

Table of Contents

SEMICONDUCTOR EQUIPMENT MANUFACTURING AND MATERIALS SERVICE

COMPANY BACKGROUNDS

Company	Fiscal Year-End
Air Products and Chemicals, Inc.	September
Anelva Corporation	October
Applied Materials, Inc.	December
ASM International N.V.	December
Canon Incorporated	December
E.I. du Pont de Nemours and Company	December
General Signal Corporation	-
Hitachi, Ltd.	March
Hoechst AG	December
KLA Instruments Corporation	June
Lam Research Corporation	June
Nippon Kogaku K.K. (Nikon)	March
Nippon Sanso K.K.	-
Olin Corporation	December
Osaka Titanium Co., Ltd.	March
Shin-Etsu Chemical Co., Ltd.	March
Silicon Valley Group, Inc.	September
Tokyo Electron Ltd.	-
Tokyo Ohka Kogyo Co., Ltd.	-
Union Carbide Corporation	December
Varian Associates, Inc.	September

Air Products and Chemicals, Inc.

7201 Hamilton Boulevard
Allentown, Pennsylvania 18195-1501

Telephone: (215) 481-4911

Fax: (215) 481-5800

Dun's Number: 00-300-1070

Date Founded: 1940

CORPORATE STRATEGIC DIRECTION

Air Products and Chemicals, Inc., consists of four segments: industrial gases, chemicals, environmental and energy, and equipment and technology. The industrial gases segment produces and distributes industrial gases such as oxygen, nitrogen, argon, and hydrogen, and a variety of medical and specialty gases. Air Products is the fourth largest industrial gas manufacturer in the world. The chemicals segment produces industrial and specialty chemicals used in adhesives, coatings, polyurethane, herbicides, pesticides, and water treatment chemicals. The environmental and energy segment includes activities in cogeneration, flue gas desulfurization, and waste-to-energy conversion, as well as landfill gas recovery and wastewater treatment. The equipment and technology segment supplies cryogenic process equipment, including air separation equipment and liquid natural gas heat exchange equipment.

The Company's total revenue increased 8.6 percent to \$2.6 billion* in fiscal year 1989, from \$2.4 billion in fiscal year 1988. Air Products attributed the rise in revenue to the strengthened demand for industrial gases and strategic chemicals, resulting in record shipments in most major product lines. Net income reached \$222.1 million for fiscal 1989, resulting in a growth rate of 3.9 percent over fiscal 1988. Air Products employs 14,100 people.

Air Products' sales are concentrated in the North American region. Revenue from North American sales accounted for 78.0, 76.0, and 76.4 percent for fiscal year 1987, 1988, and 1989. Revenue from international sales accounted for 23.6 percent during fiscal 1989, of which 85.4 percent was from European sales.

*All dollar amounts are in US dollars.

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

Industrial Gases

The principal industrial gases sold by Air Products are oxygen, nitrogen, argon, hydrogen, carbon monoxide, and helium. All these gases are used heavily in the fabrication of semiconductors, steel, and chemicals. Medical and specialty gases are manufactured or blended by Air Products or purchased for resale. This segment accounts for 60 percent of the Company's sales and 80 percent of its profits.

Chemicals

Air Products' strategic chemical business can be grouped into three categories: polymer products (emulsions and polyvinyl alcohol), polyurethane intermediates and additives (dinitrotoluene, toluene diamine, catalysts, surfactants, and mold release agents), and amines and specialty additives (alkylamines and a line of amines used principally in crop protection and water treatment). The total sales from these three businesses constituted approximately 28 percent of the Company's consolidated sales in fiscal 1989. Other chemical businesses that contributed to 9 percent of the Company's consolidated sales over the past three years are acetic acid, ammonia, and ammonia products, methanol, and polyvinyl chloride resins.

Environmental and Energy

Air Products' environmental and energy segment consists of two joint ventures. American Ref-Fuel, established through a joint venture with Browning-Ferris, builds, owns, and operates trash-to-energy facilities. Pure Air, formed through a joint venture with Mitsubishi, designs and operates facilities to remove sulfur emissions from coal-fired utilities flue gas. Air Products also has an energy system component that builds, runs, and operates cogeneration facilities.

Equipment and Technology

Air Products' equipment and technology segment designs, manufactures, and supplies cryogenic process equipment used for air separation, gas processing, natural gas liquefaction, wastewater treatment, hydrogen purification, and nitrogen rejection.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service.

Table 1
Five-Year Corporate Highlights (Thousands of U.S. Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$1,829,600.0	\$1,941,500.0	\$2,132,200.0	\$2,431,900.0	\$2,641,800.0
Percent Change	-	6.12	9.82	14.06	8.63
Capital Expenditure	\$399,000.0	\$407,000.0	\$367,700.0	\$556,400.0	\$562,000.0
Percent of Revenue	21.81	20.96	17.25	22.88	21.27
R&D Expenditure	\$51,107.0	\$61,091.0	\$56,530.0	\$71,797.0	\$71,403.0
Percent of Revenue	2.79	3.15	2.65	2.95	2.70
Number of Employees	12,500	12,700	12,100	13,300	14,100
Revenue (\$K)/Employee	\$146	\$153	\$176	\$183	\$187
Net Income	\$143,484.0	\$4,735.0	\$155,587.0	\$213,747.0	\$222,137.0
Percent Change	-	(96.70)	3,185.89	37.38	3.93
1989 Calendar Year (US\$M)	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$668.94	\$663.71	\$668.62	\$652.50	
Quarterly Profit	\$56.65	\$53.36	\$51.01	\$49.40	

Source: Air Products and Chemicals, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	86.28	80.41	77.97	76.03	76.43
International	13.72	19.59	22.03	23.97	23.57*

*For 1989, Europe contributed 35.4 percent and Canada and Latin America 14.6 percent of the international revenue.

Source: Air Products and Chemicals, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	90.00	90.00
Indirect Sales	10.00	10.00

Source: Air Products and Chemicals, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—66
Japan—3
Europe—19
Asia/Pacific—9
ROW—1

MANUFACTURING LOCATIONS

North America

United States

Alabama—Chunchula, Decatur, Flomaton,
Irondale, Lowndesboro, Monroeville, Muscle
Shoals
Arizona—Chandler, Phoenix
Arkansas—Ashdown
California—City of Industry, El Segundo, Galt,
Hesperia, Lathrop, Long Beach, Mountain View,
Sacramento, Santa Clara, Stockton, Golden
Colorado—Colorado Springs
District of Columbia—Washington
Florida—Fort Walton Beach, Jacksonville, Jay,
Largo, Orlando, Pensacola
Georgia—Conyers
Illinois—Brookfield, Chicago, Granite City,
Hennepin, LaSalle, Mount Zion
Indiana—Chesterton, South Bend
Iowa—Bettendorf, Cedar Rapids, Davenport, Des
Moines, Sioux City
Kansas—Lenexa, Wichita
Kentucky—Ashland, Calvert City, Louisville,
Russellville
Louisiana—Geismar, Luling, New Orleans,
Plaquemine, Sorrento, St. Gabriel
Maryland—Elkton, Sparrows Point
Massachusetts—Hopkinton, Marlborough
Michigan—Detroit, Saginaw
Minnesota—Shakopee
Mississippi—Greenwood, Pass Christian
Missouri—Earth City
Nebraska—Lincoln, Omaha
New Jersey—Camden, Dayton, Iselin, Manalapan,
Paulsboro, Wharton
New York—Fishkill, Glenmont, Lackawanna,
Latham, Oswego, Rochester

North Carolina—Charlotte, Greensboro,
Laurinburg, Reidsville, Research Triangle Park,
Wilmington
Ohio—Cleveland, Middletown, North Baltimore
Oklahoma—Oklahoma City, Pryor
Oregon—Albany, Tualatin
Pennsylvania—Allentown, Butler, Creighton,
Dravosburg, Lancaster, Lehigh Valley,
Manchester, Marcus Hook, Meadville, Mt. Holly
Springs, Tamaqua, Wilkes-Barre
South Carolina—Florence, Piedmont
South Dakota—Rapid City
Tennessee—Alcoa, Huntingdon, Kingsport,
Memphis, Nashville, New Johnsonville
Texas—Arlington, Austin, Baytown, Conroe,
Corpus Christi, Dallas, Deer Park, Garland,
Gruver, La Porte, Lubbock, Midlothian,
Pasadena, Wichita Falls
Utah—Centerville
Virginia—Hampton, Richmond
Washington—Puyallup
West Virginia—Apple Grove, Ceredo, Nitro,
Proctor, Weirton
Wisconsin—Oak Creek
Wyoming—Evanston

Canada

Alberta—Calgary
British Columbia—Richmond
Manitoba—Winnipeg
Ontario—Brampton, Kanata, Nanticoke, Sarnia
Quebec—LaSalle

Europe

Belgium
Ghent, Vilvoorde
Netherlands
Terneuzen

Asia/Pacific

Australia
Fitzroy, Victoria
Korea
Seoul

ROW

Brazil
Casa Verde
Mexico
Estado De Mexico
Puerto Rico
Ponce

SUBSIDIARIES

North America

Air Products Canada Ltd.
Air Products Inc.
Air Products Manufacturing Corp.
Air Products Pacific, Inc.
Air Products Refuel Holdings Corp.
Cambria Co. Gen. (I), Inc.
Cambria Co. Gen. (II), Inc.
GSF Energy Inc.
Prodair Corp.
Pure Air on the Lake (I), Inc.
Pure Air on the Lake (II), Inc.
Stockton Co. Gen. (I), Inc.

Europe

Air Products (GB) Ltd.
Air Products (UK) Ltd.
Air Products GmbH
Air Products Gases Industrialis Ltda.
Air Products Gesellschaft m.b.H.
Air Products Ireland Limited
Air Products Italia S.p.A.
Air Products Netherlands B.V.
Air Products PLC
Air Products S.A.
Anchor Chemical Group PLC
Gardner Cryogenics A/S
Gardner Cryogenics Limited
Prodair S.A.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1988

Akzo, NV

The companies undertook a joint venture to design and develop membrane systems for air separation. Air Products is to have exclusive worldwide rights to market all membrane systems resulting from this joint venture.

Super Oxygen Sdn. Bhd.

The companies undertook a joint venture to produce and market industrial gases in Malaysia.

Bangkok Industrial Gas Co., Ltd.

The companies have a joint venture for producing and marketing industrial gases in Thailand.

San Fu Chemical Co., Ltd.

The companies have a joint venture for producing and marketing industrial gases in Taiwan.

Athens Corporation

Under an agreement, Air Products is to mark Athens' chemical purification systems for semiconductor wafer cleaning and other applications.

1987

Chun Wang Industrial Gases

The companies undertook a joint venture to supply industrial gases in China and Hong Kong.

Mitsubishi Heavy Industries America, Inc.

The companies have a joint venture establishing Pure Air to market a technology that reduces sulfur emissions from coal-fired utilities.

MERGERS AND ACQUISITIONS

1989

Dow Corning

Air Products acquired Dow Corning's polyurethane silicone surfactant business.

Athens Corporation

Air Products acquired an equity interest in Athens, a firm with proprietary systems for processing chemicals used in manufacturing semiconductor wafers.

Trimont Chemicals

Air Products acquired Trimont Chemicals, which provides Air Products with new epoxy additives and increased manufacturing capacity.

1988

Valchem

Air Products acquired Valchem to add high-performance products to Air Products' polymer chemicals technology base. Valchem is to provide a line of water-based acrylic products.

Anchor Chemical Group

Air products acquired 70.5 percent of Anchor Chemical Group, giving Air Products a 100 percent holding. Air Products acquired 29.5 percent of Anchor in November 1987.

L'Oxygene Liquide

Air products acquired 65 percent interest in L'Oxygene Liquide, an important regional gas supplier in France.

1987

Anchor Chemical Group

Air products acquired 29.5 percent of Anchor Chemical.

KEY OFFICERS

Dexter F. Baker

Chairman of the board and chief executive officer

Leon C. Holt, Jr.

Vice chairman and chief administrative officer

Frank J. Ryan

President and chief operating officer

PRINCIPAL INVESTORS

Lazard Freres & Co.—5.30 percent

Oppenheimer & Co., L.P.—5.04 percent

Wellington Management Company—5.04 percent

Table 4
Comprehensive Financial Statement
Fiscal Year Ending September
(Thousands of U.S. Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$638,130.0	\$581,629.0	\$577,917.0	\$626,271.0	\$756,784.0
Cash	32,463.0	34,657.0	54,871.0	32,696.0	45,236.0
Receivables	381,516.0	273,598.0	289,917.0	344,707.0	377,295.0
Marketable Securities	13,762.0	81,998.0	41,764.0	3,518.0	4,266.0
Inventory	128,049.0	133,234.0	127,017.0	175,399.0	215,107.0
Other Current Assets	82,340.0	58,142.0	64,348.0	69,951.0	114,880.0
Net Property, Plants	\$1,782,267.0	\$1,818,158.0	\$1,920,520.0	\$2,061,642.0	\$2,217,594.0
Other Assets	\$173,058.0	\$261,241.0	\$206,694.0	\$311,597.0	\$391,330.0
Total Assets	\$2,593,455.0	\$2,661,028.0	\$2,705,131.0	\$2,999,510.0	\$3,365,708.0
Total Current Liabilities	\$493,179.0	\$401,521.0	\$433,411.0	\$516,759.0	\$494,477.0
Long-Term Debt	\$520,839.0	\$698,857.0	\$616,389.0	\$667,937.0	\$853,710.0
Other Liabilities	\$416,459.0	\$460,509.0	\$508,700.0	\$542,572.0	\$572,622.0
Total Liabilities	\$1,430,477.0	\$1,560,887.0	\$1,558,500.0	\$1,727,268.0	\$1,920,809.0
Total Shareholders' Equity	\$1,162,978.0	\$1,100,141.0	\$1,146,631.0	\$1,272,242.0	\$1,444,899.0
Converted Preferred Stock	NA	NA	NA	NA	NA
Common Stock	31,182.0	62,364.0	62,364.0	62,364.0	62,364.0
Other Equity	103,169.0	49,547.0	(9,048.0)	(36,873.0)	(17,086.0)
Retained Earnings	1,028,627.0	988,230.0	1,093,315.0	1,246,751.0	1,399,621.0
Total Liabilities and Shareholders' Equity	\$2,593,455.0	\$2,661,028.0	\$2,705,131.0	\$2,999,510.0	\$3,365,708.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$1,829,600.0	\$1,941,500.0	\$2,132,200.0	\$2,431,900.0	\$2,641,800.0
U.S. Revenue	1,578,500.0	1,561,100.0	1,662,400.0	1,849,000.0	2,019,200.0
Non-U.S. Revenue	251,100.0	380,400.0	469,800.0	582,900.0	622,600.0
Cost of Sales	\$1,059,220.0	\$1,146,089.0	\$1,275,499.0	\$1,451,508.0	\$1,600,832.0
R&D Expense	\$51,107.0	\$61,091.0	\$56,530.0	\$71,797.0	\$71,403.0
SG&A Expense	\$472,972.0	\$467,658.0	\$486,732.0	\$545,403.0	\$609,997.0
Capital Expense	\$399,000.0	\$407,000.0	\$367,700.0	\$556,400.0	\$562,000.0
Pretax Income	\$217,693.0	\$152,319.0	\$242,859.0	\$303,666.0	\$321,495.0
Pretax Margin (%)	11.90	7.85	11.39	12.49	12.17
Effective Tax Rate (%)	33.50	29.80	34.30	29.60	30.90
Net Income	\$143,484.0	\$4,735.0	\$155,587.0	\$213,747.0	\$222,137.0
Shares Outstanding, Millions	60,402.3	58,623.0	56,366.7	54,857.8	54,941.4
Per Share Data					
Earnings	\$2.38	\$0.08	\$2.76	\$3.90	\$4.04
Dividend	\$0.63	\$0.77	\$0.90	\$1.10	\$1.26
Book Value	\$19.25	\$18.77	\$20.34	\$23.19	\$26.30

Table 4 (Continued)
 Comprehensive Financial Statement
 Fiscal Year Ending September
 (Thousands of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.29	1.45	1.33	1.21	1.53
Quick (Times)	1.03	1.12	1.04	0.87	1.10
Fixed Assets/Equity (%)	153.25	165.27	167.49	162.05	153.48
Current Liabilities/Equity (%)	42.41	36.50	37.80	40.62	34.22
Total Liabilities/Equity (%)	123.00	141.88	135.92	135.77	132.94
<i>Profitability (%)</i>					
Return on Assets	-	0.18	5.80	7.49	6.98
Return on Equity	-	0.42	13.85	17.67	16.35
Profit Margin	7.84	0.24	7.30	8.79	8.41
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	2.79	3.15	2.65	2.95	2.70
Capital Spending % of Revenue	21.81	20.96	17.25	22.88	21.27
Employees	12,500	12,700	12,100	13,300	14,100
Revenue (\$K)/Employee	\$106.00	\$152.90	\$176.20	\$182.80	\$187.40
Capital Spending % of Assets	15.38	15.29	13.59	18.55	16.70

NA = Not available

Source: Air Products and Chemicals, Inc.
 Annual Reports and Forms 10-K
 Dataquest (1990)

Anelva Corporation

8-1, Yotsuya 5-chome
Fuchu-shi, Tokyo 183, Japan

Telephone: 0423-64-2111

Telex: 2832558

Fax: Not Available

Dun's Number: 69-084-8478

Date Founded: 1967

CORPORATE STRATEGIC DIRECTION

Anelva Corporation is an experienced international specialist in vacuum technology, which is essential to semiconductor and electronic device production. Anelva stands for ANalysis, ELectionics, and VAcuum, which are the Company's main areas of concentration and innovation.

Anelva is focusing its R&D on thin-film manufacturing systems, peripheral equipment, and software. Beam technology and plasma technology have demanded continuous R&D support.

Because Anelva is a privately held company, no financial statements are included.

BUSINESS SEGMENT STRATEGIC DIRECTION

Anelva has two business segments: thin-film producing systems and analyzing systems. The thin-film producing systems consist of a wide range of products. They are suitable for a number of applications including small, experimental batch use, cassette-to-cassette fully automated systems, and on-line systems for mass production. These systems include the following:

- Sputtering systems, which produce high-quality metallic films, oxide films, and magnetic films by magnetron high-rate sputtering
- Reactive ion etching systems, which perform fine-line etching of films such as Al, Al-alloy, Al-oxide, and poly-Si

- Plasma-chemical vapor deposition (CVD) systems, which produce amorphous silicon films for solar batteries and silicon nitride films for thin-film transistors
- Molecular beam epitaxy (MBE) systems, which perform compound semiconductor MBE, Si-MBE, and a combination of multichamber and sample transport mechanisms
- Vacuum evaporators, which are a combination of an electronic beam gun and a planetary motion substrate holder

Analyzing systems are used at pure research centers for analysis and at commercial production facilities for quality control. These systems include the following:

- Gas analyzers, which include trace gas analyzers, which perform high-sensitivity and continuous analysis by a quadrupole mass spectrometer
- Surface analyzers, which include an Auger Electron Spectrometer (AES) and a Secondary Ion Mass Spectrometer (SIMS)
- Vacuum pumps, which include cryo pumps, sputter ion pumps, oil diffusion pumps, and mechanical rotary pumps
- Vacuum components, which include ICF flanges and gaskets, valve viewing ports, electrical and motion feed-through components, fittings, and ion bombardment and electron-beam guns
- Gauges and controllers, which include vacuum gauges (low vacuum to UHV), film thickness monitors and deposition controllers, residual gas analyzers, and leak detectors
- Materials, which include sputtering targets and pump oil

Further Information

For further information about the Company's business segments, please contact the appropriate Dataquest industry service.

1989 SALES OFFICE LOCATIONS

North America—1
Asia/Pacific—2

MANUFACTURING LOCATIONS

North America

San Jose, California
Testing equipment, sputtering systems, and gas and surface analyzers

Asia/Pacific

Fuchu Factory, Japan
All products
Fuchu Higashi (East) Factory, Japan
All products
Fuji Plant, Japan
Sputtering systems, REI systems, and vacuum pumps

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

J. Osawa
Chairman

Y. Morisada
President

Z. Oda
Executive director

Y. Sato
Director

S. Tsuneki
Director

R. W. Kane
Director

H. Kobayashi
Director

T. Inoue
Director

K. Takada
Director

R. Yamamoto
Director

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

Applied Materials, Inc.

3050 Bowers Avenue
Santa Clara, California 95054-3299
Telephone: (408) 727-5555
Fax: (408) 748-9943
Dun's Number: 04-272-8840

Date Founded: 1967

CORPORATE STRATEGIC DIRECTION

Applied Materials, Inc., develops, manufactures, and markets semiconductor wafer fabrication equipment and related parts throughout the world. It produces systems for chemical vapor deposition (CVD) and epitaxial silicon deposition, dry plasma etching, and ion implantation.

The Company's total revenue increased 38.3 percent to \$501.8 million* in fiscal year 1989, from \$362.8 million in fiscal 1988. Applied Materials attributes this growth to the increasing demand for its products and its well-balanced geographic position. The Company's strategy is sales penetration of all global markets. For fiscal 1989, international sales revenue accounted for 65.2 percent of total revenue. Net income reached \$51.5 million in fiscal 1989, up 28.7 percent from fiscal 1988. Applied Materials employs 2,651 full-time people.

Applied Materials' research and development efforts are aimed toward the development of new wafer processing systems and new process applications for existing products. Applied Materials commits itself to working closely with its customers worldwide to design its systems to meet the customers' planned technical and production requirements. The R&D facilities are located in the United States, England, and Japan. Applied Materials allocated \$31.2 million, \$43.5 million, and \$72.3 million to R&D in the respective fiscal years 1987, 1988, and 1989. These amounts accounted for 17.9, 12.0, and 14.4 percent of the Company's total revenue those years.

In fiscal 1989, Applied Materials saw a 56 percent revenue growth in European sales. The Company anticipates another 30 percent increase in 1990.

*All dollar amounts are in U.S. dollars.

During fiscal 1989, European sales amounted to \$75 million, and the European work force increased by more than 500 people. For 1990, Applied Materials plans to expand its operations in Italy to supply service and support for SGS-Thomson and Texas Instruments. It also plans to add Japanese-speaking sales and service representatives to work with Japanese companies that have announced wafer fab facilities in Europe. In March 1990, Applied Materials announced a new service center in Japan, representing the fourth to open there in the past year. Over the past two years, Applied Materials has increased sales to Japan by more than 400 percent.

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

Deposition

One of the fundamental steps in fabricating a device is deposition, a process in which a layer of either electrically insulating (dielectric) or electrically conductive material is deposited on the wafer. Applied Materials manufactures CVD and epitaxial silicon deposition systems. The CVD product line consists of film applications based on the Precision 5000 architecture, with capabilities in such areas as interlayer dielectrics (ILD), intermetal dielectrics (IMD), passivation nitrides, and tungsten CVDs (WCVDs). Epitaxial deposition involves depositing a

layer of high-quality, single crystal silicon on the surface of an existing silicon wafer to change its electrical properties and form the base on which an integrated circuit is built. In May 1989, Applied Materials announced the Precision 7700 cpi system for advanced silicon deposition. According to Dataquest estimates, Applied Materials held 31.7 percent of the nontube CVD worldwide market and 55.9 percent of the silicon epitaxy worldwide market in 1988.

Dry Etch

The Precision 5000 Etch system, an extension of the Precision 5000 architecture, is designed specifically for low-pressure, magnetically enhanced reactive ion etching (MERIE) of submicron features in films such as single-crystal silicon, polysilicon, and oxide. In May 1989, Applied Materials unveiled a new critical oxide etch process for its Precision 5000 Etch system, enabling the extension of Applied Materials' MERIE technology to sub-halfmicron oxide contacts.

Dataquest estimates that Applied Materials captured 36 percent of the dry etch worldwide market in 1988.

Implant

In 1985, Applied Materials entered the high-current portion of the implant market. The Precision Implant 9200 was introduced in April 1988. It has been upgraded with the new option of enabling automated selection of implant angles and new hardware/software options allowing customers to perform remote monitoring and diagnostics, as well as download process recipes, from outside the fab. In 1988, Applied Materials had 10 percent of the high-current ion implant worldwide market, according to Dataquest's 1988 figures.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service.

Table 1
Five-Year Corporate Highlights (Thousands of U.S. Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$174,595.0	\$149,261.0	\$174,444.0	\$362,758.0	\$501,846.0
Percent Change	-	(14.51)	16.87	107.95	38.34
Capital Expenditure	\$12,930.0	\$11,541.0	\$11,491.0	\$19,821.0	\$42,944.0
Percent of Revenue	7.41	7.73	6.59	5.46	8.56
R&D Expenditure	\$31,519.0	\$24,621.0	\$31,204.0	\$43,477.0	\$72,296.0
Percent of Revenue	18.05	16.50	17.89	11.99	14.41
Number of Employees	1,359	1,415	1,406	1,765	2,651
Revenue (\$K)/Employee	\$128.50	\$105.50	\$124.10	\$205.50	\$189.30
Net Income	\$9,270.0	\$1,860.0	\$336.0	\$40,020.0	\$51,484.0
Percent Change	-	(79.94)	(81.94)	11,810.71	28.65
1989 Calendar Year (US\$M)*	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$106.71	\$122.77	\$130.19	\$142.18	
Quarterly Profit	\$13.50	\$13.92	\$12.53	\$11.54	

*Based on fiscal year rather than calendar year.

Source: Applied Materials, Inc.
 Annual Reports and
 Forms 10-K
 Dataquest
 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	67.81	44.60	49.76	44.16	34.82
International	32.19	55.40	50.24	55.84	65.18
Japan	30.07	28.20	22.63	37.26	39.87
Europe	2.12	24.62	23.56	12.73	14.87
Asia/Pacific	0	2.58	4.05	5.85	10.44

Source: Applied Materials, Inc.
 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

1989 SALES OFFICE LOCATIONS

North America—12
Japan—11
Europe—9
Asia/Pacific—3
ROW—0

MANUFACTURING LOCATIONS

North America

Santa Clara, California
All products except ion implant

Japan

Narita, Chiba Prefecture
Chemical vapor deposition and system
customization

Europe

Horsham, England
Ion implant

SUBSIDIARIES

North America

Applied Acquisition Subsidiary
Applied Implant Technology Inc.
Applied Materials International Inc.
ILT Inc.

Europe

Applied Materials Europe B.V.
Applied Materials International B.V.
Applied Materials Limited
Applied Materials Srl
Applied Materials Technology Electronics G.m.b.H.

Asia/Pacific

Applied Materials Asia/Pacific Ltd.
Applied Materials Hong Kong Ltd.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Peak Systems

The companies made a strategic alliance involving a development and production contract focused on adding rapid thermal processing (RTP) to semiconductor processes available to the worldwide customers of Applied Materials' Precision 5000 system. As part of the agreement, Applied Materials will acquire 10 percent ownership of Peak Systems.

1988

Gasonics

The companies made a technology agreement to explore the integration of a microwave downstream photoresist stripping capability into Applied Materials' multichamber Precision 5000 Etch system.

