete set of administrative utilities and software tools for application development and provides transparent connectivity in a multivendor, open-systems environment.

Service Business Unit

Prime provides hardware and software maintenance for approximately 27,000 systems and 10,000 customers worldwide through its Service Business Unit, which is responsible for all field service and support for all the Company's product lines. In 1989, this unit accounted for 40 percent of total Company revenue. It employs approximately 3,300 people at over 180 locations.

This unit also offers a wide variety of courses and customized instruction for customers. Currently, more than 150 self-paced and traditional educational courses are offered worldwide.

Systems Integration Business Unit

The Systems Integration Business Unit provides customers with total system integration and project management capabilities that address strategic information needs. It concentrates on opportunities in the engineering market and database management activities. The business unit proposes, designs, and implements projects including Prime standard products, custom-designed products, and externally purchased products and subsystems. The Systems Integration Unit offerings include systems integration project management, business, and technology consulting services; custom hardware and software products; externally purchased hardware, software, and services; and special education, training, and seminars.

International Business Unit

The International Business Unit is responsible for marketing the full line of Prime's products and services outside the United States. As mentioned previously, 60 percent of the Company's revenue is generated in international markets. In order to serve customers in over 60 countries, Prime has established international headquarters in Munich, Germany; marketing subsidiaries in large markets; and an international distributor network to serve developing markets.

Prime is a founding member of UNIX International and a member of X/Open, a consortium of international computer systems vendors that are developing a Common Applications Environment based on de facto and international standards.

Further Information

For further information about the Company's business segments, please contact the appropriate Dataquest industry service.

©1990 Dataquest Incorporated

Table 1
Corporate Highlights* (Millions of US Dollars)

	1985	1986	1987	1988
Four-Year Revenue	$769.7	$860.2	$960.9	$1,595.2
Percent Change	-	11.76	11.71	66.01
Capital Expenditure	$73.1	$86.2	$82.6	$140.3
Percent of Revenue	9.50	10.02	8.60	8.80
R&D Expenditure	$81.1	$91.9	$109.7	$174.3
Percent of Revenue	10.54	10.68	11.42	10.93
Number of Employees	8,115	8,621	8,818	12,386
Revenue ($K)/Employee	$94.85	$99.78	$108.97	$128.79
Net Income	$57.8	$46.9	$64.8	$19.0
Percent Change	-	(18.86)	38.17	(70.68)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$387.00	$381.96	NA	NA
Quarterly Profit	NA	NA	NA	NA

*Because the Company became privately held in 1989, comprehensive financial information is no longer available.
NA = Not available

Source: Prime Computer, Incorporated Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	55.26	54.81	53.48	44.66	45.0
International	44.74	45.19	46.52	55.34	55.0
Europe	30.90	32.60	33.53	43.00	41.2
Asia/Pacific	13.84	12.54	12.99	12.34	13.8

Source: Prime Computer, Incorporated Annual Reports and Forms 10-K Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	80.83	NA
Indirect Sales	18.27	NA
VARs	14.73	NA
Distributors	3.54	NA

NA = Not available

Source: Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS

North America—100
Europe—46
Asia/Pacific—30
  Japan—4
ROW—29

MANUFACTURING LOCATIONS

North America

Framingham, Massachusetts
  Systems
Manchester, New Hampshire
  Systems (closed recently)
Ponce, Puerto Rico
  Systems

Europe

Coolock, Ireland
  Systems

SUBSIDIARIES

North America

CIS Inc. (United States)
Computervision Corporation (United States)
Computervision Securities Corporation (United States)
CV Holdings, Inc. (United States)
Prime Computer, Inc. de Puerto Rico (Puerto Rico)
Prime Computer International (United States)
Prime Computer International Services Limited (United States)
Prime Computer Investment, Ltd. (United States)
Prime Computer Leasing Limited (United States)
Prime Computer of Canada Limited (Canada)
Prime Computer Pensions Limited (United States)
Prime Computer R&D Limited (United States)
Prime Computer Service Limited (United States)
Prime Insurance, Ltd. (United States)
Prime Wild GIS, Inc. (United States)
VersaCAD Corporation (United States)

Europe

CIS Medusa B.V. (Netherlands)
Computervision A.B. (Sweden)
Computervision A/S (Norway)
Computervision B.V. (Netherlands)
Computervision Coordination Centre S.A. (Spain)
Computervision Danmark A/S (Denmark)
Computervision Handelsgesellschaft mbH (Germany)
Computervision Inc. (Europe)
Oy Prime Computer AB (Finland)
Prime Computer (Denmark)
Prime Computer, AG (Switzerland)
Prime Computer A/S (Norway)
Prime Computer, B.V. (Benelux)
Prime Computer CAD/CAM, B.V. (Netherlands)
Prime Computer De Espana, S.A. (Spain)
Prime Computer Finance, B.V. (Netherlands)
Prime Computer, GmbH (Germany)
Prime Computer Italia, S.P.A. (Italy)
Prime Computer Limited (United Kingdom)
Prime Computer Ltd. (Ireland)
Prime Computer S.A./N.A. (Belgium)
Prime Computer Scandinavia, AB (Scandinavia)
Prime France, S.A. (France)
Prime Wild GIS, A.G. (Switzerland)

Asia/Pacific

Computervision China Inc. (China)
Computervision Designer Systems Ltd. (Hong Kong)
Computervision Far East Ltd. (Pakistan)
Computervision Japan Ltd. (Japan)
Computervision Pte Ltd. (Singapore)
Prime Computer Japan, Inc. (Japan)
Prime Computer Limited (Hong Kong)
Prime Computer of Australia Limited (Australia)
Prime Computer Pte Limited (Singapore)
Prime Retirement Benefits Funds Pty. Limited (Australia)
Prime Wholesale Pty. Limited (Australia)

ROW

Computervision Do Brasil (Brazil)
Industrial E Comercio Limited (Brazil)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Minardi Team
  Computervision signed an agreement with the Minardi Team, a European designer of Formula

©1990 Dataquest Incorporated

One race cars. Computervision will act as a technology sponsor and will supply its Personal CAD/CAM technology to Minardi.

Sun Microsystems, Inc.
Prime has signed a two-year, $200 million agreement to resell SPARC workstations and servers from Sun.

BellSouth Corporation and AT&T
Prime Computer achieved successful integration of high-speed, primary-rate Integrated Services Digital Network (ISDN) between its computer installations in Atlanta, working closely with Bellsouth and AT&T. Prime is the first major computer supplier to successfully integrate its wide area networking services with ISDN at primary-rate interface speeds of up to 1.544 Mbps.

1989

Korea Computer
Prime and Korea Computer will jointly operate an educational institute in South Korea to expand use of CAD/CAM technology. Students will be referred to the institute by their industries and will receive full scholarships from the two parent companies.

Phoenix Technologies
Prime will license MS-DOS emulation from Phoenix Technologies. Prime will provide Phoenix Open PC MS-DOS software as a standard feature on its SPARC-based WS42C workstation. The software allows users of the SPARC computer to switch between DOS applications and programs operating under the workstation's native UNIX operating system.

Object Management Group (OMG)
OMG is an international organization devoted to making computer systems and software from different manufacturers communicate and work together more efficiently using object-oriented technology. Members of the group include Prime, Canon, Philips International, Sun Microsystems, 3COM, and Unisys, among others. In joining, each company commits to researching or developing products based on the common applications environment.

G&R Technologies
This Midwestern distributor of microcomputer-based presentation graphics and computer imaging entered a MasterVAR agreement with Prime to market Prime's EXL line of UNIX-based supermicrocomputers.

Number Nine Computer
POWER9, Number Nine's display list processing software for its PEPPER graphics board family, has been released for Prime/Computervision's Personal Designer series CAD software. Number Nine and Prime worked together to achieve CAD workstation performance levels in a desktop platform.

Novell
The companies are jointly developing LAN solutions that incorporate the Prime EXL family of UNIX-based multiuser computers and Novell's Netware Software.

General Electric
The companies are jointly developing CAD/CAM software.

Sun Microsystems
Prime is developing, manufacturing, and marketing workstation platforms together with Sun to serve Prime's application markets.

1988

Wild Leitz Group
The companies formed a joint venture company called Prime Wild GIS Inc., which will market and develop System 9, an advanced geographic information system.

Intel
The companies are conducting shared research into a multiprocessing implementation of the UNIX operating system.

Dialcom Inc.
The companies formed an alliance for integrated messaging.

MERGERS AND ACQUISITIONS

1988

Computervision
Prime merged with Computervision, a leading supplier of computer-based interactive graphics systems and services to the CAD/CAM/CAE market.

©1990 Dataquest Incorporated

Calma Company
Prime acquired the mechanical/AEC CAD/CAM assets of the Calma Company, a subsidiary of General Electric. The acquisition provided Prime with access to more than 800 Calma CAD/CAM customers, including General Electric.

1987

VersaCAD Corporation
Prime acquired VersaCAD, a vendor of PC-based CAD and CAE software.

KEY OFFICERS

James F. McDonald
Vice chairman and chief executive officer

John T. Shields
President and chief operating officer

Lawrence M. Bornstein
Vice president, Human Resources

Anthony N. Fiore, Jr.
Vice president, general counsel, and secretary

Joseph F. Pesce, Jr.
Vice president, corporate controller, and treasurer

Harvey A. Wagner
Vice president, Finance, Administration, and Planning, and chief financial officer

Richard L. Ballantyne
Vice president and general counsel

Kathleen A. Cote
Vice president, Manufacturing

Robert A. Fischer
Vice president, Marketing and Business Development

Michael H. Forster
President, Americas

Vladimir P. Geisberg
Vice president, CAD/CAM Product Development

Cornelius P. McMullan
Vice president and general manager, Asia/Pacific Operations

PRINCIPAL INVESTORS

State Treasurer, State of Michigan—6.2 percent
Trinity Investment Management Corp.—5.3 percent

FOUNDERS

Information is not available.

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement*
Fiscal Year Ending December
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988
Total Current Assets	$390.7	$429.6	$924.0	$808.3
Cash	67.9	87.6	490.2	107.8
Receivables	220.7	225.1	316.9	500.4
Inventory	82.9	95.8	87.3	147.6
Other Current Assets	19.2	21.1	29.6	52.5
Net Property, Plants	$186.8	$225.6	$255.9	$372.6
Other Assets	$24.0	$35.2	$154.7	$470.0
Total Assets	$601.5	$690.4	$1,334.6	$1,650.9
Total Current Liabilities	$121.8	$146.2	$235.7	$445.7
Long-Term Debt	$10.0	$10.0	$493.5	$561.2
Other Liabilities	$86.4	$93.4	$101.6	$102.3
Total Liabilities	$218.2	$249.6	$830.8	$1,109.2
Total Shareholders' Equity	$383.3	$437.8	$503.8	$541.7
Common Stock	104.3	105.5	120.4	130.9
Other Equity	(13.9)	(7.5)	(21.2)	(12.8)
Retained Earnings	292.9	339.8	404.6	423.6
Total Liabilities and Shareholders' Equity	$601.5	$687.4	$1,334.6	$1,650.9
Income Statement	**1985**	**1986**	**1987**	**1988**
Revenue	$769.7	$860.2	$960.9	$1,595.2
US Revenue	425.3	471.5	513.9	712.4
Non-US Revenue	344.4	388.7	447.0	882.8
Cost of Sales	$358.4	$407.2	$448.2	$810.2
R&D Expense	$81.1	$91.9	$109.7	$174.3
SG&A Expense	$251.6	$297.7	$320.9	$494.9
Capital Expense	$73.1	$86.2	$82.6	$140.3
Pretax Income	$77.0	$62.6	$86.4	$17.8
Pretax Margin (%)	10.00	7.28	8.99	1.12
Effective Tax Rate (%)	25.00	24.90	25.00	27.00
Net Income	$57.8	$46.9	$64.8	$19.0
Shares Outstanding, Millions	48.2	48.4	49	48.5
Per Share Data				
Earnings	$1.20	$0.97	$1.32	$0.39
Dividend	0	0	0	0
Book Value	$8.10	$9.10	$10.50	$10.90

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement*
Fiscal Year Ending December
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988
Liquidity				
Current (Times)	3.21	2.94	3.92	1.81
Quick (Times)	2.53	2.28	3.55	1.48
Fixed Assets/Equity (%)	48.73	51.53	50.79	68.78
Current Liabilities/Equity (%)	31.78	33.39	46.78	82.28
Total Liabilities/Equity (%)	56.93	57.01	164.91	204.76
Profitability (%)				
Return on Assets	-	7.26	6.40	1.27
Return on Equity	-	11.42	13.76	3.63
Profit Margin	7.51	5.45	6.74	1.19
Other Key Ratios				
R&D Spending % of Revenue	10.54	10.68	11.42	10.93
Capital Spending % of Revenue	9.50	10.02	8.60	8.80
Employees	8,115	8,621	8,818	12,386
Revenue ($K)/Employee	$94.85	$99.78	$108.97	$128.79
Capital Spending % of Assets	12.15	12.49	6.19	8.50

*Because the Company became privately held in 1989, comprehensive financial information is no longer available.

Source: Prime Computer, Incorporated Annual Reports and Forms 10-K Dataquest (1990)

©1990 Dataquest Incorporated

Racal Electronics Plc

Western Road
Bracknell, Berkshire RG12 1RG
England
Telephone: (0344) 481222
Fax: (0344) 54119
Dun's Number: 10-193-9122

Date Founded: 1950

CORPORATE STRATEGIC DIRECTION

Racal Electronics Plc is known for three principal businesses: telecommunications, data communications, and security. Its Racal-Vodafone subsidiary in the United Kingdom is one of the world's largest and most profitable cellular radio companies and is the main contributor to Racal Electronics' profitability.

Racal's security business is its most important area, accounting for 33 percent of the Company's sales in 1989. Data communications was the second most important, representing 18 percent of sales, followed very closely by telecommunications, which contributed 15 percent. The Company's other four businesses—specialized businesses, radio communications, marine and energy, and defense radar and avionics—in combination made up the remaining 33 percent.

Racal's total revenue increased 16 percent to £1,589 million (US$2,605 million) in fiscal 1989 from £1,366 million (US$2,398 million) in fiscal 1988. (Percentage changes refer to £ amounts only; US$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) Net income increased 28 percent to £177 million (US$290.7 million) in fiscal 1989 from £138 million (US$226.2 million) in fiscal 1988. Racal Electronics employs approximately 33,702 people worldwide.

Europe's sales contribution to Racal's total revenue grew to £1.0 billion (US$1.7 billion) in 1989. Sales to the European countries accounted for 62 percent of the total, up slightly from 61 percent in 1988.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information on revenue by distribution channel is not available. Table 3, a financial statement, is at the end of this backgrounder. Due to the Company's accounting methods, a financial ratio analysis and comprehensive financial statements are not available.

BUSINESS SEGMENT STRATEGIC DIRECTION

Security

The Company's security group is the largest security business in the world with wide geographical and product coverage. Sales of Racal's security products totaled £527.8 million (US$865.2 million) in 1989. Racal is the international leader in providing electronic and physical security systems as well as fire detection and protection systems. Products in this business segment include safes that use a lightweight nonmetallic barrier material, safe enclosures, car locks, portable extinguishers, firefighting products for the offshore oil and gas industry, intruder alarms, locks and electronic security systems, and foam systems.

Telecommunications

Racal Telecom, in which Racal Electronics has an almost 80 percent equity interest, is the provider of mobile telecommunications including cellular radio, wide area paging, trunked private mobile radio, packet radio, and value-added network services. Sales of Racal's Telecom products totaled £241.7 million (US$424 million) in 1989.

©1990 Dataquest Incorporated

During March 1990, Racal-Vodafone celebrated the connection of the 500,000th subscriber to the Vodafone network, which is now the largest contiguous mobile telephone service in the world.

Data Communications

The Data Communications Group deals with business communications products in the areas of data, text, image, and voice. Racal produces equipment ranging from modems and multiplexers to local area networks (LANs) and packet-switching devices for digital services. Sales of Racal data communications products rose 12.7 percent in 1989 to £286 million (US$468.8 million). The Racal-Milgo Limited's Private Local Area Network (PLANET) system was designed to enable linking a wide range of equipment such as mainframes, personal computers, video display units, word processors, telex and viewdata terminals, disk storage file servers, and printers. Dataquest estimates that the Racal-Milgo subsidiary ranked third in the US modem market with 11 percent of the market share. Racal-Vadic, another Racal supplier of modems, was merged with Racal-Milgo in 1989. In 1988, before the merger, Racal-Vadic ranked ninth with 3.8 percent of the US market share. In the statistical multiplexer industry segment, Racal-Milgo was one of the top ten companies and commanded 4.2 percent of the worldwide market share in 1988.

Racal's change in emphasis within the Data Communications Group toward systems, managed networks, and network services continued in 1989. The group's first network services success, Government Data Network, was accepted into service in 1989. In fiscal 1989, Racal also acquired Quanta, a fiber-optic multiplexer company, and Interlan, the US-based local area networking company.

Racal InterLan designs and manufactures hardware and software solutions for standards-based local area networking at the work group, departmental, and premises levels. Headquartered in Boxborough, Massachusetts, Racal InterLan employs 275 people in the United States and abroad. Racal InterLan is a subsidiary of The Racal Corporation of Fort Lauderdale, Florida, a company within the US$550 million Data Communications Group of the US$3.2 billion parent corporation, Racal Electronics Plc.

Radio Communications

Racal is one of the world leaders in the radio communications field. Currently, it supplies military and civilian customers in more than 140 countries. Sales for the radio communications group totaled £133.5 million (US$218.8 million) in 1989. The Company specializes in the provision of a wide range of turnkey systems based on a number of radio technologies such as mobile, fixed, and air-transportable. These systems may be linked over local and wide area networks and used for medium- and long-haul communications links.

The Company also has an outstanding line of advanced technology products, from hand-held radios to high-power transmitters. These products have been designed to meet the needs of widely diverse users in tactical and strategic defense, security and paramilitary operations, and a variety of civil roles.

Racal entered the UK market as an operator and supplier of cellular mobile telephone systems. To secure itself in this market, Racal formed two companies: Racal-Vodac, to market the mobile telephone handset equipment; and Racal-Vodafone, to establish the cellular transmission and switching network.

Racal supplies three types of mobile equipment: a mobile telephone for automobiles, a portable telephone, which is a short-range handset unit, and a transportable telephone, which can be used for either purpose. During 1989, Vodafone continued to be the UK market leader, offering service to more than 90 percent of its territory.

Defense Radar and Avionics

Racal defense radar and avionics companies supply radar, electronic warfare systems, and high-performance radar for surface-to-air missile systems. Sales for Defense Radar and Avionics products totaled £126 million (US$206.5 million) in 1989. A key user of these products is the United Kingdom's Royal Navy. In the avionics sector, Racal established its flight management systems for civil and military fixed- and rotary-wing applications. These systems control and display all aspects of navigation, flight performance, communications, monitoring, and mission management.

During 1990, Britain's Racal Electronics is holding discussions with British, US, and European defense companies regarding a joint venture to remain competitive in the radar business. The decision comes on the heels of an earlier decision to cease the Company's efforts to divest itself of its defense business, but

©1990 Dataquest Incorporated

Racal decided instead to consolidate and reorganize those efforts. The Company believes a joint venture with another company for future radar work is the best response to reductions in the defense budget.

Marine and Energy

Racal's marine and energy electronics sector supplies advanced terrestrial and satellite systems for navigation and positioning. For merchant and naval ships, pleasure craft, and fishing boats, these products are designed to improve efficiency and safety. Products range from a simple radar system to fully customized, integrated electronic systems covering an entire ship. The new range of deep-sea radars made a major impact in fiscal year 1989, with sales volumes increased by more than 20 percent. Sales for Racal's Marine and Energy Group totaled £105.7 million (US$173.2 million) in 1989.

Seismic exploration grew strongly worldwide while drilling activity continued at a high level. The group's established networks of high-accuracy, short- and medium-range positioning chains benefited accordingly and were aided by the incorporation of satellite techniques. Sales of the MICRO-FIX high-accuracy, short-range positioning system, used extensively for dredging and offshore work, increased 50 percent.

Specialized Businesses

Sales for Specialized Businesses totaled £168.3 (US$275.9 million) in 1989.

Data and Communications Recording

The acoustics area deals with high-noise-level environments for both military and civilian communications markets. The products include transducers, microphones, handsets, headsets, protective communications helmets, field telephones, intercom systems, and on-board audio management systems for trains and aircraft.

The Company continued to make progress with its new airborne satellite communications antennas, which are being used for passenger trials in British Airways aircraft.

Electronic Design Automation

Racal-Redac is addressing the increasing requirement of its customers for a fully integrated system for the design and verification of electronic circuits and their physical implementation as printed circuit boards (PCBs) or application-specific integrated circuits (ASICs). Dataquest estimates that Racal-Redac had 6.4 percent of the 1989 revenue share in the worldwide PCB layout sector of the computer-aided design/computer-aided manufacturing (CAD/CAM) industry. It ranked among the top ten CAD/CAM vendors participating in PCB layout applications.

During 1990, Racal Electronics acquired Silc Technologies for US$3.2 million. Silc is a spinoff of GTE and will become a subsidiary of Racal with the completion of the deal. Silc, which has 30 employees, is expected to add its SilcSyn technology to the Racal-Redac Visula design system.

Silc and HHB, a Racal subsidiary, entered an agreement in 1989 to develop an interface between Racal-Redac's IC simulation system and the SilcSyn design system. The agreement also included Racal-Redac distributing the SilcSyn design system. The acquisition of Silc Technologies is expected to strengthen Racal-Redac's position in the design-automation market and provide a wider range of design tools from which to choose. Silc was founded in February 1987 and shipped its first product, the SilcSyn ASIC Design System, in mid-1988.

Health and Safety

Racal's products for health and safety include a line of hearing protectors, the lightweight Jupiter antidust helmet, a dual-air protection system, and the Zephyr power respirator for dentists. Hearing and respiratory protection equipment achieved an increase of more than 20 percent in both sales and profit in fiscal 1989.

Further Information

For more information about the Company's business segments, please contact the appropriate Dataquest industry service.

©1990 Dataquest Incorporated

Table 1
Corporate Highlights* (Millions of US Dollars)

	1986	1987	1988	1989
Four-Year Revenue	$1,862.2	$2,116.1	$2,397.9	$2,788.4
Percent Change	29.54	13.63	13.32	16.29
Net Income	$132.7	$164.4	$246.5	$312.2
Percent Change	(22.8)	23.9	50.0	26.6
Number of Employees	32,545	32,418	31,910	33,702
Revenue ($K)/Employee	$57.22	$65.28	$75.15	$82.74
Exchange Rate (US$1=£)	£0.68	£0.61	£0.57	£0.61

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	NA	NA	NA	NA
Quarterly Profit	NA	NA	NA	NA

NA = Not available
*Highlights for 1985 were not available.

Source: Racal Electronics Plc Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989
Europe	53.00	57.00	61.00	62.00
All Others	47.00	43.00	39.00	38.00
North America	25.00	23.00	20.00	18.00
Asia/Pacific	17.00	15.00	14.00	16.00
ROW	5.00	5.00	5.00	4.00

Source: Racal Electronics Plc Annual Reports
Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Florida, United States
Data communications equipment

Europe

Warrington, United Kingdom
Data communications equipment

SUBSIDIARIES

Companies in this list are wholly owned by Racal Electronics Plc except where stated. Subsidiaries of these companies are inset beneath the parent company.

North America

ACS Communication Systems Inc. (United States)
Chubb National Foam Inc. (United States)
Decca Electronics Inc. (United States)
Racal Avionics Inc. (United States)
Racal (Canada) Inc. (Canada)
Racal-Chubb Canada Inc. (Canada)
Racal-Chubb Electronic Security Systems Inc. (United States)
Racal-Chubb Inc. (United States)
Racal Communications Inc. (United States)
Racal-Data Communications Inc. (United States)
Racal-Data Instruments Inc. (United States)
Racal Decca Canada Limited (Canada)
Racal Electronics Inc. (United States)
Racal Filter Technologies Limited (Canada)
Racal Guardall Inc. (United States)
Racal-Guardata Inc. (United States)
Racal Health & Safety Inc. (United States)
Racal-Milgo Limited (United States)
Racal Recorders Inc. (United States)
Racal-Redac Inc. (United States)
Racal Survey (Canada) Inc. (Canada)
The Racal Corporation Canada Inc. (Canada)
The Racal Corporation (United States)

Europe

Ablex Audio Video Limited (United Kingdom)
A.R.E.—Applicazioni Radio Elettroniche SpA (67.5 percent) (Italy)
C.E. Marshall (Wolverhampton) Limited (United Kingdom)
Chubb Alarms Limited (United Kingdom)
Chubb Wardens Limited
Chubb & Son Scandinavia AB (Sweden)
Chubb Electronics Limited (United Kingdom)
Chubb Fire Limited (United Kingdom)
Chubb National Foam Limited, Racal Panorama Limited
Chubb Fire Security Limited (United Kingdom)
Chubb International Limited (United Kingdom)
Chubb Ireland Limited (Ireland)
Chubb Lips Nederland BV (Netherlands)
Chubb Lips Systemen BV (Netherlands)
Chubb (N.I.) Limited (Northern Ireland) (United Kingdom)
Chubb Parsi SA (Spain)
Chubb Securite SA (France)
Chubb-SIA SpA (Italy)
Chubb Sicherheitstechnik Vertrieb GmbH (Germany)
Decca Limited (United Kingdom)
Decca Radio and Television Limited (United Kingdom)
Decca Survey Overseas Limited (United Kingdom)
De Culemborgse Beveiligingsdienst BV (Netherlands)
Fibre Form Limited (United Kingdom)
Gispen Buroeinirchtung GmbH (Germany)
Gispen + Staalmeubel BV (Netherlands)
Hormann Sicherheitstechnik GmbH (Germany)
H.S. Control Systems Limited (United Kingdom)
International Navigatie Apparaten BV (Netherlands)
Josiah Parkes & Sons Limited (United Kingdom)
L&F Willenhall Limited (United Kingdom)
Lips & Gispen BV (Netherlands)
Lips-Vago Elettronica SpA (Italy)
Lips-Vago SpA (Italy)
Lynx Alarm SA (France)
Nederland Survey Projecten en Apparatuur BV (Netherlands)
NV Security Industries SA (Belgium)
Racal Acoustics Limited (United Kingdom)
Racal Antennas Limited (United Kingdom)
Racal Arbeitssicherheit GmbH (Germany)
Racal Avionics Limited (United Kingdom)
Racal-Chubb Data Security Limited (United Kingdom)
Racal-Guardata Limited, Racal-Guardata Financial Systems Limited, Racal-Transcom Limited