KEY OFFICERS

James C. Morgan

Chairman and chief executive officer

James W. Bagley

President and chief operating officer

Dan Maydan

Executive vice president

Dana C. Diltmore

Vice president, Customer Service

Steve Lindsay

Vice president, Sales and Marketing

Howard L. Neff

Vice president, Corporate Operations

Peter R. Hanely

Group vice president, Customer Business Group

Tetsuo Iwasaki

Vice president; president, Applied Materials Japan

Sasson Somekh
Vice president, Applied Conductor Technology

John G. Stewart
Vice president, Applied Implant Technology

David N. K. Wang
Vice president, Chemical Vapor Deposition and
Etch Technologies

PRINCIPAL INVESTORS

FMR Corporation—9.6 percent

Neuberger & Berman—5.5 percent

T. Rowe Price Associates, Inc.—5.5 percent

Table 4
Comprehensive Financial Statement
Fiscal Year Ending October
(Thousands of U.S. Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$107,482.0	\$106,166.0	\$179,159.0	\$276,159.0	\$342,944.0
Cash	35,674.0	21,796.0	44,815.0	58,219.0	57,426.0
Receivables	31,199.0	39,577.0	49,527.0	98,624.0	131,563.0
Marketable Securities	N/A	N/A	25,907.0	42,570.0	49,682.0
Inventory	30,857.0	36,039.0	47,139.0	53,757.0	77,015.0
Other Current Assets	9,752.0	8,754.0	11,771.0	22,989.0	27,258.0
Net Property, Plants	\$35,718.0	\$43,358.0	\$47,039.0	\$55,994.0	\$82,127.0
Other Assets	\$5,220.0	\$6,614.0	\$6,428.0	\$7,055.0	\$8,786.0
Total Assets	\$148,420.0	\$156,138.0	\$232,626.0	\$339,208.0	\$433,857.0
Total Current Liabilities	\$37,582.0	\$32,384.0	\$48,130.0	\$116,985.0	\$142,852.0
Long-Term Debt	\$16,880.0	\$19,615.0	\$21,112.0	\$11,346.0	\$29,445.0
Other Liabilities	\$7,532.0	\$10,393.0	\$9,776.0	\$10,070.0	\$7,161.0
Total Liabilities	\$61,994.0	\$62,392.0	\$79,018.0	\$138,401.0	\$179,458.0
Total Shareholders' Equity	\$86,426.0	\$93,746.0	\$153,608.0	\$200,807.0	\$254,399.0
Converted Preferred Stock	N/A	N/A	N/A	N/A	N/A
Common Stock	53,673.0	55,428.0	155.0	158.0	162.0
Other Equity	1,072.0	4,407.0	119,206.0	126,382.0	128,486.0
Retained Earnings	31,681.0	33,911.0	34,247.0	74,267.0	125,751.0
Total Liabilities and Shareholders' Equity	\$148,420.0	\$156,138.0	\$232,626.0	\$339,208.0	\$433,857.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$174,595.0	\$149,261.0	\$174,444.0	\$362,758.0	\$501,846.0
U.S. Revenue	118,395.0	66,568.0	86,810.0	160,190.0	174,755.0
Non-U.S. Revenue	56,200.0	82,693.0	87,634.0	202,568.0	327,091.0
Cost of Sales	\$94,210.0	\$87,730.0	\$103,061.0	\$192,094.0	\$257,149.0
R&D Expense	\$31,519.0	\$24,621.0	\$31,204.0	\$43,477.0	\$72,296.0
SG&A Expense	\$32,763.0	\$31,811.0	\$38,096.0	\$56,659.0	\$88,935.0
Capital Expense	\$12,930.0	\$11,541.0	\$11,491.0	\$19,821.0	\$42,944.0
Pretax Income	\$15,983.0	\$3,313.0	\$578.0	\$66,700.0	\$84,402.0
Pretax Margin (%)	9.15	2.22	0.33	18.39	16.82
Effective Tax Rate (%)	42.00	44.00	42.00	40.00	39.00
Net Income	\$9,270.0	\$1,860.0	\$336.0	\$40,020.0	\$51,484.0
Shares Outstanding, Thousands	13,160.0	13,322.0	14,140.0	16,491.0	16,757.0
Per Share Data					
Earnings	\$0.71	\$0.14	\$0.02	\$2.43	\$3.07
Dividends	N/A	N/A	N/A	N/A	N/A
Book Value	\$6.57	\$7.04	\$10.86	\$12.18	\$15.18

Table 4 (Continued)
 Comprehensive Financial Statement
 Fiscal Year Ending October
 (Thousands of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	2.86	3.28	3.72	2.36	2.40
Quick (Times)	2.04	2.17	2.74	1.90	1.86
Fixed Assets/Equity (%)	41.33	46.25	30.62	27.88	32.28
Current Liabilities/Equity (%)	43.48	34.54	31.33	58.26	56.15
Total Liabilities/Equity (%)	71.73	66.55	51.44	68.92	70.54
<i>Profitability (%)</i>					
Return on Assets	-	1.22	0.17	14.00	13.32
Return on Equity	-	2.06	0.27	22.58	22.62
Profit Margin	5.31	1.25	0.19	11.03	10.26
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	18.05	16.50	17.89	11.99	14.41
Capital Spending % of Revenue	7.41	7.73	6.59	5.46	8.56
Employees	1,359	1,415	1,406	1,765	2,651
Revenue (\$K)/Employee	\$128.50	\$105.50	\$124.10	\$205.50	\$189.30
Capital Spending % of Assets	8.71	7.39	4.94	5.84	9.90

N/A = Not Available

Source: Applied Materials, Inc.
 Annual Reports and
 Forms 10-K
 Dataquest
 1990

Advanced Semiconductor Materials International N.V.

Jan Steenlaan 9
3723 BS Bilthoven
Netherlands
Phone: (31) 30-281836
Fax: (31) 30-281863
Dun's Number: Not Available

Date Founded: 1968

CORPORATE STRATEGIC DIRECTION

Advanced Semiconductor Materials International N.V. (ASM International N.V.) is a worldwide supplier of semiconductor process and assembly equipment. Products include assembly automation and encapsulation equipment, microcomputer-controlled wafer processing equipment, chemical vapor deposition (CVD) systems, epitaxial reactors, components for gas control systems, and semiconductor leadframe products and materials.

ASM markets its products to semiconductor manufacturers on a worldwide basis. Customers vary from independent semiconductor manufacturers to large, vertically integrated electronic systems companies that manufacture semiconductors for internal use. ASM's strategy addresses the needs of both types of customers, emphasizing sales among the largest manufacturers. New products are being designed in a modular style that will provide configurations for various customer requirements and that allow incorporation of technological advances in semiconductor processing technology.

Net sales of ASM products were slightly over F 416.2 million (US\$195.4 million) for the year ended December 31, 1989. This represents a 14.7 percent increase over 1988 sales of F 362.9 million (US\$183.3 million). (Percentage changes refer only to F amounts; US\$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) Sales in the Far East and Japan showed the greatest gains, at F 130.9 million and F 110.5 million (US\$61.5 million and US\$51.9 million), respectively. This compares with 1988 sales of F 93 million and F 89 million (US\$47 million and US\$45 million). Product sales in Europe slowed during 1989, down to F 129.7 million (US\$60.9 million),

compared with F 135.7 million (US\$68.5 million) in 1988. Sales in the United States remained fairly flat, at F 45.1 million (US\$21.2 million) in 1989, versus F 45.2 million (US\$22.8 million) in 1988.

In order to develop and manufacture products to accommodate local needs and to market and service products in a worldwide market, ASM has manufacturing, sales, and service facilities in Europe, the United States, Hong Kong, and Japan. Most of the Company's sales are through its direct sales force. In addition to individual sales and service offices throughout the world, ASM maintains a specialized group of sales, support, and service personnel to meet specific technology and application requirements for each of the main product categories.

ASM has R&D facilities in Arizona, Tokyo, Hong Kong, and the Netherlands that enable it to draw on innovative and technical capabilities on an international basis. Each location is the center of expertise for a specific product or technology. ASM also has established an international research center in the Netherlands for the development of semiconductor manufacturing technology.

During 1989, ASM opened a factory in the Shenzhen economic zone of the People's Republic in China. In addition, ASM intends to set up a factory and R&D facility in Singapore and a new customer engineering facility in Kyushu, Japan, during the next few years. ASM plans to continue its significant investments in R&D to expand and improve product lines. During 1989, the Company spent F 39.7 million (US\$18.6 million) on R&D, a 39 percent increase over the 1988 level of F 28.6 million (US\$14.4 million).

As of December 31, 1989, ASM employed more than 2,200 people worldwide. ASM employment is highest in Hong Kong at 1,044, followed by the Netherlands with 635, the United States with 252, Japan with 177, and other European countries with 105.

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 and 5, comprehensive financial statements, are at the end of this background.

BUSINESS SEGMENT STRATEGIC DIRECTION

ASM's business is divided into three main segments: wafer processing, assembly and encapsulation, and materials. The biggest revenue producer for 1989 was the wafer processing segment with net sales of F 224.5 million (US\$105.4 million), or 54 percent of total net sales. The assembly and encapsulation segment was second, with net sales of F 128.0 million (US\$60.1 million), followed by material segment sales of F 63.0 million (US\$30.0 million). Sales for the latter two business segments represented 31 and 15 percent of total net sales, respectively.

The wafer processing equipment products are used in the semiconductor manufacturing process, during which a series of thin films is deposited, or grown, on a silicon wafer. ASM manufactures equipment that uses CVD and diffusion technologies in this process. Dataquest estimates ASM's market share of the worldwide CVD equipment market at 12 percent for 1989 based on estimated sales of F 147.0 million (US\$69 million). For the 1989 worldwide diffusion tube market, Dataquest estimates ASM's market share at 9 percent based on estimated diffusion tube sales of F 61.8 million (US\$29 million).

The Company's wafer processing equipment sector has two main product categories: horizontal tube plasma-enhanced CVD reactors (PECVDs) used in wafer processing for VLSI devices such as 4Mb DRAMs, and micropressure CVD systems (LPCVD) used for low-pressure wafer processing that permits high deposition rates at moderate temperatures. LPCVD systems include the horizontal tube systems

of the DFS 210 and 250 series as well as the vertical tube LPCVD system, the VMP100 PRO. The DFS 210 and 250 series encompass diffusion and oxidation capabilities with LPCVD. Dataquest estimates ASM's 1989 sales at F 108 million (US\$51 million) in the PECVD market and F 38 million (US\$18 million) in the LPCVD market.

During 1989, ASM introduced the VMP100 PRO, which is a vertical tube LPCVD system, in Japan. The DFS 210 and 250 series of diffusion and oxidation systems are ASM's mainstream products in Europe.

Another wafer processing equipment category is epitaxial reactors, which are used for epitaxial growth of crystal structures on silicon wafers, a process commonly used in the manufacturing of advanced bipolar devices and CMOS devices. Dataquest estimates ASM's sales in this market for 1989 at F 13.2 million (US\$6.2 million). In 1988, ASM announced the Epsilon One, which features single-wafer production with high uniformity of layers and low particulate contamination. The system is aimed at the fast-growing CMOS device market. In 1989, ASM introduced the E2 model, with 200mm wafer capability.

Recent developments in ASM's wafer processing product line include the integration of microprocessor-based controls and the addition of automated wafer handling to existing products and newly developed systems. During 1989, ASM announced the Advance 600, a new family of multiprocessing systems for use in submicron chip manufacturing. The Advance 600 products incorporate ASM's Central Loadlock Systems, to which various modules for processing and handling can be connected. ASM's strategy is to make modular systems that allow a variety of system configurations to address selected applications.

ASM's assembly and encapsulation segment provides equipment used after the wafer processing step. The assembly equipment line includes automated systems for die inspection and separation, die bonders, wire bonders, molding systems, and trim-and-form systems. ASM's bonding equipment integrates mechanical and computer-based automation technology to meet productivity and quality criteria, while maintaining cost effectiveness.

During 1989, a new aluminum wire bonder, the AB509, was introduced. This product is targeted to the LED market for consumer electronics applications. More recently, in March 1990, ASM introduced the AB309 gold wire bonder. This product incorporates a new pattern recognition system and an ultralight moving bondhead for high-speed production rates. The AB309 system specifications are designed to provide higher productivity for customers in the high-volume IC market.

The Company's transfer molds, used in plastic packaged circuits, also provide fully automated systems operation. This category includes the AMS 480, a high-capacity, automated in-line molding system introduced several years ago. In 1987, lower-capacity automatic and semiautomatic molding systems, the AMS 140 and MS 100, were added to address a growing market for high-variety/small-series production of semiconductors. Similar to trends in wafer processing equipment, these encapsulation systems include the integration of microprocessor-based controls for process and information handling.

ASM expanded its molding systems product line with the introduction of the AMS 280 from ASM Fico in May 1989. This AMS 280 system offers a midrange production capacity, fitting between the MS 100 and AMS 140 at the low end and the AMS 480 at the high end. To further strengthen its position in the assembly markets, ASM is also developing advanced versions of its automatic and semiautomatic trim-and-form systems.

Manufacturing of assembly equipment is concentrated in Hong Kong for sale worldwide. ASM's encapsulation products are manufactured in the Netherlands and Hong Kong. The Company also has established precision machine tooling facilities in those locations to manufacture very high-precision transfer molds for encapsulation and automated trim-and-form tooling.

Further Information

For further information regarding the Company's business segments, please contact the appropriate Dataquest industry service.

Table 1
Five-Year Corporate Highlights (Thousands of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$105,677.7	\$128,463.7	\$136,614.3	\$183,276.8	\$195,401.4
Percent Change	-	21.56	6.34	34.16	6.62
Capital Expenditure	\$18,660.2	\$14,679.2	\$11,852.7	\$9,623.2	\$18,028.6
Percent of Revenue	17.66	11.43	8.68	5.25	9.23
R&D Expenditure	\$11,056.3	\$18,730.6	\$17,476.8	\$14,447.0	\$18,659.6
Percent of Revenue	10.46	14.58	12.79	7.88	9.55
Number of Employees	1,868	2,092	2,056	1,984	2,213
Revenue (\$K)/Employee	\$56,573	\$61,407	\$66,447	\$92,377	\$88,297
Net Income	(\$5,794.6)	(\$25,182.0)	(\$22,544.8)	\$21,314.6	\$4,510.8
Percent Change	-	95.96	3,514.20	(194.54)	(78.84)
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	NA	NA	NA	NA	
Quarterly Profit	NA	NA	NA	NA	

NA = Not available

Source: Advanced Semiconductor Materials International N.V.
 Quarterly Reports
 Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	27.00	15.00	12.00	12.00	11.00
International	73.00	85.00	88.00	88.00	89.00
Europe	24.00	44.00	46.00	37.00	31.00
Asia/Pacific	49.00	41.00	42.00	51.00	58.00

Source: Advanced Semiconductor Materials International N.V.
 Annual Reports
 Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1985	1986	1987	1988	1989
Direct Sales	100.0	100.0	100.0	100.0	100.0
Indirect Sales	0	0	0	0	0

Source: Advanced Semiconductor Materials International N.V.
 Annual Reports
 Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—7
Europe—4
Asia/Pacific—11

MANUFACTURING LOCATIONS

North America

Phoenix, Arizona
Wafer processing equipment (PECVD)
Tempe, Arizona
Wafer processing equipment (epitaxy)

Europe

Bilthoven, Netherlands
CVD, diffusion, and oxidation wafer processing products
Brunssum, Netherlands
Encapsulation equipment manufacturing
Herwen, Netherlands
Encapsulation and tooling products manufacturing
Montpellier, France
Gas component manufacturing, small CVD systems, MOCVD

Asia/Pacific

Kwai Chung, N.T. Hong Kong
Assembly automation equipment, encapsulation, and leadframe manufacturing
Nagaoka, Japan
Wafer processing equipment
Shenzhen, People's Republic of China
Precision metal tooling
Singapore
Assembly automation equipment

SUBSIDIARIES

North America

ASM America, Inc. (United States)
ASM Epitaxy (United States)
ASM Pacific Assembly Products, Inc. (United States)
ASM Rio USA, Inc. (United States)

Europe

ASM Europe B.V. (Netherlands)
ASM Fico Tooling B.V. (Netherlands)
ASM Finance Ltd. (Germany)
ASM France SARL (France)
ASM Germany Sales B.V. (Germany)
ASM UK Sales B.V. (England)

Asia/Pacific

ASM Asia Ltd. (Hong Kong)
ASM Assembly Automation Ltd. (Hong Kong)
ASM Assembly Materials Ltd. (Hong Kong)
ASM Japan K.K. (Japan)
ASM Pacific International Marketing Ltd. (Singapore)
ASM Pacific Technology Ltd. (Hong Kong)
ASM Technology Singapore Pte. Ltd. (Singapore)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Arthur H. del Prado
Managing director, president, and chief executive officer

Andre C. van Rhee
Managing director, vice president of Finance, and chief financial officer

Lam See-Pong (Patrick)
Vice president of Asian Operations and managing director of ASM Pacific Technology Ltd., the holding company for Asia/Pacific subsidiaries

William H. de Leeuw
Managing director of ASM Europe B.V.

Herbert O. Lakens
Director of Marketing

Jan Willem Baud
Managing director of ASM Fico Tooling B.V.

Yo Miyazaki
Vice president of Japanese Operations and managing director of ASM Japan K.K.

John E. Krickl
President of ASM America, Inc., and ASM Epitaxy

L. David Sikes
General manager of ASM America, Inc., and ASM Epitaxy

PRINCIPAL INVESTORS

Stichting Administratiekantoor ASMI—47.3 percent
All officers and directors as a group (13 persons)—49.7 percent

FOUNDERS

Arthur H. del Prado

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	\$78,714.5	\$104,304.9	\$129,632.0	\$140,244.4	\$121,505.2
Cash	5,773.8	5,429.8	8,390.1	27,736.9	9,533.3
Receivables	20,345.5	34,413.9	47,794.1	59,249.5	53,110.8
Marketable Securities	0	0	0	0	6,316.4
Inventory	43,688.9	51,894.7	60,249.8	42,367.7	41,808.0
Other Current Assets	8,906.3	12,566.5	13,198.0	10,890.4	10,736.6
Net Property, Plants	\$32,566.6	\$45,131.4	\$52,610.8	\$47,658.1	\$48,378.4
Other Assets	\$1,622.3	\$1,243.7	\$1,513.3	\$5,236.9	\$7,079.3
Total Assets	\$112,903.3	\$150,680.0	\$183,756.2	\$193,139.4	\$176,962.9
Total Current Liabilities	\$51,525.6	\$80,199.6	\$111,408.9	\$94,344.9	\$85,153.1
Long-Term Debt	\$13,341.3	\$24,071.8	\$27,545.3	\$21,649.0	\$17,894.4
Other Liabilities	\$758.4	\$13,357.1	\$32,869.5	\$41,495.5	\$35,659.6
Total Liabilities	\$65,625.3	\$117,628.6	\$171,823.6	\$157,489.4	\$138,707.0
Total Shareholders' Equity	\$47,278.0	\$33,051.4	\$11,932.5	\$35,650.0	\$38,255.9
Converted Preferred Stock	0	0	0	0	0
Common Stock	63.0	85.3	103.0	105.6	104.2
Other Equity	34,831.0	41,366.5	44,512.8	47,738.4	44,976.1
Retained Earnings	12,384.0	(8,400.4)	(32,683.3)	12,193.9	(6,824.4)
Total Liabilities and Shareholder's Equity	\$112,903.3	\$150,680.0	\$183,756.2	\$193,139.4	\$176,962.9
Income Statement	1985	1986	1987	1988	1989
Revenue	\$105,677.7	\$128,463.7	\$136,614.3	\$183,276.8	\$195,401.4
Cost of Sales	\$64,604.2	\$87,338.8	\$87,996.6	\$112,505.6	\$116,165.3
R&D Expense	\$11,056.3	\$18,730.6	\$17,476.8	\$14,447.0	\$18,659.6
SG&A Expense	\$31,314.8	\$37,197.6	\$39,388.2	\$47,189.9	\$47,188.3
Capital Expense	\$18,660.2	\$14,679.2	\$11,852.7	\$9,623.2	\$18,028.6
Pretax Income	(\$1,802.4)	(\$18,302.9)	(\$13,820.2)	\$12,318.7	\$7,900.9
Pretax Margin (%)	NA	NA	NA	NA	NA
Effective Tax Rate (%)	43.0	43.0	43.0	43.0	43.0
Net Income	(\$5,794.6)	(\$25,182.0)	(\$22,544.8)	\$21,314.6	\$4,510.8
Shares Outstanding, Millions	\$6,959.0	\$6,959.0	\$6,959.0	\$6,959.0	\$6,959.0
Per Share Data					
Earnings	(\$0.8)	(\$3.6)	(\$3.3)	\$3.1	\$0.6
Dividend	NA	NA	NA	NA	NA
Book Value	NA	NA	NA	NA	NA
Exchange Rate (US\$1=F)	F 3.32	F 2.45	F 2.03	F 1.98	F 2.13

NA = Not available

Source: Advanced Semiconductor Materials International N.V.
 Annual Reports and Forms 10-K
 Dataquest (1990)

Table 5
Comprehensive Financial Statement
Fiscal Year Ending December
(Thousands of Guilders, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	F 261,332.0	F 255,547.0	F 263,153.0	F 277,684.0	F 258,806.0
Cash	19,169.0	13,303.0	17,032.0	54,919.0	20,306.0
Receivables	67,547.0	84,314.0	97,022.0	117,314.0	113,126.0
Marketable Securities	0	0	0	0	13,454.0
Inventory	145,047.0	127,142.0	122,307.0	83,888.0	89,051.0
Other Current Assets	29,569.0	30,788.0	26,792.0	21,563.0	22,869.0
Net Property, Plants	F 108,121.0	F 110,572.0	F 106,800.0	F 94,363.0	F 103,046.0
Other Assets	F 5,386.0	F 3,047.0	F 3,072.0	F 10,369.0	F 15,079.0
Total Assets	F 374,839.0	F 369,166.0	F 373,025.0	F 382,416.0	F 376,931.0
Total Current Liabilities	F 171,065.0	F 196,489.0	F 226,160.0	F 186,803.0	F 181,376.0
Long-Term Debt	F 44,293.0	F 58,976.0	F 55,917.0	F 42,865.0	F 38,115.0
Other Liabilities	F 2,518.0	F 32,725.0	F 66,725.0	F 82,161.0	F 75,955.0
Total Liabilities	F 217,876.0	F 288,190.0	F 348,802.0	F 311,829.0	F 295,446.0
Total Shareholders' Equity	F 156,963.0	F 80,976.0	F 24,223.0	F 70,587.0	F 81,485.0
Converted Preferred Stock	0	0	0	0	0
Common Stock	209.0	209.0	209.0	209.0	222.0
Other Equity	115,639.0	101,348.0	90,361.0	94,522.0	95,799.0
Retained Earnings	41,115.0	(20,581.0)	(66,347.0)	24,144.0	(14,536.0)
Total Liabilities and Shareholders' Equity	F 374,839.0	F 369,166.0	F 373,025.0	F 382,416.0	F 376,931.0
Income Statement	1985	1986	1987	1988	1989
Revenue	F 350,850.0	F 314,736.0	F 277,327.0	F 362,888.0	F 416,205.0
Cost of Sales	F 214,486.0	F 213,980.0	F 178,633.0	F 222,761.0	F 247,432.0
R&D Expense	F 36,707.0	F 45,890.0	F 35,478.0	F 28,605.0	F 39,745.0
SG&A Expense	F 103,965.0	F 91,134.0	F 79,958.0	F 93,436.0	F 100,511.0
Capital Expense	F 61,952.0	F 35,964.0	F 24,061.0	F 19,054.0	F 38,401.0
Pretax Income	(F 5,984.0)	(F 44,842.0)	(F 28,055.0)	F 24,391.0	F 16,829.0
Pretax Margin (%)	NA	NA	NA	NA	NA
Effective Tax Rate (%)	43.0	42.0	42.0	40.0	35.0
Net Income	(F 19,238.0)	(F 61,696.0)	(F 45,766.0)	F 42,203.0	F 9,608.0
Shares Outstanding, Millions	F 6,959.0	F 6,959.0	F 6,959.0	F 6,959.0	F 7,185.0
Per Share Data					
Earnings	(F 2.8)	(F 8.9)	(F 6.6)	F 6.1	F 1.3
Dividend	NA	NA	NA	NA	NA
Book Value	NA	NA	NA	NA	NA

Table 5 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Thousands of Guilders, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.53	1.30	1.16	1.49	1.43
Quick (Times)	0.68	0.65	0.62	1.04	0.94
Fixed Assets/Equity (%)	68.88	136.55	440.90	133.68	126.46
Current Liabilities/Equity (%)	108.98	242.65	933.66	264.64	222.59
Total Liabilities/Equity (%)	138.81	355.90	1,439.96	441.77	362.58
<i>Profitability (%)</i>					
Return on Assets	(10.26)	(16.58)	(12.33)	11.17	2.53
Return on Equity	(24.51)	(51.86)	(87.01)	89.03	12.64
Profit Margin	(5.48)	(19.60)	(16.50)	11.63	2.31
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	10.46	14.58	12.79	7.88	9.55
Capital Spending % of Revenue	17.66	11.43	8.68	5.25	9.23
Employees	1,868	2,092	2,056	1,984	2,213
Revenue (F K)/Employee	F 187,821	F 150,447	F 134,887	F 182,907	F 188,073
Capital Spending % of Revenue	16.53	9.74	6.45	4.98	10.19
Exchange Rate (US\$1=F)	F 3.32	F 2.45	F 2.03	F 1.98	F 2.13

NA = Not available

Source: Advanced Semiconductor Materials International N.V.
 Annual Reports and Forms 10-K
 Dataquest (1990)

Canon Incorporated

7-1, Nishi-shinjuku 2-chome
Shinjuku-ku, Tokyo 163, Japan

Telephone: (03) 348-2121

Fax: (03) 349-8957

Dun's Number: 69-054-9662

Date Founded: 1937

CORPORATE STRATEGIC DIRECTION

Canon Incorporated, a Japanese parent/holding company, is the world's largest (in unit sales) maker of copiers and a leading producer of office equipment and cameras. Its business is divided into three product segments—business machines, cameras, and optical and other products—with net sales of 80 percent, 13 percent, and 7 percent, respectively. The Company conducts the majority of its business in Japan, Europe, and North America with approximately 30 percent of net sales coming from each respective region.

The main market factors affecting the Company are trade sanctions, exchange rate risk, and a rapidly expanding global economy. Trade sanctions affect all Japanese companies. Because of increasing anti-Japanese sentiment, European countries have imposed or threatened to impose import restrictions on products manufactured in Japan. Many of Canon's products are affected by these trade sanctions.

Another factor affecting the Company is fluctuating exchange rates. Because of the yen's decline over the past five years, profit margins on exported products have deteriorated. Japanese copier manufacturers have had to raise prices five times since 1987. In 1989 alone, foreign exchange translation adjustments affected Canon by ¥17,928 million (US\$123.4 million).

Last, with a globalizing economy, Canon and other multinational companies are expanding their sales and distribution to worldwide markets. By doing so, they are entering new markets where market demand challenges will be heightened.

In 1987, Canon implemented a five-year "Global Corporation Plan" to address these issues. The plan calls for an increase in international investment and

production, which effectively limits the effects of the trade sanctions because products manufactured outside Japan are not considered "Japanese" products. Rather, they are considered to be native to the country in which they are manufactured. Also, by increasing foreign investment and production, Canon's foreign branches are becoming more self-sufficient, thereby decreasing the number of cross-border transactions and reducing the Company's exposure to interest-rate volatility. By establishing a direct interest in the foreign market, the Company gains a closeness to the market that it would not otherwise be able to achieve.

Going one step further, Canon has begun to emphasize increases in research and development (R&D), joint company ventures, and product sourcing in the foreign markets. These steps are expected to improve the geopolitical relationships that Canon has with the foreign nations and to help its corporate image on an international level.

The Company is financially able to follow this strategy because it conducts business in large foreign markets, which can support large-scale, local production. It also has a significant cash base from which it may make the investments. The Company's cash base is ¥514,312 million (US\$3,729.0 million) with a net working capital to total asset ratio of 30 percent.

The Company's net sales increased by 22.1 percent to ¥1,350,917 million, (US\$9,794.9 million) in fiscal 1989 from ¥1,106,010 million (US\$8,633.3 million) in fiscal 1988. (Percentage changes refer only to ¥ amounts; US\$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) Business machines and optical and other products net sales were both up approximately 23.0 percent in fiscal 1989. Contributing to the strong growth were copiers and computer peripherals.

Operating profit surpassed the improvement in sales by increasing 31.9 percent to ¥115,985 million (US\$840.0 million) in fiscal 1989 from ¥87,914 million (US\$686.2 million) in fiscal 1988. The increase was primarily due to the aforementioned increase in net sales as well as the introduction of higher profit margin products. R&D expense increased 15 percent to ¥75,566 million (US\$548.1 million) in fiscal 1989 from ¥65,522 million (US\$511.5 million) in fiscal 1988. However, as a percent of sales, R&D expense remained fairly stable at approximately 6 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. Tables 3 and 4, comprehensive financial statements, are at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Copiers

Copiers alone represent over one-quarter of the Company's business. In fiscal 1989, the Company retained its leadership position by capturing 23 percent of the copier market, while its closest competitors, Xerox and Sharp, captured 15 percent and 14.6 percent, respectively. The Company is striving to add value to the basic copier and capture more of the market by implementing editing and full-color capabilities. Some of the outstanding products introduced in 1989 are as follows:

- **Color Laser Copier 500 (CLC-500)**—In 1989, Canon introduced its top of the line digital full-color model, the CLC-500. The 400-dpi printer/copier produces photographic-quality, plain paper copies of color images at a rate of 5 pages per minute (ppm).
- **PS-IPU**—The PS-IPU is a new PostScript language interpreter for the Company's CLC-500 system. This interpreter enables color laser copier users to access, manipulate, and print more than 4,000 different computer software packages that support the PostScript page description language (PDL).
- **Color Bubble-Jet Copier A1**—One of Canon's outstanding new copiers is the Color Bubble-Jet Copier, which last year was sold as an output printer. However, at the 1989 Canon Expo, the copier was presented as a standalone device, capable of producing full-color documents up to 22 x 33 inches that are scanned on the color copier.

Peripherals

The peripheral segment of Canon's product line includes printers and data storage systems. Sales of the computer peripheral segment reached ¥274,048 million (US\$1,987 million) in fiscal 1989.

Canon is one of the leading manufacturers of electronic printers. In 1989, Canon accounted for approximately 80 percent of the less than 10-ppm electronic printer market (the market share figure is based on the machine unit itself, not the brand name). Canon's significant product introductions for 1989 include the following:

- **LBP-4**—The LBP-4 is Canon's first 4-ppm desktop laser beam printer. It has a printing resolution of 300 dpi and is equipped with nine scalable fonts.
- **LBP-8 Mark III series**—The LBP-8 Mark III series is a new series of laser beam printers that use Canon's new page control language, LBP Image Processing System. There are three products in this series, all equipped with scalable fonts, 1.5Mb standard memory, increased software support, and improved vector graphics capabilities.
- **BJ-130e**—The BJ-130e is a bubble-jet printer aimed at the impact matrix printer market. It offers 240-cps printing, automatic sheet feeder, 360-dpi resolution, and built-in Courier and Gothic fonts.

In data storage systems, Canon manufactures large-volume memory systems. One of the Company's products, the MOD, is an innovative small format memory device with a 256MB capacity per side, which is equivalent to 190,000 A4-size pages. The MOD's main application is in computer external storage peripherals. However, the first application of the MOD technology was incorporated in the memory of the NeXT workstation.

Another application of Canon's memory technology is the data card. In 1989, Canon unveiled its new Optical Memory Cards, which improved upon the magnetic and integrated circuit (IC) designs by allowing users to store graphics as well as alphanumeric data. The card's technology embeds optical-recording material onto a 2MB plastic card, immunizing it from static electricity or magnetic forces and making it more difficult to alter. These new cards have a higher storage capacity and cost less to manufacture than their predecessors. Applications for the card include personal identification, personal medical record storage, and security access cards.

Business Systems

The business systems segment of Canon encompasses a broad range of products, including facsimile transceivers, workstations, microcomputers, word processors, and desktop publishing (DTP), micrographics equipment, calculators, and electronic typewriters. The 1989 product introductions include the following:

- FAX-L6500—Canon refers to the plain paper FAX-L6500 facsimile transceiver as a Group 4, Class 1 "image terminal" capable of providing networking for Group 3 and 4 facsimiles, making it truly multifunctional. It combines the laser print engine of Canon's 9330 digital copier with a flat-bed scanner and 20MB of hard-disk memory. The user can use this product as a facsimile machine or a full-range copier, capable of reducing or enlarging documents by 35 to 800 percent. Its image editing and output is 30 ppm.
- FAX-L4600—This new plain paper laser beam G4 fax machine is designed for high-volume communication. This product provides true networking capabilities by accepting documents from either a G3 or G4 terminal without reprogramming.
- Navigator—The most innovative of Canon's new products is the Navigator. This compact, integrated personal workstation has the multifunctional features of a word processor, facsimile transceiver, telephone, IBM-compatible microcomputer, and personal data management—all of which can be operated from the touch of a screen.

- Bubble-Jet Word Processor and Thermal Transfer Word Processor—These are compact, all-in-one word processors that do not require a separate printer. They are marketed toward the home office and feature Canon's "nonimpact" printing systems.

Cameras

The camera is what first introduced the Canon name to the world. Along with cameras, Canon is involved in video camcorders, still video, and camera lenses. The camera division accounted for 13.1 percent of total net sales.

Optical Products

The optical product division comprises high-tech, precision products including semiconductor production equipment, broadcasting lenses, and medical equipment. The Company is currently one of the largest suppliers of optical lithography equipment used in semiconductor device manufacturing. Optical products contributed 5 percent to net sales.

Further Information

For further information about the Company's business segments, please contact the appropriate industry service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$4,006.8	\$5,276.6	\$6,728.5	\$8,633.3	\$9,794.9
Percent Change	-	31.69	27.52	28.31	13.46
Capital Expenditure	\$384.7	\$482.3	\$437.4	\$648.4	\$777.9
Percent of Revenue	9.60	9.14	6.50	7.51	7.94
R&D Expenditure	\$207.2	\$328.3	\$393.3	\$51.1	\$547.9
Percent of Revenue	5.17	6.22	5.84	0.59	5.59
Number of Employees	34,129	35,498	37,521	37,521	44,401
Revenue (\$K)/Employee	\$117.40	\$148.65	\$179.33	\$230.09	\$220.60
Net Income	\$155.3	\$63.7	\$91.1	\$289.6	\$277.6
Percent Change	-	(59.02)	43.10	217.89	(4.13)
Exchange Rate (US\$1=¥)	¥238.54	¥168.52	¥145.16	¥128.11	¥137.92
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	NA	NA	NA	NA	
Quarterly Profit	NA	NA	NA	NA	

NA = Not available

Source: Canon Incorporated
Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	37.87	34.77	32.48	30.24	30.55
International	71.44	69.17	70.27	68.49	69.36
Japan	28.56	30.83	29.73	31.51	30.64
Europe	24.22	27.45	30.48	30.70	31.36
ROW	9.35	6.95	7.31	7.55	7.45

Source: Canon Incorporated
Annual Reports

1989 SALES OFFICE LOCATIONS

North America—4
Europe—13
Asia/Pacific—6
Japan—4
ROW—3

MANUFACTURING LOCATIONS

North America

Canon Business Machines, Inc. (United States)
Produces electronic typewriters and facsimiles, as well as copier and electronic typewriter consumables
Canon Virginia, Inc. (United States)
Manufactures copiers, laser printers, and printer consumables

Europe

Canon Bretagne S.A. (France)
Manufactures electronic typewriters and facsimile transceivers
Canon Giessen GmbH (West Germany)
Manufactures plain paper copiers

Asia/Pacific

Canon Chemical Co., Inc. (Japan)
Produces rollers and blades for copiers
Canon Components, Inc. (Japan)
Manufactures hybrid ICs and other high-tech components
Canon Electronics, Inc. (Japan)
Manufactures precision components such as floppy disk drives, magnetic heads, single lens reflex (SLR) components, and micrographics
Canon Inc. (Taiwan) (Japan)
Manufactures 35mm range-finder cameras and micromotors for audio products
Canon Precision, Inc. (Japan)
Manufactures micromotors used in audio products, video tape recorders, business machines, and computers
Canon Seiko Co., Ltd. (Japan)
Manufactures molded parts and electronic flash guns
Copolyer Co. Ltd. (Japan)
Manufactures copiers and copier supplies

Dai-ichi Seiki Kogyo Co., Ltd. (Japan)
Produces cartridges and accessories for copiers
Oita Canon Inc. (Japan)
Manufactures 35mm range-finder cameras

SUBSIDIARIES

North America

Ambassador Office Equipment, Inc. (United States)
Astro Office Products, Inc. (United States)
Canon Canada Inc. (Canada)
Canon U.S.A., Inc. (United States)
MCS Business Machines Inc. (United States)

Europe

Canon Business Machines Belgium N.V./S.A. (Belgium)
Canon Copylux GmbH. (West Germany)
Canon Espana S.A. (Spain)
Canon Europa N.V. (Netherlands)
Canon Euro-Photo Handelsgesellschaft m.b.H. (West Germany)
Canon France S.A. (France)
Canon Gesellschaft m.b.H. (West Germany)
Canon Italia S.p.A. (Italy)
Canon Photo Video France S.A. (France)
Canon Rechner Deutschland GmbH. (West Germany)
Canon Svenska AB (Sweden)
Canon (UK) Ltd. (United Kingdom)
Canon Verkooporganisatie Nederland B.V. (Netherlands)
Oy Canon Ab (Finland)
Selex France S.A. (France)

Asia/Pacific

Canon Australia Pty. Ltd. (Australia)
Canon Copyer Sales, Co., Ltd. (Japan)
Canon Eiken Co., Inc. (Japan)
Canon Hong Kong Trading Co., Ltd. (Hong Kong)
Canon Marketing (Malaysia) Sdn. Bhd. (Malaysia)
Canon Marketing Services Pte. Ltd. (Singapore)
Canon Sales Co., Inc. (Japan)
Canon Singapore Pte. Ltd. (Singapore)
Canon Software Inc. (Japan)
Canon System Sales Co., Inc. (Japan)

ROW

Canon de Brasil Industria e Comercio Limitada (Brazil)
Canon Latin America, Inc. (Panama)
Canon Panama S.A. (Panama)

ALLIANCES, JOINT VENTURES, LICENSING AGREEMENTS

1989

NeXT Incorporated

Canon agreed to be the exclusive distributor of NeXT computers in Asia.

Software Limited

Software Limited agreed to distribute Canon's LBP-4 and LPB-8 III laser printers, as well as the BJ-130 Bubble-Jet printer, in the United Kingdom.

Hewlett-Packard

Canon and Hewlett-Packard agreed to codevelop the specifications for a Japanese language version of the HP NewWave software.

Hitachi, Ltd.

Canon agreed to market Hitachi's high-capacity PBXs (Private Branch Exchanges) in combination with its own Office Automation equipment.

Adobe Systems

Canon licensed the Adobe Systems PostScript interpreter to implement into its own line of printers.

1988

Apple Computers

Canon distributes 80 to 90 percent of all Apple computers sold in Japan.

Eastman Kodak Company

Canon agreed to supply copiers and medical equipment to Kodak.

Intel Corporation

Canon and Intel agreed to jointly develop specialized large-scale integration for copiers. Canon has cosigned production to Intel.

Nippon Typewriter Co., Ltd.

Nippon commissioned the production of Canon's LBP-ST, a compact laser printer.

Ricoh Co., Ltd.

Canon and Ricoh agreed to OEM supply each other with plain paper copiers in order to supplement their respective copier lines.

Computer Automation

Canon acquired the patent rights for micro channel technology from Computer Automation.

1987

Siemens

Canon agreed to supply facsimiles and original bubble-jet printers to Siemens on an OEM and technology license basis.

Olivetti S.p.A. Inc.

Olivetti-Canon Industriale S.p.A. was established by Canon and Olivetti to produce plain paper copiers and laser printers.

National Semiconductor Corporation

National and Canon formed a technology agreement. The first by-product of this agreement is the 1989 LBP-8 Mark III model laser printers.

MERGERS AND ACQUISITIONS

1989

NeXT Incorporated

Canon purchased a 16.7 percent interest in NeXT stock, valued at \$100 million.

New Zealand Canon

DRG sold its New Zealand Canon business machines operations for NZD\$13.25 million to a newly established subsidiary of Canon.

KEY OFFICERS

Ryuzaburo Kaku

Chairman and representative director

Dr. Keizo Yamaji

President and representative director

Hajime Mitarai

Senior managing and representative director

Kazuo Naito

Senior managing director

Hiroshi Tanaka

Senior managing director

Fujio Mitarai

Senior managing director

Shigeru Nishioka

Senior managing director

Torakiyo Yamanaka

Managing director

Masahiro Tanaka

Managing director

Hideharo Takemoto
Managing director

Takeshi Mitarai
Managing director

Tsuneo Enome
Managing director

Güichi Marushima
Managing director

PRINCIPAL INVESTORS

Dai-Ichi Mutual Life Insurance Co.—6.7 percent
Mitsubishi Trust & Banking Co., Ltd.—4.4 percent
Sumitomo Trust & Banking Co., Ltd.—4.0 percent
Fuji Bank Ltd.—3.5 percent
Yasuda Trust & Banking Co., Ltd.—3.2 percent

Table 3
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	\$3,061.9	\$4,239.2	\$5,703.2	\$7,499.0	\$8,731.8
Cash	742.0	806.2	1,740.0	3,033.7	3,729.1
Receivables	701.6	1,002.5	1,125.7	1,512.8	1,758.3
Marketable Securities	489.8	734.1	1,061.5	412.5	210.6
Inventory	983.3	1,473.7	1,513.2	2,167.6	2,494.8
Other Current Assets	145.2	222.7	262.9	372.5	538.9
Net Property, Plants	\$902.8	\$1,373.3	\$1,630.2	\$1,999.5	\$2,191.5
Other Assets	\$231.9	\$377.9	\$477.9	\$647.8	\$941.4
Total Assets	\$4,196.5	\$5,990.4	\$7,811.2	\$10,146.3	\$11,864.7
Total Current Liabilities	\$2,004.2	\$2,680.9	\$3,303.1	\$4,695.7	\$5,172.6
Long-Term Debt	\$563.3	\$989.3	\$1,534.7	\$1,608.6	\$2,012.4
Other Liabilities	\$46.4	\$64.8	\$75.1	\$84.9	\$83.0
Total Liabilities	\$2,613.9	\$3,735.0	\$4,913.0	\$6,389.2	\$7,268.0
Total Shareholders' Equity	\$1,582.7	\$2,255.4	\$2,898.2	\$3,757.1	\$4,596.7
Common Stock	726.4	1,079.3	1,517.4	1,845.6	2,367.7
Other Equity	212.8	301.7	396.0	574.6	668.1
Retained Earnings	688.2	990.7	1,190.2	1,575.7	1,669.5
Currency Adjustments	(44.8)	(116.3)	(205.4)	(238.8)	(108.5)
Total Liabilities and Shareholders' Equity	\$4,196.5	\$5,990.4	\$7,811.2	\$10,146.3	\$11,864.7
Income Statement	1985	1986	1987	1988	1989
Revenue	\$4,006.8	\$5,276.6	\$6,728.5	\$8,633.3	\$9,794.9
Japan	1,144.3	1,627.0	2,000.4	2,720.0	3,000.7
International	2,862.5	3,649.7	4,728.1	5,913.3	6,794.3
Cost of Sales	\$1,603.4	\$2,346.6	\$3,248.8	\$4,493.5	\$4,258.5
R&D Expense	\$207.3	\$328.3	\$393.3	\$51.1	\$547.9
SG&A Expense	\$1,439.0	\$1,941.1	\$2,330.1	\$2,942.1	\$3,369.7
Capital Expense	\$384.7	\$482.3	\$437.4	\$648.4	\$777.9
Pretax Income	\$355.4	\$164.7	\$277.2	\$670.0	\$660.5
Pretax Margin (%)	8.87	3.12	4.12	7.76	6.74
Effective Tax Rate (%)	53.40	64.60	62.70	62.70	50.80
Net Income	\$155.3	\$63.7	\$91.1	\$289.6	\$277.6
Shares Outstanding, Thousands	661,142	678,280	679,140	612,489	780,546
Per Share Data					
Earnings	\$0.25	\$0.11	\$0.15	\$0.40	\$0.36
Dividend	\$0.05	\$0.05	\$0.07	\$0.09	\$0.09
Book Value	\$0.0024	\$0.0033	\$0.0043	\$0.0061	\$0.0059
Exchange Rate (US\$1=¥)	¥238.54	¥168.52	¥145.16	¥128.11	¥137.92

Source: Canon Incorporated
Annual Reports
Dataquest (1990)

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of Yen, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	¥730,374	¥714,393	¥827,878	¥960,699	¥1,204,283
Cash	176,987	135,860	252,576	388,645	514,312
Receivables	167,359	168,946	163,410	193,800	242,511
Marketable Securities	116,838	123,717	154,085	52,843	29,052
Inventory	234,545	248,349	219,649	277,691	344,077
Other Current Assets	34,645	37,521	38,158	47,720	74,331
Net Property, Plants	¥215,360	¥231,242	¥236,637	¥256,151	¥302,258
Other Assets	¥55,310	¥63,687	¥69,366	¥82,993	¥129,839
Total Assets	¥1,001,044	¥1,009,504	¥1,133,881	¥1,299,843	¥1,636,380
Total Current Liabilities	¥478,092	¥451,780	¥479,483	¥601,562	¥713,399
Long-Term Debt	¥134,366	¥166,722	¥222,784	¥206,083	¥277,556
Other Liabilities	¥11,060	¥10,921	¥10,908	¥10,879	¥11,447
Total Liabilities	¥623,518	¥629,423	¥713,175	¥818,524	¥1,002,402
Total Shareholders' Equity	¥377,526	¥380,081	¥420,706	¥481,319	¥633,978
Common Stock	173,277	181,892	220,273	236,443	326,547
Other Equity	50,765	50,838	57,478	73,607	92,146
Retained Earnings	164,161	166,947	172,766	201,866	230,252
Currency Adjustments	(10,677)	(19,596)	(29,811)	(30,597)	(14,967)
Total Liabilities and Shareholders' Equity	¥1,001,044	¥1,009,504	¥1,133,881	¥1,299,843	¥1,636,380
Income Statement	1985	1986	1987	1988	1989
Revenue	¥955,780	¥889,217	¥976,711	¥1,106,010	¥1,350,917
Japan	272,966	274,174	290,382	348,462	413,854
International	682,814	615,043	686,329	757,548	937,063
Cost of Sales	¥382,481	¥395,445	¥471,592	¥575,659	¥587,329
R&D Expense	¥49,461	¥55,330	¥57,085	¥6,552	¥75,566
SG&A Expense	¥343,269	¥327,108	¥338,231	¥376,915	¥464,747
Capital Expense	¥91,763	¥81,273	¥63,497	¥83,069	¥107,290
Pretax Income	¥84,780	¥27,759	¥40,237	¥85,829	¥91,091
Pretax Margin (%)	8.87	3.12	4.12	7.76	6.74
Effective Tax Rate (%)	53.40	64.60	62.70	62.70	50.80
Net Income	¥37,056	¥10,728	¥13,224	¥37,100	¥38,293
Shares Outstanding, Thousands	661,142	678,280	679,140	612,489	780,546
Per Share Data					
Earnings	¥58.72	¥18.34	¥21.61	¥51.27	¥49.31
Dividend	¥12.50	¥12.50	¥10.00	¥11.36	¥11.93
Book Value	¥0.57	¥0.56	¥0.62	¥0.79	¥0.81

Table 4 (Continued)
 Comprehensive Financial Statement
 Fiscal Year Ending December
 (Millions of Yen, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.53	1.58	1.73	1.60	1.69
Quick (Times)	1.04	1.03	1.27	1.14	1.21
Fixed Assets/Equity (%)	57.05	60.89	56.25	53.22	47.68
Current Liabilities/Equity (%)	126.64	118.86	113.97	124.98	112.53
Total Liabilities/Equity (%)	165.16	165.60	169.52	170.06	158.11
<i>Profitability (%)</i>					
Return on Assets	-	1.07	1.32	3.05	2.61
Return on Equity	-	2.83	3.30	8.23	6.87
Profit Margin	3.88	1.21	1.35	3.35	2.83
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	5.17	6.22	5.84	0.59	5.59
Capital Spending % of Revenue	9.60	9.14	6.50	7.51	7.94
Employees	34,129	35,498	37,521	37,521	44,400
Revenue (¥K)/Employee	¥28,005	¥25,050	¥26,031	¥29,477	¥30,425
Capital Spending % of Assets	9.17	8.05	5.60	6.39	6.56
Exchange Rate (US\$1=¥)	¥238.54	¥168.52	¥145.16	¥128.11	¥137.92

Source: Canon Incorporated
 Annual Reports
 Dataquest (1990)

E. I. du Pont de Nemours and Company

1007 Market Street
Wilmington, Delaware 19898
Telephone: (302) 774-1000
Fax: (302) 724-9560
Dun's Number: 00-1131-5704

Date Founded: 1802

CORPORATE STRATEGIC DIRECTION

E. I. du Pont de Nemours and Company was founded in 1802 and incorporated in Delaware in 1915. The Company consists of six primary business segments: industrial products; fibers; polymers; petroleum; coal; and diversified businesses consisting of electronics, imaging systems, agricultural products, and medical products.

Du Pont has approximately 85 major businesses selling a wide array of products to many different markets that include energy, transportation, textile, construction, electronics, health care, packaging, and agriculture. Business operations of Du Pont and its subsidiaries exist in approximately 60 countries.

Total revenue increased by 10 percent to \$36 billion* in fiscal 1989 from \$33 billion in fiscal 1988. Net income increased 13 percent to \$2.5 billion in fiscal 1989 from \$2.2 billion in fiscal 1988. Du Pont employs 145,787 people worldwide.

R&D expenditure totaled \$1.4 billion in fiscal 1989, representing 4 percent of revenue. Most R&D is performed internally, although some research is accomplished within joint ventures for a few embryonic businesses. R&D focus at present is being placed on health sciences, agricultural products, electronics, new imaging systems, and advanced materials.

Du Pont maintains two large research centers near Wilmington, Delaware: The Experimental Station engages in research of a fundamental, exploratory, and applied nature; the Chestnut Run Laboratories are concerned principally with technical activities related to the end-use performance and requirements of Company products. Du Pont conducts research at facilities

in Ponaca City, Oklahoma, for new products and new petroleum business technology, and in Library, Pennsylvania, for coal businesses. Internationally, major research facilities are located in Canada, Belgium, Germany, Switzerland, and Japan.

Capital spending totaled \$5 billion in fiscal 1989, representing 14 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

Industrial Products

In fiscal 1989, the industrial products business segment had sales of \$3.7 billion. Industrial products comprise a wide range of commodity and specialty products that include white pigments, organic chemicals, polymer intermediates, fluorochemicals, petroleum additives, and mineral acids. These products are used in the construction, transportation, petroleum, agricultural, coatings, paper, cleaning agents, and textile industries.

Fibers

Du Pont produces the most extensive family of man-made fibers in the world. In fiscal 1989, the fibers business segment had sales of \$6 billion. Developed through material and processing expertise, new fiber systems are being used wherever high performance is

*All dollars amounts are in US dollars.

required—from advanced composites to protective apparel, active sportswear, and floor coverings.

Polymer Products

Du Pont's polymer products are used by a wide array of industries that include transportation, packaging chemical processing, construction, electrical/electronics, paper, adhesives, and textiles. Product lines include engineering polymers, ethylene polymers, elastomers, fluoropolymers, films, acrylics, membranes, and fabricated parts. In fiscal 1989, the polymer products business segment had sales of \$5.6 billion.

Petroleum Exploration and Production

In fiscal 1989, the petroleum exploration and production business segment group had sales of \$12.3 billion. Du Pont's petroleum operations are conducted through its Conoco subsidiary. Exploration activities are conducted worldwide, with crude oil produced in the United States, Canada, the United Kingdom, Norway, the Netherlands, Egypt, Dubai, and Indonesia. Natural gas is sold in the United States, Canada, the United Kingdom, and Norway.

Coal

In fiscal 1989, the coal business segment's sales were \$1.8 billion. Du Pont's coal operations are conducted through Consolidated Coal Company (Consol), a subsidiary. Operations consist primarily of mining stream and metallurgical coal that is sold mainly to electric utilities and steel producers in the United States.

Diversified Businesses

The diversified businesses segment consists of electronics, imaging systems, agricultural products, and medical products. In fiscal 1989, the diversified businesses segment had revenue of \$6.2 billion.

Electronics

Du Pont's electronics businesses seek to become a premier supplier of materials and components to the worldwide data processing, telecommunications, and information storage industries. This segment includes materials for electronic circuits; electronic components that include connectors and microelectric packages; information storage media for the audio, video,

and data markets; photographic systems and products for printing and a broad array of industrial applications; finishes for the automotive, chemical, and petroleum industries; and analytical instruments for research and monitoring industrial processes. Du Pont at present ranks among the leaders of the world's broad-based material and components suppliers.

Acquisitions during 1989 concentrated on achieving a leadership position in a relatively new business—photomasks used in producing integrated circuits. New alliances were forged with National Semiconductor, SGS-Thompson, and N.V. Philips to supply them with photomasks. New plants were opened in Europe and North America.

Imaging Systems

In 1989, the imaging systems business used strategic acquisitions to improve its position as one of the top four suppliers to the world's printing industry. Howson-Algraphy, manufacturer of offset plates based in the United Kingdom, was acquired in 1989. Also, this segment expanded with the acquisitions of Imagitex and Camex. These companies provide Du Pont a strong position in the black-and-white prepress markets.

Agricultural Products

Du Pont's agricultural products include fungicides, herbicides, and insecticides.

Medical Products

The medical products segment includes a broad line of medical X-ray products; diagnostic kits, instruments, reagents, and imaging agents; prescription pharmaceuticals; and a wide range of radiolabeled chemicals, biological materials, and instruments used in biomedical research.

Further Information

For more information about the Company's business segments, please contact Dataquest's Semiconductor Equipment and Materials Service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$29,865.0	\$27,421.0	\$30,344.0	\$32,771.0	\$35,991.0
Percent Change	-	(8.18)	10.66	8.00	9.83
Capital Expenditure	\$3,095.0	\$2,939.0	\$3,212.0	\$4,207.0	\$5,092.0
Percent of Revenue	10.36	10.72	10.59	12.84	14.15
R&D Expenditure	\$1,144.0	\$1,156.0	\$1,223.0	\$1,319.0	\$1,387.0
Percent of Revenue	3.83	4.22	4.03	4.02	3.85
Number of Employees	146,017	141,268	140,145	140,949	145,787
Revenue (\$K)/Employee	\$204.53	\$194.11	\$216.52	\$232.50	\$246.87
Net Income	\$1,118.0	\$1,538.0	\$1,786.0	\$2,190.0	\$2,480.0
Percent Change	-	37.57	16.12	22.62	13.24
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$8,674.00	\$9,278.00	\$8,589.00	\$8,993.00	
Quarterly Profit	\$736.00	\$714.00	\$547.00	\$483.00	

Source: E. I. du Pont de Nemours and Company
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	67.98	68.41	67.09	66.63	66.31
International	32.02	31.59	32.91	33.37	33.69

Source: E. I. du Pont de Nemours and Company
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)

1989 SALES OFFICE LOCATIONS

North America—80
Europe—15
Asia/Pacific—15
ROW—15

MANUFACTURING LOCATIONS

North America—35; Europe—1; Asia/Pacific—3;
ROW—5

Industrial products production activities include Ti-Pure titanium dioxide, Freon fluorocarbons, sodium cyanide, hydrogen peroxide, Adi-Pure adipic acid and other polymer intermediates, sulfuric acid, formaldehyde, methanol, aniline, Tetrathane products, and fuel additives.

North America—5; Europe—2; Asia/Pacific—4;
ROW—4

Electronics production activities include connectors and packaging, Riston photoresists, Kapton polyimide film, thick film and semiconductor materials and photomasks, Mylar polyester film, chromium dioxide particles, and optical disks.

North America—8; Europe—3

Imaging systems production activities include Cromalin proofing systems; Howson offset and Cyrel printing plates, chemicals and equipment; Bright Light and other silver-sensitized films and papers; a full line of color electronic systems; and color and black-and-white text systems for news, classified, and display ads for newspapers.