©1990 Dataquest Incorporated

Racal-Chubb Limited (United Kingdom)
Albert Marston & Company Limited, Chubb & Sons Lock and Safe Company Limited, Chubb Security Installations Limited
Racal-Chubb Security Systems Limited (United Kingdom)
Racal Communications Limited (United Kingdom)
Racal Communications Systems Limited
Racal-Comsec Limited (United Kingdom)
Racal-Dana Instruments SA (France)
Racal-Decca Advanced Development Limited (United Kingdom)
Racal-Decca Limited (United Kingdom)
Racal-Decca Marine Navigation Limited (United Kingdom)
Racal-Decca Navigator A/S (Denmark)
Racal-Decca Service Limited (United Kingdom)
Racal Defense Radar Limited (United Kingdom)
Racal Defense Electronics (Radar) Limited, Racal Defense Radar and Displays Limited, Racal Radar Defense Systems Limited
Racal-Dena Instruments Italia Srl (Italy)
Racal Electronics Deutschland Holding GmbH (Germany)
Racal Electronics Europe BV (Netherlands)
Racal Electronics France SA (France)
Racal Electronics Ireland Limited (Ireland)
Racal Electronics SA (Switzerland)
Racal Elektronik System GmbH (Germany)
Racal Engineering Limited (United Kingdom)
Racal Finance Limited (United Kingdom)
Racal Group Services Limited (United Kingdom)
Racal-Guardall (Scotland) Limited (United Kingdom)
Racal-Guardall (Sales) Limited
Racal-Guardall Espana Sa (Spain)
Racal-Guardall SA (France)
Racal-Guardall Srl (Italy)
Racal Health & Safety AB (Sweden)
Racal Imaging Systems Limited (United Kingdom)
Racal Information Technology Services Limited (United Kingdom)
Racal Instrumentation Limited (United Kingdom)
Racal Automation Limited, Racal-Dana Instruments Limited, Racal Recorders Limited
Racal International Limited (United Kingdom)
Racal Marine Electronics Limited (United Kingdom)
Racal Marine Group Limited (United Kingdom)
Racal Marine Ireland Limited (Ireland)
Racal Marine Systems Limited (United Kingdom)
Racal-MESL (France) SARL (99.5 percent) (France)
Racal-MESL Limited (Scotland) (United Kingdom)
Racal Microelectronic Systems Limited (United Kingdom)
Racal-Milgo (Belgium) SA-NV (Belgium)
Racal-Milgo BV (Netherlands)
Racal-Milgo Gmbh (Germany)
Racal-Milgo Italia Srl (Italy)
Racal-Milgo Limited (United Kingdom)
Racal Network Services Limited (United Kingdom)
Racal Data Networks Limited, Racal Voice Networks Limited
Racal Norge A/S (Norway)
Racal Oil and Gas Limited (United Kingdom)
Racal Properties Limited (United Kingdom)
Racal Protection SARL (France)
Racal Radar A/S (Denmark)
Racal-Redac AB (Sweden)
Racal-Redac BV (Netherlands)
Racal-Redac Group Limited (United Kingdom)
Racal-Redac Systems Limited, Racal-Redac UK Limited
Racal-Redac Italia Srl (Italy)
Racal-Redac SA (France)
Racal-Redac-Design-System GmbH (Germany)
Racal Research Limited (United Kingdom)
Racal Safety Limited (United Kingdom)
Racal Survey China Limited (United Kingdom)
Racal Survey Limited (United Kingdom)
Racal Survey Norge A/S (Norway)
Racal Survey (UK) Limited (United Kingdom)
Racal Svenska Ab (Sweden)
Racal-Tacticom Limited (United Kingdom)
British Communications Corporation Limited, Racal Mobilcal Limited, Racal-Tacticom Systems Limited
Racal Telecom Plc (79.92 percent) (United Kingdom)
Racal Cellular Limited (79.92 percent), Racal-Vodac Limited (79.92 percent)
Racal Training Services Limited (United Kingdom)
Racal-Vodacom Limited (79.92 percent) (United Kingdom)
Racal-Vodafone (Holdings) Limited (79.92 percent) (United Kingdom)
Racal-Vodafone Limited (79.92 percent) (United Kingdom)
Racal-Vodapage Limited (79.92 percent), Racal-Vodata Limited (79.92 percent)
Safety Techniek BV (Netherlands)
Sea Surveys Limited (Ireland)
Societe Lyonnaise de Protection Electronique SA (France)
Union Locks Limited (United Kingdom)
Van Dam Beveiligingen BV (Netherlands)
Walton SA (France)
Weyrad Electronics Limited (United Kingdom)

Asia-Pacific

Chubb Australia Limited (Australia)
Chubb Electronics (Hong Kong) Limited (50 percent) (Hong Kong)

©1990 Dataquest Incorporated

Chubb Hong Kong Limited (50 percent) (Hong Kong)
Chubb National Foam Pty Limited (Australia)
Chubb New Zealand Limited (New Zealand)
Chubb Singapore Private Limited (70 percent) (Singapore)
Decca Electronics Limited (Australia)
Mills-Tui Trailers Limited (New Zealand)
PT Chubb-Lips Indonesia (76 percent) (Indonesia)
Racal Electronics (Singapore) Private Limited (Singapore)
Racal Electronics Pty Limited (Australia)
Racal-Chubb Holdings Australia Limited (Australia)
Racal-Decca Electronics (Hong Kong) Limited (Hong Kong)
Racal-Guardata (New Zealand) Limited (New Zealand)
Racal-Redac (Japan) Limited (Japan)
Racal-Redac Asia Limited (Hong Kong)
Racal-Survey (Malaysia) Sdn Bhd (70 percent) (Malaysia)
Swordsman Australia Pty Limited (Australia)
Tag Security Systems Australasia Pty Limited (Australia)
Wormald Security Australia Pty Limited (Australia)

ROW

Chubb Alarms (Pty) Limited (69.1 percent) (South Africa)
Chubb Fire Security (Pty) Limited (69.1 percent) (South Africa)
Chubb Holdings Limited (69.1 percent) (South Africa)
Chubb Holdings (Private) Limited (69.1 percent) (Zimbabwe)
Chubb Lock & Safe Company (Pty) Limited (69.1 percent) (South Africa)
Chubb-Union Security (Private) Limited (69.1 percent) (Zimbabwe)
Decca Contractors (SA) Pty Limited (South Africa)
Josiah Parkes & Sons (Nigeria) Limited (60 percent) (Nigeria)
Josiah Parkes & Sons (South Africa) Limited (69.1 percent) (South Africa)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Willemijn
Willemijn granted a token-ring license to Racal.

IBM
Racal is to become an industry remarketer of IBM PS/2 and RT computers.

1988

Ericsson
The companies agreed to cooperative development of the digital cellular infrastructure and subscriber equipment for the pan-European system.

Matra
The companies agreed to cooperative development of the digital cellular infrastructure and subscriber equipment for the pan-European system.

MERGERS AND ACQUISITIONS

1990

Network Communications Group of DCA
Racal Electronics acquired DCA's Network Communications Group in January to integrate with Racal-Milgo's networking systems group.

Silc Technologies
Racal Electronics acquired this software company to strengthen its position in the design-automation market.

1989

HHB Systems
Racal Electronics acquired this manufacturer of PCB layout systems.

DCA's Network Communications Group
Racal Electronics acquired this digital systems multiplexer and OSI network management equipment manufacturer.

Thom "6"
Racal Electronics acquired the CAE activities of Thom "6."

Quanta
Racal Electronics acquired Quanta, a fiber-optic multiplexer company.

1988

ACS Communication Systems, Inc.
Racal Electronics acquired this communications company.

©1990 Dataquest Incorporated

Pall Canada Limited
Racal Electronics acquired this Canadian filter manufacturing company.

Interlan
Racal Electronics acquired this leading specialist in LANs.

Wormald Security
Racal Electronics acquired this security company.

H. S. Control Systems Ltd.
Racal Electronics acquired this security company.

KEY OFFICERS

Sir Ernest Harrison OBE
Chairman and chief executive officer

D. C. Elsbury OBE
Deputy chief executive officer

Sir Edward Ashmore
Director

B. J. Clarke
Director

J. E. Coates
Director

P. G. Crossland
Director

J. E. Diggins
Director

G. J. Lomer
Director

D. J. Peacock
Director

M. R. Richards
Director

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

©1990 Dataquest Incorporated

Table 3
Comprehensive Financial Statement*
Fiscal Year Ending March 31
(Millions of US Dollars)

Balance Sheet	1986	1987	1988	1989
Fixed Assets	$502.1	$568.0	$675.4	$853.6
Tangible Assets	500.3	564.8	665.8	828.7
Investments	1.8	3.3	9.6	14.9
Current Assets	$1,350.9	$1,498.2	$1,665.3	$2,376.7
Stocks	427.6	484.8	536.7	526.6
Debtors	717.8	808.0	888.9	973.4
Investments	0.4	0.5	0.5	2.0
Cash	205.0	204.9	239.1	838.7
Provisions for Liabilities and Charges	$479.4	$469.0	$443.5	$259.8
Net Current Assets	$621.2	$639.7	$577.5	$741.5
Net Assets	$1,600.9	$1,676.7	$1,696.5	$1,854.9
Capital and Reserves	$636.5	$737.0	$804.7	$1,257.4
Share Capital	210.1	256.1	274.6	262.5
Share Premium Account	118.4	261.6	284.2	293.0
Profit and Loss	284.4	199.8	239.3	697.7
Other Reserves	23.5	19.5	6.7	4.3
Minority Interest	$10.6	$5.7	$8.1	$2.6
Shareholders' Equity	$647.1	$742.8	$804.7	$1,257.2
Income Statement	**1986**	**1987**	**1988**	**1989**
Revenue	$1,862.2	$2,116.1	$2,397.9	$2,605.6
Cost of Sales	$1,253.2	$1,370.8	$1,545.3	$1,685.6
SG&A Expenses	$442.1	$540.5	$578.6	$628.7
Operating Profit	$167.1	$205.9	$276.1	$289.8
Exchange Rate (US$1=£)	£0.68	£0.61	£0.57	£0.61

*Financial information for 1985 was not available.

Source: Racal Electronics Plc
Annual Reports
Dataquest (1990)

©1990 Dataquest Incorporated

Schlumberger, Ltd.

227 Park Avenue
New York, New York 10172
Telephone: (212) 350-9400
Fax: (212) 354-9457
Dun's Number: 00-185-4546

Date Founded: 1919

CORPORATE STRATEGIC DIRECTION

Schlumberger, Ltd., was founded in 1919 by Conrad and Marcel Schlumberger when they first demonstrated that electrical resistance measurements on the earth's surface can detect mineral ores such as copper or iron, deep in the ground. Schlumberger later entered the computer-aided design/computer-aided manufacturing (CAD/CAM) and automatic test equipment (ATE) markets. Originally a French company, Schlumberger is now incorporated in the Netherlands.

Schlumberger comprises two divisions: Oilfield Services and Measurement and Systems. The Oilfield Services Division includes the following subdivisions: Wireline, Testing and Seismic Services, GECO, Drilling and Pumping Services, Sedco Forex, Anadrill, and Dowell Schlumberger. The Measurement and Systems Division includes the following subdivisions: Schlumberger Industries, Electricity Management, Water and Gas, Schlumberger Technology Corporation, Automatic Test Equipment, CAD/CAM, Electronic Transactions, and Instruments.

Revenue for 1989 was $4.7 billion,* a decrease of 4.8 percent over the 1988 figure of $4.9 billion. Schlumberger Technology Corporation and CAD/CAM revenue increased 2 percent in 1989, whereas Electronic Transactions gained 10 percent. Oilfield Services accounted for 57.5 percent of 1989 revenue; Measurement and Systems was responsible for 42.5 percent.

Net income in 1989 totaled $441.5 million, a decrease of 7.3 percent from the 1988 figure of $476.2 million. The 1989 sale of Schlumberger Defense Systems raised income by $13 million.

R&D expenditure increased 3.8 percent in 1989 to $339.1 million representing 7.2 percent of revenue. The 1988 figure of $352.6 million represented 7.2 percent of revenue. Forty-two percent, or $140.5 million, of the R&D expenditure was used in the Measurement and Systems sector, with the Schlumberger Industries and Schlumberger Technology Corporation subsidiaries each receiving $70.3 million.

Capital expenditure totaled $549.0 million, or 11.7 percent of revenue, in 1989. Of this total, 82 percent was spent on Oilfield Services; 18 percent, or $435.9 million, was spent on Measurement and Systems. Capital spending decreased 66 percent from the 1988's $1,617.0 million representing 32.8 percent of revenue.

Schlumberger employed 46,000 people worldwide in 1989.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information about revenue by distribution channel is not available. Tables 3 and 4, comprehensive financial statements, are at the end of this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

Measurement and Systems

CAD/CAM

Schlumberger's CAD/CAM division, formerly known as Applicon and Manufacturing Data Systems, Inc. (MDSI), and headquartered in Ann Arbor, Michigan, is a subsidiary of Schlumberger, Ltd., and is part of

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

the Schlumberger Technology Corporation business group. The acquisitions of Applicon and MDSI took place in 1987.

Dataquest estimates that Schlumberger generated $141.1 million in the 1989 worldwide market with 1.1 percent market share. Schlumberger was most noted for its software with 1.5 percent of the worldwide market. The European market was the most lucrative, contributing $70.4 million to total revenue; North America contributed $63.5 million. Schlumberger receives 55 percent of its revenue from turnkey CAD/CAM systems; unbundled software and service revenue generated the remaining 45 percent.

In April 1989, Schlumberger began shipping MacBRAVO! CAD software for the Apple Macintosh II computer. The two newest members of MacBRAVO! are MacBRAVO! FACILITIES, a system for design, layout, and management of facilities, and MacBRAVO! ELECTRONICS DESIGNER, a schematics entry system with fully integrated simulation waveform editing. Other members of the MacBRAVO! family include the MacBRAVO! DETAILER and the MacBRAVO! MODELER. The Company also released BRAVO 3 software, a set of over 30 integrated electromechanical CAD/CAM products running on Digital Equipment Corporation's (DEC's) VAX and VAXstation computers.

Electronic Transactions

Smart Cards and Systems produced 28 million cards in 1989 and began to manufacture in the United States. Electronic Transactions Division revenue gained 10 percent in 1989 while orders were up 9 percent. Sales of urban terminals and systems, particularly integrated parking systems, increased significantly in Western Europe. New card-operated mass-transit ticketing systems were developed and automatic ticket dispensers were introduced.