SUBSIDIARIES

North America

Conoco Inc. (United States)
Conoco International (United States)
Conoco Pipeline Company (United States)
Conoco Shale Company (United States)
Consolidated Coal Company (United States)
Continental Overseas Oil Company (United States)

Douglas Oil Company (United States)
Du Pont Canada Ltd. (Canada)
Du Pont Electronic Materials Inc. (Puerto Rico)
Du Pont Pharmaceutical Caribe Inc. (Puerto Rico)
Fairmont Supply Company (United States)
Kayo Oil Company (United States)
Louisiana Gas System Inc. (United States)
Remington Arms Company Inc. (United States)

Europe

Conoco Ireland Ltd. (Ireland)
Conoco Norway Inc. (Norway)
Du Pont de Nemours (Belgium)
Du Pont de Nemours B.V. (Netherlands)
Du Pont de Nemours GmbH (Germany)
Du Pont de Nemours Italiana S.p.A. (Italy)
Du Pont de Nemours International S.A. (Switzerland)
Du Pont de Nemours S.A. (France)
Du Pont de Nemours S.A. (Luxembourg)
Du Pont Iberia S.A. (Spain)
Du Pont Ltd. (United Kingdom)
Du Pont Scandinavia AB (Sweden)

Asia/Pacific

Conoco Irian Jaya Co. (Indonesia)
Du Pont China Ltd. (China)
Du Pont Company Ltd. (Thailand)
Du Pont Electronics Private Ltd. (Singapore)
Du Pont Japan Ltd. (Japan)
Du Pont Ltd. (Australia)
Du Pont Ltd. (New Zealand)
Du Pont Philippines (Philippines)
Du Pont Taiwan Ltd. (Taiwan)

ROW

Du Pont S.A. de C.V. (Mexico)
Du Pont de Brasil S.A. (Brazil)
Du Pont de Colombia S.A. (Colombia)
Du Pont de Venezuela C.A. (Venezuela)
Ducilio S.A. (Argentina)
World Wide Transport Inc. (Liberia)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Hewlett-Packard and Los Alamos National Laboratory
Du Pont, Hewlett-Packard, and the Los Alamos National Laboratory have agreed to an \$11 million

cooperative superconductivity R&D project. The deal, one of the biggest such pacts between industry and a government research facility, covers a three-year period and initially will be for manufacturing thin-film, high-temperature superconductors for electronics components.

Hanyang Chemical

Du Pont and Hanyang Chemical have received government approval to build a joint-venture titanium dioxide plant in South Korea that will produce 65,000 metric tons per year. Planned start-up is expected in late 1993.

Freshworld and Sunkist Growers

Freshworld, a joint venture of Du Pont and DNA Plant Technology, signed a five-year agreement with Sunkist Growers to distribute produce. Patented packaging and processing techniques developed by the joint venture produce ready-to-eat celery and carrots with a shelf life of 30 days.

Waste Management of North America

Du Pont and Waste Management of North America entered into a joint venture to build a plastics recycling plant in southwest Chicago.

Chemical Exchange Industries

Du Pont acquired worldwide marketing rights for hexamethyleneimine (HMI) from Chemical Exchange Industries.

Merck and Co., Inc.

Du Pont and Merck entered into an agreement calling for Du Pont to receive exclusive marketing rights to Sinemet, a major Parkinson's disease therapy.

Waste Management, Inc.

Du Pont and Waste Management plan joint development of a \$5 million, 100,000-square-foot plastics recycling facility in the Harrowgate section of Philadelphia, Pennsylvania.

1989

Soviet Union

A discussed joint venture would have Du Pont produce and sell chemicals in the Soviet Union and be paid back in crude oil.

Biolistics

Du Pont and Biolistics entered into a licensing agreement that would have Biolistics license its biolistic gene gun technology to Du Pont.

C&C Industries

Du Pont and C&C Industries signed a marine fabrics technical and marketing pact relating to the use of woven Kevlar, along with glass fabrics, in sailboats made by C&C.

MERGERS AND ACQUISITIONS

1990

Seicor

Du Pont acquired Seicor's electronic and optoelectronic LAN component business, which produces connection devices that hook up personal computers to local area networks.

National Semiconductor

Du Pont acquired National Semiconductor's photo-mask operation.

1989

Howson-Algraphy

Du Pont acquired Howson-Algraphy, a leading printing plate manufacturer in the United Kingdom.

KEY OFFICERS

Edgar S. Woolard, Jr.

Chairman of the board, chief executive officer

Constantine S. Nicandros

Executive vice president

Charles L. Henry

Group vice president, Electronics

Mark A. Suwyn

Group vice president, Imaging Systems

J. Edward Newall

Group vice president, International

Alexander MacLachlan

Senior vice president, Technology

PRINCIPAL INVESTORS

Charles R. Bronfman—22.9 percent
Edgar M. Bronfman—22.9 percent

FOUNDERS

Information is not available.

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	\$8,876.0	\$8,960.0	\$9,953.0	\$10,238.0	\$11,344.0
Cash	583.0	584.0	756.0	603.0	692.0
Receivables	4,044.0	3,771.0	4,376.0	4,815.0	5,298.0
Inventory	3,873.0	4,253.0	4,342.0	4,467.0	4,910.0
Other Current Assets	376.0	352.0	479.0	353.0	444.0
Net Property, Plants	\$15,195.0	\$15,697.0	\$15,854.0	\$17,221.0	\$18,876.0
Other Assets	\$1,069.0	\$2,076.0	\$2,402.0	\$3,260.0	\$4,495.0
Total Assets	\$25,140.0	\$26,733.0	\$28,209.0	\$30,719.0	\$34,715.0
Total Current Liabilities	\$5,311.0	\$5,636.0	\$6,140.0	\$6,696.0	\$9,348.0
Long-Term Debt	\$3,191.0	\$3,227.0	\$3,018.0	\$3,158.0	\$4,080.0
Other Liabilities	\$3,979.0	\$4,496.0	\$4,807.0	\$5,285.0	\$5,489.0
Total Liabilities	\$12,481.0	\$13,359.0	\$13,965.0	\$15,139.0	\$18,917.0
Total Shareholders' Equity	\$12,659.0	\$13,374.0	\$14,244.0	\$15,580.0	\$15,798.0
Converted Preferred Stock	237.0	237.0	237.0	237.0	237.0
Common Stock	401.0	400.0	398.0	399.0	411.0
Other Equity	3,761.0	3,670.0	3,621.0	4,595.0	4,399.0
Retained Earnings	8,260.0	9,067.0	9,988.0	10,349.0	10,751.0
Total Liabilities and Shareholders' Equity	\$25,140.0	\$26,733.0	\$28,209.0	\$30,719.0	\$34,715.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$29,865.0	\$27,421.0	\$30,344.0	\$32,771.0	\$35,991.0
US Revenue	20,301.0	18,758.0	20,358.0	21,834.0	23,865.0
Non-US Revenue	9,564.0	8,663.0	9,986.0	10,937.0	12,126.0
Cost of Sales	\$17,898.0	\$15,129.0	\$16,613.0	\$17,900.0	\$19,604.0
R&D Expense	\$1,144.0	\$1,156.0	\$1,223.0	\$1,319.0	\$1,387.0
SG&A Expense	\$2,077.0	\$2,350.0	\$2,716.0	\$3,065.0	\$3,377.0
Capital Expense	\$3,095.0	\$2,939.0	\$3,212.0	\$4,207.0	\$5,092.0
Pretax Income	\$3,195.0	\$2,985.0	\$3,588.0	\$3,797.0	\$4,324.0
Pretax Margin (%)	10.70	10.89	11.82	11.59	12.01
Effective Tax Rate (%)	65.00	48.50	50.20	42.30	42.60
Net Income	\$1,118.0	\$1,538.0	\$1,786.0	\$2,190.0	\$2,480.0
Shares Outstanding, Millions	240.6	240.0	238.8	718.3	685.3
Per Share Data					
Earnings	\$4.61	\$6.35	\$2.46	\$3.04	\$3.53
Dividend	\$3.00	\$3.05	\$3.30	\$1.23	\$1.45
Book Value	\$52.61	\$55.73	\$59.65	\$21.69	\$23.05

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
<i>Liquidity</i>					
Current (Times)	1.67	1.59	1.62	1.53	1.21
Quick (Times)	0.94	0.84	0.91	0.86	0.69
Fixed Assets/Equity (%)	120.03	117.37	111.30	110.53	119.48
Current Liabilities/ Equity (%)	41.95	42.14	43.11	42.98	59.17
Total Liabilities/ Equity (%)	98.59	99.89	98.04	97.17	119.74
<i>Profitability (%)</i>					
Return on Assets	-	5.93	6.50	7.43	7.58
Return on Equity	-	11.82	12.93	14.69	15.81
Profit Margin	3.74	5.61	5.89	6.68	6.89
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	3.83	4.22	4.03	4.02	3.85
Capital Spending % of Revenue	10.36	10.72	10.59	12.84	14.15
Employees	146,017	141,268	140,145	140,949	145,787
Revenue (\$K)/Employee	\$204.53	\$194.11	\$216.52	\$232.50	\$246.87
Capital Spending % of Assets	12.31	10.99	11.39	13.70	14.67

Source: E. I. du Pont de Nemours and Company
Annual Reports and Forms 10-K
Dataquest (1990)

General Signal Corporation

1 High Ridge Park
P.O. Box 10010
Stamford, Connecticut 06904
Telephone: (203) 329-4100
Fax: (203) 329-4159
Dun's Number: 00-246-4100

Date Founded: 1904

CORPORATE STRATEGIC DIRECTION

General Signal Corporation produces instrumentation and controls and related systems and equipment for semiconductor production, telecommunications transmission, test and measurement, industrial automation, management of electrical energy, and transportation. General Signal serves these markets through four product areas: process controls, technology industries, electrical controls, and transportation controls.

In 1989, General Signal positioned itself for stronger worldwide sales and income growth through a series of reorganizations and consolidations in its Transportation Controls, Electrical Controls, and Technology Industries sectors, including combining Technology Industries' foreign semiconductor equipment operations into a single international unit. In addition, General Signal acquired four new businesses: GCA, Spectron, Hydromatic Pumps, and Turbo-Mueller. General Signal plans to continue pursuing these types of product line acquisitions with the purpose of sharpening its business focus and adding critical mass to its operating units.

Total revenue increased 9 percent to \$1.9 billion* in fiscal 1989 from \$1.76 billion in fiscal 1988. Net income increased 211 percent to \$78.5 million in fiscal 1989 from \$25.2 million in fiscal 1988. General Signal employs 19,377 worldwide.

Research and development expenditures totaled \$111.1 million in fiscal 1989, representing about 6.0 percent of revenue. Capital spending expenditures totaled \$62.0 million in fiscal 1989, representing about 3.2 percent of revenue.

*All dollar amounts are in U.S. dollars.

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

Technology Industries

After two years of losses, the Technology Industries sector posted operating earnings of \$8.2 million on a sales increase of 8.8 percent in fiscal 1989. Strategic consolidations among international operations, the merging of domestic photolithography sales and service organizations, and the broad support of Sematech, the principal domestic consortium dedicated to U.S. preeminence in semiconductor manufacturing technology, helped position General Signal to meet the industry's evolving product and service needs.

The 1988 reorganization of General Signal's telecommunications equipment group into clearly defined product and market segments paid off in 1989 as each of its four business units measured significant performance gains. The Company's data-network equipment manufacturer of network restoration systems is now the largest in the world and one of the most diversified suppliers of data communications test and control equipment.

Process Controls

The Process Controls sector had sales revenue of \$726.5 million with an operating margin of 11.2 percent in fiscal 1989. This sector benefited from a general economic expansion fueled by high-capacity utilization and strong export demand in its major markets, which include the chemical, minerals, pharmaceutical, water/wastewater, and pulp-and-paper processing industries.

General Signal's mixing equipment operation maintained its world leadership position by meeting a heightened demand for agitator equipment. The Company's A-315 impeller, originally designed for fermentation technology, has been extended to other gas-liquid processing applications. General Signal also constructed a unique high-pressure, high-temperature oxidation test facility for gold processing and has installed flexible machining centers to boost productivity and reduce product costs.

Demand for the Company's industrial valves continued strong in 1988. General Signal introduced a cage-retained globe valve to control corrosive liquids and gases at temperatures from -100°F to 1,400°F. Export sales were paced by major orders from Korea and Mexico.

With former unit BIF's instrumentation and supervisory control and data acquisition systems merged into L&N product lines, General Signal fortified its offerings to the municipal water and wastewater treatment market.

General Signal provided software and hardware enhancements to its line of LN700 energy management systems, for both large and medium-size utilities and industrial companies. For small to medium-size applications, General Signal developed a series of software packages for its MICRO-MAX process management center. The Company also introduced a hybrid multipoint recorder, the SPEEDOMAX 25000, which combines features of analog strip-chart recorders and programmable digital data loggers.

General Signal's coal feeder and weighing products business developed a continuous coal analyzer to improve operating efficiency and ensure the environmental compliance of sulfur emissions in coal-fired plants.

General Signal's industrial pump sector improved its standing on major distribution and licensing agreements for a broad range of submersible pumps; it also acquired Hydromatic Pumps, a manufacturer of pumps for residential, commercial, and municipal applications, in 1989. A new pump developed specifically for the vacuum food-packaging industry and the introduction of foreign service centers in Italy, Taiwan, and the United Kingdom led to a successful year for the Company's vacuum pump business: Export sales increased more than 50 percent in 1987.

Electrical Controls

The Electrical Controls sector had record sales of \$421.4 million with an operating margin of 11.5 percent in fiscal 1989. The strongest sales increases were derived from this sector's electrical fittings, transformer and power distribution, and fire alarm and signaling operations.

General Signal's power protection products operations experienced record sales in 1989 for uninterruptible power systems, standby power sources, and power conditioning units. To meet future market demands, a new regulating standby power source and a compact uninterruptible power system have been developed.

General Signal's line of totally encapsulated industrial control transformers was improved in 1988; primary and secondary fusing features now comply with new industrial safety requirements. In addition, General Signal expanded its soft-seal firestop product line in 1988 and introduced a microprocessor-based monitoring system for complex heat-trace applications. Also, General Signal introduced in 1988 a minimum-wire microprocessor-based fire alarm system for small buildings, a new line of emergency lighting products, and a field-programmable analog fire alarm system for high-rises.

Transportation Controls

This sector's net sales were \$289 million in fiscal 1989, with an operating margin of 7.4 percent, compared with a 2.9 percent operating margin in fiscal 1988.

In fiscal 1989, General Signal manufactured 700 locomotives requiring advanced equipment such as General Signal's CCL Locomotive Control System for monitoring and regulating speed, braking, and critical electronic subsystems.

In fiscal 1988, General Signal combined its mainline railroad and transit signaling, communications, braking, and revenue control systems operations into one group. Close to 30,000 new freight cars were ordered in 1988, the highest level in eight years. The Company's development of the CCL locomotive control system has been sparked by parallel growth in the market for new and rebuilt locomotives.

In fiscal 1988, General Signal's rail signaling operation received major orders for signaling and speed control equipment on rail lines in Boston, Los Angeles, and Washington D.C. Also in 1988, the Company received a \$9 million contract to provide automatic vehicle identification equipment for the national railroad of Spain.

General Signal continued to penetrate the bus fleet management systems market in fiscal 1988 with the first phase of a \$29 million order from the Southern California Rapid Transit District. The Company will supply a system that provides vehicle location, passenger, and routing data; radio communication between vehicles and a central control office; and an emergency communications network for transit police.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service.

Table 1
Five-Year Corporate Highlights (Millions of U.S. Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$1,800.9	\$1,583.4	\$1,603.0	\$1,760.2	\$1,918.3
Percent Change	-	(12.08)	1.24	9.81	8.98
Capital Expenditure	\$68.1	\$45.7	\$34.0	\$38.8	\$62.0
Percent of Revenue	3.78	2.89	2.12	2.20	3.23
R&D Expenditure	\$100.7	\$98.0	\$105.4	\$115.6	\$111.1
Percent of Revenue	5.59	6.19	6.58	6.57	5.79
Number of Employees	22,312	20,180	19,126	19,082	19,377
Revenue (\$K)/Employee	\$80.71	\$78.46	\$83.81	\$92.24	\$99.00
Net Income	\$49.3	\$74.6	\$69.4	\$25.2	\$78.5
Percent Change	-	51.32	(6.97)	(63.69)	211.51
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$478.41	\$488.54	\$473.83	\$477.50	
Quarterly Profit	\$19.82	\$18.67	\$17.92	\$22.10	

Source: General Signal Corporation
Annual Reports and Forms 10-K
Dataquest
1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	91.31	88.63	88.02	87.43	86.48
International	8.69	11.37	11.98	12.57	13.52
Japan	-	-	-	-	-
Europe	-	-	-	-	-
Asia/Pacific	-	-	-	-	-
ROW	-	-	-	-	-

Source: General Signal Corporation
Annual Reports and Forms 10-K
Dataquest
1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	-	-
Indirect Sales	-	-
VARs	-	-
Distributors	-	-
Dealers	-	-
Mass Merchandisers	-	-
Manufacturers' Representatives	-	-

Source: Dataquest
1990

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

Stamford, Connecticut

Manufacturing activities include process controls, semiconductor equipment, telecommunications equipment, defense electronics, and electrical controls manufactured through 30 operating units. The Company manufactures many of the components used in its products but also purchases a variety of basic materials and component parts. Also, General Signal is both a licensor and licensee of patents and realizes more income than expense from such arrangements.

SUBSIDIARIES

North America

Aerotronic Associates Inc. (United States)
 Assembly Technologies (United States)
 Aurora/Hydromatic Pumps Inc. (United States)
 Drytek Inc. (United States)
 Edwards Company, Inc. (United States)
 Electric Panelboard Company (United States)
 GCA Corporation-Nevada Corp. (United States)
 GCA Overseas Corp. (United States)
 GCA Technology Division (United States)
 GSA Disc Inc. (United States)
 General Signal A.S.G.M. Corp. (United States)
 General Signal Controls Inc. (United States)
 General Signal FSC Corp. (United States)
 General Signal Holdings Co. (United States)
 General Signal Ltd. (Canada)
 G.R.S. Trading Corp. (United States)
 Leeds and Northrup Co. (United States)
 Old Company (United States)
 Serveng Inc. (United States)
 Sola Basic Puerto Rico Inc. (United States)

Telenex Corp. (United States)
 The Merrick Corporation (United States)
 Thun Inc. (United States)
 Xynetics Divestiture Corp. (United States)

Japan

General Signal Kabushiki Kaisha
 Stock Japan Ltd.

Europe

Algemein Sein Industrie B.V. (Netherlands)
 General Railway Signal Co. Ltd. (United Kingdom)
 General Signal SEG GmbH (West Germany)
 General Signal SEG Ltd. (United Kingdom)
 General Signal SEG SARL (France)
 Leeds and Northrup GmbH (Germany)
 Leeds and Northrup Italy S.r.l. (Italy)
 Leeds and Northrup Ltd. (United Kingdom)
 Leeds and Northrup S.A. (Spain)
 Leeds and Northrup S.A.R.L. (France)
 Misurazioni Industriali S.r.l. (Italy)
 Misurazioni Industriali Trading S.r.l. (Italy)
 Xynetics (Netherlands) B.V. (Netherlands)

Asia/Pacific

General Signal SEG Asia Ltd. (Hong Kong)
 Leeds and Northrup Australia Pty. Ltd. (Australia)
 Sola Basic Australia Ltd. (Australia)

ROW

Leeds and Northrup Mexicana S.A. (Mexico)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Olin Hunt Specialty Products

General Signal and Olin Hunt Specialty Products agreed to set up a joint technical center in Belgium for development of a new application of wafer fabrication equipment and advanced materials. Olin Hunt currently provides photoresists to General Signal.

1987

Cognex

General Signal's Electroglas subsidiary used Cognex's MVS in its wafer prober product line. The nonexclusive agreement called for Cognex to provide its Cognex 2000 single-board vision system used to detect problems in alignment, gauging, inspection, and identification.

MERGERS AND ACQUISITIONS

1989

Atlantic Research Corporation Teleproducts Division

General Signal acquired the teleproducts division of Atlantic Research Corporation, a leading manufacturer of data communication protocol analyzers for both the WAN and LAN markets. Atlantic Research also manufactures a broad line of switching and patching equipment and network test, restoration, and management systems.

International Mirtone Production Operations

General Signal acquired International Mirtone's production operations. International Mirtone produces fire alarm equipment.

Suitomo GCA

General Signal merged its Japanese subsidiary with Suitomo GCA to form a new joint company, General Signal Japan. General Signal hopes the merger will improve its current lackluster domestic sales of steppers, etching devices, and probers, and hopes the existing joint venture will expand its lineup by using technical and maintenance personnel at General Signal.

Marley Pump Hydromatic Division

General Signal acquired Marley Pump's Hydromatic division, which makes pumps for residential, commercial, and municipal applications.

GCA

General Signal acquired GCA, a semiconductor equipment manufacturer. Through the acquisition, General Signal will make gains in the area of stepper lenses and, possibly, in the areas of short-wave length optical technology, X-ray, and e-beam technologies.

1988

Spectron

General Signal acquired Spectron, which will operate as General Signal's Telenex subsidiary. Spectron manufactures and sells data test systems and products.

KEY OFFICERS

Edmund M. Carpenter

Chairman and chief executive officer

Joel S. Friedman

Senior vice president, Operations

Peter A. Laing

Senior vice president, Operations

George Falconer

Vice president, Human Resources

J. Roberts Hipps

Vice president and controller

PRINCIPAL INVESTORS

J.P. Morgan and Company Inc.—8.6 percent

American Express Company—5.6 percent

Teachers Retirement System of Texas—5.5 percent

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$927.0	\$887.2	\$867.8	\$892.0	\$774.0
Cash	30.3	43.6	82.9	81.4	22.9
Receivables	324.0	296.3	330.8	360.6	348.2
Marketable Securities	47.4	80.1	13.1	27.1	1.5
Inventory	426.7	360.4	343.1	372.8	324.3
Other Current Assets	98.6	106.8	97.9	50.1	77.1
Net Property, Plants	\$361.5	\$345.6	\$310.6	\$312.5	\$325.1
Other Assets	\$194.7	\$225.3	\$219.0	\$192.1	\$225.2
Total Assets	\$1,483.2	\$1,458.1	\$1,397.4	\$1,396.6	\$1,324.3
Total Current Liabilities	\$406.3	\$351.0	\$326.9	\$395.6	\$445.2
Long-Term Debt	\$124.0	\$124.3	\$110.5	\$491.7	\$331.2
Other Liabilities	\$48.9	\$55.5	\$52.8	\$48.3	\$41.8
Total Liabilities	\$579.2	\$530.8	\$490.2	\$935.6	\$818.2
Total Shareholders' Equity	\$904.0	\$927.3	\$907.2	\$461.0	\$506.1
Converted Preferred Stock	-	-	-	-	-
Common Stock	40.4	40.5	40.7	41.8	41.9
Other Equity	197.8	204.0	224.2	293.9	300.0
Retained Earnings	689.4	712.3	731.0	705.2	749.3
Less: Treasury Stock	(23.6)	(29.5)	(88.7)	(579.9)	(585.1)
Total Liabilities and Shareholders' Equity	\$1,483.2	\$1,458.1	\$1,397.4	\$1,396.6	\$1,324.3
Income Statement	1985	1986	1987	1988	1989
Revenue	\$1,800.9	\$1,583.4	\$1,603.0	\$1,760.2	\$1,918.3
U.S. Revenue	1,644.4	1,403.4	1,410.9	1,538.9	1,659.0
Non-U.S. Revenue	156.5	180.0	192.1	221.3	259.3
Cost of Sales	\$1,278.6	\$1,114.6	\$1,151.5	\$1,266.7	\$1,378.0
R&D Expense	\$100.7	\$98.0	\$105.4	\$115.6	\$111.1
SG&A Expense	\$372.7	\$348.7	\$356.0	\$418.6	\$403.6
Capital Expense	\$68.1	\$45.7	\$34.0	\$38.8	\$62.0
Pretax Income	\$80.2	\$117.5	\$96.9	\$52.8	\$106.5
Pretax Margin (%)	4.45	7.42	6.04	3.00	5.55
Effective Tax Rate (%)	38.60	36.50	28.40	52.30	26.30
Net Income	\$49.3	\$74.6	\$69.4	\$25.2	\$78.5
Shares Outstanding, Thousands	28,706.0	28,730.0	28,239.0	27,709.0	19,056.0
Per Share Data					
Earnings	\$1.72	\$2.60	\$2.46	\$0.91	\$4.12
Dividends	\$1.80	\$1.80	\$1.80	\$1.80	\$1.80
Book Value	\$31.50	\$32.31	\$32.13	\$16.64	\$26.57

Table 4 (Continued)
 Comprehensive Financial Statement
 Fiscal Year Ending December
 (Millions of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	2.28	2.53	2.65	2.25	1.74
Quick (Times)	1.23	1.50	1.61	1.31	1.01
Fixed Assets/Equity (%)	39.99	37.27	34.24	67.79	64.24
Current Liabilities/Equity (%)	44.94	37.85	36.03	85.81	87.97
Total Liabilities/Equity (%)	64.07	57.24	54.03	202.95	161.67
<i>Profitability (%)</i>					
Return on Assets	-	5.07	4.86	1.80	5.77
Return on Equity	-	8.15	7.57	3.68	16.23
Profit Margin	2.74	4.71	4.33	1.43	4.09
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	5.59	6.19	6.58	6.57	5.79
Capital Spending % of Revenue	3.78	2.89	2.12	2.20	3.23
Employees	22,312	20,180	19,126	19,082	19,377
Revenue (\$K)/Employee	\$80.71	\$78.46	\$83.81	\$92.24	\$99.00
Capital Spending % of Assets	4.59	3.13	2.43	2.78	4.68

Source: General Signal Corporation
 Annual Reports and Forms 10-K
 Dataquest
 1990

Hitachi, Ltd.

6, Kanda-Surugadai
4-chome, Chiyuoda-ku
Tokyo 101, Japan
Telephone: (03) 258-1111
Fax: (03) 253-2186
Dun's Number: 69-054-1503

Date Founded: 1910

CORPORATE STRATEGIC DIRECTION

Hitachi, Ltd., was founded to develop indigenous Japanese electrical power equipment manufacturing technology. Initially, the Company emphasized the development of heavy electrical equipment and industrial machinery. After World War II, Hitachi expanded into the consumer product area and in the 1950s entered the electronics field, producing computers, semiconductors, and other electronic devices.

Over the years, Hitachi continued to expand and diversify the scope of its business activities, which led to the development of the Hitachi Group. The Hitachi Group is made up of Hitachi, Ltd., domestic and overseas, and its subsidiaries and affiliates, including the three major subsidiaries, Hitachi Chemical, Hitachi Metals, and Hitachi Cable. The Hitachi Group companies conduct business in electrical and electronic equipment, metals, metallic products, machinery, chemicals, trading, and transportation.

Hitachi's consolidated revenue of ¥7,077.8 billion (US\$49.7 billion) in the period ending March 31, 1990, increased 10.5 percent from ¥6,401.4 billion (US\$49.9 billion) in 1989. (Percentage changes refer only to ¥ amounts; US\$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) Information, Communication Systems, and Electronic Devices were the largest contributors, responsible for 33 percent of revenue with ¥2,318 billion (\$16.3 billion). Overseas computer sales had substantial increases, primarily for large general-purpose machines.

The Japanese domestic sales contribution to Hitachi's total revenue increased to ¥5,420.1 billion (US\$38.0 billion) for the period ending March 31, 1990, up from ¥4,932.3 billion (US\$38.5 billion) in fiscal 1988. In fiscal 1989, domestic sales accounted for about 77 percent of total revenue.

Net income increased by 13.69 percent to ¥211.0 billion (US\$1.5 billion) for the period ending March 31, 1990, compared with ¥185.6 billion (US\$1.4 billion) in fiscal 1988. The improved results were attributed to the Company's steady expansion on a worldwide scale. Hitachi employs more than 290,000 people worldwide.

Research and development expenditure increased to ¥429.4 billion (US\$3.0 billion) and represented 6.0 percent of total revenue for the period. This figure is an increase of 15 percent over the 1988 figure of ¥373.5 billion (US\$2.9 billion). Areas of focus were the development of technologies that will enable Hitachi to respond to future increased processing power, the development of higher speed and packing density technologies for semiconductors, and development of nonsilicon devices.

Capital expenditure for the year ending March 31, 1990, were not available.

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 and 5, comprehensive financial statements, are at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Semiconductors

Hitachi is the third largest worldwide semiconductor manufacturer with ¥5.09 trillion (US\$3.974 billion, Dataquest exchange rate) in if-sold revenue for calendar 1989, representing a 6.9 percent market share.

Dataquest estimates the Company's single largest market to be Japan, which generates approximately ¥3.48 trillion (US\$2.7 billion), representing 11.8 percent of the market. Dataquest ranks Hitachi third in this market. Hitachi's next largest market is in North America, where Hitachi earned ¥752 billion (US\$587 million) in calendar 1989, ranking eighth and posting a 28 percent increase in revenue generated. Dataquest estimates that Hitachi ranks tenth in Europe with 3 percent of the market and fourth in Rest of World with a 5.8 percent market share in calendar 1989.

Dataquest estimates that the highest growth rate experienced by Hitachi in semiconductors was in BiCMOS semiconductors, which grew by 2,086 percent worldwide. Hitachi's best-selling semiconductor was the MOS memory chip, which accounted for approximately ¥1.96 trillion (US\$13.75 billion) worldwide in calendar 1989. Hitachi's CMOS semiconductors accounted for ¥1.86 trillion (US\$13.05 billion) worldwide in calendar 1989.

Dataquest estimates that the Company ranked second in the Japanese bipolar digital market with a 19.7 percent share. This ranking is based on ¥4.4 billion (US\$345 million) in revenue for calendar 1989. The revenue figures were down 7 percent when compared with the 1988 figures of ¥4.73 billion (US\$369 million), while the total market experienced an 8 percent decrease in sales.

Hitachi has focused on high-value-added products such as 1MB, 4MB, and 16MB DRAMs. However, future revenue may be gained by the Company's increasing efforts on 32-bit MPUs and ASICs. These efforts are part of a corporate goal to expand the Company's product mix and reduce dependence on any one product line.

Hitachi generates significant revenue from its bipolar (BCL) products. In calendar 1989, Hitachi earned ¥1.56 billion (US\$122 million) in revenue from the ECL products.

Computers

In 1989, Hitachi and General Motors Electronic Data Systems bought National Advanced Systems, the mainframe arm of National Semiconductor. The two companies have changed the name of the company to Hitachi Data Systems (HDS).

In 1989, Hitachi had less than 1 percent of the worldwide market share in the personal, business, and

technical computer industry segments. Dataquest estimates that Hitachi had 4.9 percent of the worldwide mainframe market while Hitachi Data Systems controlled 1.8 percent of the market. HDS's Andromeda system, which competes directly with IBM in the United States and elsewhere, is pushing the eventual release of IBM's Summit system.

HDS announced in 1989 extensions to its family of 370 plug-compatible machines (PCMs). The three new machines—the EX 85, EX 310, and EX 420—are upgrades of the existing EX Series. A fourth model was announced in Japan, the M880/220. The announcement precedes the release of HDS's new mainframe, "ZEUS," expected out in 1990.

Other Hitachi computers include the B16 LX XX, the B32 Series, the HL 500 Series, the PROSET 30, the PWS 2020, and the PWS 2050.

Computer Storage

Hitachi is active in two computer storage markets. Dataquest estimates that Hitachi ranks second in the 12-inch WORM optical disk drive market, with a 28 percent share based on 3,400 units shipped. Hitachi is the leader in the CD-ROM optical disk drive market. Hitachi captured 26 percent of this market in 1989 by selling 40,000 units, which generated \$11.8 million in if-sold revenue. Hitachi sold CD-ROMs under its own brand name, as well as through Amdek and Denon via its subsidiary Nippon Columbia.

Printers

Dataquest estimates that in the printer peripheral market, Hitachi is in the lower 25 percent of both line printer and page printer companies. Hitachi had less than 1 percent in these markets in 1989.

Telecommunications

Hitachi is not a very significant competitor in the PBX business communications market. Dataquest estimates that Hitachi ranked tenth in the US PBX market, with a 2.3 percent market share. Hitachi is not considered a major player in the European PBX market.

CAD/CAM

Hitachi holds a 1.4 percent market share by revenue, on a worldwide basis, of the CAD/CAM market. Hitachi has concentrated on the Asian market, which

is responsible for all of its market-generated revenue in 1989. The revenue generated was in turnkey systems and services.

Other Products

Hitachi's Power and Equipment Division witnessed a 10 percent increase in calendar 1989 sales because of expanded sales of thermal plants to power companies. Sales in Hitachi's Consumer Product Division, on the other hand, grew only slightly as a result of a mature VCR market, reduced export levels, and increasing

competition. Revenue in the Industrial Machinery and Plants Division increased 16 percent, primarily because of expanded activities in the construction equipment field. The Wire and Cable, Metals, Chemicals, and Other Products Division witnessed a 10 percent growth in sales over the preceding year.

Further Information

For further information pertaining to the Company's business segments, please contact the appropriate industry service.

Table 1
Five-Year Corporate Highlights (Billions of US Dollars)

	1986	1987	1988	1989	1990
Five-Year Revenue	\$22.6	\$30.4	\$36.0	\$49.9	\$49.7
Percent Change	-	34.19	18.61	38.48	(0.47)
Capital Expenditure	\$2.0	\$4.1	\$2.3	\$4.2	NA
Percent of Revenue	8.92	13.56	6.44	8.32	0
R&D Expenditure	\$1.3	\$1.9	\$2.3	\$2.9	\$3.0
Percent of Revenue	5.90	6.34	6.51	5.83	6.07
Number of Employees	164,117	161,325	159,910	274,508	290,000
Revenue (\$K)/Employee	\$0.14	\$0.19	\$0.23	\$0.18	\$0.17
Net Income	\$0.4	\$0.6	\$1.0	\$1.4	\$1.5
Percent Change	-	38.67	60.22	46.02	2.34
Exchange Rate (US\$1=¥)	¥221.26	¥159.56	¥138.03	¥128.25	¥142.47

NA = Not available

Source: Hitachi, Ltd.
 Annual Reports and Forms 20-F
 Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
Japan	99.86	99.84	76.00	77.05	76.58
International	30.16	26.18	24.00	22.95	23.42

Source: Hitachi, Ltd.
 Annual Reports
 Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989	1990
Direct Sales	30	30	30
Indirect Sales	70	70	70
Distributor	70	70	70

Source: Hitachi, Ltd.
 Annual Reports
 Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—2
Europe—2
Asia/Pacific—11
Japan—50
ROW—9

MANUFACTURING LOCATIONS

North America

High Voltage Breakers, Norcross, Georgia
SF6 gas breakers
Hitachi Automotive Products, Farminghills, Michigan
Electronic auto parts
Hitachi Cable Manchester, Inc., Manchester, New Hampshire
Cables
Hitachi Cable Manchester, Inc., New Albany, Indiana
Automobile brake hose
Hitachi (Canadian), Ltd., Calgary, Alta.
Turbine generator and heavy industrial equipment
Hitachi Computer Products (America), Norman, Oklahoma
Computer products (magnetic disk devices, magnetic tape cartridges)
Hitachi Construction Machinery Corp., Brampton, Ontario
Excavators, cranes, tunnel shield machines
Hitachi Consumer Products of America, Anaheim, California
Color TVs, VCRs
Hitachi Denshi (Canada), Ltd., Scarborough, Ontario
Broadcast and professional video, CCTV equipment, test and instrumentation
Hitachi (HSC) Canada, Inc., Pointe Claire, Quebec
TVs, VCRs, and household electric appliances
Hitachi Semiconductor (America), Irving, Texas
Semiconductors
Hitachi Telecom, Norcross, Georgia
Digital PBXs

Europe

Hitachi Consumer Products (Europe), Germany
VCRs
Hitachi Consumer Products (U.K.), United Kingdom
Color TVs
Hitachi Semiconductor Europe, Germany
Semiconductors

Asia/Pacific

Akita Electronic Co., Akita, Japan
MOS, bipolar IC
Hanshi Electric, Japan
Ignition coils for automobiles
Haramachi Semiconductor Ltd., Ibaraga, Japan
Diodes, thyristors
Hitachi Computer Engineering, Japan
Development of automatic designing systems
Hitachi Consumer Products, Malaysia
TV parts
Hitachi Consumer Products, Singapore
Color TVs, audio equipment, vacuum cleaners
Hitachi Consumer Products, Thailand
Electric fans, refrigerators, TVs, motors, air-conditioners, electric rice cookers
Hitachi Cubu Electric, Japan
Switchboards
Hitachi Denshi, Japan
Communications equipment, measuring instruments, information equipment
Hitachi Electronic Devices, Singapore
Color CRTs
Hitachi Electronics Engineering, Japan
Information equipment, semiconductor devices, energy-saving equipment
Hitachi Elevator Engineering, Singapore
Elevators, escalators
Hitachi Engineering, Japan
Electric/electronic equipment, plant engineering
Hitachi Haramachi Semiconductor, Japan
Semiconductor parts
Hitachi Kiden Kogyo, Japan
Cranes, water treatment equipment, FA-related equipment
Hitachi Kyowa Kogyo, Japan
Electric equipment
Hitachi Maxell, Japan
Dry batteries, magnetic tapes, electronic devices
Hitachi Medical, Japan
Medical equipment
Hitachi Microcomputer Engineering, Tokyo, Japan
MPUs, ASICs
Hitachi Mizusawa, Japan
Transformers for TVs
Hitachi Naka Seiki, Japan
Chromatographic equipment, scientific instruments
Hitachi Nissin Electronics, Japan
Electronic parts
Hitachi Ohira Industrial, Japan
Parts for refrigerators, air conditioners
Hitachi Process Computer Engineering, Japan
Process computers
Hitachi Semiconductor, Malaysia
Semiconductors

Hitachi Setsubi Engineering, Japan
FA equipment
Hitachi Techno Engineering, Japan
Electronic part manufacturing equipment
Hitachi Telecom Technologies, Japan
Switching systems
Hitachi Television, Taiwan
Color TVs, audio equipment, displays
Hitachi Video Engineering, Japan
Development of video equipment
Hitachi Works, Ibaraga, Japan
Discrete devices
Hitachi Yomezawa Electronic, Japan
Semiconductor elements
Hokkai Semiconductor, Hokkaido, Japan
SRAMs
Horiba Ltd., Japan
Electric measuring instruments
Japan Servo, Japan
Precision motors
Jidosha Denki Kogyo, Japan
Electrical auto parts
Kaohsiung Hitachi Electronics, Taiwan
Electronic parts, transistors, LCDs
Kokusai Electric, Japan
Electric communications equipment
Kokusan Denki, Japan
Electrical auto parts, generators, motors
Komoro Works, Nagano, Japan
Photo devices, hybrid ICs
Mobara Works, Chiba, Japan
DRAMs, CMOS logic, LCDs
Musashi Works, Tokyo, Japan
MPUs, diodes, DRAMs, SRAMs
Naka Works, Ibaraga, Japan
Semiconductor sensors, DRAMs, SRAMs
Nakayo Telecommunications, Japan
Telephone and switching systems
Nigata Works, Nigata, Japan
Linear, bipolar digital ICs
Nippon Columbia, Japan
Records, stereos, and other audio equipment
Nissin Electronics Ltd., Ibaraga, Japan
MOS
Taga Sangyo, Japan
Electric equipment
Taiwan Hitachi, Taiwan
Room air-conditioners
Takasaki Works, Gunma, Japan
Bipolar and MOS ICs, EPROMs, CMOS logic

Tobu Semiconductor Ltd., Aomari, Japan
Bipolar ICs
Tobu Semiconductor Ltd., Saitama, Japan
Transistor, hybrid ICs
Tokico Ltd., Japan
Electrical auto parts and equipment
Tokyo Electronics Co., Yamanashi, Japan
Diodes, bipolar ICs
Yagi Antenna, Japan
Antennas
Yomezawa Electronic Co., Yamagata, Japan
MOS

ROW

Industrias Hitachi, Brazil
Distribution equipment, air-conditioners, electronic parts, transformers, switches

SUBSIDIARIES

North America

Hitachi America, Ltd. (United States)
Hitachi Automotive Products (USA), Inc.
(United States)
Hitachi Computer Products (America), Inc.
(United States)
Hitachi Consumer Products of America Inc.
(United States)
Hitachi Semiconductor (America) Inc. (United States)
Hitachi Telecom (USA), Inc. (United States)

Europe

Hitachi Consumer Products Europe Ltd.
(United Kingdom)
Hitachi Semiconductor Europe (Germany)
Hitachi Consumer Products (Europe) (Germany)

Asia/Pacific

Asahi Kogyo Co., Ltd. (Japan)
Babcock-Hitachi K.K. (Japan)
Chuo Shoji, Ltd. (Japan)
Hitachi Air Conditioning & Refrigeration Co., Ltd.
(Japan)
Hitachi Australia Ltd. (Australia)
Hitachi Automobile Appliances Sales Co., Ltd.
(Japan)
Hitachi Cable Ltd. (Japan)
Hitachi Chemical Co., Ltd. (Japan)
Hitachi Construction Machinery Co., Ltd. (Japan)
Hitachi Consumer Products (Malaysia) Sdn. Bhd.
(Malaysia)
Hitachi Consumer Products Pte. Ltd.
Hitachi Credit Corporation (Japan)

Hitachi Electronic Components (Asia) Ltd.
 (Hong Kong)
 Hitachi Electronic Devices (Singapore) Pte. Ltd.
 (Singapore)
 Hitachi Denshi, Ltd. (Japan)
 Hitachi Electronics Engineering Co., Ltd. (Japan)
 Hitachi Electronics Service Co., Ltd. (Japan)
 Hitachi Elevator Engineering and Service Co., Ltd.
 (Japan)
 Hitachi Engineering Co., Ltd. (Japan)
 Hitachi Heating Appliances Co., Ltd. (Japan)
 Hitachi Higashi Shohin Engineering, Ltd. (Japan)
 Hitachi Hokkai Semiconductor, Ltd. (Japan)
 Hitachi Kiden Kogyo, Ltd. (Japan)
 Hitachi Lighting, Ltd. (Japan)
 Hitachi Machinery and Engineering, Ltd. (Japan)
 Hitachi Maxell, Ltd. (Japan)
 Hitachi Medical Corporation (Japan)
 Hitachi Metals, Ltd. (Japan)
 Hitachi Mokuzai Jisho, Ltd. (Japan)
 Hitachi Nishi Shohin Engineering, Ltd. (Japan)
 Hitachi Plant Engineering & Construction Co., Ltd.
 (Japan)
 Hitachi Power Engineering Co., Ltd. (Japan)
 Hitachi Printing Co., Ltd. (Japan)
 Hitachi Sales Corporation (Japan)
 Hitachi Seiko, Ltd. (Japan)
 Hitachi Semiconductor (Malaysia) Sdn. Bhd.
 (Malaysia)
 Hitachi Service Engineering Co., Ltd. (Japan)
 Hitachi Software Engineering Co., Ltd. (Japan)
 Hitachi Techno Engineering Co., Ltd. (Japan)
 Hitachi Telecom Technologies, Ltd. (Japan)
 Hitachi Television, Ltd. (Taiwan)
 Hitachi Tochigi Electronics, Co., Ltd. (Japan)
 Hitachi Tohbu Semiconductor, Ltd. (Japan)
 Hitachi Tokyo Electronics Co., Ltd. (Japan)
 Hitachi Transport System, Ltd. (Japan)
 Hitachi Welfare Service, Ltd. (Japan)
 Japan Servo Co., Ltd. (Japan)
 Nippon Business Consultant Co., Ltd. (Japan)
 Nissei Sangyo Co., Ltd. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Comparex Information Systems GmbH

Comparex Information Systems GmbH will ship Hitachi's new Integrated Vector Feature for its 8/9X series of processors.

VLSI Technology Inc.

Hitachi plans to supply SRAMs to VLSI Technology Inc. on an OEM basis. The SRAMs have been jointly developed by the two companies.

Kansai Electric Power Co., Matsushita Electric Industrial Co., Toshiba Corp., Mitsubishi Electric Corp., Sumitomo Electric Industries, Ltd., Kawasaki Heavy Industries, Ltd., and Kobe Steel, Ltd.

Hitachi has agreed to set up a new company by year end, which will perform research and development for free electron lasers with the preceding companies.

Sears and Roebuck

Hitachi agreed to let Sears and Roebuck market its VY15A video printer.

1989

Sun Microsystems

Hitachi will license Sun's Open Network Computing/Network File System technology for implementation on Hitachi's mainframe computers.

Zuken Inc.

Hitachi agreed to allow Zuken to develop CAD/CAM/CAE software packages for the 2050G Series of engineering workstations made by Hitachi.

Adaptive Information Systems (AIS)

AIS has been formed by Hitachi to market document image processing systems using optical storage technology.

Hewlett-Packard

Hewlett-Packard is licensing its proprietary Precision Architecture to Hitachi.

Texas Instruments

Texas Instruments will supply SRAMs to Hitachi on an OEM basis.

GoldStar

Hitachi signed a major pact with South Korea's GoldStar Company covering 1Mb DRAMs, for which Hitachi will provide technical consultations and manufacturing technology. Hitachi will get royalty payments from GoldStar and eventually will buy chips to sell under its own label.

Cray

This agreement gives each company the right to make use of the other's patents in designing computer hardware.

Hewlett-Packard

The two companies will jointly develop a new set of chips using HP's proprietary Precision Architecture RISC MPU technology.

National Semiconductor

Under this production agreement for FACT logic devices, both companies can mutually produce independently defined and independently developed new functions.

MERGERS AND ACQUISITIONS

1990

Dataproductions Corporation

Two Hitachi affiliates, Hitachi Koki and Nissei Sangyo, acquired Dataproducts Corporation for approximately \$160 million. Dataproducts manufactures a broad range of band, dot matrix, laser, solid ink, and thermal printers, and a wide range of printer supplies. Dataproducts is counting on solid ink jet printers to play a significant role in the printer industry and is investing heavily to finance this strategically important technology. The 1988 acquisition of Imaging Solutions, Inc., gave Dataproducts 100 percent ownership of this new technology. Dataproducts had sales of \$353 million in fiscal 1989, an increase of 2 percent over 1988.

1989

National Advanced Systems

Mainframe computers and peripheral subsystems

KEY OFFICERS

Katsushige Mita

President and representative director

Masataka Nishi

Executive vice president and representative director

Shiro Kawada

Executive vice president and director

Yutaka Sonoyama

Executive vice president and director

Sutezo Hata

Executive vice president and director

Takeo Miura

Executive vice president and director

Tsutomu Kanai

Executive vice president and director

Table 4
Comprehensive Financial Statement
Fiscal Year Ending March
(Billions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$14.8	\$21.6	\$27.2	\$38.0	\$37.8
Cash	3.0	5.6	8.0	12.8	12.0
Receivables	4.4	6.3	7.8	10.7	11.2
Marketable Securities	2.2	2.9	3.0	3.0	3.3
Inventory	4.4	5.6	7.0	9.7	9.5
Other Current Assets	0.8	1.1	1.4	1.7	1.8
Net Property, Plants	\$5.4	\$7.4	\$8.2	\$11.5	\$12.0
Other Assets	\$3.1	\$4.4	\$5.3	\$4.6	\$5.0
Total Assets	\$23.3	\$33.4	\$40.7	\$54.1	\$54.8
Total Current Liabilities	\$10.8	\$14.3	\$17.4	\$24.8	\$23.3
Long-Term Debt	\$1.7	\$3.1	\$3.1	\$4.1	\$9.7
Other Liabilities	\$1.4	\$2.2	\$2.8	\$3.8	NA
Total Liabilities	\$13.9	\$19.6	\$23.3	\$32.6	\$33.0
Minority Interests	\$1.5	\$2.3	\$2.8	\$3.7	\$3.9
Total Shareholders' Equity	\$7.9	\$11.4	\$14.6	\$17.8	\$18.0
Common Stock	0.6	0.9	1.3	1.7	1.7
Other Equity	0.8	1.3	1.8	2.5	2.5
Retained Earnings	6.4	9.3	11.5	13.6	13.7
Total Liabilities and Shareholders' Equity	\$23.3	\$33.4	\$40.7	\$54.1	\$54.8
Income Statement	1986	1987	1988	1989	1990
Revenue	\$22.6	\$30.4	\$36.0	\$49.9	\$49.7
Japanese Revenue	22.6	30.3	27.4	38.5	38.0
Non-Japanese Revenue	6.8	8.0	8.7	11.5	11.6
Cost of Sales	\$16.9	\$23.0	\$28.7	\$35.5	\$35.3
R&D Expense	\$1.3	\$1.9	\$2.3	\$2.9	\$3.0
SG&A Expense	\$4.4	\$6.0	\$7.5	\$11.0	\$10.8
Capital Expense	\$2.0	\$4.1	\$2.3	\$4.2	N/A
Pretax Income	\$1.7	\$1.6	\$2.4	\$3.8	\$3.7
Pretax Margin (%)	7.41	5.33	6.66	7.67	7.49
Effective Tax Rate (%)	57.50	57.50	56.10	56.10	56.10
Net Income	\$0.4	\$0.6	\$1.0	\$1.4	\$1.5
Shares Outstanding, Millions	2,803.4	2,816.3	2,921.7	3,017.7	3,418.6
Per Share Data					
Earnings	\$0.23	\$0.21	\$0.32	\$0.46	\$0.43
Dividend	\$0.04	\$0.06	\$0.07	\$0.07	\$0.06
Book Value	0	0	\$0.01	\$0.01	\$0.01
Exchange Rate (US\$1=¥)	¥221.26	¥159.56	¥138.03	¥128.25	¥142.47

Source: Hitachi Ltd.
 Annual Reports
 Dataquest (1990)

Table 5
Comprehensive Financial Statement
Fiscal Year Ending March
(Billions of Yen, except Per Share Data)

Balance Sheet	1986	1987	1988	1989	1990
Total Current Assets	¥3,276.2	¥3,444.8	¥3,757.4	¥4,870.0	¥5,390.9
Cash	661.7	892.9	1,103.9	1,638.3	1,705.5
Receivables	971.0	1,010.6	1,080.7	1,372.2	1,594.3
Marketable Securities	492.4	470.6	412.3	385.1	473.0
Inventory	980.0	898.5	960.6	1,250.0	1,355.0
Other Current Assets	171.1	172.2	199.9	224.4	263.1
Net Property, Plants	¥1,200.0	¥1,179.1	¥1,133.0	¥1,473.1	¥1,708.9
Other Assets	¥688.0	¥704.1	¥730.7	¥594.4	¥705.3
Total Assets	¥5,164.2	¥5,328.0	¥5,621.1	¥6,937.5	¥7,805.1
Total Current Liabilities	¥2,393.3	¥2,288.5	¥2,399.0	¥3,183.5	¥3,314.9
Long-Term Debt	¥369.7	¥488.9	¥432.8	¥520.9	¥1,380.8
Other Liabilities	¥319.6	¥352.3	¥381.9	¥481.0	NA
Total Liabilities	¥3,082.6	¥3,129.7	¥3,213.7	¥4,185.4	¥4,695.7
Minority Interests	¥338.9	¥372.4	¥388.8	¥470.4	¥548.7
Total Shareholders' Equity	¥1,742.7	¥1,825.8	¥2,018.6	¥2,281.7	¥2,560.7
Common Stock	140.3	141.2	180.3	219.4	246.8
Other Equity	186.5	199.6	244.4	322.0	357.8
Retained Earnings	1,415.9	1,485.0	1,593.9	1,740.3	1,956.1
Total Liabilities and Shareholders' Equity	¥5,164.2	¥5,327.9	¥5,621.1	¥6,937.5	¥7,805.1
Income Statement	1986	1987	1988	1989	1990
Revenue	¥5,010.5	¥4,848.7	¥4,975.0	¥6,401.4	¥7,077.8
Japanese Revenue	3,499.5	3,579.3	3,781.0	4,932.3	5,420.1
Non-Japanese Revenue	1,511.0	1,269.4	1,194.0	1,469.1	1,657.7
Cost of Sales	¥3,741.2	¥3,675.0	¥3,961.9	¥4,552.1	¥5,023.5
R&D Expense	¥295.7	¥307.6	¥324.0	¥373.5	¥429.4
SG&A Expense	¥962.7	¥958.8	¥1,032.4	¥1,416.1	¥1,533.2
Capital Expense	¥447.0	¥657.4	¥320.4	¥532.4	NA
Pretax Income	¥371.1	¥258.3	¥331.1	¥491.1	¥530.0
Pretax Margin (%)	7.41	5.33	6.66	7.67	7.49
Effective Tax Rate (%)	57.50	57.50	56.10	56.10	56.10
Net Income	¥98.7	¥98.7	¥136.8	¥185.6	¥211.0
Shares Outstanding, Millions	2,803.4	2,816.3	2,921.7	3,017.7	3,418.6
Per Share Data					
Earnings	¥50.65	¥33.45	¥44.14	¥58.94	¥61.71
Dividend	¥9.00	¥9.00	¥9.00	¥9.00	¥9.00
Book Value	¥0.62	¥0.65	¥0.69	¥0.76	¥0.75

Table 5 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending March
(Billions of Yen, except Per Share Data)

Key Financial Ratios	1986	1987	1988	1989	1990
<i>Liquidity</i>					
Current (Times)	1.37	1.51	1.57	1.53	1.63
Quick (Times)	0.96	1.11	1.17	1.14	1.22
Fixed Assets/Equity (%)	68.86	64.58	56.13	64.56	66.74
Current Liabilities/Equity (%)	137.33	125.34	118.84	139.52	129.45
Total Liabilities/Equity (%)	176.89	171.42	159.20	183.43	183.37
<i>Profitability (%)</i>					
Return on Assets	-	1.88	2.50	2.96	2.86
Return on Equity	-	5.53	7.12	8.63	8.71
Profit Margin	1.97	2.04	2.75	2.90	2.98
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	5.90	6.34	6.51	5.83	6.07
Capital Spending % of Revenue	8.92	13.56	6.44	8.32	0
Employees	164,117	161,325	159,910	274,508	290,000
Revenue (¥K)/Employee	¥30.53	¥30.06	¥31.11	¥23.32	¥24.41
Capital Spending % of Assets	8.66	12.34	5.70	7.67	0
Exchange Rate (US\$1=¥)	¥221.26	¥159.56	¥138.03	¥128.25	¥142.47

NA = Not available

Source: Hitachi, Ltd.
Annual Reports
Dataquest (1990)

Hoechst AG

Postfach 80 03 20
D-6230 Frankfurt am main 80
Federal Republic of Germany
Telephone: (069) 305-0
Fax: (069) 316700
Dun's Number: 31-756-2718
Date Founded: 1863

CORPORATE STRATEGIC DIRECTION

Hoechst AG (The Hoechst Group) comprises six business areas: chemicals and color, fibers and plastic film, polymers, health, engineering and technology, and agriculture. The Company is active in the European Community (EC), North America, Latin America, Africa, and the Asia/Pacific region.

Consolidated revenue increased 12.0 percent to DM 45.9 billion (US\$24.4 billion) in 1989, from DM 41.0 billion (US\$23.5 billion) in 1988. Growth outside Germany proved to be greater, with sales rising 14.0 percent as opposed to sales within Germany increasing 7.0 percent. Chemical sales rose 5.0 percent during 1989 totaling DM 11.6 billion (US\$6.1 billion), representing 25.3 percent of total revenue. (Percentage changes refer only to DM amounts; US\$ percentage changes will differ because of fluctuations in Dataquest exchange rates.)

Revenue in the fibers and plastic film business area increased 16.0 percent and totaled DM 9.0 billion (US\$4.9 billion), representing 19.6 percent of total revenue. In this business area, plastic film generated approximately DM 1.6 billion (US\$851 million), whereas fibers and fiber intermediates generated DM 7.4 billion (US\$3.9 billion).

Revenue from the polymers business area increased approximately 5 percent to DM 7.8 billion (US\$4.1 billion), representing 17 percent of total revenue. Of this total, paints and synthetic resins generated nearly DM 3.3 billion (US\$1.8 billion), and plastics and waxes and engineering plastics generated DM 3.1 (US\$1.6 billion) and DM 1.4 billion (US\$744 million), respectively, for fiscal 1989.

In the health business area, revenue increased 14.0 percent, totaling DM 8.3 billion (US\$4.4 billion) for fiscal 1989. Almost half of the sales were in Western Europe, with 11.0 percent in North America and 14.0 percent in Japan. Sales of pharmaceuticals increased nearly DM 1 billion (US\$531.9 million), reaching approximately DM 8 billion (US\$4.3 billion). Sales in cosmetics remained stable, totaling approximately DM 300 million (US\$159.0 million). Sales in this business area represented 18.1 percent of total revenue.