Automatic Test Equipment (ATE)

Schlumberger manufactures test equipment used in the manufacture of semiconductors. The Company has shipped over 70 IDS 5000 units worldwide, which are used in the testing phase of semiconductor manufacturing.

Further Information

For further information about the Company's business segments, please contact the appropriate Dataquest industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$6,557.1	$4,938.4	$4,727.0	$4,924.5	$4,686.0
Percent Change	-	(24.69)	(4.28)	4.18	(4.84)
Capital Expenditure	$787.0	$447.0	$276.0	$1,617.0	$549.0
Percent of Revenue	12.00	9.05	5.84	32.84	11.72
R&D Expenditure	$420.5	$387.5	$351.8	$352.6	$339.1
Percent of Revenue	6.41	7.85	7.44	7.16	7.24
Number of Employees	72,810	49,661	50,000	48,000	46,000
Revenue ($K)/Employee	$90	$99	$95	$103	$102
Net Income	$351.0	($2,017.6)	$352.6	$476.2	$441.5
Percent Change	-	(674.76)	(117.48)	35.05	(7.29)
Exchange Rate (US$1=F)	F 3.32	F 2.45	F 2.03	F 1.98	F 2.13

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$1,182.00	$1,197.00	$1,106.00	$1,201.00
Quarterly Profit	$335.00	$340.00	$332.00	$337.00

Source: Schlumberger, Ltd.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	36.83	27.30	28.20	31.09	31.80
International	63.17	72.70	71.80	68.91	68.20

Source: Schlumberger, Ltd.
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

Information is not available.

SUBSIDIARIES

North America

Anadrill, Inc., Texas (United States)
Dowell Schlumberger, Inc., Delaware (50 percent owned) (United States)
Schlumberger Canada, Ltd. (Canada)
Schlumberger Industries, Inc., Delaware (United States)
Schlumberger Technology Corporation, Texas (United States)

Europe

BVI Holdings, Ltd., B.V.I. (Netherlands)
Dowell Schlumberger Corporation, B.V.I. (50 percent owned) (Netherlands)
Flopetrol S.A. Franc (France)
GECO A.S. (Norway)
MC&C Holdings, Ltd., B.V.I. (Netherlands)
Nepfor, Ltd., Netherlands Antilles (Netherlands)
Schlumberger Holdings, Ltd., B.V.I. (Netherlands)
Schlumberger Industries (France)
Schlumberger Measurement and Systems, Ltd., U.K. (United Kingdom)
Societe De Prospection Electrique Schlumberger Franc (France)

Asia/Pacific

Schlumberger K.K. (Japan)

ROW

Anadrill International S.A. (Panama)
Kintore Investments, Ltd. (Bermuda)
Schlumberger Offshore Services, Ltd.
Schlumberger Overseas S.A. (Panama)
Schlumberger Surenco S.S. (Panama)
Sedco Forex International, Inc. (Panama)
Triton Industries, Inc. (Panama)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Ericsson Telecom AB
Schlumberger Technologies and Ericsson Telecom announced that Ericsson will base its worldwide manufacturing test systems for circuit boards on a new family of testers developed by Schlumberger.

Ganz Arammerogyar
Schlumberger Industries with the Bank of Budapest, Budapest Holding, and Electricity of Hungary formed a joint venture meter company called Ganz Arammerogyar or Ganz Meter.

Bailey Controls Group
Schlumberger Industries (France) has sold a controlling stake in its Industrial Controls Division.

Bharat Electronics (BE)
BE will supply software products specializing in CAD, graphics, real-time systems, signal processing, and automatic testing to be marketed by Schlumberger.

1989

Parametric Technology Corporation (PTC)
PTC and Schlumberger CAD/CAM announced that PTC's Pro/ENGINEER mechanical engineering automation tools are now available as an addition to Schlumberger's BRAVO 3 family.

Digital Equipment Corporation (DEC)
DEC announced that it has signed a distribution agreement with Schlumberger Technologies' CAD/CAM Division for its BRAVO 3 CAD/CAM/CAE software.

Nippon Telegraph & Telephone (NTT)
NTT and Schlumberger entered into a joint venture forming Verisys. Verisys will make circuit testers for application-specific integrated circuits (ASICs).

©1990 Dataquest Incorporated

Remex
Schlumberger Technologies' CAD/CAM unit will market Remex's distributed DNC products in its integrated computer-aided systems.

MERGERS AND ACQUISITIONS

1989

THORN EMI
Schlumberger acquired THORN EMI's gas metering business in the United Kingdom.

Dowell Schlumberger
Schlumberger purchased 50 percent of Dowell's worldwide assets from Sedco Forex.

KEY OFFICERS

Euan Baird
Chairman and chief executive officer

Arthur Lindenauer
Executive vice president, chief financial officer

Roland Genin
Vice chairman of the board

Michel Gouilloud
Executive vice president

PRINCIPAL INVESTORS

Schlumberger, Ltd., has no principal investors.

FOUNDERS

Conrad Schlumberger
Marcel Schlumberger

©1990 Dataquest Incorporated

Table 3
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$6,640.2	$5,412.0	$4,418.3	$3,222.6	$3,031.2
Cash	41.3	45.2	57.1	41.7	53.9
Receivables	1,273.0	974.7	1,099.1	1,129.6	1,103.6
Marketable Securities	4,548.8	3,765.1	2,511.5	1,407.4	1,300.0
Inventory	700.0	560.0	575.9	583.3	509.9
Other Current Assets	77.1	66.9	174.7	60.6	63.8
Net Property, Plants	$3,125.2	$1,832.5	$1,670.4	$1,616.7	$1,647.8
Other Assets	$1,516.8	$767.3	$652.3	$760.9	$803.1
Total Assets	$11,282.2	$8,011.8	$6,741.0	$5,600.2	$5,482.1
Total Current Liabilities	$3,291.3	$3,293.2	$2,657.1	$2,511.8	$2,146.7
Long-Term Debt	$1,013.7	$504.3	$125.3	$191.5	$292.5
Other Liabilities	$81.5	$91.0	$122.7	$141.9	$145.0
Minority Interests	$18.5	-	-	-	-
Total Liabilities	$4,405.0	$3,888.5	$2,905.1	$2,845.2	$2,584.2
Total Shareholders' Equity	$6,877.2	$4,123.3	$3,835.9	$2,755.0	$2,897.9
Common Stock	421.2	421.1	423.8	432.9	410.3
Other Equity	(444.9)	(837.3)	(1,148.1)	(2,399.2)	(2,389.8)
Retained Earnings	6,900.9	4,539.4	4,560.2	4,721.3	4,877.4
Total Liabilities and Shareholders' Equity	$11,282.2	$8,011.8	$6,741.0	$5,600.2	$5,482.1
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$6,557.1	$4,938.4	$4,727.0	$4,924.5	$4,686.0
US Revenue	2,415.0	1,348.0	1,333.0	1,531.0	1,490.0
Non-US Revenue	4,142.1	3,590.4	3,394.0	3,393.5	3,196.0
Cost of Sales	$4,169.4	$3,510.3	$3,273.0	$3,528.1	$3,342.1
R&D Expense	$420.5	$387.5	$351.8	$352.6	$339.1
SG&A Expense	$1,596.2	$2,695.2	$345.7	$830.8	$742.5
Capital Expense	$787.0	$447.0	$276.0	$1,617.0	$549.0
Pretax Income	$617.0	($1,549.0)	$619.0	$589.0	$531.0
Pretax Margin (%)	9.41	(31.37)	13.09	11.96	11.33
Effective Tax Rate (%)	43.00	NA	NA	NA	NA
Net Income	$351.0	($2,017.6)	$352.6	$476.2	$441.5
Shares Outstanding, Millions	298.9	287.3	277.1	264.2	237.9
Per Share Data					
Earnings	$1.17	($7.02)	$1.27	$1.80	$1.86
Dividend	$1.20	$1.20	$1.20	$1.20	$1.20
Book Value	$23.01	$14.35	$13.84	$10.43	$12.18
Exchange Rate (US$1=F)	F 3.32	F 2.45	F 2.03	F 1.98	F 2.13

NA = Not available

Source: Schlumberger, Ltd.
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of Guilders, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	F 22,045.5	F 13,259.3	F 8,969.1	F 6,380.7	F 6,426.2
Cash	137.2	110.8	115.9	82.6	114.3
Receivables	4,226.4	2,388.0	2,231.2	2,236.6	2,339.6
Marketable Securities	15,101.9	9,224.5	5,098.3	2,786.7	2,756.0
Inventory	2,323.9	1,372.1	1,169.1	1,154.9	1,081.0
Other Current Assets	256.1	163.9	354.6	120.0	135.3
Net Property, Plants	F 10,375.7	F 4,489.5	F 3,390.9	F 3,201.1	F 3,493.3
Other Assets	F 5,035.8	F 1,879.9	F 1,324.1	F 1,506.6	F 1,702.6
Total Assets	F 37,457.0	F 19,628.8	F 13,684.1	F 11,088.4	F 11,622.1
Total Current Liabilities	F 10,927.2	F 8,068.3	F 5,393.9	F 4,973.4	F 4,551.0
Long-Term Debt	F 3,365.5	F 1,235.6	F 254.4	F 379.2	F 620.1
Other Liabilities	F 270.6	F 222.9	F 249.1	F 281.0	F 307.4
Minority Interests	F 61.3	-	-	-	-
Total Liabilities	F 14,624.6	F 9,526.8	F 5,897.4	F 5,633.5	F 5,478.5
Total Shareholders' Equity	F 22,832.3	F 10,102.0	F 7,786.9	F 5,454.9	F 6,143.5
Common Stock	1,398.3	1,031.7	860.3	857.1	869.8
Other Equity	(1,477.0)	(2,051.3)	(2,330.6)	(4,750.4)	(5,066.4)
Retained Earnings	22,911.0	11,121.6	9,257.2	9,348.2	10,340.1
Total Liabilities and Shareholders' Equity	F 37,456.9	F 19,628.8	F 13,684.2	F 11,088.4	F 11,622.1
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	F 21,769.5	F 12,099.1	F 9,595.8	F 9,750.5	F 9,934.3
US Revenue	8,017.8	3,302.6	2,706.0	3,031.4	3,158.8
Non-US Revenue	13,751.7	8,796.5	6,889.8	6,719.1	6,775.5
Cost of Sales	F 13,842.4	F 8,600.2	F 6,644.2	F 6,985.6	F 7,085.3
R&D Expense	F 1,395.9	F 949.4	F 714.2	F 698.1	F 718.9
SG&A Expense	F 5,299.3	F 6,603.2	F 701.8	F 1,645.0	F 1,574.1
Capital Expense	F 2,612.8	F 1,095.2	F 560.3	F 3,201.7	F 1,163.9
Pretax Income	F 2,048.4	(F 3,795.1)	F 1,256.6	F 1,166.2	F 1,125.7
Pretax Margin (%)	9.41	(31.37)	13.09	11.96	11.33
Effective Tax Rate (%)	43.00	NA	NA	NA	NA
Net Income	F 1,165.4	(F 4,943.1)	F 715.8	F 942.9	F 936.0
Shares Outstanding, Millions	298.9	287.3	277.1	264.2	237.9
Per Share Data					
Earnings	F 3.88	(F 17.20)	F 2.58	F 3.56	F 3.94
Dividend	F 3.98	F 2.94	F 2.44	F 2.38	F 2.54
Book Value	F 76.39	F 35.16	F 57.05	F 20.65	F 25.82

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of Guilders, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	2.02	1.64	1.66	1.28	1.41
Quick (Times)	1.80	1.47	1.45	1.05	1.17
Fixed Assets/Equity (%)	45.44	44.44	43.55	58.68	56.86
Current Liabilities/Equity (%)	47.86	79.87	69.27	91.17	74.08
Total Liabilities/Equity (%)	64.05	94.31	75.73	103.27	89.17
Profitability (%)					
Return on Assets	6.22	(17.32)	4.30	7.61	8.24
Return on Equity	10.21	(30.02)	8.00	14.24	16.14
Profit Margin	5.35	(40.86)	7.46	9.67	9.42
Other Key Ratios					
R&D Spending % of Revenue	6.41	7.85	7.44	7.16	7.24
Capital Spending % of Revenue	12.00	9.05	5.84	32.84	11.72
Employees	72,810	49,661	50,000	48,000	46,000
Revenue (F K)/Employee	F 299	F 244	F 192	F 203	F 216
Capital Spending % of Assets	6.98	5.58	4.09	28.87	10.01
Exchange Rate (US$1=F)	F 3.32	F 2.45	F 2.03	F 1.98	F 2.13

NA = Not available

Source: Schlumberger, Ltd.
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

Silicon Graphics, Inc.

2011 North Shoreline Boulevard
Mountain View, California 94039
Telephone: (415) 960-1980
Fax: (415) 961-0595
Dun's Number: 02-403-9778

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Silicon Graphics, Inc., designs, manufactures, markets, and services high-performance superworkstations that are used by engineers, scientists, and other professionals to develop, analyze, and simulate complex three-dimensional objects and phenomena. Silicon Graphics primarily targets four industries: manufacturing, visual simulation, general scientific and research, and graphic arts and animation.

Silicon Graphics designs its superworkstations to meet the needs of three-dimensional applications. Currently, the Company's systems are used in applications such as mechanical computer-aided engineering (CAE), animation, visual stimulation, and various scientific applications including molecular modeling and computational fluid dynamics.

The Company's primary competition is from other workstation and computer system manufacturers, graphics subsystem and terminal vendors, and graphics integrated circuit manufacturers. Silicon Graphics competes with major corporations with substantial technical, marketing, and financial resources, including Digital Equipment Corporation (DEC), Hewlett-Packard and its recently acquired subsidiary Apollo Computer, IBM, Sun Microsystems, and Stardent Computer.

The Company's total revenue increased 73 percent to $264 million* in fiscal 1989 from $153 million in fiscal 1988. Net income decreased 8 percent to $11 million in fiscal 1989 from $13 million in fiscal 1988. According to Silicon Graphics, the decline in net income was the result of product introduction investments. Silicon Graphics employs 1,483 worldwide.

Research and development expenditures totaled $31 million in fiscal 1989, representing 11 percent of revenue. The Company's R&D program is directed principally toward maintaining and enhancing its competitive position in graphics performance through VLSI technology, improved computational performance and networking capabilities, and improved software development tools.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

*All dollar amounts are in U.S. dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

High-Performance Workstations

In March 1990, Silicon Graphics introduced the IRIS POWERVISION Graphics Supercomputers. The POWERVISION Series uses new, proprietary, custom-VLSI, programmable graphic engines to provide 1.0 million antialiased vectors, 1.0 million antialiased polygons, and 1.5 million antialiased pixels-per-second performance. To ensure imaging quality, each pixel is defined as a minimum of 140 bits to a maximum of 268 bits per pixel. POWERVISION will be available as of June 1990 either as an upgrade to existing POWER Series products or as a new system. Upgrade pricing starts at $40,000, and new systems start at $94,900. Silicon Graphics claims that the POWERVISION is the fastest 3-D graphics workstation available today.

Silicon Graphics' IRIS 4D product line includes the Personal IRIS, Professional IRIS, and IRIS POWER Series workstations and the IRIS POWER STATION

©1990 Dataquest Incorporated

supercomputing servers. The IRIS 4D products use either R2000 or R3000 32-bit RISC microprocessors developed by MIPS Computer Systems (MIPS) and are binary-compatible, meaning that software applications run without modification across this entire product line. Also, Silicon Graphics continues to sell its older IRIS 3000/3100 Series workstations.

Silicon Graphics currently offers its IRIS workstations and servers at base prices ranging from approximately $13,000 to more than $200,000, depending on the system, features, and selected configurations. During fiscal 1988, sales of the IRIS 3000/3100 Series workstations accounted for approximately 29 percent of the Company's system shipment revenue; its Professional IRIS workstations and servers accounted for approximately 71 percent. In October 1988, Silicon Graphics introduced its Personal IRIS and IRIS POWER Series products. Sales of these products accounted for approximately 55 percent of the Company's fiscal 1989 product shipment revenue.

Graphics Subsystems

Silicon Graphics also markets specialized graphics subsystems to other computer manufacturers and systems integrators. Under this program, Silicon Graphics manufactures and sells or licenses to selected customers a graphics subsystem to enhance the graphics performance of other computer systems. Companies such as IBM and Raytheon have agreed to purchase subsystems and/or license software from Silicon Graphics under such an arrangement. In addition to the revenue from subsystem sales, Silicon Graphics believes that this program will increase the IRIS Graphics Library-based applications software available for use on its workstations.

Peripherals

Silicon Graphics workstations support a wide range of peripheral and input/output devices as options, including a variety of disk storage devices, a 1/4-inch cartridge tape or a 1/2-inch tape for backup storage, black-and-white or color printers, electrostatic color plotters, laser printers, and film recorders to create hard-copy reproductions of workstation screen images.

Services

Silicon Graphics provides a wide array of training, consulting, maintenance, and repair services to customers using its products.

Software

The Personal IRIS and IRIS POWER Series use IRIX, a Company-developed version of the AT&T UNIX System V, Release 3 operating system.

To take full advantage of its special-purpose graphics hardware and encourage the development of applications software, Silicon Graphics provides the IRIS Graphics Library as a standard component of its workstations. The Company has licensed its Graphics Library to IBM, which has the right to use the Graphics Library in its products. Silicon Graphics believes that this will stimulate the development of applications packages by third-party software developers.

All IRIS 4D workstations include the 4Sight integrated windowing environment, which allows the combination of network-distributed 3-D graphics and high-performance graphics simultaneously on the screen. The 4Sight windowing system supports three different graphics formats: dedicated 3-D graphics from the IRIS Graphics Library, and industry-standard NeWS and X.11 networked graphics protocols. The 4Sight window provides a fully customizable user interface, a common font manager, and a straightforward program interface, and allows the use of arbitrarily shaped windows.

Silicon Graphics connectivity products enable its IRIS workstations and servers to operate in a multivendor computing environment and to exchange data at high speeds and share computing and peripheral resources and access data from Cray, IBM, DEC, and other computer systems.

Silicon Graphics has not developed applications software, but it licenses and markets certain horizontal and software packages, including database, computational, desktop publishing, modeling, and rendering products. For other requirements, customers using the Company's workstations must either develop or purchase from a third-party the software necessary to address their particular needs.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Thousands of U.S. Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$21,546.0	$41,506.0	$86,278.0	$152,594.0	$263,776.0
Percent Change	-	92.64	107.87	76.86	72.86
Capital Expenditure	0	0	0	0	0
Percent of Revenue	0	0	0	0	0
R&D Expenditure	$5,025.0	$7,205.0	$14,542.0	$24,168.0	$31,365.0
Percent of Revenue	23.32	17.36	16.85	14.13	11.10
Number of Employees	238	330	605	1,053	1,483
Revenue ($K)/Employee	$90.53	$125.78	$142.61	$162.44	$190.59
Net Income	($4,833.0)	$1,902.0	$10,250.0	$12,529.0	$11,490.0
Percent Change	-	(139.35)	438.91	22.23	(8.29)

1989 Calendar Year (US$M)	Q1	Q2	Q3	Q4
Quarterly Revenue	$65.92	$68.35	$86.43	$103.10
Quarterly Profit	$2.64	$3.06	$5.21	$7.18

Source: Silicon Graphics, Inc. Annual Reports and Forms 10-K
Dataquest
1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	0	87.00	83.00	84.00	72.00
International	0	13.00	17.00	16.00	28.00
Japan	0	10.00	10.00	10.00	10.00

Source: Silicon Graphics, Inc. Annual Reports and Forms 10-K
Dataquest
1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1989
Direct Sales	74.00
Indirect Sales	26.00
VARs	8.00
OEMs	18.00

Source: Dataquest
1990

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS

North America—40
Japan—1
Europe—13
Asia/Pacific—5
ROW—1

MANUFACTURING LOCATIONS

Mountain View, California

Primary activities involve assembling proprietary printed circuit boards and high-level systems and testing major purchased subassemblies. The Company significantly increased its manufacturing capacity in fiscal 1988 and 1989.

Neuchatel, Switzerland

With the growth of international sales, the Company has established this European manufacturing and support center.

SUBSIDIARIES

North America

Silicon Graphics Canada Inc. (Canada)
Silicon Graphics Federal Sales Corp. (United States)
Silicon Graphics International (United States)
Silicon Graphics World Trade Corp. (United States)

Japan

Nihon Silicon Graphics K.K.

Europe

Silicon Graphics AB (Sweden)
Silicon Graphics A/S (Denmark)
Silicon Graphics B.V. (The Netherlands)
Silicon Graphics Computer Systems Ltd. (England)
Silicon Graphics GmbH (West Germany)
Silicon Graphics Ltd. (England)
Silicon Graphics Manufacturing S.A. (Switzerland)
Silicon Graphics N.V. S.A. (Norway)
Silicon Graphics S.A. (Switzerland)
Silicon Graphics S.A.R.L. (Belgium)
Silicon Graphics S.P.A. (Italy)

Asia/Pacific

Silicon Graphics Applications Systems Ltd. (Singapore)
Silicon Graphics Pte Ltd. (Singapore)
Silicon Graphics Pty Ltd. (Australia)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Protocol Engines, Inc. (PEI)
Silicon Graphics and PEI entered into a $5.5 million joint marketing agreement. The project is to implement the Xpress Transfer Protocol (XTP) in VLSI. XTP is an innovative, lightweight local area network (LAN) transport protocol that will deliver higher effective throughput, real-time response, and lower CPU utilization than traditional transport protocols.

Oracle
Silicon Graphics and Oracle entered into an OEM agreement under which Silicon Graphics is to market Oracle's relational database products for use with Silicon Graphics' entire range of binary-compatible IRIS 4D workstations and server products.

Nixdorf Computer
Silicon Graphics and Nixdorf Computer entered into an OEM agreement under which Nixdorf is to use Silicon Graphics' IRIS 4D workstations as the desired platform for its CAD/CAM projects. The workstations and servers are to be used for design, analysis, and drafting, along with simulation of computer numerical control (CNC) tool paths and robotic trajectories.

Frame Technology Corporation
Silicon Graphics and Frame Technology entered into an OEM agreement under which Silicon Graphics is to sell Framemaker, Frame's leading computer software, worldwide on its complete line of IRIS 4D workstations.

©1990 Dataquest Incorporated

BioDesign

Silicon Graphics and BioDesign entered into a joint marketing agreement under which the two firms will cooperate to market BioDesign software to scientific end users. BioDesign makes Biograph, a design and simulation software package for the biotechnology and pharmaceutical research sectors. It also produces Polygraf, a molecular modeling and simulation package for polymer research scientists.

Full Color Computing

Silicon Graphics and Full Color Computing entered into a marketing agreement under which Silicon Graphics is to jointly market Full Color Computing's new image processing and presentation product. Designed for graphic workstations, the new Full Color Publisher features full-color image manipulation, text handling, page layout, photo retouch, and special effects.

CADKEY, Sigma Designs

Silicon Graphics, CADKEY, and Sigma Designs entered into a licensing agreement under which CADKEY and Sigma Designs are to market Silicon Graphics' Personal IRIS 4D workstations.

The Eagle Technology Group Limited

Silicon Graphics and Eagle Technology entered into an agreement under which Eagle Technology is to be Silicon Graphics' distributor for New Zealand. Initially, Eagle Technology is to focus on selling Silicon Graphics products to the education, manufacturing, scientific, and architectural markets.

Xyvision Design Systems

Silicon Graphics and Xyvision Design Systems entered an OEM agreement under which Xyvision is to bundle Silicon Graphics' IRIS systems with its own proprietary software. Xyvision is a leading developer and marketer of computer graphics systems for consumer product companies, design firms, and packaging manufacturers.

1988

MacNeal-Schwendler Corporation (MSC)

Silicon Graphics and MSC entered into an agreement under which MSC is to jointly market MSC/NASTRAN on Silicon Graphics IRIS 4D workstations. MSC is a leading supplier of structural analysis software and engineering services used in the automotive, aerospace, defense, and general manufacturing industries.

IBM

Silicon Graphics and IBM entered into an agreement under which IBM is to sell Silicon Graphics' 4D IRIS Graphics Library software for its Entry System division. IBM also is to buy Silicon Graphics' 4D IRIS graphics cards.

PDA Engineering

Silicon Graphics and the PATRAN Software Products Division of PDA Engineering entered into a joint marketing and development agreement under which PATRAN is to support Silicon Graphics' IRIS 4D workstations with its PATRAN MCAE design and analysis software packages. Through PDA Engineering's Hardware Partner Product Optimization Program, PDA and Silicon Graphics have established a joint development team dedicated to ensuring that PDA's customers are capable of fully utilizing all the latest features and benefits of the IRIS 4D workstations. This product optimization program is one of the first in the industry dedicated to specially tuning software to take advantage of the unique features of a specific hardware platform.

Informix Software

Silicon Graphics and Informix Software entered an OEM agreement offering the first relational database management system for Silicon Graphics' family of 3-D superworkstations. Under the agreement, Informix-SQL, -4GL, -ESQL/C, -ESQL/COBOL, and C-ISAM are to be available on Silicon Graphics' IRIS 3100 and IRIS 4D families of superworkstation products.

Biosym Technologies

Silicon Graphics and Biosym entered into an agreement under which Biosym is to integrate its Discover and Insight molecular simulation and modeling software with Silicon Graphics' IRIS superworkstations.

Bechtel Software

Silicon Graphics and Bechtel Software entered into a VAR agreement under which Bechtel Software is to resell Silicon Graphics' IRIS 3100 and 4D Series workstations in a one-year pact, renewable yearly by mutual consent. The Bechtel Group subsidiary is to sell the superworkstations together with its Walkthru 3-D modeling software.

1987

Control Data

Silicon Graphics and Control Data entered an agreement under which Control Data is to remarket Silicon Graphics' IRIS 4D workstations as Cyber 910-500s, as part of a $10 million agreement.

©1990 Dataquest Incorporated

Prime Computer
Silicon Graphics and Prime Computer entered an agreement under which the companies are to jointly market a 3-D graphics workstation. Prime is to sell the system as the PXCL 5500; Silicon Graphics is to sell it as the IRIS 4D/60 system. Both machines feature a reduced-instruction-set computing (RISC) processor.

Convex Computer
Silicon Graphics and Convex entered an agreement under which Convex is to jointly market its C1 Series of supercomputers with Silicon Graphics' IRIS superworkstations for interactive graphics applications.