The engineering and technology business area sales grew 7.0 percent to DM 6.5 billion (US\$3.5 billion), representing 14.2 percent of total revenue for fiscal 1989. The industrial gases and welding technologies total sales were approximately DM 2.0 billion (US\$1.1 billion), showing an 11.0 percent increase over the previous year's total. Technical information systems sales remained stable at DM 1.3 billion (US\$691.5 million), whereas the new carbon products division posted DM 1.0 billion (US\$532.0 million) in sales for fiscal 1989. The plant engineering division and the engineering ceramics division generated DM 500.0 million (US\$266.0 million) and DM 250.0 million (US\$133.0 million) during fiscal 1989, respectively.

The agriculture business area sales increased 14 percent, totaling DM 2.7 billion (US\$1.4 billion) for fiscal 1989. Nearly 93 percent of these sales occurred outside Germany.

Net income increased 5.7 percent in fiscal 1989 to DM 2.1 billion (US\$1.1 billion) from DM 2.0 billion (US\$1.1 billion) in fiscal 1988.

R&D for fiscal 1989 totaled DM 2.6 billion (US\$1.4 billion), representing 5.7 percent of revenue. This is an increase of 8.3 percent over the previous

year's figure of DM 2.4 billion (US\$1.4 billion). Research costs by business area show that the health business area received 44.0 percent of R&D expenditure. Chemicals and color received 13.0 percent, the polymers area received 12.0 percent, agriculture 10.0 percent, and fibers and plastic film 8.0 percent for fiscal 1989. Engineering and technology and central research received 7.0 and 6.0 percent, respectively.

Capital expenditure totaled DM 3.9 billion (US\$2.1 billion) for fiscal 1989, representing 8.4 percent of revenue. This is an 87.3 percent increase from the previous year's figure of DM 2.1 billion (US\$1.2 billion), which represented 5.0 percent of fiscal 1988 revenue.

The Hoechst Group employed 169,295 people at the close of fiscal 1989. Seventy percent of these employees worked in the EC, 15 percent in North America, 7 percent in Latin America, and the remaining 8 percent in the Asia/Pacific and the Rest of World regions.

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 and 4, comprehensive financial statements, are at the end of this background.

BUSINESS SEGMENT STRATEGIC DIRECTION

Products for Component Equipment

Hoechst has 12 divisions and subsidiaries that serve all areas of microelectronics. The Technical Information Systems Division serves the semiconductor manufacturer market. Materials for photolithography such as AZ positive photoresists, protective coatings, developers and thinners for photoresists, adhesion promoters, and strippers are manufactured by this division. The division provides printed circuit board (PCB) manufacturers with materials for photoprinting and screen printing, such as negative and positive Ozatec dry film, photoresists and liquid photoresists, diazo-duplicating film and screen emulsion, screen stencil films, photosolder masks, and dry film photoresist processing equipment.

Messer Griesheim GmbH provides semiconductor manufacturers with deposition gases like silane, dichlorosilane, nitrous oxide, ammonia, tungsten hexafluoride, and oxygen; and with doping gases like arsine, phosphine, diborane, and boron trifluoride. This division provides gases used in etching, such as tetrafluoromethane, trifluoromethane, silicon tetrafluoride, sulphur hexafluoride, nitrogen trifluoride, chlorine, hydrogen chloride, and boron trichloride. It also supplies storage and transfer equipment for gases, as well as purification and supply systems, including valves, pressure regulators, manifolds, and gas cabinets.

Messer Griesheim GmbH PECO manufactures seal welding machines for metal and ceramic housings for semiconductor and hybrid manufacturers; gap welding machines for bonding for PCB manufacturers; and thin- and thick-film equipment.

Riedel-de Haen AG manufactures VLSI PURANAL, which is the brand name of a product range specially designed for the cleaning and etching processes in VLSI manufacturing. Riedel-de Haen's hydrofluoric acid production also forms the basis for a number of chemicals used in the production of PCBs.

Hoechst's Chemicals Division manufactures chemicals for the doping and production of III/V compounds, as well as inorganic and fluorocarbon gases for doping and plasma etching processes. This division also produces acids, bases, and salts for etching and stripping PCBs; Frigen 113 TR for cleaning, perfluorinated inert fluids for vaporphase soldering and components testing, and lubricants for vacuum pumps.

Ringsdorff Werke GmbH produces high-purity graphite components, such as susceptors, heating elements, heat shields for crystal growth, slicing beams, SiC-coated susceptors for epitaxy, wafer trays for plasma-etched chemical vapor deposition (PECVD), electrodes, diffusers, shields for ion implantation, soldering and glass-to-metal sealing jigs, and pyrolytic boron-nitride components.

The equipment that SIGRI GmbH produces for semiconductor manufacturers includes carbon felts, graphite felts and foils, heating elements, charge carriers, charging equipment, and superstructures for furnaces.

The Hoechst Plastics and Waxes Division manufactures a sealing agent for semiconductor manufacturers. This division also produces fluoropolymers

hostafion as insulating and corrosion-resistant materials for PCB manufacturers. The Plastics and Waxes Division produces heat- and chemical-resistant components for wire and cable insulation, PCB housing, plugs, and insulating components.

Hoechst's Synthetic Resins Division manufactures phenolic and durophen, which are phenolic and epoxy resins. This division also produces Beckopox for laminates.

The Hoechst Films Division produces hostaphan, polyester films, trespaphan, polypropylene films for the component market, and carrier film for audio, video, and computer tapes. This division produces polyester films as base materials for flexible PCBs.

Hoechst CeramTec produces chip carrier and pin grid arrays for the semiconductor market. This division produces ceramic rods and tubes for carbon film, metal film, and wire wound resistors for all leading manufacturers of resistors in the components market.

Herberts produces solder, finishing varnishes, and casting resins for the PCB market.

Further Information

For further information about the Company's business segments, please contact the appropriate Dataquest industry service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$14,531.3	\$17,518.0	\$20,531.1	\$23,275.0	\$24,413.8
Percent Change	-	20.55	17.20	13.36	4.89
Capital Expenditure	\$804.4	\$1,234.6	\$1,330.0	\$1,171.0	\$2,057.4
Percent of Revenue	5.54	7.05	6.48	5.03	8.43
R&D Expenditure	\$708.5	\$985.3	\$1,231.7	\$1,372.7	\$1,394.1
Percent of Revenue	4.88	5.62	6.00	5.90	5.71
Number of Employees	180,561	153,651	167,781	164,527	169,295
Revenue (\$K)/Employee	\$80	\$114	\$122	\$141	\$144
Net Income	\$499.3	\$644.7	\$848.9	\$1,144.9	\$1,133.0
Percent Change	-	29.12	31.66	34.87	(1.04)
Exchange Rate (US\$1=DM)	DM 2.94	DM 2.17	DM 1.80	DM 1.76	DM 1.88
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	NA	NA	NA	NA	
Quarterly Profit	NA	NA	NA	NA	

NA = Not available

Source: Hoechst AG
 Annual Reports and Forms 10-K
 Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
German	25.28	28.49	60.19	58.73	57.73
Non-German	74.72	71.51	39.81	41.27	42.27

Source: Hoechst AG
 Annual Reports and Forms 10-K
 Dataquest 1990

SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

Information is not available.

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Chemiefaser Guben

Hoechst and Chemiefaser Guben have signed a letter of intent to establish a joint venture in East Germany to produce polyester tire cord, with Hoechst becoming the majority owner of the joint venture.

BASF and Bayer

Hoechst, BASF, and Bayer will form Entwicklungsgesellschaft fuer die Wiederverwertung von Kunststoffen (EWK), which will be responsible for recycling plastics waste.

Deutsche Wellcome

Hoechst has received marketing rights for Zovirax, an antiviral, from Deutsche Wellcome, a subsidiary of Wellcome Foundation (United Kingdom).

Daicel Chemical Industries, Ltd.

Hoechst and Daicel plan to establish a UK joint venture for the production and marketing of acrylonitrile butadiene styrene (ABS) resin. A production plant will be built in the United Kingdom.

Lucky Goldstar

Hoechst AG and Lucky Goldstar of South Korea have established a joint venture to produce chiefly ultrahigh molecular weight high-density plasma etchant (HDPE) in South Korea. The venture calls for the construction of a plant in South Korea.

Mitsubishi Kasei

Hoechst and Mitsubishi formed a 50/50 dyestuffs joint venture.

MERGERS AND ACQUISITIONS

1990

Benckiser-Knapsack

Joh Benckiser sold its 50 percent share in its joint venture company, Benckiser-Knapsack, to partner Hoechst.

Fincisa, Fibras Sinteticos SA of Portugal

Hoechst has agreed to purchase from Imperial Chemical Industries Plc its 50 percent share in Fincisa, Fibras Sinteticos SA of Portugal. At its Portalegre site, Fincisa produces polyester fiber staple and PET polymer for bottle and packaging applications.

Union Carbide

Union Carbide will sell its primary alcohol ethoxylates business to Hoechst. Applications for primary alcohol ethoxylates include household products such as cleaners and laundry detergents.

Schwarzkopf GmbH

Hoechst has increased its holding in Schwarzkopf to 77 percent. Schwarzkopf operates in the Eastern European cosmetics market.

KEY OFFICERS

R. Sammet

Chairman of the Supervisory Board

R. Brand

Vice chairman of the Supervisory Board

G. Bradeck

Member of the Supervisory Board

E. Bouillon

Member of the Supervisory Board

W. Hilger

Chairman of the Board of Directors

G. Metz

Vice chairman of the Board of Directors

M. Fruhauf

Member of the Board of Directors

H. Gareis

Member of the Board of Directors

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

Table 3
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	\$6,005.6	\$8,366.3	\$8,866.1	\$9,935.8	\$9,899.5
Cash	356.0	1,875.6	946.1	970.5	763.3
Receivables	2,768.1	3,316.3	4,060.6	4,576.1	4,460.1
Marketable Securities	425.7	195.3	499.4	943.8	1,065.4
Inventory	2,455.8	2,979.0	3,360.0	3,445.5	3,610.6
Other Current Assets	0	0	0	0	0
Net Property, Plants	\$3,090.1	\$3,996.6	\$7,118.3	\$7,831.8	\$4,411.6
Other Assets	\$213.5	\$310.5	\$88.3	\$61.9	\$73.9
Total Assets	\$9,309.3	\$12,673.4	\$16,072.8	\$17,829.5	\$14,385.0
Total Current Liabilities	\$2,319.7	\$2,767.6	\$1,286.1	\$1,607.4	\$1,549.5
Long-Term Debt	\$1,235.3	\$1,393.3	\$3,598.9	\$3,497.7	\$3,279.8
Other Liabilities	\$2,433.7	\$3,555.9	\$1,762.2	\$6,264.8	\$6,206.9
Total Liabilities	\$5,988.7	\$7,716.9	\$6,647.2	\$11,369.9	\$11,036.2
Total Shareholders' Equity	\$3,320.6	\$4,956.5	\$9,425.6	\$6,459.7	\$6,701.6
Common Stock	876.9	1,264.5	1,553.9	1,608.5	1,534.0
Other Equity	1,508.0	1,212.4	4,593.3	4,148.3	4,468.1
Retained Earnings	935.7	2,479.7	3,278.3	702.8	699.5
Total Liabilities and Shareholders' Equity	\$9,309.3	\$12,673.4	\$16,072.8	\$17,829.5	\$14,385.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$14,531.3	\$17,518.0	\$20,531.1	\$23,275.0	\$24,413.8
German Revenue	3,672.8	4,991.7	12,358.3	13,669.9	14,094.1
Non-German Revenue	10,858.5	12,526.3	8,172.8	9,605.1	10,319.7
Cost of Sales	NA	NA	\$12,881.1	\$14,534.1	\$15,572.3
R&D Expense	\$708.5	\$985.3	\$1,231.7	\$1,372.7	\$1,394.1
SG&A Expense	NA	NA	\$4,845.6	\$5,303.4	\$5,542.6
Capital Expense	\$804.4	\$1,234.6	\$1,330.0	\$1,171.0	\$2,057.4
Pretax Income	\$1,073.5	\$1,479.7	\$1,726.7	\$2,321.6	\$2,205.3
Pretax Margin (%)	7.39	8.45	8.41	9.97	9.03
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	\$499.3	\$644.7	\$848.9	\$1,144.9	\$1,133.0
Shares Outstanding, Millions	63.1	63.1	62.0	62.5	64.1
Per Share Data					
Earnings	\$7.91	\$10.21	\$13.68	\$18.30	\$17.79
Dividend	\$3.40	\$4.61	\$6.11	\$6.82	\$6.91
Book Value	\$52.62	\$78.55	\$152.03	\$103.35	\$104.55
Exchange Rate (US\$1=DM)	DM 2.94	DM 2.17	DM 1.8	DM1.76	DM 1.88

NA = Not available

Source: Hoechst AG
 Annual Reports and Forms 10-K
 Dataquest (1990)

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of Deutsche Marks, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	DM 17,656.6	DM 18,154.9	DM 15,959.0	DM 17,487.0	DM 18,611.0
Cash	1,046.5	4,070.1	1,703.0	1,708.0	1,435.0
Receivables	8,138.3	7,196.4	7,309.0	8,054.0	8,385.0
Marketable Securities	1,251.7	423.9	899.0	1,661.0	2,003.0
Inventory	7,220.1	6,464.5	6,048.0	6,064.0	6,788.0
Other Current Assets	0	0	0	0	0
Net Property, Plants	DM 9,084.9	DM 8,672.7	DM 12,813.0	DM 13,784.0	DM 14,597.0
Other Assets	DM 627.8	DM 673.7	DM 159.0	DM 109.0	DM 139.0
Total Assets	DM 27,369.3	DM 27,501.3	DM 28,931.0	DM 31,380.0	DM 33,347.0
Total Current Liabilities	DM 6,820.0	DM 6,005.8	DM 2,315.0	DM 2,829.0	DM 2,913.0
Long-Term Debt	DM 3,631.8	DM 3,023.5	DM 6,478.0	DM 6,156.0	DM 6,166.0
Other Liabilities	DM 7,155.0	DM 7,716.3	DM 3,172.0	DM 11,026.0	DM 11,669.0
Total Liabilities	DM 17,606.8	DM 16,745.6	DM 11,965.0	DM 20,011.0	DM 20,748.0
Total Shareholders' Equity	DM 9,762.5	DM 10,755.7	DM 16,966.0	DM 11,369.0	DM 12,599.0
Common Stock	2,578.2	2,743.9	2,797.0	2,831.0	2,884.0
Other Equity	4,433.4	2,630.9	8,268.0	7,301.0	8,400.0
Retained Earnings	2,750.9	5,380.9	5,901.0	1,237.0	1,315.0
Total Liabilities and Shareholders' Equity	DM 27,369.3	DM 27,501.3	DM 28,931.0	DM 31,380.0	DM 33,347.0
Income Statement	1985	1986	1987	1988	1989
Revenue	DM 42,722.0	DM 38,014.0	DM 36,956.0	DM 40,964.0	DM 45,898.0
German Revenue	10,798.0	10,832.0	22,245.0	24,059.0	26,497.0
Non-German Revenue	31,924.0	27,182.0	14,711.0	16,905.0	19,401.0
Cost of Sales	NA	NA	DM 23,186.0	DM 25,580.0	DM 29,276.0
R&D Expense	DM 2,083.0	DM 2,138.0	DM 2,217.0	DM 2,416.0	DM 2,621.0
SG&A Expense	NA	NA	DM 8,722.0	DM 9,334.0	DM 10,420.0
Capital Expense	DM 2,365.0	DM 2,679.0	DM 2,394.0	DM 2,061.0	DM 3,868.0
Pretax Income	DM 3,156.0	DM 3,211.0	DM 3,108.0	DM 4,086.0	DM 4,146.0
Pretax Margin (%)	7.39	8.45	8.41	9.97	9.03
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	DM 1,468.0	DM 1,399.1	DM 1,528.0	DM 2,015.0	DM 2,130.0
Shares Outstanding, Millions	63.1	63.1	62.0	62.5	64.1
Per Share Data					
Earnings	DM 23.27	DM 22.16	DM 24.63	DM 32.21	DM 33.44
Dividend	DM 10.00	DM 10.00	DM 11.00	DM 12.00	DM 13.00
Book Value	DM 154.71	DM 170.45	DM 273.65	DM 181.90	DM 196.55

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of Deutsche Marks, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	2.59	3.02	6.89	6.18	6.39
Quick (Times)	1.53	1.95	4.28	4.04	4.06
Fixed Assets/Equity (%)	93.06	80.63	75.52	121.24	115.86
Current Liabilities/Equity (%)	69.86	55.84	13.64	24.88	23.12
Total Liabilities/Equity (%)	180.35	155.69	70.52	176.01	164.68
<i>Profitability (%)</i>					
Return on Assets	-	5.10	5.42	6.68	6.58
Return on Equity	-	13.64	11.02	14.22	17.77
Profit Margin	3.44	3.68	4.13	4.92	4.64
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	4.88	5.62	6.00	5.90	5.71
Capital Spending % of Revenue	5.54	7.05	6.48	5.03	8.43
Employees	180,561	153,651	167,781	164,527	169,295
Revenue (DM K)/Employee	DM 237	DM 247	DM 220	DM 249	DM 271
Capital Spending % of Assets	8.64	9.74	8.27	6.57	11.60
Exchange Rate (US\$1=DM)	DM 2.94	DM 2.17	DM 1.8	DM 1.76	DM 1.88

NA = Not available

Source: Hoechst AG
 Annual Reports and Forms 10-K
 Dataquest (1990)

KLA Instruments Corporation

3506 Bassett Street
Santa Clara, California 95054
Telephone: (408) 988-6100
Fax: (415) 659-1560
Dun's Number: 01-093-6193

Date Founded: 1975

CORPORATE STRATEGIC DIRECTION

KLA Instruments Corporation designs, manufactures, markets, and services automated optical inspection equipment used primarily by the semiconductor and interconnect industries in the production of all types of integrated circuits and printed circuit boards (PCBs). The need for automation arises from the complex patterns with decreasing feature dimensions that must be inspected during manufacturing.

The Company's customers are semiconductor manufacturers, photomask producers, PCB manufacturers, and other companies primarily in the computer, telecommunications, and automation industries that manufacture LSI and VLSI circuits for use in their own products. The Company markets its systems in the United States, Canada, and Europe through its own sales organization.

Total revenue increased by 47 percent to \$165.5 million in fiscal 1989, from \$112.9 million* in fiscal 1988. Net income increased substantially to \$11.7 million in fiscal 1989, from \$887,000 in fiscal 1988. KLA employs 991 people worldwide.

Research and development expenditures totaled \$25.1 million in fiscal 1989, representing 15 percent of revenue. The Company entered into research and development contracts with four partnerships, organized from 1981 to 1986, to develop certain new technologies—wholly owned subsidiaries of the Company are general partners in these partnerships. Approximately 25 percent of the Company's work

force is engaged in engineering, research, and development.

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

The Company's business activities are organized into four operating divisions and one research and development laboratory responsible for the application of the Company's image-processing technology. These groups are named the Reticle and Photomask Inspection Division (RAPID); the Wafer Inspection System for the Automatic Recognition of Defects Division (WISARD); the Automated Test Systems Division (ATS); the KLA Scanning, Inspection, and Classification Division (KLASIC); and the Company's Advanced Development Laboratory.

RAPID Division

The RAPID Division manufactures, sells, and services the KLA 100 and KLA 200 Series systems, which are the product lines. In 1989, the RAPID Division introduced the KLA 210e Automatic Reticle Inspection System, which can detect smaller defects than any previous or competing systems. Also in 1989, RAPID began deliveries of the KLA-259 System, which inspects images on transparent (quartz) substrates.

*All dollar amounts are in U.S. dollars.

WISARD Division

The WISARD Division manufactures, sells, and services the KLA 2020, KLA 2028, KLA 2029, and the KLA 2030 and KLA 2031. The KLA 2020 is the older-generation model, which has both inspection and critical-dimension measurement (CD) capability. CD is the measurement of the circuit and line dimensions on the wafer, which are typically on the order of one micron or less. The KLA 2028 and KLA 2030 models are the newer-generation products with higher resolution, which offer inspection speeds up to 15 times greater than the KLA 2020 and CD capabilities either independently or in one machine. In 1989, WISARD announced the KLA 2029 for use in defect detection and the KLA 2031 for use in defect detection and metrology by manufacturers of 4Mb dynamic random-access memory (DRAM) chips. The trend toward denser, multilayer circuits and dramatically reduced line widths resulted in the development of the KLA 5000 Coherence Probe Metrology System.

ATS Division

The ATS Division manufactures, sells, and services the KLA 1007 wafer prober, the KLAASP, the KLA 1500 Networking Controller, and the Emission Microscope for Multilayer Inspection (EMMI). The ATS Division's products address the finished chip in wafer tests and assembly, with a microscopic probe

that inspects the wafer both optically and electronically. Additionally, the wafer also can be inspected to determine whether the probe itself is causing damage to the wafer.

KLASIC Division

The KLASIC Division manufactures, sells, and services the KLA 3000 Series Systems. These products optically inspect PCB layers at all interconnect points under varying surface conditions. The KLA 3000 Series provides one of the fastest throughput rates in the automatic PCB-inspection market. In 1989, the KLASIC Division introduced the CAM-300 Series, which generates PCB images by computer-aided design (CAD). KLA believes that the CAM-3000 Series will provide a high-performance central node for future integrated data networks.

KLA Advanced Development Laboratory

The KLA Advanced Development Laboratory is the central engineering, research, and development laboratory of the Company.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service.

Table 1
Five-Year Corporate Highlights (Thousands of U.S. Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$62,878.0	\$82,526.0	\$88,194.0	\$112,851.0	\$165,459.0
Percent Change	-	31.25	6.87	27.96	46.62
Capital Expenditure	\$4,452.0	\$2,999.0	\$2,869.0	\$9,289.0	\$10,692.0
Percent of Revenue	7.08	3.63	3.25	8.23	6.46
R&D Expenditure	\$10,734.0	\$10,141.0	\$8,655.0	\$13,714.0	\$25,087.0
Percent of Revenue	17.07	12.29	9.81	12.15	15.16
Number of Employees	560	660	760	861	991
Revenue (\$K)/Employee	\$112.28	\$125.04	\$116.04	\$131.07	\$166.96
Net Income	\$8,802.0	\$9,854.0	\$7,489.0	\$887.0	\$11,678.0
Percent Change	-	11.95	(24.00)	(88.16)	1,216.57
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$42,000.00	\$43,160.00	\$40,200.00	NA	
Quarterly Profit	\$2,920.00	\$3,110.00	\$2,500.00	NA	

N/A = Not available

Source: KLA Instruments
Annual Reports and Forms 10-K
Dataquest
1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	51.00	68.00	80.22	50.17	52.27
International	49.00	32.00	19.78	49.83	47.73
Japan	-	-	00	2.00	7.00
Europe	-	-	18.00	26.00	17.00
Asia/Pacific	-	-	-	21.00	24.00
ROW	-	-	-	-	-

Source: KLA Instruments
Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	77.00	76.00
Indirect Sales	23.00	24.00
VARs	-	-
Distributors	21.00	17.00
Dealers	-	-
Mass Merchandisers	2.00	7.00
Manufacturers' Representatives	-	-

Source: Dataquest
1990

1989 SALES OFFICE LOCATIONS

North America—1
Europe—3
Japan—2
ROW—1

Japan

KLA Technology Center Limited

Europe

KLA Instruments France S.A. (France)
KLA Instruments GmbH (West Germany)
KLA Instruments Ltd. (United Kingdom)

ROW

KLA Instruments (Cayman) Ltd. (British West Indies)
KLA Instruments (Israel) Corporation (Israel)

MANUFACTURING LOCATIONS

North America

San Jose, California
Santa Clara, California

Europe

Coburg, West Germany

ROW

Migdal Ha'mek, Israel

Manufacturing activities include high-speed image processors, air-bearing stages, image digitizers and optical systems. Other manufacturing activities consist primarily of assembling standard parts and subsystems manufactured to its specifications into subassemblies that are, in turn, assembled into finished product.

SUBSIDIARIES

North America

KLA Building Corporation (United States)
KLA Instruments KLINNIK Corporation (United States)
KLA Instruments Sales Corporation (U.S. Virgin Islands)
KLA International Corporation (United States)
KLA Management Corporation (United States)
KLA PCBI Corporation (United States)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Kenneth Levy

President, chief executive officer

Robert R. Anderson

Chairman of the board, chief financial officer

Robert J. Boehlke

Executive vice president, chief operating officer

Paul Sandland

Senior vice president, chief technical officer

PRINCIPAL INVESTORS

State Farm Mutual Automobile Insurance Co.—
8.4 percent
Levy, Kenneth—7.4 percent

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	\$56,745.0	\$73,331.0	\$79,567.0	\$103,823.0	\$126,421.0
Cash	15,308.0	12,204.0	15,248.0	9,917.0	18,153.0
Receivables	15,466.0	20,951.0	23,216.0	40,819.0	54,183.0
Marketable Securities	6,827.0	13,277.0	10,605.0	14,491.0	8,755.0
Inventory	18,440.0	26,195.0	29,172.0	36,717.0	42,480.0
Other Current Assets	704.0	704.0	1,326.0	1,879.0	2,850.0
Net Property, Plants	\$8,891.0	\$8,992.0	\$8,408.0	\$14,590.0	\$20,024.0
Other Assets	\$14,967.0	\$15,854.0	\$27,523.0	\$16,212.0	\$14,309.0
Total Assets	\$80,603.0	\$98,177.0	\$115,498.0	\$134,625.0	\$160,754.0
Total Current Liabilities	\$16,509.0	\$20,477.0	\$24,757.0	\$31,477.0	\$42,269.0
Long-Term Debt	-	-	-	-	-
Other Liabilities	\$1,453.0	\$2,104.0	\$3,696.0	\$5,684.0	\$7,468.0
Total Liabilities	\$17,962.0	\$22,581.0	\$28,453.0	\$37,161.0	\$49,737.0
Total Shareholders' Equity	\$62,641.0	\$75,596.0	\$87,045.0	\$97,464.0	\$111,017.0
Converted Preferred Stock	-	-	-	-	-
Common Stock	17.0	17.0	17.0	18.0	18.0
Other Equity	42,331.0	45,432.0	49,392.0	50,983.0	52,858.0
Retained Earnings	20,293.0	30,147.0	37,636.0	46,463.0	58,141.0
Total Liabilities and Shareholders' Equity	\$80,603.0	\$98,177.0	\$115,498.0	\$134,625.0	\$160,754.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$62,878.0	\$82,526.0	\$88,194.0	\$112,851.0	\$165,459.0
U.S. Revenue	32,068.0	56,118.0	70,745.0	56,620.0	86,479.0
Non-U.S. Revenue	30,810.0	26,408.0	17,449.0	56,231.0	78,980.0
Cost of Sales	\$28,981.0	\$44,008.0	\$51,076.0	\$67,269.0	\$91,173.0
R&D Expense	\$10,734.0	\$10,141.0	\$8,655.0	\$13,714.0	\$25,087.0
SG&A Expense	\$12,076.0	\$14,001.0	\$14,924.0	\$19,637.0	\$31,136.0
Capital Expense	\$4,452.0	\$2,999.0	\$2,869.0	\$9,289.0	\$10,692.0
Pretax Income	\$14,442.0	\$16,845.0	\$12,777.0	\$13,876.0	\$17,966.0
Pretax Margin (%)	22.97	20.41	14.49	12.30	10.86
Effective Tax Rate (%)	39.00	41.50	41.30	36.40	35.00
Net Income	\$8,802.0	\$9,854.0	\$7,489.0	\$887.0	\$11,678.0
Shares Outstanding, Thousands	17,509.0	17,702.0	17,787.0	18,006.0	7,934.0
Per Share Data					
Earnings	\$0.50	\$0.56	\$0.42	\$0.49	\$0.65
Dividends	-	-	-	-	-
Book Value	\$3.58	\$4.27	\$4.89	\$5.41	\$13.99

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
<i>Liquidity</i>					
Current (Times)	3.44	3.58	3.21	3.30	2.99
Quick (Times)	2.32	2.30	2.04	2.13	1.99
Fixed Assets/Equity (%)	14.19	11.89	9.66	14.97	18.04
Current Liabilities/Equity (%)	26.35	27.09	28.44	32.30	38.07
Total Liabilities/Equity (%)	28.67	29.87	32.69	38.13	44.80
<i>Profitability (%)</i>					
Return on Assets	-	11.02	7.01	0.71	7.91
Return on Equity	-	14.26	9.21	0.96	11.20
Profit Margin	14.00	11.94	8.49	0.79	7.06
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	17.07	12.29	9.81	12.15	15.16
Capital Spending % of Revenue	7.08	3.63	3.25	8.23	6.46
Employees	560	660	760	861	991
Revenue (\$K)/Employee	\$112.28	\$125.04	\$116.04	\$131.07	\$166.96
Capital Spending % of Assets	5.52	3.05	2.48	6.90	6.65

Source: KLA Instruments
 Annual Reports and Forms 10-K
 Dataquest
 1990

Lam Research Corporation

4650 Cushing Parkway
Fremont, California
Telephone: (415) 659-0200
Fax: (415) 659-1560
Dun's Number: 03-813-7956

Date Founded: 1980

CORPORATE STRATEGIC DIRECTION

Lam Research Corporation develops, manufactures, markets, and services semiconductor wafer processing capital equipment used in the production of very large-scale integrated (VLSI) circuits. The Company's wafer fabrication equipment is designed to meet the demands of semiconductor manufacturers by offering reliable automated equipment with low particle contamination levels and high levels of process integration.