KEY OFFICERS

James H. Clark
Chairman of the board

Edward McCracken
President and chief executive officer

Kenneth L. Coleman
Senior vice president

Forest Baskett
Vice president, Research and Development

Thomas A. Jermoluk
Vice president and general manager, Advanced Systems Division

Jennifer A. Konecny
Vice president, Human Resources

Gary L. Lauer
Vice president, North American Field Operations

Dennis P. McBride
Vice president, controller

Deborah G. Miller
Vice president, Marketing

Michael Ramsay
Vice president and general manager, Entry Systems Division

Howard J. Smith
Vice president and general manager, Workgroup Products Division

PRINCIPAL INVESTORS

Control Data Canada Ltd.—18.8 percent

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending June
(Thousands of U.S. Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$15,407.0	$24,072.0	$94,407.0	$145,461.0	$214,027.0
Cash	4,163.0	6,915.0	58,276.0	51,086.0	70,865.0
Receivables	6,611.0	10,148.0	19,678.0	44,616.0	82,649.0
Marketable Securities	-	-	-	24,740.0	23,652.0
Inventory	4,501.0	6,280.0	15,201.0	44,577.0	49,662.0
Other Current Assets	132.0	729.0	1,252.0	5,182.0	10,851.0
Net Property, Plants	$3,154.0	$4,666.0	$11,038.0	$25,429.0	$37,056.0
Other Assets	$614.0	$325.0	$1,792.0	$11,307.0	$16,293.0
Total Assets	$19,175.0	$29,063.0	$107,237.0	$206,937.0	$291,028.0
Total Current Liabilities	$3,179.0	$8,088.0	$20,169.0	$32,151.0	$46,512.0
Long-Term Debt	$753.0	$1,069.0	$35,562.0	$35,081.0	$87,785.0
Other Liabilities	-	-	-	-	-
Total Liabilities	$3,932.0	$9,157.0	$55,731.0	$67,232.0	$134,297.0
Total Shareholders' Equity	$15,243.0	$19,906.0	$50,668.0	$139,705.0	$156,731.0
Converted Preferred Stock	28,933.0	31,652.0	-	-	-
Common Stock	2.0	3.0	12.0	16.0	16.0
Other Equity	199.0	240.0	53,233.0	128,899.0	134,435.0
Retained Earnings	(13,891.0)	(11,989.0)	(1,739.0)	10,790.0	22,280.0
Total Liabilities and Shareholders' Equity	$19,175.0	$29,063.0	$107,237.0	$206,937.0	$291,028.0

Income Statement	1985	1986	1987	1988	1989
Revenue	$21,546.0	$41,506.0	$86,278.0	$152,594.0	$263,776.0
U.S. Revenue	-	36,110.0	71,611.0	128,323.0	187,683.0
Non-U.S. Revenue	-	5,396.0	14,667.0	24,271.0	76,093.0
Cost of Sales	$11,723.0	$17,850.0	$35,908.0	$70,218.0	$134,412.0
R&D Expense	$5,025.0	$7,205.0	$14,542.0	$24,168.0	$31,365.0
SG&A Expense	$9,616.0	$14,830.0	$25,657.0	$42,716.0	$83,388.0
Capital Expense	-	-	-	-	-
Pretax Income	($4,833.0)	$1,926.0	$11,295.0	$17,072.0	$16,414.0
Pretax Margin (%)	(22.43)	4.64	13.09	11.19	6.22
Effective Tax Rate (%)	-	-	50.00	29.00	30.00
Net Income	($4,833.0)	$1,902.0	$10,250.0	$12,529.0	$11,490.0
Shares Outstanding, Thousands	9,122.0	10,537.0	12,561.0	14,341.0	17,211.0
Per Share Data					
Earnings	($0.53)	$0.18	$0.82	$0.87	$0.67
Dividends	-	-	-	-	-
Book Value	$1.67	$1.89	$4.03	$9.74	$9.11

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending June
(Thousands of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	4.85	2.98	4.68	5.29	5.11
Quick (Times)	3.43	2.20	3.93	3.91	4.04
Fixed Assets/Equity (%)	20.69	23.44	21.43	18.20	23.64
Current Liabilities/Equity (%)	20.86	40.63	39.16	23.01	29.68
Total Liabilities/Equity (%)	25.80	46.00	108.20	48.12	85.69
Profitability (%)					
Return on Assets	-	7.89	15.04	7.98	4.61
Return on Equity	-	10.82	28.71	13.10	7.75
Profit Margin	(22.43)	4.58	11.88	8.21	4.36
Other Key Ratios					
R&D Spending % of Revenue	23.32	17.36	16.85	15.84	11.89
Capital Spending % of Revenue	0	0	0	0	0
Employees	238	330	605	1,053	1,483
Revenue ($K)/Employee	$90.53	$125.78	$142.61	$144.91	$117.87
Capital Spending % of Assets	0	0	0	0	0

Source: Silicon Graphics, Inc. Annual Reports and Forms 10-K
Dataquest
1990

©1990 Dataquest Incorporated

Sun Microsystems, Inc.

2550 Garcia Avenue
Mountain View, California 94043
Telephone: (415) 960-1300
Fax: (415) 969-9131
Dun's Number: 01-304-4532

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Sun Microsystems, Inc., founded in 1982, is a leading supplier of high-performance workstations, servers, and networking software to the engineering, scientific, commercial, and technical markets. According to Dataquest and based upon total revenue, Sun was the premier workstation company during 1989 with a 28 percent share of the technical workstation market. Sun's strategic goal is to place itself within the mainstream of the general-purpose, distributed computing marketplace in the early 1990s. To achieve this goal, Sun must continue to grow rapidly and stay at the forefront of technical innovation.

The Company's strategy for future growth is to drive industry standards, continue to be a price/performance leader, and license its technology to the worldwide computer industry. The Company has completed the transition from its Motorola and Intel microprocessor-based line to products based on the SPARC microprocessor.

Total revenue increased 40 percent to $2.47 billion* in fiscal 1990, up from $1.77 billion in fiscal 1989. Net income rose 83 percent to $111 million versus $61 million in fiscal 1989. Sun currently employs 11,490 people worldwide.

Over the past five years, revenue generated from the international market has grown from representing 20 percent of sales in fiscal 1986 to 49 percent in fiscal 1990. Sun predicts that this figure will grow to approximately 60 percent during the 1990s. The Company's international strategy is based upon product and distribution strategies. Its product strategy is to base its products on open standards, allowing international customers to use Sun workstations in conjunction wth other vendors' products. Sun and AT&T codeveloped the System V Release 4 (SVR4) UNIX standard software adapted by UNIX International. The Company is also a participant in the X/Open Branding Program and has introduced many products that meet the specifications stated in the consortium's Common Applications Environment. Sun's distribution strategy focuses on the formation of strategic alliances with third parties.

Sun uses a mixture of direct and indirect sales channels. According to Dataquest, direct sales channels accounted for 48 percent of total revenue and indirect sales channels accounted for 52 percent during 1989. Sun has 12 subsidiaries worldwide, each providing full sales, service, and technical support. Sun Europe covers the United Kingdom, France, Italy, the Netherlands, Spain, Sweden, Switzerland, and Germany. With the changes in Eastern Europe, Sun is preparing itself to meet the growing opportunities and demands in these countries. Sun's Intercontinental Operations Group services Japan, Australia, South America, and Canada. These areas have been growing markets for Sun's high-performance workstations. The Asia Group is responsible for Hong Kong, Singapore, the People's Republic of China, Taiwan, South Korea, India, and all of Southeast Asia. Indirect sales channels in 1989 consisted of value-added resellers (VARs) and original equipment manufacturers (OEMs) representing 44 percent of total revenue and distributors representing 8 percent. As of June 1990, the Company had distributors in 24 countries and VARs in over 250 locations throughout the United States.

R&D expenditure totaled $301.9 million, $234.1 million, and $139.9 million during fiscal years 1990, 1989, and 1988, respectively. These figures represented 12.2, 13.3, and 13.3 percent, respectively,

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

of total revenue. Currently, R&D activities are aimed at increasing the performance of Sun's product line and developing advanced workstation architectures, application-specific integrated circuits (ASICs), and software for communications and distributed systems.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Technical Workstations

Sun's hardware consists of workstations, servers, board-level CPUs, specialized processors, and peripherals. Sun's workstations can be used in stand-alone or networked configurations although emphasis is on the latter. Sun provides a variety of system-level products including the SPARC-based family, Sun-3 family, and Sun 386i family.

SPARC-Based Family

In May 1990, Sun introduced five additions to its family of SPARC workstations and servers: the SPARCstation SLC, the SPARCserver 470, the SPARCstation 470GX, the SPARCstation 1+, and the SPARCserver 1+. The Desktop SPARCstation SLC is an entry-level, full-featured RISC workstation with 12.5 mips (million instructions per second), 1.2 mflops (million floating-point instructions per second), 8 to 16 megabytes of memory, and an audio speaker. The system may not be expanded internally. The midrange SPARCserver 470 performs at 22 mips and 3.8 mflops and has up to 10 gigabytes of storage. The Deskside SPARCstation 470GX is a workstation version of the SPARCserver 470. It is designed for 2-D and 3-D graphics applications and supports standards like GKS and PHIGS. The SPARCstation 1+ is the successor to SPARCstation 1. It performs at 15.8 mips and offers up to 40 megabytes of memory. The SPARCserver 1+ performs at 15.8 mips and 1.7 mflops and supports up to 2 gigabytes of external disk storage.

Existing members of the SPARC family are the SPARCstation 1, the SPARCstation 330 and 370 series, and the SPARCserver 300 and 490 series. The SPARCstation 1 is a desktop workstation capable of 12.5 mips. It performs 1.4 mflops through its floating-point coprocessor, can be configured with 8 to 16 megabytes of main memory, and can contain up to 208 megabytes of internal hard disk storage. The SPARCstation 330 and 370 series deliver 16-mips and 2.6-mflops performance. The systems can be configured with 8 to 56 megabytes of main memory and up to 5.5 gigabytes of disk storage depending upon the model. Three server machines based on the same SPARC implementation are available in the SPARCserver 300 series. The SPARCserver 490 supplies 22.6-mips and 3.8-mflops performance. All Sun SPARC systems are capable of running over 2,000 SPARCware applications and feature OPEN LOOK, a graphical interface that simplifies the operation of UNIX-based computers. Sun has successfully integrated its customer base to its SPARC RISC technology. Over 85 percent of its 1990 customer orders are for SPARC products.

Sun-3 Family

In November 1985, Sun began shipping its third-generation Sun-3 family of workstations, servers, and board-level CPUs. The Sun-3 workstation family is based on the Motorola 68020 microprocessor. In April 1989, Sun replaced its Sun-3 workstations with Sun 3/80 and Sun 3/400 workstations. The entry-level Sun 3/80 series of desktop workstations delivers up to 3-mips performance and can be configured with up to 16 megabytes of main memory. Two models in this family have been specially engineered for graphics applications. The Sun 3/400 series of workstations and servers utilizes the Motorola 68030 microprocessor to deliver up to 7-mips performance. The models may be configured with 8 to 128 megabytes of main memory and up to 6.8 gigabytes of disk storage.

Sun 386i Family

Sun unveiled the Sun 386i workstation family in March 1988. Based on the Intel 80386 microprocessor, this family merges UNIX and PC-DOS applications available for personal computers. The Sun 386i performs at 2.5 to 5.0 mips depending upon the model.

©1990 Dataquest Incorporated

Other

Sun provides a communications processor board that accelerates the execution of certain Sun communications software to enhance network performance, increase communications speeds, and reduce workstation CPU overhead. Sun also offers a variety of peripherals options, such as laser printers, mass storage options, 1/4-inch and 1/2-inch tape drives, and additional communications interfaces.

Software

According to Dataquest, Sun held 12.4 percent share of the 1989 US UNIX market, ranking it first among UNIX vendors based upon total factory revenue. The UNIX operating system is the sole architecture of Sun's open system networking technology. Sun is a member of X/Open, a group promoting the SVR4 version of UNIX; whereas Digital Equipment Corporation (DEC), Hewlett-Packard (HP), and IBM are members of the Open Software Foundation (OSF), which promotes another version of UNIX.

Open Network Computing

Open Network Computing (ONC) is Sun's modular set of networking protocols and services that enable distributed computing across mixed-vendor networks. It is part of SunNet, Sun's comprehensive family of networking products. ONC services consist of Network File System (NFS), Network Information Services, Network Lock Manager, Remote Execution, Automounter, and PC-NFS. ONC is supported on all major operating systems including UNIX, VMS, MVS, VM, PC-DOS, and OS/2.

Open Windows

Sun's window system offering includes Open Windows, a comprehensive set of products for developing consistent window-based applications that may be ported across a broad range of systems. Open Windows includes OPEN LOOK, a graphical user interface; Open Windows DeskSet, an integrated suite of personal productivity tools; XView, a mature Xtoolkit; and X11/NeWS, a high-performance, portable, network-based window system platform.

OPEN LOOK

In April 1988, Sun and AT&T introduced the joint development of the OPEN LOOK graphical user interface. OPEN LOOK has the icons, pull-down menus, point-and-click mouse controls, and other features associated with user-friendly systems. It is an open and portable interface that is bundled as a standard part of UNIX V.4.

SimplifySQL

On July 9, 1990, Sun presented SimplifySQL, a set of productivity tools that simplifies the use of three of the leading database management systems (DBMSs) on workstations. The new package was designed by Sun with help from Ingres, Oracle, and Sybase for Sun's SPARC family of workstations. SimplifySQL uses OPEN LOOK and runs under SunOS 4.0, 4.0.3, and 4.1.

Further Information

For further information about Sun Microsystems' business segments, please contact the appropriate Dataquest industry service.