Lam Research markets and sells single wafer plasma etch systems through its Lam Research Etch Division and epitaxy wafer processing equipment through its Gemini Epitaxy Equipment Division. However, the Company has recently announced a decision to remove itself slowly from the epitaxy market.

The Company's current product market focus is on equipment for silicon epitaxy and dry etch, which are key wafer fabrication technologies. The Company's products are targeted at independent semiconductor device manufacturers that sell their semiconductor devices to others (merchants) and to computer, telecommunications, and other companies that manufacture semiconductors for use in their own products (captives).

Total revenue increased 68 percent to \$126.0 million* in fiscal 1989 from \$74.9 million in fiscal 1988. Net income increased 271 percent to \$9.3 million in fiscal 1989 from \$2.5 million in fiscal 1988. Lam Research employs 731 people worldwide.

R&D expenditure totaled \$21.9 million in fiscal 1989, representing 17 percent of revenue. Lam's current R&D efforts are directed at improvements to its existing etch and epitaxy product lines and at the

development of a new chemical vapor deposition (CVD) system. As part of the Company's efforts to develop a CVD system, it has acquired a portion of Monkowski-Rhine Inc. (MRI) and entered into an investment and R&D agreement. MRI engages in the development, design, and process development of the CVD of thin films used in semiconductor device fabrication. Pursuant to the R&D agreement, Lam Research employed MRI to develop a CVD system.

Process technology is essential to success in this industry. More than one-quarter of Lam's facilities are dedicated to advanced research and process development. Lam employs over 100 process engineers and researchers who work in partnership with customers, consortia, and industry leaders. Key relationships with Du Pont, Sematech, Sumitomo Metal Industries, Ltd. (SMI), and other major customers allows Lam to anticipate future process requirements and maintain the process advantages.

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 profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Etch Products

Dataquest estimates that the sale of dry etch products raised \$85.6 million for Lam Research during 1989. The Company's largest single market was in North America, which accounted for 51.4 percent of sales, or \$44 million. Lam's second largest market was Rest of World, where the Company held a 37.3 percent

*All dollar amounts are in US dollars.

share. Dataquest estimates that Lam had a 13.5 percent share of the worldwide dry etch market for 1989.

Lam manufactures two families of single wafer etch systems: the AutoEtch and Rainbow etchers. Designed to meet the full range of etch applications, the AutoEtch series includes the AutoEtch 490, 590, 690, and 790, for etching polysilicon, nitrides, silicides, refractory metals, oxides, and aluminum.

The Rainbow series (Lam's flagship product) of etchers is designed to respond to the demands of the semiconductor manufacturers to increase total circuit density and speed without sacrificing manufacturing yield or device reliability. Lam Research claims that the Rainbow's design and process capability provide its users with reduced particulate contamination and improved selectivity, etch repeatability, uniformity, system reliability, and the ability to process wafer sizes up to 8 inches in diameter.

Electron cyclotron resonance (ECR) is one of the possible techniques capable of depositing films with high aspect ratios for intermetal dielectrics—crucial in 64 and 256Mb devices. Currently, Lam markets and supports the ECR systems designed and manufactured by its Japanese trading partner, SMI.

With the continued growth of multilayer integrated circuits regulating the requirements for unconventional CVD tools, Lam has incorporated unique technologies into a low-pressure CVD system introduced in fall 1990.

Epitaxy Products

In revenue, Lam held a dominant position in the \$72 million 1989 epitaxy market when compared with other manufacturers. Dataquest estimates that the sale of epitaxy products generated \$25.7 million in worldwide revenue for Lam in 1989, giving it a 35.7 percent share of the market. Recently, LAM has decided to remove itself slowly from this market in favor of the more lucrative etching market.

Lam manufactures a series of epitaxy products: the Gemini-1 and Gemini-2 Reactors, the Tetron One Reactor, and the Gemini-3. The Gemini-1 and Gemini-2 are high-performance epitaxy reactors capable of addressing a wide range of process, device, and production volume variations. The Gemini-1, which is available in three different models, has the capability to process wafers up to 6 inches in diameter. The Gemini-2, which is also available in three different models, has higher productivity and processes wafers up to 8 inches in diameter. The Gemini-1 and Gemini-2 Reactors also are capable of processing thick polysilicon films required for radiation-hardened circuits and certain communications switching devices demanding long process times at high temperatures.

As of 1988, the Tetron One Reactor is believed to be the largest epitaxy reactor, with a load size of fifty 5- or 6-inch diameter wafers. The Tetron One is targeted at the MOS-on-epitaxy market, where large numbers of wafers are expected to be manufactured to a relatively small number of specifications in the centralized materials operations of larger device companies and silicon materials manufacturers. The Tetron One system consists of a large single-process chamber. It offers productivity advantages of two to five times those of the Gemini-2. The Tetron One is fully automated, with cassette-to-cassette wafer handling.

The Gemini-3 is an advanced version of the Gemini-1 and Gemini-2 Reactors. Its design provides improved uniformity, lower maintenance cost, robotic wafer handling, and advanced computer control. The Gemini-3 is targeted at advanced bipolar and BiCMOS wafer fabrication, where process control, uniformity, and particle contamination are major concerns. The Gemini-3 is also targeted at the application-specific integrated circuit (ASIC) market.

Further Information

For more information about the Company's business segments, please contact the appropriate Dataquest industry service.

Table 1
Five-Year Corporate Highlights (Thousands of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$62,816.0	\$46,739.0	\$35,468.0	\$74,963.0	\$126,048.0
Percent Change	-	(25.59)	(24.11)	111.35	68.15
Capital Expenditure	-	-	-	-	-
Percent of Revenue	0	0	0	0	0
R&D Expenditure	\$5,181.0	\$13,883.0	\$12,809.0	\$15,749.0	\$21,852.0
Percent of Revenue	8.25	29.70	36.11	21.01	17.34
Number of Employees	288	323	440	558	731
Revenue (\$K)/Employee	\$218.11	\$144.70	\$80.61	\$134.34	\$172.43
Net Income	\$7,133.0	(\$900.0)	(\$6,908.0)	\$2,505.0	\$9,302.0
Percent Change	-	(112.62)	667.56	(136.26)	271.34
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$33.58	\$34.24	\$37.40	\$35.72	
Quarterly Profit	\$2.54	\$2.65	\$2.30	\$2.35	

Source: Lam Research Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	87.40	55.04	61.75	62.20	56.03
International	12.60	44.96	38.25	37.80	43.97
Europe	3.60	17.96	20.25	13.80	10.97
Asia/Pacific	9.00	27.00	18.00	24.00	33.00
Japan	9.00	21.00	16.00	19.00	31.00

Source: Lam Research Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—10
Europe—2
Asia/Pacific—3
Japan—2

MANUFACTURING LOCATIONS

North America

Fremont, California

Lam Research maintains two separate manufacturing facilities for the Lam Research Etch Division and the Gemini Epitaxy Equipment Division. The Company's manufacturing activities consist of assembling and testing components and subassemblies that then are integrated into finished systems. Prior to shipping a completed etching process system, the customer's engineers may perform acceptance tests at Lam's facility, using the customer's own wafers.

Epitaxy products are tested similarly, but only for electromechanical function. Because of contamination issues, process chemicals are not introduced into the epitaxy reactor until it is installed at the customer's location.

SUBSIDIARIES

North America

Gemini Research (United States)
LRC International Inc. (United States)

Europe

Lam Research GmbH (Germany)
West Germany Monkowski-Rhine Inc. (Germany)

Asia/Pacific

Lam Research Ltd. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Perkin-Elmer Corporation

Lam Research and Perkin-Elmer entered a patent purchase and sales agreement.

Sematech

LAM Research and Sematech agreed to codevelop an enhanced metal etch system exclusively for sale to Sematech members. The agreement involves the use of each other's facilities and personnel.

Du Pont

Lam Research and Du Pont agreed to codevelop a future generation of etch systems. The five-year agreement also calls for exchanging technology regarding the process of etchant gases. The technology that results will be sold by each firm separately.

Brookside Software

Lam Research received an exclusive distribution contract to market LamStation, a software program developed by Brookside Software. LamStation is a data acquisition program tailored for Lam Research's AutoEtch plasma etch equipment and performs data analysis control process monitoring.

1988

Sumitomo Metal Industries Ltd. (SMI)

Lam Research and SMI entered into a licensing agreement calling for SMI to market Lam's Rainbow line of plasma etching systems in Japan. Also, LAM will market and service SMI's new ECR systems in North America and Europe.

1987

Tokyo Electron, Ltd.

Lam Research and Tokyo Electron converted their joint venture agreement to a five-year licensing and consulting agreement. As a result, Lam Research recorded a gain of \$940,000 from the sale of its 50 percent equity position in the joint venture.

MERGERS AND ACQUISITIONS

1989

Monkowski-Rhine Inc. (MRI)

Lam Research acquired MRI, a maker of semiconductor equipment.

1988

Gemini Research

Lam Research acquired Gemini Research, a manufacturer of capital equipment for the semiconductor industry.

KEY OFFICERS

Roger D. Emerick

President and chief executive officer

Carl A. Kountz

Chief operating officer, Lam Research Corporation, and president, Etch Division

Osamu Kano

Senior vice president, Japan Operations

Joseph R. Monkowski

Senior vice president, chief technical officer

Bruce Rhine

Vice president, Marketing

PRINCIPAL INVESTORS

Merrill Pickard Anderson & Eyre I—7.7 percent
Fiduciary Management Inc.—5.2 percent

FOUNDERS

Information is not available.

Table 3
Comprehensive Financial Statement
Fiscal Year Ending June
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$44,511.0	\$41,898.0	\$48,607.0	\$54,079.0	\$79,514.0
Cash	30,893.0	23,383.0	25,814.0	11,836.0	14,579.0
Receivables	6,093.0	9,585.0	8,681.0	19,961.0	31,884.0
Inventory	6,622.0	6,284.0	12,033.0	21,408.0	30,610.0
Other Current Assets	903.0	2,646.0	2,079.0	874.0	2,441.0
Net Property, Plants	\$3,205.0	\$4,009.0	\$7,322.0	\$10,070.0	\$12,901.0
Other Assets	\$673.0	\$2,322.0	\$1,225.0	\$2,199.0	\$3,489.0
Total Assets	\$48,389.0	\$48,229.0	\$57,154.0	\$66,348.0	\$95,904.0
Total Current Liabilities	\$8,210.0	\$5,220.0	\$10,184.0	\$16,204.0	\$26,407.0
Long-Term Debt	\$231.0	\$306.0	\$2,952.0	\$3,410.0	\$12,396.0
Other Liabilities	\$43.0	\$209.0	-	-	-
Total Liabilities	\$8,484.0	\$5,735.0	\$13,136.0	\$19,614.0	\$38,803.0
Total Shareholders' Equity	\$39,905.0	\$42,494.0	\$44,018.0	\$46,734.0	\$57,101.0
Common Stock	35,374.0	35,591.0	38,430.0	11.0	11.0
Other Equity	-	38,630.0	39,684.0	38,630.0	39,684.0
Retained Earnings	4,531.0	6,903.0	5,588.0	8,093.0	17,406.0
Total Liabilities and Shareholders' Equity	\$48,389.0	\$48,229.0	\$57,154.0	\$66,348.0	\$95,904.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$62,816.0	\$46,739.0	\$35,468.0	\$74,963.0	\$126,048.0
US Revenue	54,904.0	25,725.0	21,902.0	46,630.0	70,625.0
Non-US Revenue	7,912.0	21,014.0	13,566.0	28,333.0	55,423.0
Cost of Sales	\$16,312.0	\$24,538.0	\$19,149.0	\$37,995.0	\$68,596.0
R&D Expense	\$5,181.0	\$13,883.0	\$12,809.0	\$15,749.0	\$21,852.0
SG&A Expense	\$8,951.0	\$13,939.0	\$14,097.0	\$18,530.0	\$26,827.0
Capital Expense	-	-	-	-	-
Pretax Income	\$7,865.0	(\$3,456.0)	(\$9,468.0)	\$3,850.0	\$12,474.0
Pretax Margin (%)	12.52	(7.39)	(26.69)	5.14	9.90
Effective Tax Rate (%)	-	-	-	40.60	25.40
Net Income	\$7,133.0	(\$900.0)	(\$6,908.0)	\$2,505.0	\$9,302.0
Shares Outstanding, Thousands	10,202.0	10,250.0	10,320.0	10,950.0	11,135.0
Per Share Data					
Earnings	(\$0.70)	(\$0.09)	(\$0.67)	\$0.23	\$0.84
Dividend	-	-	-	-	-
Book Value	\$3.91	\$4.15	\$4.27	\$4.27	\$5.13

Table 3 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending June
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	5.42	8.03	4.77	3.34	3.01
Quick (Times)	4.61	6.82	3.59	2.02	1.85
Fixed Assets/Equity (%)	8.03	9.43	16.63	21.55	22.59
Current Liabilities/Equity (%)	20.57	12.28	23.14	34.67	46.25
Total Liabilities/Equity (%)	21.26	13.50	29.84	41.97	67.96
<i>Profitability (%)</i>					
Return on Assets	-	(1.86)	(13.11)	4.06	11.47
Return on Equity	-	(2.18)	(15.97)	5.52	17.92
Profit Margin	11.36	(1.93)	(19.48)	3.34	7.38
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	8.25	29.70	36.11	21.01	17.34
Capital Spending % of Revenue	0	0	0	0	0
Employees	288	323	440	558	731
Revenue (\$K)/Employee	\$218.11	\$144.70	\$80.61	\$134.34	\$172.43
Capital Spending % of Assets	0	0	0	0	0

Source: Lam Research Corporation
 Annual Reports and Forms 10-K
 Dataquest (1990)

Nippon Kogaku K.K. (Nikon)

Fuji Building, 2-3, Maronouchi 3-Chome

Chiyoda-ku, Tokyo 100, Japan

Telephone: 03-214-5311

Fax: 03-201-5856

Dun's Number: Not available

Date Founded: 1917

CORPORATE STRATEGIC DIRECTION

Nippon Kogaku K.K., also known as Nikon, is the result of a 1917 merger of three leading Japanese optical manufacturers. Today, Nikon is a leading manufacturer of precision instruments, cameras and other photo products, and ophthalmic products. In recent years, Nikon has become an important developer of IC-related equipment such as steppers and inspection systems.

Total revenue increased by 33 percent to \$1.9 billion* in fiscal 1989 from \$1.4 billion in fiscal 1988. Net income increased to \$87.1 million in fiscal 1989 from a loss of \$9.6 million in fiscal 1988.

Research and development expenditures totaled \$54.8 million in fiscal 1989, representing 2.8 percent of revenue. Capital spending expenditures totaled \$79.0 million in fiscal 1989, representing 4.0 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

Precision Equipment

In fiscal 1989, the Precision Equipment Sector segment had revenue of \$989 million, a 60 percent

increase over fiscal 1988. Sales from this sector accounted for 53.7 percent of total net sales, up from 42.8 percent in fiscal 1988.

This sector includes semiconductor-related equipment, measuring instruments, microscopes, surveying equipment, binoculars, and telescopes.

In semiconductor-related equipment, Nikon is the leading manufacturer worldwide of steppers used in the production of very large scale integrated (VLSI) circuits and maintains a dominant market share in Japan. In fiscal 1989, sales of semiconductor-related equipment were \$628 million, almost twice the level of fiscal 1988.

In the measuring instruments area, Nikon's most sophisticated product is the Tristation. The Tristation is a computerized, three-dimensional, coordinate-measuring machine capable of measuring complex shapes. Sales of measuring instruments in fiscal 1989 were \$59 million, a 20 percent increase over fiscal 1988.

Photo Products and Electronic Imaging Equipment

In fiscal 1989, consolidated sales of photo products and electronic imaging equipment were \$716.6 million, a 6.5 percent increase over 1988. This sector represents 38.9 percent of the company's total revenue.

This sector includes 35mm single-lens-reflex (SLR) and automatic compact cameras; interchangeable camera lenses, speedlights, and accessories; and electronic imaging equipment such as still video camera systems, television camera lenses, and camcorders.

Ophthalmic Products

In fiscal 1989, consolidated sales for ophthalmic products were \$136 million, a decrease of 7.5 percent over fiscal 1988. This sector accounted for 7.4 percent of net sales.

This sector includes equipment used by professional optometrists and ophthalmologists, including optical frames, lenses, and sunglasses.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service. Dataquest tracks Nikon's semiconductor equipment products through the Component Group's Semiconductor Equipment and Materials Service (SEMS).

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$1,666.9	\$1,521.2	\$1,386.4	\$1,449.4	\$1,923.5
Percent Change	-	(8.74)	(8.86)	4.54	32.71
Capital Expenditure	\$106.0	\$144.6	\$52.8	\$42.4	\$79.0
Percent of Revenue	6.36	9.51	3.81	2.93	4.11
R&D Expenditure	\$34.7	\$46.5	\$43.8	\$45.5	\$54.8
Percent of Revenue	2.08	3.06	3.16	3.14	2.85
Number of Employees	NA	NA	NA	NA	NA
Revenue (\$K)/Employee	NA	NA	NA	NA	NA
Net Income	\$54.5	\$16.9	(\$12.0)	(\$9.6)	\$87.1
Percent Change	-	(68.99)	(171.01)	20.00	1,007.29
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	NA	NA	NA	NA	
Quarterly Profit	NA	NA	NA	NA	

NA = Not available

Source: Nikon
Annual Reports and Forms 10K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
Japan	-	-	48.70	52.80	60.40
International	-	-	51.30	47.20	39.60
North America	-	-	28.00	22.30	15.30
Europe	-	-	15.00	15.10	13.70
Asia/Pacific	-	-	7.50	9.20	10.20
ROW	-	-	0.80	0.60	0.40

Source: Nikon
Annual Reports and Forms 10K
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	100	100
Indirect Sales	0	0
VARs	-	-
Distributors	-	-
Dealers	-	-
Mass Merchandisers	-	-
Manufacturers' Representatives	-	-

Source: Nikon
Annual Reports and Forms 10K
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—3

Japan—17

Europe—6

Asia/Pacific—1

MANUFACTURING LOCATIONS

Japan

Ohi, Yokohama, and Kumagaya

Manufacturing activities at these locations include the making of IC production-related measuring instruments and other precision instruments, as well as industrial supplies.

Ohi, Ibaraki, Tochigi, and Miyagi

Manufacturing activities here include most of Nikon's cameras.

Yokohama, Miyagi, and Tochigi

Manufacturing activities include optical instruments such as objective lenses for microscopes and eyeglasses.

SUBSIDIARIES

Japan

Kurobane Nikon Co. Ltd.

Mito Nikon K.K.

Nasu Nikon Co. Ltd.

Nikon Photo Products Inc.

Nikon Tec Corporation

Sendai Nikon K.K.

Tochigi Nikon K.K.

Zao Nikon K.K.

North America

Nikon Canada Inc. (Canada)

Nikon Inc. (United States)

Nikon Precision Inc. (United States)

Europe

Nikon AG (Switzerland)

Nikon Europe B.V. (the Netherlands)

Nikon France S.A. (France)

Nikon GmbH (West Germany)

Nikon Precision Europe GmbH (West Germany)

Nikon U.K. Ltd. (United Kingdom)

Asia/Pacific

Nikon Hong Kong Ltd. (Hong Kong)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1988

Anam Precision

Nikon and Anam Precision (South Korea) entered into a technology transfer agreement. Under the agreement, Nikon will transfer technology related to the production of low-priced 35mm compact cameras to Anam Precision in South Korea.

1987

Davidson Optronics

Nikon and Davidson Optronics entered into a licensing agreement. Under the agreement, Davidson Optronics will market Nikon's Autocollimators in the United States. Davidson also will administer the warranty/repair service.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Shigetada Fukuoka

Chairman

Koji Sho

President

Isao Ichikawa

Executive vice president

Shigeo Ono

Senior managing director

Shoichiro Yoshida

Senior managing director

PRINCIPAL INVESTORS

The Mitsubishi Trust and Banking Corporation—
6.74 percent

The Meiji Mutual Life Insurance Company—
5.45 percent

The Mitsubishi Bank Ltd.—4.81 percent

The Sumitomo Trust and Banking Company
Ltd.—4.02 percent

Table 4
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	\$718.6	\$1,116.2	\$1,127.8	\$1,258.4	\$1,305.0
Cash	118.1	128.9	132.5	142.8	112.7
Receivables	254.8	334.9	357.7	465.9	558.7
Marketable Securities	46.5	42.7	30.0	34.9	26.6
Inventory	282.8	581.9	575.8	574.5	564.5
Other Current Assets	16.4	27.8	31.8	40.3	42.5
Net Property, Plants	\$206.3	\$429.2	\$414.9	\$432.2	\$429.6
Other Assets	\$72.7	\$162.0	\$204.6	\$255.6	\$317.6
Total Assets	\$997.6	\$1,707.4	\$1,747.3	\$1,946.2	\$2,052.2
Total Current Liabilities	\$473.8	\$653.9	\$704.7	\$862.9	\$907.7
Long-Term Debt	\$116.7	\$344.3	\$331.9	\$243.9	\$243.2
Other Liabilities	\$3.6	\$5.9	\$12.8	\$16.7	\$12.4
Total Liabilities	\$594.1	\$1,004.1	\$1,049.4	\$1,123.5	\$1,163.3
Total Shareholders' Equity	\$403.6	\$703.3	\$698.1	\$822.7	\$888.9
Converted Preferred Stock	-	-	-	-	-
Common Stock	103.1	183.1	192.8	243.2	247.9
Other Equity	161.0	287.8	301.6	373.8	380.8
Retained Earnings	139.5	232.4	203.7	205.7	260.2
Total Liabilities and Shareholders' Equity	\$997.7	\$1,707.4	\$1,747.5	\$1,946.2	\$2,052.2
Income Statement	1985	1986	1987	1988	1989
Revenue	\$1,666.9	\$1,521.2	\$1,386.4	\$1,449.4	\$1,923.5
Japan Revenue	-	-	675.2	765.3	1,161.8
Non-Japan Revenue	-	-	711.2	684.1	761.7
Cost of Sales	\$496.6	\$832.0	\$831.7	\$986.0	\$1,112.9
R&D Expense	\$34.7	\$46.5	\$43.8	\$45.5	\$54.8
SG&A Expense	\$485.7	\$500.9	\$431.7	\$523.0	\$458.9
Capital Expense	\$106.0	\$144.6	\$52.8	\$42.4	\$79.0
Pretax Income	\$70.5	\$43.5	\$5.3	\$48.2	\$159.1
Pretax Margin (%)	4.23	2.86	0.38	3.33	8.27
Effective Tax Rate (%)	-	-	-	-	-
Net Income	\$54.5	\$16.9	(\$12.0)	(\$9.6)	\$87.1
Shares Outstanding, Millions	262.0	300.0	349.0	362.2	363.5
Per Share Data					
Earnings	\$0.17	\$0.05	(\$0.04)	(\$0.03)	\$0.24
Dividends	\$0.04	\$0.05	\$0.05	\$0.04	\$0.06
Book Value	\$1.54	\$2.34	\$2.00	\$2.27	\$2.45

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending March
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.52	1.71	1.60	1.46	1.44
Quick (Times)	0.92	0.82	0.78	0.79	0.82
Fixed Assets/Equity (%)	51.11	61.03	59.43	52.53	48.33
Current Liabilities/Equity (%)	117.39	92.98	100.95	104.89	102.11
Total Liabilities/Equity (%)	147.20	142.77	150.32	136.56	130.87
<i>Profitability (%)</i>					
Return on Assets	-	1.25	(0.69)	(0.52)	4.36
Return on Equity	-	3.05	(1.71)	(1.26)	10.18
Profit Margin	3.27	1.11	(0.87)	(0.66)	4.53
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	2.08	3.06	3.16	3.14	2.85
Capital Spending % of Revenue	6.36	9.51	3.81	2.93	4.11
Employees	NA	NA	NA	NA	NA
Revenue (\$K)/Employee	NA	NA	NA	NA	NA
Capital Spending % of Assets	10.63	8.47	3.02	2.18	3.85

NA = Not available

Source: Nikon
Annual Reports and Forms 10-K
Dataquest (1990)

Company Backgrounder by Dataquest

Nippon Sanso K.K.

16-7, Nishi-Shinbashi 1-chome

Minato-ku, Tokyo, Japan

Telephone: (03) 581-8200

Fax: (03) 580-9425

Dun's Number: Not Available

Date Founded: 1910

CORPORATE STRATEGIC DIRECTION

Nippon Sanso K.K. is one of the world's leading industrial gas manufacturers. The Company supplies industrial gases such as oxygen, nitrogen, and argon. It also provides air separation plants and various chemical plants. Nippon Sanso's consolidated revenue was ¥191.3 billion (US\$1.3 billion) in the year ended March 31, 1990, compared with revenue of ¥166.7 billion (US\$1.3 billion) for fiscal year 1989. Consolidated net income totaled ¥3.5 billion (US\$24.5 million) in fiscal 1990 compared with ¥3.2 billion (US\$24.7 million) in fiscal 1989. Sales of oxygen and nitrogen represented 29 percent of revenue, argon 7 percent, special-purpose gases 12 percent, gas-related equipment 14 percent, foodstuffs 8 percent, and other products made up the remaining 30 percent. R&D expenditure was ¥3.1 billion (US\$21.8 million) in fiscal 1990.

Financial statements are not included in this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

Nippon Sanso is the largest supplier of bulk and specialty gases in Japan and a major supplier in the Pacific Rim countries. The Company is a primary manufacturer of specialty gases, including phosphine and diborane. The Company is also the largest supplier of metal oxide chemical vapor deposition (MOCVD) equipment in Japan.

Matheson's US operations were acquired in 1983 as a joint venture between Nippon Sanso of Japan and

Amerigas of the United States. Matheson's European operations were acquired at the same time by Union Carbide Corporation. In 1989, Nippon Sanso acquired the 50 percent of Matheson's US operations that was owned by Amerigas. Matheson supplies specialty gases to semiconductor manufacturers in the United States and ROW.

Nippon Sanso has a strong distribution network for both bulk and specialty products in the Japanese markets. Matheson's US operations provide primary manufacturing capability for many semiconductor gases, including phosphine and diborane.

In 1988, Nippon Sanso announced that it would invest in Industrial Oxygen Inc., Malaysia's second largest gas producer. Also in 1988, Nippon Sanso and Linde AG of Wiesbaden, Germany, agreed to a joint technology exchange. This agreement involved the exchange of engineers and technology to improve the production, analysis, and safe handling of silane, arsine, and phosphine gases.

In 1990, Nippon Sanso attempted to purchase Semi-gas Systems of San Jose, California. The Justice Department is reviewing the case, and a ruling is expected later this year on whether the combined companies would control a dominant market share of semiconductor gas distribution systems. Semi-gas is the leading US manufacturer of gas containment systems used in chip manufacturing.

Further Information

For further information about Nippon Sanso's business segments, please contact the appropriate Dataquest industry service.

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

Information is not available.

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

AGA

Nippon Sanso and AGA formed AGA/NSK to market Japanese production technology in Europe. AGA/NSK will be based in Germany.

Nippon Sanso, Nikko Sanso, Taiyo Sanso, and Toyo Sanso

Four of Japan's leading oxygen manufacturers plan to establish a joint venture for the production of oxygen, nitrogen, and argon. The new venture will be called Shin Sagamihara Sanso Co., Ltd.