©1990 Dataquest Incorporated

Table 1
Five-Year Corporate Highlights (Thousands of US Dollars)

	1986	1987	1988	1989	1990
Five-Year Revenue	$210,126.0	$537,537.0	$1,051,618.0	$1,765,366.0	$2,466,185.0
Percent Change	-	155.82	95.64	67.87	39.70
Capital Expenditure	$76,114.0	$117,339.0	$204,758.0	$204,758.0	$204,758.0
Percent of Revenue	36.22	21.83	19.47	11.60	8.30
R&D Expenditure	$31,041.0	$69,578.0	$139,906.0	$234,106.0	$301,854.0
Percent of Revenue	14.77	12.94	13.30	13.26	12.24
Number of Employees	2,246	4,182	7,090	10,208	11,490
Revenue ($K)/Employee	$93.56	$128.54	$148.32	$172.94	$214.64
Net Income	$11,189.0	$36,298.0	$66,436.0	$60,838.0	$111,179.0
Percent Change	-	224.41	83.03	(8.43)	82.75

1990 Calendar Year*	Q1	Q2	Q3	Q4
Quarterly Revenue	$538,511.00	$595,366.00	$632,212.00	$700,096.00
Quarterly Profit	$5,185.00	$20,197.00	$36,694.00	$49,103.00

*Based on fiscal year

Source: Sun Microsystems, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	80.00	66.00	63.00	58.00	51.00
International	20.00	34.00	37.00	42.00	49.00
Europe	17.00	25.00	23.00	24.00	27.00
Asia/Pacific	3.00	9.00	14.00	18.00	22.00

Source: Sun Microsystems, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1989	1990
Direct Sales	48.00	NA
Indirect Sales	52.00	NA
VARs/OEMs	44.00	NA
Distributors	8.00	NA

NA = Not available

Source: Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES AND SERVICE OFFICE LOCATIONS

North America—94
Europe—32
Asia/Pacific—23
  Japan—5
ROW—3

MANUFACTURING LOCATIONS

North America

Milpitas, California
  Computing systems including technical workstations, servers, UNIX operating systems, productivity software
Westford, Massachusetts
  Computing systems including technical workstations, servers, UNIX operating systems, productivity software

Europe

Linlithgow, Scotland
  Computing systems including technical workstations, servers, UNIX operating systems, productivity software

SUBSIDIARIES

North America

Sun Microsystems Canada (Canada)

Europe

Sun Microsystems France (France)
Sun Microsystems Germany (Germany)
Sun Microsystems Italy (Italy)
Sun Microsystems Netherlands (Netherlands)
Sun Microsystems Spain (Spain)
Sun Microsystems Sweden (Sweden)
Sun Microsystems Switzerland (Switzerland)
Sun Microsystems UK (United Kingdom)

Asia/Pacific

Sun Microsystems Australia (Australia)
Sun Microsystems Japan (Japan)
Sun Microsystems of California (Hong Kong)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Universal Computer SA
Sun signed Universal Computer SA of Casablanca, Morocco, as its first African distributor.

Bell Atlantic Business Systems Services
Bell Atlantic Business Systems Services signed a strategic partnership agreement with Sun that will expand Sun's field service and maintenance for customers in the Eastern United States.

TGV
Sun and TGV signed a development agreement for TGV to port Sun's XView toolkit to DEC's VAX/VMS platform.

Genisco Technology Corporation (GTC)
Sun and GTC signed an agreement under which GTC's Solaris Systems Division will create versions of Sun's desktop SPARCstation RISC workstations for factory floor environments.

NYNEX Information Solutions Group Inc.
NYNEX Information Solutions Group and Sun established an agreement to jointly pursue large-scale systems and network integration projects in the domestic and international commercial markets.

Meiko Scientific Corporation
Sun and Meiko Scientific Corporation signed an agreement under which Sun will use Meiko silicon design technology in new products.

Eastman Kodak Company
Sun and the Eastman Kodak Company formed an agreement in which Kodak's Customer Equipment Service Division will extend Sun's delivery of hardware-related customer service in the Central and Western regions of the United States. The agreement will double the number of field engineers available for on-site hardware maintenance calls for Sun equipment.

©1990 Dataquest Incorporated

Ashton-Tate Corporation
Sun and Ashton-Tate signed a joint development and marketing agreement to make dBASE IV available for Sun computer systems.

Meiko Scientific Corporation
Meiko Scientific Corporation licensed Sun's SPARC RISC technology for use in Meiko's Computing Surface systems.

General Electric Information Services (GEIS)
Sun and GEIS jointly developed Newsware, a database search and electronic mail service. Newsware uses Sun's OPEN LOOK graphical user interface and will be offered by Sun, with GEIS providing the backbone network.

American Telephone & Telegraph Company (AT&T)
Sun and AT&T will jointly perform systems integration services for the financial, scientific, engineering, and telecommunications markets and the federal government.

Hitachi Ltd.
Sun and Hitachi signed an agreement under which Hitachi will license Sun's Open Network Computing/Network File System (ONC/NFS) technology for implementation on Hitachi's mainframe computers.

1989

Prime Computer Inc.
Prime signed a two-year, $200 million agreement to resell Sun's workstations and servers.

N. V. Philips
Philips was granted a license to manufacture SPARC chips.

Toshiba
The companies have a licensing agreement for Toshiba to build SPARC-based UNIX laptop computers.

Tatung Company
The companies have a licensing agreement for Tatung to manufacture a microcomputer based on Sun's SPARC microprocessor.

Datatech Enterprises
Under this licensing agreement, Datatech can manufacture microcomputers based on Sun's SPARC microprocessor.

1988

AT&T
Under this investment alliance, AT&T will purchase newly issued common stock amounting to up to 15 percent of Sun's outstanding common stock at Sun's option over a three-year period. AT&T also may purchase up to an additional 5 percent of Sun's stock in the open market.

Fujitsu Limited
The companies signed a five-year OEM agreement worth at least $250 million under which half the units sold will be Sun-4 systems.

Texas Instruments (TI)
The companies signed a SPARC licensing and development agreement under which TI will design, manufacture, and distribute SPARC chips worldwide and will also employ them in its own computer design.

Amdahl
This product development and marketing program will lead to the integration of Sun's technical workstations and Amdahl's mainframes.

Xerox
In this technology alliance, Xerox will incorporate Sun's SPARC into Xerox systems.

Unisys
Unisys was granted a SPARC license.

Cypress Semiconductor
Cypress was granted a license to manufacture SPARC chips.

International Computers Ltd.
International Computers was granted a SPARC license.

LSI Logic
LSI Logic was granted a license to manufacture SPARC chips.

Bipolar Integrated Technology
Bipolar Integrated Technology was licensed to manufacture SPARC chips.

Matra
Matra was granted a SPARC license.

MERGERS AND ACQUISITIONS

1990

Raychem
Raychem sold an undeveloped industrial site in Menlo Park, California, to Sun Microsystems for $39 million.

©1990 Dataquest Incorporated

1988

Centram Systems West of California, Inc.
Sun acquired Centram, whose software extended Sun's networking and data communications products to include the Apple Macintosh and IBM PC.

Trancept Systems, Inc.
Sun acquired Trancept, which develops accelerator products for computation.

KEY OFFICERS

Scott G. McNealy
Chairman of the board of directors, president, chief executive officer

William Raduchel
Vice president, Finance, and chief financial officer

Crawford W. Beveridge
Vice president, Corporate Resources

Edward J. Zandler
Vice president, Corporate Marketing

Carol Bartz
Vice president, Worldwide Field Operations

William Joy
Vice president, Research and Development

Kevin Melia
Vice president, Worldwide Operations Group

Dennis Ohryn
Vice president, Corporate Development

Wayne Rosing
Vice president, Desktop Systems and Graphics Group

Eric Schmidt
Vice president, General Systems Group

PRINCIPAL INVESTORS

AT&T—16.5 percent

FOUNDERS

Vinod Khosla
Andreas V. Bechtolsheim
William Joy
Scott McNealy

©1990 Dataquest Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending June
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1986	1987	1988	1989	1990
Total Current Assets	$127,507.0	$396,764.0	$532,194.0	$879,803.0	$1,297,368.0
Cash	49,681.0	181,392.0	128,195.0	53,694.0	393,563.0
Receivables	40,380.0	98,277.0	214,847.0	330,598.0	523,316.0
Marketable Securities	NA	35,102.0	NA	NA	NA
Inventory	33,611.0	66,145.0	143,359.0	308,706.0	204,833.0
Other Current Assets	3,835.0	15,848.0	45,793.0	186,805.0	175,656.0
Net Property, Plants	$45,546.0	$99,870.0	$172,417.0	$293,994.0	$349,737.0
Other Assets	$9,329.0	$27,328.0	$52,583.0	$95,277.0	$131,471.0
Total Assets	$182,382.0	$523,962.0	$757,194.0	$1,269,074.0	$1,778,576.0
Total Current Liabilities	$67,395.0	$155,393.0	$259,545.0	$462,535.0	$492,902.0
Long-Term Debt	$4,481.0	$127,444.0	$124,689.0	$142,764.0	$358,907.0
Other Liabilities	$2,159.0	$391.0	$3,000.0	$1,975.0	0
Total Liabilities	$74,035.0	$283,228.0	$387,234.0	$607,274.0	$851,809.0
Total Shareholders' Equity	$108,347.0	$240,734.0	$369,960.0	$661,800.0	$926,767.0
Converted Preferred Stock	0	0	0	0	0
Common Stock	18.0	23.0	24.0	56.0	62.0
Other Equity	85,425.0	181,509.0	244,298.0	475,268.0	629,050.0
Retained Earnings	22,904.0	59,202.0	125,638.0	186,476.0	297,655.0
Total Liabilities and Shareholders' Equity	$182,382.0	$523,962.0	$757,194.0	$1,269,074.0	$1,778,576.0
Income Statement	**1986**	**1987**	**1988**	**1989**	**1990**
Revenue	$210,126.0	$537,537.0	$1,051,618.0	$1,765,366.0	$2,466,185.0
US Revenue	166,752.0	354,597.0	658,564.0	1,021,296.0	1,257,754.0
Non-US Revenue	43,374.0	182,940.0	393,054.0	744,070.0	1,208,431.0
Cost of Sales	$101,983.0	$272,722.0	$550,344.0	$1,010,250.0	$1,399,015.0
R&D Expense	$31,041.0	$69,578.0	$139,906.0	$234,106.0	$301,854.0
SG&A Expense	$57,257.0	$126,933.0	$250,341.0	$432,556.0	$588,007.0
Capital Expense	$36,257.0	$76,114.0	$117,339.0	$204,758.0	$212,875.0
Pretax Income	$20,214.0	$69,138.0	$110,725.0	$78,013.0	$154,414.0
Pretax Margin (%)	9.62	12.86	10.53	4.42	6.26
Effective Tax Rate (%)	44.60	47.50	40.00	22.00	28.00
Net Income	$11,189.0	$36,298.0	$66,436.0	$60,838.0	$111,179.0
Shares Outstanding, Thousands	26,620.0	33,674.0	77,880.0	85,161.0	94,369.0
Per Share Data					
Earnings	$0.42	$1.11	$0.89	$0.76	$121.00
Dividend	0	0	0	0	0
Book Value	$4.07	$7.15	$4.75	$7.77	$9.82

©1990 Dataquest Incorporated

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending June
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1986	1987	1988	1989	1990
Liquidity					
Current (Times)	1.89	2.55	2.05	1.90	2.63
Quick (Times)	1.39	2.13	1.50	1.23	2.22
Fixed Assets/Equity (%)	42.04	41.49	46.60	44.42	37.74
Current Liabilities/Equity (%)	62.20	64.55	70.15	69.89	53.19
Total Liabilities/Equity (%)	68.33	117.65	104.67	91.76	91.91
Profitability (%)					
Return on Assets	-	10.28	10.37	6.00	7.30
Return on Equity	-	20.80	21.76	11.79	14.00
Profit Margin	5.32	6.75	6.32	3.45	4.51
Other Key Ratios					
R&D Spending % of Revenue	14.77	12.94	13.30	13.26	12.24
Capital Spending % of Revenue	17.25	14.16	11.16	11.60	8.63
Employees	2,246	4,182	7,090	10,208	11,490
Revenue ($K)/Employee	$93.56	$128.54	$148.32	$172.94	$214.64
Capital Spending % of Assets	19.88	14.53	15.50	16.13	11.97

Source: Sun Microsystems, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated

Valid Logic Systems, Inc.

2820 Orchard Parkway
San Jose, California 95134
Telephone: (408) 432-9400
Fax: (408) 432-9430
Dun's Number: 05-251-8412

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Valid Logic Systems, Inc., designs, manufactures, markets, and supports hardware and software solutions for electronic design automation (EDA). These systems are used in the development of electronic systems, printed circuit boards (PCBs) and integrated circuits (ICs). Valid provides a broad line of EDA tools addressing both the computer-aided engineering (CAE) tasks of product definition, including design capture and validation, and the computer-aided design (CAD) tasks of physical layout.

Valid's products consist of software, application-specific hardware for IC prototype verification, and hardware and software acquired from third parties. These products are designed to operate on commercially available platforms, such as those of Digital Equipment Corporation, IBM, and Sun Microsystems, Inc. The Company's software is written to run under both UNIX and VMS operating systems.

Valid's products are sold separately as software packages for existing hardware or as turnkey systems combining hardware and software. Valid sells its systems to a variety of customers in the electronic systems manufacturing market, including the computer, semiconductor, telecommunications, instrumentation, automotive, aerospace, and military industries.

Valid markets its products worldwide, primarily through its direct sales force. The Company has direct sales and customer support offices in 28 US cities, 8 European cities, and in Australia, Canada, Japan, South Korea, and Taiwan. Valid is also represented by distributors in various countries. International sales accounted for 48 percent of 1989 revenue, up from 44 percent and 38 percent in 1988 and 1987, respectively. Valid seeks to enhance this global base in order to capitalize on growth surges in specific regions, while reducing the impact from any softening markets.

Revenue for 1989 was $173.9 million,* an increase of 23 percent over 1988 revenue of $141.1 million. Net income for 1989 was $10.0 million, an increase of 29 percent over 1988 income of $7.7 million. The rapid revenue growth over the last two years has elevated Valid to the number two position among worldwide EDA suppliers. Dataquest estimates that Valid Logic Systems captured 6.2 percent of the worldwide EDA market in 1989, up from its 1988 position as the third largest supplier with 6.0 percent of the market. These market share figures are based on Company revenue as a percentage of the total market revenue, which Dataquest estimates at $2.84 billion for 1989.

R&D expenditure totaled $25.4 million in 1989, up from $19.7 million in 1988. These figures represent 14.6 percent and 14.0 percent of total sales, respectively. In 1989, much of this expense was incurred in connection with Valid's efforts to integrate its own product line offerings with those of the companies it acquired. Capital expenditure amounted to $9.3 million in 1989, representing 5.4 percent of total sales.

In June 1990, Valid completed the sale of $11.2 million worth of newly issued voting convertible preferred stock to IBM Corporation. IBM's investment represents an interest of approximately 8 percent in Valid. IBM's stake in Valid may increase over the next four years, up to a maximum of 49.9 percent.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information on revenue by distribution channel is not available. Table 3, a comprehensive financial statement, is at the end of this backgrounder.

*All dollar amounts are in US dollars.

©1990 Dataquest Incorporated

BUSINESS SEGMENT STRATEGIC DIRECTION

Valid offers a full line of integrated EDA solutions for both digital and analog CAE, as well as both IC CAD and PCB CAD processes. Valid's new products originate through internal development and occasionally through acquisitions of other companies or product lines. Valid's stated goal is to provide complete design solutions that integrate with the customer's existing engineering, design, and manufacturing environments. To help achieve this goal, Valid provides EDA framework technology supporting its own products and integration of third-party commercial or customer tools.

EDA Framework

Valid's Design Process Framework (also called ValidFrame) uses a switchboard methodology to provide the tool integration and design management capabilities demanded by users without the limitations in performance and extendability inherent in single database approaches. Four framework "managers"—the Communications Manager, Design Manager, User Interface Manager, and Process Manager—can be "plugged into" by applications using documented programming interfaces. This allows Valid applications or other tools to incorporate framework functionality without database modifications.

CAE Digital Software

ValidGED Graphics Editor is a menu-driven tool used to accelerate design capture. With ValidGED, engineers can create and modify schematic drawings using parts from existing component libraries or from libraries created with ValidGED. ValidGED supports both analog and digital design and allows engineers to create designs at any level, including block diagrams, hierarchical schematics, and flat schematics. Valid's digital and analog libraries each include more than 4,000 commonly used parts. In addition, Valid is supported by over 100 application-specific IC (ASIC) design kits supplied by ASIC vendors and used in the design and simulation of ASICs.

The Logic Workbench is a simulation framework that enables users to analyze and debug their digital designs. It includes a multiwindow display environment, advanced stimulus creation capabilities, and integration features such as cross-probing between schematics and simulation input patterns or output waveforms. RapidSIM, part of the Logic Workbench, is a mixed-level simulation and timing analysis tool that has replaced the Company's original ValidSIM simulator. RapidSIM features a new vendor-definable algorithms capability that enables it to simulate submicron ASICs and high-speed board designs. It also utilizes optimized data structures to provide improvements over ValidSIM in the areas of speed and circuit capacity.

CAE Analog Software

Valid's analog products were obtained through the acquisition of ADT in February 1989. Valid has integrated those products within its EDA product line, linking them with both design capture tools and physical design tools.

The Analog Workbench II was introduced in March 1990 as a continuation of the Analog Workbench developed by ADT. It provides an environment for the simulation and analysis of analog circuits. The Analog Workbench II can be used for both IC and board-level analog designs.

Optional Analysis Modules enable analog designers to evaluate and optimize their circuits with respect to quality, manufacturability, and reliability. Included is the Smoke Alarm stress analysis package; Statistical Analysis, containing statistical, sensitivity, and worst case analysis programs; and the Parametric Plotting analysis package.

Application-Specific Hardware

Valid has discontinued manufacturing of application-specific hardware products for simulation acceleration and hardware modeling.

Valid's two patents for hardware modeling systems have been licensed to Logic Modeling Systems, Inc., of San Jose. Valid resells the Logic Modeling products under the name of Realchip-LM.

PCB CAD Software

Valid offers a broad set of tools for the physical design and analysis of PCB designs. Allegro is a rules-driven system for PCB layout that addresses the needs of high-speed and double-sided board surface-mount design technologies. Thermostats analyzes board designs for component temperature and calculates a board's reliability and susceptibility to noise interference.

©1990 Dataquest Incorporated

Valid's Signal Noise Analysis is an integrated analysis package that examines the electrical characteristics of high-frequency board designs to help engineering teams achieve proper circuit performance.

IC CAD Software

For full-custom ICs, Valid has a broad line of tools spanning the physical design process. Included are tools for traditional polygon-level editing, as well as higher-level design tools for automated chip assembly and post-layout analysis.

The Construct IC Layout Editor features full GDS II compatibility at both the database and command levels, plus a variety of advanced automation features such as multiple view ports, cut-and-paste editing, and programmable cells. Valid's Compose Hierarchical Chip Assembly Environment is a rules- and netlist-driven design tool for complex chip layout. Compose is integrated with Construct so that ICs can be hand-tailored without database conversion.

Valid also offers the Confirm Physical Verification Tools that provide design and electrical rule checking for both hierarchical and flat layouts. Confirm can be used to extract capacitance and parameters from the physical design for use in post-layout simulations.

Other products include the TIMEMILL+ Digital Timing Simulator, which provides timing simulation of full-custom ICs at the functional, logic, or transistor levels from the design's layout, and the PATHMILL Critical Path Analyzer, which lets users perform critical path analysis on their IC designs either before or after physical layout. The Fast Mask CAM Output Tools deliver CAM output for both optical and electron-beam pattern generation.

TestBRIDGE Software

As electronic designs become more complex, need to link the design environment with the production test environment increases. CAE and CAD tools provide significant amounts of information that may be used in the test process. Valid has developed certain products designed to facilitate the design-to-test transition.

The RapidTEST Concurrent Fault Simulator is a high-speed fault simulator for measuring the effectiveness of test programs in detecting potential manufacturing defects. The Test Prep Automatic Test Point Generator is an automated tool that helps designers avoid the "physical" testability problems associated with tester access requirements.

ASIC Verification

With the acquisition of Integrated Measurement Systems (IMS) in February 1989, Valid is able to offer the series of design verification systems offered by IMS. Each system integrates the functions of individual test instruments into a single unit that offers increased verification performance at a significant cost savings over traditional automated test equipment and instrument clusters.

The IMS product line consists of the Logic Master XL series, which includes the Logic Master XL, Logic Master XL2, the Logic Master Mixed-Signal System, and the XL SCAN module. Logic Master is designed to work with computer systems or terminals to receive and execute test commands and report the results of test procedures. Logic Master may be used with mainframes, minicomputers, or microcomputers, and also may be linked to most CAE workstations.

Further Information

For more information about the Company's business segments, please contact the appropriate Dataquest industry service.

©1990 Dataquest Incorporated

Table 1
Corporate Highlights (Thousands of US Dollars)

	1988*	1989*
Two-Year Revenue	$141,117.0	$173,856.0
Percent Change	60.06	23.20
Capital Expenditure	$9,798.0	$9,308.0
Percent of Revenue	6.94	5.35
R&D Expenditure	$19,733.0	$25,446.0
Percent of Revenue	13.98	14.64
Number of Employees	498	973
Revenue ($K)/Employee	$283,367	$178,680
Net Income	$7,744.0	$10,002.0
Percent Change	(128.79)	29.16

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	NA	NA	NA	NA
Quarterly Profit	NA	NA	NA	NA

*Financial data for 1988 and 1989 include revenue and assets acquired through the purchase of ADT, IMS, Telesis, and the IC CAD product line from Calma.
NA = Not available

Source: Valid Logic Systems, Inc. Annual Reports and Forms 10-K Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1988	1989
North America	56.44	52.00
International	43.56	48.00
Europe	25.00	NA
Asia/Pacific	23.00	NA

Source: Valid Logic Systems, Inc. Annual Reports and Forms 10-K Dataquest (1990)

©1990 Dataquest Incorporated

1989 SALES OFFICE LOCATIONS

The Company has a total of 46 offices.

MANUFACTURING LOCATIONS

North America

San Jose, California; Beaverton, Oregon
Design verification products

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

ExperTest, Inc.
Valid and ExperTest signed a joint marketing agreement that calls for ExperTest to develop and market a software interface between ExperTest's Test Design Expert (TDX) software and Valid's Design Process Framework.

Minc, Inc.
Valid and Minc signed an agreement that provides for the integration of Minc's advanced programmable logic device (PLD) and field-programmable gate array (FPGA) design and synthesis technology into Valid's design framework.

Logic Automation, Inc.
Valid and Logic Automation introduced an expansion of the two companies' software marketing relationship whereby Valid will supply a six-month subscription to the SmartModel library with all new-customer shipments of RapidSIM on the Sun-3 and Sun-4 platforms.

Intermetrics, Inc.
Valid made an unspecified initial payment to Intermetrics for its VHDL source code after having sold Intermetrics' VHDL tools on an OEM basis for a year. The deal gives Valid an important asset for the military market.

Seattle Silicon, Inc.
Valid entered into an OEM/Distribution agreement with Seattle Silicon to market the SS ChipCrafter ASIC CAE software package alongside its own products in Taiwan, South Korea, and Japan.

1989

Sun Microsystems
Valid bundles Sun's workstations with its EDA products. The agreement with Sun, worth $120 million, includes the RISC-based SPARCstation 1 and the SPARCstation 330 and 370 deskside systems. The agreement is valid through November 1990.

IBM
IBM and Valid agreed to market Valid's CAE software ported to the IBM PC RT. The joint marketing agreement involves Valid's entire range of CAE software, which IBM's Professional Services Group (Dallas, Texas) will integrate, install, and support as turnkey CAE systems.

Apex Microtechnology
Valid and Apex Microtechnology signed a technology exchange agreement that gives Valid customers analog simulation models for Apex's leading line of analog ICs and gives Apex access to Valid's large analog customer base.

1988

Logic Automation, Inc.
Logic Automation and Valid agreed to offer Logic Automation's SmartModels on Valid's EDA systems. The agreement resulted from a cooperative marketing arrangement calling for joint development to make all SmartModels compatible with Valid's ValidSIM logic simulator.

MERGERS AND ACQUISITIONS

1989

Analog Design Tools (ADT)
ADT was acquired by Valid for $35 million in stock. The acquisition helps position Valid in the CAD market, since ADT is a leading supplier of CAE systems for analog circuit design.

Integrated Measurement Systems (IMS)
IMS was acquired by Valid for approximately $18 million in stock. IMS will enable Valid to provide a full line of design-to-test solutions and

©1990 Dataquest Incorporated

ASIC verification products. The unit will operate as the IMS division of Valid and will remain in Beaverton, Oregon.

1988

Calma
Calma sold its computer-aided chip design business to Valid. Calma is a unit of General Electric USA.

1987

Telesis Systems Corporation
Valid acquired all the outstanding common stock of Telesis and subsidiaries in exchange for 4 million shares of Valid's common stock. Telesis sold EDA workstations and software, and its main product was its PCB layout system. The merger was accounted for as a pooling of interests.

KEY OFFICERS

W. Douglas Hajjar
Chairman of the board, chief executive officer, and director

L. George Klaus
President and chief operating officer

Thomas F. Kelly
Vice president, Finance and Administration, and chief financial officer

Alain Labat
Vice president, International Operations

Robert J. Moore
Vice president, US Sales

Joseph Prang
Vice president, Marketing

Franklin D. White, Sr.
Vice president, Operations

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

©1990 Dataquest Incorporated

Table 3
Comprehensive Financial Statement
Fiscal Year Ending January 1
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1988*	1989*
Total Current Assets	$81,749.0	$87,792.0
Cash	13,455.0	9,206.0
Receivables	45,016.0	56,034.0
Marketable Securities	0	0
Inventory	19,718.0	17,669.0
Other Current Assets	3,560.0	4,883.0
Net Property, Plants	$19,319.0	$25,032.0
Other Assets	$11,130.0	$26,822.0
Total Assets	$112,198.0	$139,646.0
Total Current Liabilities	$33,775.0	$38,226.0
Long-Term Debt	$7,279.0	$17,858.0
Other Liabilities	$41.0	$746.0
Total Liabilities	$41,095.0	$56,830.0
Total Shareholders' Equity	$71,103.0	$82,816.0
Common Stock	31.0	32.0
Other Equity	116,676.0	118,820.0
Retained Earnings	(50,100.0)	(40,098.0)
Total Liabilities and Shareholders' Equity	$112,198.0	$139,646.0

Income Statement	1988*	1989*
Revenue	$141,117.0	$173,856.0
US Revenue	79,646.0	91,249.0
Non-US Revenue	61,471.0	82,607.0
Cost of Sales	$85,308.0	$96,803.0
R&D Expense	$19,733.0	$25,446.0
SG&A Expense	$60,828.0	$70,902.0
Capital Expense	$9,798.0	$9,308.0
Pretax Income	$8,475.0	$11,078.0
Pretax Margin (%)	6.01	6.37
Effective Tax Rate (%)	NA	NA
Net Income	$7,744.0	$10,002.0
Shares Outstanding, Millions	30.3	32.6
Per Share Data		
Earnings	$0.26	$0.31
Dividend	0	0
Book Value	$2.35	$2.54

©1990 Dataquest Incorporated

Table 3 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending January 1
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1988*	1989*
Liquidity		
Current (Times)	2.42	2.30
Quick (Times)	1.84	1.83
Fixed Assets/Equity (%)	27.17	30.23
Current Liabilities/Equity (%)	47.50	46.16
Total Liabilities/Equity (%)	57.80	68.62
Profitability (%)		
Return on Assets	8.12	7.94
Return on Equity	14.70	13.00
Profit Margin	5.49	5.75
Other Key Ratios		
R&D Spending % of Revenue	13.98	14.64
Capital Spending % of Revenue	6.94	5.35
Employees	498	973
Revenue ($K)/Employee	$283,367	$178,680
Capital Spending % of Assets	8.73	6.67

*Financial data for 1988 and 1989 include revenue and assets acquired through the purchase of ADT, IMS, Telesis, and the IC CAD product line from Calma.
NA = Not available

Source: Valid Logic Systems, Inc. Annual Reports and Forms 10-K
Dataquest (1990)

©1990 Dataquest Incorporated