MERGERS AND ACQUISITIONS

1989

Thermos

Nippon Sanso acquired Thermos, a supplier of glass vacuum bottles.

KEY OFFICERS

Natsuro Ishizawa
Chairman

Hideo Mabuchi
President

PRINCIPAL INVESTORS

Fuji Bank
Yasuda Life Insurance
Yasuda Trust

FOUNDERS

Information is not available.

Olin Corporation

120 Long Ridge Road
Stamford, Connecticut 06904
Telephone: (203) 356-2000
Fax: (203) 356-3065
Dun's Number: 00-133-8086

Date Founded: 1892

CORPORATE STRATEGIC DIRECTION

Olin Corporation is a manufacturer of chemicals, metals and materials, defense-related products, and ammunition. The chemicals segment includes industrial chemicals, performance chemicals, and image-forming and related specialty chemicals. Products in the metals and materials area include copper alloy sheet, strip, rod, tube, and fabricated parts; stainless steel strip, specialty clad, and inlay materials; and electronic interconnect materials and services. The defense and ammunition area includes small-, medium-, and large-caliber defense ammunition and advanced technology products and services for the aerospace and defense industries.

Total revenue increased by 8.7 percent to \$2.5 billion* in fiscal 1989 from \$2.3 billion in fiscal 1988. Net income increased 27.0 percent to \$124 million in fiscal 1989 from \$98 million in fiscal 1988. Olin employs 15,400 people worldwide.

Research and development expenditure totaled \$66 million in fiscal 1989, representing 2.6 percent of revenue. Capital spending totaled \$142 million in fiscal 1989, representing 6.0 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. Information on revenue by distribution channel is not available. Table 3, a comprehensive financial statement, is at the end of this profile.

*All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

Chemicals

Olin's Chemical business segment consists of seven major operating segments: Urethane Chemicals, Electrochemicals, Pool Products, Electronic Chemicals, Cleaning Products and Services, Organics, and Specialty Chemicals.

Olin develops, manufactures, and markets industrial and performance chemicals. Olin's wholly owned subsidiary, Olin Hunt Specialty Products Inc., manufactures and markets image-forming and related specialty chemicals.

Olin Hunt's products include photoresists, high-purity semiconductor-grade acids and solvents, dopants, and etchants for use in the manufacture of semiconductors and printed wireboard products; toners and developers used in photocopiers and computer printers; and conductive materials used in the electronics industry.

Metals and Materials

Olin's Metals and Materials business segment consists of two major operating units: Olin Brass and Interconnect Materials.

The metals products business is focused on the electronics market, providing high-performance and high-quality materials needed by the electronics industry and other advanced technology customers. These

materials include specialty clad and inlay materials and Copperbond, a treated copper foil marketed to the printed circuit industry.

Olin's subsidiary, Fabricated Metal Products, fabricates ferrous and nonferrous specialty stamped metal products and shaped charge copper cones and produces specialized fabricated parts for durable goods and consumer recreational items.

Olin manufactures and sells strips, sheets, rods, and seamless and welded tubes of copper and copper alloy. Principal customers include producers of electrical and electronic equipment, producers of builders' hardware and appliances, the plumbing, automobile, and air-conditioning industries, and manufacturers of a variety of consumer goods. Fabricating operations allow Olin to produce stamped, formed, and drawn parts from its strip for many of these markets. In 1988, Olin acquired Bridgeport Brass Corporation, a producer of copper and copper alloy (strips, rods, and seamless tubes).

Defense and Ammunition

Olin's Defense and Ammunition business segment consists of three major operating units: Aerospace Division, Ordnance Division, and Winchester Division.

The Defense Systems Group's Aerospace Division manufactures specialty defense products, including small rocket engines used for altitude control and guidance, pulsed power systems, power supplies, and antiarmor warheads. Olin also operates the US government-owned Lake City Ammunition Plant, the largest small-caliber ammunition facility in the United States, as well as other government arsenals. Olin manufactures small-, medium-, and large-caliber defense ammunition; Winchester sporting ammunition (including shot shells and centerfire and rimfire ammunition); and smokeless powder.

In December 1988, Olin acquired General Defense Corporation, a prime systems contractor in large-caliber ammunition. The subsidiary's Tactical Systems Division produces large-caliber tank and artillery projectiles and components.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service. Dataquest tracks Olin Hunt through the Semiconductor Equipment and Materials Service (SEMS).

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$1,760.0	\$1,732.0	\$1,930.0	\$2,308.0	\$2,509.0
Percent Change	-	(1.59)	11.43	19.59	8.71
Capital Expenditure	\$154.0	\$128.0	\$115.0	\$147.0	\$142.0
Percent of Revenue	8.75	7.39	5.96	6.37	5.66
R&D Expenditure	\$54.0	\$56.0	\$62.0	\$58.0	\$66.0
Percent of Revenue	3.07	3.23	3.21	2.51	2.63
Number of Employees	14,900	13,200	14,100	16,400	15,400
Revenue (\$K)/Employee	\$118.12	\$131.21	\$136.88	\$140.73	\$162.92
Net Income	(\$165.0)	\$75.0	\$78.0	\$98.0	\$124.0
Percent Change	-	(145.45)	4.00	25.64	26.53
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$671.00	\$658.00	\$580.00	\$600.00	
Quarterly Profit	\$34.00	\$35.00	\$24.00	\$31.00	

Source: Olin Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	92.84	94.00	92.75	89.95	92.79
International	7.16	6.00	7.25	10.05	7.21

Source: Olin Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—5
Europe—5
Asia/Pacific—5
Japan—1
ROW—3

MANUFACTURING LOCATIONS

North America

Augusta, Georgia
Chlorine, caustic soda, hydrochloric acid, sodium hypochlorite, sodium hydrosulfate
Beaumont, Texas
Sulfuric acid and a mix of ammonium sulfite-bisulfite
Berea, Ohio
Dry toners, developers
Bloomington, Illinois
Stamped metal products, fabricated parts, shaped charge copper cones
Brandenburg, Kentucky
Ethylene oxide, industrial glycols, glycol ethers, surfactants, polyols, functional fluids
Brook Park, Ohio
Urethane foam systems
Bryan, Ohio
Copper, copper alloy re-rolling
Charleston, Tennessee
Chlorine, caustic soda, sodium hypochlorite, sodium hydrosulfite, calcium hypochlorite
Cuba, Missouri
Copper alloy welded tube
East Alton, Illinois
Copper and copper alloy sheet and strip, fabricated parts, composite metal strip for coins, specialty metal products
East Providence, Rhode Island
Formulation and packaging of photoresists
Indianapolis, Indiana
Copper and copper alloy strip, rod, seamless tube
Joliet, Illinois
Industrial phosphates, high-grade fertilizers, sodium fluorides
Kansas City, Kansas
Formulated water-treatment chemicals
Lancaster, Pennsylvania
Mechanical and electronic fuses

Lincoln, Rhode Island
Photographic and reprographic chemicals, photoresists
Livonia, Michigan
Chloroisocyanurate packaging
Manteca, California
Assembly of integrated circuits and microelectric packages
McIntosh, Alabama
Chlorine, caustic soda, hydrogen, hydrazine propellant blending, storage
Mountain View, California
Tape-automated bonding materials
Nazareth, Pennsylvania
High-purity acids
New Bedford, Massachusetts
Packages for hybrid integrated circuits
Niagara Falls, New York
Chlorine, caustic soda, hydrogen, potassium hydroxide, sodium chlorite, sodium methylete, sodium hypochlorite
Ontario, California
Conductive inks, coatings
Palisades Park, New Jersey
Filming agents, liquid toners, plating chemicals
Redmond, Washington
Rocket engines, gas generators, electronic subsystems for aircraft and ships
Rochester, New York
Specialty chemicals and intermediates, biocides
Rolling Meadows, Illinois
Photographic chemical systems
San Leandro, California
Pulsed-power equipment and services, radiation simulators, ordnance components
Seward, Illinois
Electronic chemicals, delivery systems
Shreveport, Louisiana
Sulfuric acid
South Charleston, West Virginia
Chloroisocyanurates, cyanuric acid
Tempe, Arizona
Specialty etchants
Wadsworth, Ohio
Ordnance components
Waterbury, Connecticut
Copper foil, thin-gauge copper alloys and stainless steel, custom conversion rolling

SUBSIDIARIES

North America

Bridgeport Brass Corp. (United States)
 General Defense Corp. (United States)
 Hi-Pure Chemicals Inc. (United States)
 Olin Fabricated Metal Products Inc. (United States)
 Olin Financial Services Inc. (United States)
 Olin Hunt Specialty Products Inc. (United States)
 Olin Specialty Metals Group (United States)
 Olin Technology Inc. (United States)
 Pacific Electro Dynamics Inc. (United States)
 Physics International Inc. (United States)
 Rocket Research Co. (United States)

Europe

Olin S.p.A. (Italy)

Asia/Pacific

Olin Australia Ltd. (Australia)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Asahi Glass

Olin and Asahi Glass formed Asahi-Olin America to make urethane materials principally for automotive applications. Asahi-Olin was founded in Japan in 1974 to supply automakers, and the new US company will supply Japanese companies in the United States.

MERGERS AND ACQUISITIONS

1989

Indy Electronics

Olin acquired majority ownership (55 percent) in Indy Electronics, a major contract assembler of ICs and microelectronic packages. Olin had previously had a 45 percent stake in Indy Electronics.

1988

General Defense

Olin acquired General Defense for approximately \$104 million. General Defense markets large-caliber ammunition and artillery projectiles.

Bridgeport Brass

Olin acquired Bridgeport Brass, a producer of copper and copper alloy products, including rod and tube.

KEY OFFICERS

John W. Johnstone

Chairman, president and chief executive officer

Donald W. Griffin

Executive vice president

Robert L. Yohe

Executive vice president

Joseph M. Gaffney

Senior vice president, Planning and Development

Edward Pollack

Senior vice president

C. Robert Tully

Senior vice president and chief financial officer

Michael E. Campbell

Vice president, Human Resources

Irving Chain

Vice president and chief scientist

PRINCIPAL INVESTORS

Connecticut National—16.8 percent

Boatmen's Bankshares Inc.—7.1 percent

FOUNDERS

Information is not available.

Table 3
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	\$695.2	\$601.0	\$680.0	\$801.0	\$790.0
Cash	47.9	9.0	34.0	25.0	12.0
Receivables	324.3	321.0	362.0	437.0	453.0
Marketable Securities	-	-	-	-	-
Inventory	267.0	264.0	273.0	311.0	296.0
Other Current Assets	56.0	7.0	11.0	28.0	29.0
Net Property, Plants	\$718.0	\$720.0	\$727.0	\$801.0	\$781.0
Other Assets	\$185.0	\$224.0	\$278.0	\$338.0	\$333.0
Total Assets	\$1,598.2	\$1,545.0	\$1,685.0	\$1,940.0	\$1,904.0
Total Current Liabilities	\$391.0	\$391.0	\$404.0	\$617.0	\$585.0
Long-Term Debt	\$354.0	\$375.0	\$392.0	\$474.0	\$501.0
Other Liabilities	\$166.0	\$125.0	\$189.0	\$166.0	\$153.0
Total Liabilities	\$911.0	\$891.0	\$985.0	\$1,257.0	\$1,239.0
Total Shareholders' Equity	\$686.0	\$654.0	\$700.0	\$683.0	\$665.0
Converted Preferred Stock	-	-	-	-	-
Common Stock	24.0	21.0	22.0	20.0	19.0
Other Equity	93.0	123.0	204.0	193.0	178.0
Retained Earnings	569.0	510.0	474.0	470.0	468.0
Total Liabilities and Shareholders' Equity	\$1,597.0	\$1,545.0	\$1,685.0	\$1,940.0	\$1,904.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$1,760.0	\$1,732.0	\$1,930.0	\$2,308.0	\$2,509.0
US Revenue	1,634.0	1,628.0	1,790.0	2,076.0	2,328.0
Non-US Revenue	126.0	104.0	140.0	232.0	181.0
Cost of Sales	\$1,389.0	\$1,318.0	\$1,455.0	\$1,781.0	\$1,929.0
R&D Expense	\$54.0	\$56.0	\$62.0	\$58.0	\$66.0
SG&A Expense	\$252.0	\$252.0	\$264.0	\$289.0	\$287.0
Capital Expense	\$154.0	\$128.0	\$115.0	\$147.0	\$142.0
Pretax Income	(\$282.0)	\$115.0	\$127.0	\$151.0	\$192.0
Pretax Margin (%)	(16.02)	6.64	6.58	6.54	7.65
Effective Tax Rate (%)	(32.60)	34.80	38.60	35.10	35.40
Net Income	(\$165.0)	\$75.0	\$78.0	\$98.0	\$124.0
Shares Outstanding, Millions	23.0	22.4	23.1	21.1	20.0
Per Share Data					
Earnings	(\$8.28)	\$3.36	\$3.38	\$4.63	\$6.02
Dividend	\$1.50	\$1.52	\$1.60	\$1.70	\$1.95
Book Value	\$29.83	\$29.20	\$30.30	\$32.37	\$33.25

Table 3 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.78	1.54	1.68	1.30	1.35
Quick (Times)	1.10	0.86	1.01	0.79	0.84
Fixed Assets/Equity (%)	104.66	110.09	103.86	117.28	117.44
Current Liabilities/Equity (%)	57.00	59.79	57.71	90.34	87.97
Total Liabilities/Equity (%)	132.80	136.24	140.71	184.04	186.32
<i>Profitability (%)</i>					
Return on Assets	-	4.77	4.83	5.41	6.45
Return on Equity	-	11.19	11.52	14.17	18.40
Profit Margin	(9.38)	4.33	4.04	4.25	4.94
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	3.07	3.23	3.21	2.51	2.63
Capital Spending % of Revenue	8.75	7.39	5.96	6.37	5.66
Employees	14,900	13,200	14,100	16,400	15,400
Revenue (\$K)/Employee	\$118.12	\$131.21	\$136.88	\$140.73	\$162.92
Capital Spending % of Assets	9.64	8.28	6.82	7.58	7.46

Source: Olin Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

Company Backgrounder by Dataquest

Osaka Titanium Co.

1, Higashi-Hamacho
Amagasaki City, Hyogo, Japan

Telephone: 06-411-1121

Fax: 06-413-3435

Telex: 64510

Dun's Number: 69-087-8475

Date Founded: 1950

CORPORATE STRATEGIC DIRECTION

Osaka Titanium Co. is the world's largest manufacturer of metallic titanium and one of Japan's top producers of semiconductor silicon. The Company is a member of the Sumitomo Metal Industries Group. Osaka has established itself in the United States by absorbing US Semiconductor Corporation, an epitaxial wafer maker, in 1987.

Revenue for year ended March 1990 was ¥6.1 billion (US\$421.7 million). This is a 21.3 percent increase over the previous year's figure of ¥50.0 billion (US\$347.6 million). (Percentage changes refer only to ¥ amounts; US\$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) Net income was posted as a decrease of 38.5 percent at year ended March 1990 to ¥2.0 billion (US\$13.7 million) from ¥3.2 billion (US\$22.3 million) in the previous year.

R&D expenditure totaled ¥705 million (US\$4.9 million) for year ended March, 1990. Capital expenditure totaled ¥3.2 billion (US\$22.7 million) for the same period and is expected to increase to ¥4.4 billion (US\$30.9 million) by year ending March 1991. The Company had 762 employees as of fiscal year ended March 1990.

No financial analysis is included in this backgrounder because financial information was unavailable.

BUSINESS SEGMENT STRATEGIC DIRECTION

Sponge titanium is currently in capacity production due to increased demand from US and European civil

aircraft manufacturers. Sponge titanium also is used in seawater desalination plants. Profits are expected to rise, offsetting lowered sales resulting from silicon production cuts.

Metallic titanium is responsible for 28 percent of total revenue for year ended March 1990; semiconductor silicon is responsible for the remaining 72 percent. The Company exports approximately 20 percent of its products.

Further Information

For further information about the Company's business segments, please contact the appropriate Dataquest industry service.

1990 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Cincinnati Semiconductor, Inc., United States
Wafer production

OTC Semiconductor Corporation, United States
Wafer production

US Semiconductor Corporation, United States
Wafer production

Asia/Pacific

Hyushu Electronic Metal
Silicon wafer processing
Kyushu Denshi Kinzoku
Production of silicon wafers for 4Mb chips

SUBSIDIARIES

North America

Cincinnati Semiconductor, Inc. (United States)
OTC Semiconductor Corporation (United States)
US Semiconductor Corporation (United States)

**ALLIANCES, JOINT VENTURES, AND
LICENSING AGREEMENTS**

1990

Toho Titanium Co. and Showa Denko KK
Osaka Titanium, joined by Toho Titanium and
Showa Denko, plan to build a pilot plant with a
1,000-metric-ton annual capacity on the
Company's premises in Amagasaki, Japan, in
1992.

MERGERS AND ACQUISITIONS

1987

US Semiconductor
Osaka Titanium purchased US Semiconductor to
help launch itself in the United States.

KEY OFFICERS

Hiroshi Kojima
Chairman of the board

Shigeru Tamamoto
President

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

Shin-Etsu Chemical Co., Ltd.

6-1, Ohtemachi, 2-chome
Chiyoda-ku, Tokyo, Japan

Telephone: (03) 246-5111

Fax: (03) 246-5350

Dun's Number: Not Available

Date Founded: 1926

CORPORATE STRATEGIC DIRECTION

Established in 1926, Shin-Etsu Chemical Co., Ltd., specializes in the development and production of specialty chemicals and high-tech materials. The Company offers an extensive array of products including silicones, high-purity semiconductor silicon, synthetic quartz, polyvinyl chloride (PVC), cellulose derivatives, rare earth materials and products, and oxidized single crystals.

Shin-Etsu's consolidated revenue was ¥403,436 million (US\$3,145.7 million) in the period ended March 31, 1989, compared with revenue of ¥298,447 million (US\$2,162.2 million) for fiscal year ended March 31, 1988. Fiscal year 1988 was only ten months long due to a change in the account settlement date. Consolidated net income totaled ¥27,894 million (US\$217.5 million) in fiscal 1989.

Shin-Etsu's five divisions are plastics, organic and inorganic chemicals, electronics materials, fertilizers and ferroalloys, and international operations. Plastics and electronics materials were the largest revenue contributors, responsible for 45.3 and 35.4 percent of revenue, respectively. Organic and inorganic chemicals represented 9.3 percent of sales, international operations 6.0 percent, and fertilizers and ferroalloys 4.0 percent.

R&D costs for the year ended March 31, 1989, and for the ten-month period ended March 31, 1988, were respectively ¥18,094 million (US\$141.1 million) and ¥14,656 million (US\$106.2 million). Capital expenditure for fiscal 1989 was ¥25,241 million (US\$196.8 million). The Company employs 3,420 people worldwide.

This backgrounder includes no financial information.

BUSINESS SEGMENT STRATEGIC DIRECTION

Semiconductors

Shin-Etsu Handotai (also known as SEH) is the largest silicon and epitaxial wafer company in the world. The company was formed as a joint venture between Shin-Etsu Chemical and Dow Corning in 1967. In 1979, Shin-Etsu Chemical acquired full ownership of Shin-Etsu Handotai. Shin-Etsu Handotai's subsidiaries and affiliates include SEH America, SEH Europe, and SEH Malaysia. SEH's world headquarters are in Tokyo, and its R&D centers are in Isobe, Japan, and Vancouver, Washington. In addition to silicon products, SEH manufactures gallium arsenide and gallium phosphide through a joint venture with Furukawa Mining known as Iwaki Handotai. Like several of the major silicon merchant companies, Shin-Etsu Handotai's silicon manufacturing is vertically integrated; from polysilicon to polished wafers.

Further Information

For further information about Shin-Etsu Chemical, please contact the appropriate Dataquest industry service.

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

Information is not available.

SUBSIDIARIES

North America

Shin-Etsu Silicones of America, Inc. (United States)
Shin-Etsu Technical Services Inc. (United States)
Shintech Incorporated (United States)
SM Yttrium Canada Ltd. (Canada)

Europe

Companhia Industrial de Resinas Sinteticas S.A.R.L.
(CIRES) (Portugal)

Asia/Pacific

Kashima Vinyl Chloride Monomer Co., Ltd. (Japan)
Nagano Electronics Industrial Co., Ltd. (Japan)
Naoetsu Electronics Co., Ltd. (Japan)
Nissin Chemical Industry Co., Ltd. (Japan)
Shinano Electric Refining Co., Ltd. (Japan)
Shin-Etsu Engineering Co., Ltd. (Japan)
Shin-Etsu Film Co., Ltd. (Japan)
Shin-Etsu Handotai Co., Ltd. (Japan)
Shin-Etsu Kasei Co., Ltd. (Japan)
Shin-Etsu (Malaysia) Sdn. Bhd. (Malaysia)
Shin-Etsu Metallurgical Co., Ltd. (Japan)
Shin-Etsu Polymer Co., Ltd. (Japan)
Shin-Etsu Quartz Products Co., Ltd. (Japan)
Shin-Etsu Silicone Korea Co., Ltd. (South Korea)
Shin-Etsu Silicone Taiwan Co., Ltd. (Taiwan)
Shin-Etsu Vinyl Acetates Co., Ltd. (Japan)
Shinken Sangyo Co., Ltd. (Japan)
Shinyo Home-Services Co., Ltd. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Ciba-Geigy

Shin-Etsu Chemical has supplied Ciba-Geigy with
technology for the production of epoxy resin mold-

ing compound (EMC). EMC is used as a sealing
material in semiconductor manufacturing.

Admatechs

Admatechs has been formed by Toyota Motor (55
percent), Shin-Etsu Chemical (25 percent), and
Shin-Etsu Quartz (20 percent) to build a ceramic
powder plant at Shin-Etsu's Maoetsu, Japan, com-
plex.

MERGERS AND ACQUISITIONS

1990

MicroSci

MicroSci was formed in Delaware from Shin-Etsu
Chemical's purchase of Huls America's micro-
electrochemical division.

KEY OFFICERS

Yutaro Kosaka
President

Chihiro Kanagawa
Executive vice president

Katsurao Fujita
Executive vice president

Fumio Wakasugi
Senior managing director

Taro Sugawara
Senior managing director

Masami Hashimoto
Senior managing director

Shunichi Koyanagi
Senior managing director

Tadashi Wada
Senior managing director

Katsuro Miyasaka
Senior managing director

PRINCIPAL INVESTORS

Nippon Life Insurance Company
The Long-Term Credit Bank of Japan, Ltd.
The Mitsubishi Bank, Ltd.
The Mitsubishi Trust and Banking Corp.
The Toyo Trust and Banking Ltd.

FOUNDERS

Information is not available.

Silicon Valley Group, Inc.

541 E. Trimble Road
San Jose, California 95131

Telephone: (408) 432-9300

Fax: (408) 432-8629

Dun's Number: 08-291-0233

Date Founded: 1977

CORPORATE STRATEGIC DIRECTION

Silicon Valley Group, Inc. (SVG), designs, manufactures, and markets semiconductor production processing equipment used in the fabrication of integrated circuits. Founded in 1977 as a manufacturer of photoresist track systems and components, the Company has expanded its operations through internal development and acquisition.

SVG expanded into the chemical vapor deposition (CVD) market in 1986 by developing a vertical thermal reactor. In 1987, SVG acquired Anicon, a manufacturer of nontube CVD equipment. In December 1988, SVG further expanded its product offerings through the acquisition of Thermco Systems. The Thermco acquisition resulted in SVG's more than doubling its previous sales volume and has provided the Company with significant expansion of its customer base in the oxidation, diffusion, and low-pressure CVD (LPCVD) processing equipment market.

All SVG divisions operate as independent profit centers, complete with operations to support product development, manufacturing, marketing, and sales. The Track Systems Division is focused on the photolithography processing equipment market; the Thermco Systems Division offers oxidation, diffusion, and LPCVD processing systems. SVG Lithography Systems, Inc. (SVGL), acquired in May 1990 when SVG acquired a controlling equity position in Perkin-Elmer Corporation's optical lithography unit in Wilton, Connecticut, provides the Company with the leading-edge technology in the photolithography equipment market through Perkin-Elmer's step-and-scan lithography tools.

SVG markets and sells its products as part of new wafer fabrication lines and in connection with the expansion and upgrading of existing fabrication lines.

SVG's major customers include IBM, Intel, Motorola, Philips AG, Samsung Electronics, SGS-Thompson, and Texas Instruments. Dataquest ranks SVG as the tenth largest manufacturer of semiconductor wafer fab equipment in 1989, based on estimated equipment sales of \$127 million* worldwide.

Total revenue increased by 168 percent to \$131.0 million in fiscal 1989 from \$9.0 million in fiscal 1988. Net income increased 116 percent to \$9.6 million in fiscal 1989 from \$4.4 million in fiscal 1988. Domestic sales represented approximately 59 percent of sales for the year. The foreign sales figure of 41 percent was up from 32 percent in the previous year.

R&D expenditure totaled \$15.2 million in fiscal 1989, representing 11.6 percent of revenue. Capital spending totaled \$1.8 million in fiscal 1989, or 1.4 percent of revenue. Silicon Valley Group employs 1,500 people worldwide (including SVGL employees).

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.

BUSINESS SEGMENT STRATEGIC DIRECTION

Track Systems Division

SVG's Track Systems Division designs, manufactures, markets, and services processing equipment that performs the wafer cleaning, adhesion promotion,

*All dollar amounts are in US dollars.

coating, developing, and baking steps in the photolithographic stage of semiconductor production. The division's products include photolithography processing systems, wafer cleaning systems, and lithography automation systems.

All of the Track Systems Division's products are available in fully automated, cassette-to-cassette configurations. The products can be configured as standalone processing stations or as in-line integrated manufacturing systems that incorporate a selected assortment of the photolithography processing products offered by SVG. The equipment is modular in design to allow many different system combinations and individual product replacements or additions to existing fabrication operations.

SVG offers four product lines of photolithography processing equipment: the 8800 Series, the 8600 Series, the 8100 Series, and the new 90 Series, which was introduced in May 1990.

Thermco Systems Division

SVG's Thermco Systems Division designs, manufactures, and markets LPCVD and oxidation/diffusion processing equipment. These products include horizontal thermal systems, the Company's Vertical Thermal Reactor (VTR), the Anicon Cross Flow Reactor, and LPCVD systems.

The horizontal thermal systems include furnaces, systems for LPCVD, systems for high-temperature processing, automated load stations, lab furnaces, boatloaders, multiaccess elevators, wafer transfer stations, cassette managers, and host computer interfaces and software.

SVG Lithography Systems, Inc. (SVGL)

SVGL offers the Micrascan generation of systems, originally developed by Perkin-Elmer's optical lithography unit and introduced in 1989. Micrascan merges the optical advantages of scanning aligner technology with the registration advantages of step-and-repeat technology. SVGL believes the result to be a system capable of delivering high-resolution, local alignment and leveling while maintaining high throughput, large image field size, and low distortion.

SVGL products include the Micrascan step-and-scan system, the Micrascan projection aligner, and X-ray step-and-repeat systems.

Further Information

For more information about the Company's business segments, please contact the appropriate Dataquest industry service.

Table 1
Five-Year Corporate Highlights
 (Thousands of US Dollars)

	1985	1986	1987*	1988*	1989*
Five-Year Revenue	\$36,864.0	\$27,842.0	\$39,300.0	\$48,969.0	\$131,080.0
Percent Change	-	(24.47)	41.15	24.60	167.68
Capital Expenditure	0	\$1,914.0	\$625.0	\$1,740.0	\$1,837.0
Percent of Revenue	0	6.87	1.59	3.55	1.40
R&D Expenditure	\$4,660.0	\$4,686.0	\$5,808.0	\$7,006.0	\$15,177.0
Percent of Revenue	12.64	16.83	14.78	14.31	11.58
Number of Employees	297	268	344	382	932
Revenue (\$K)/Employee	\$12,412.12	\$10,388.81	\$11,424.42	\$12,819.11	\$14,064.38
Net Income	\$5,734.0	\$2,646.0	\$3,148.0	\$4,440.0	\$9,612.0
Percent Change	-	(53.85)	18.97	41.04	116.49
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$18,940.00	\$35,455.00	\$37,421.00	\$39,264.00	
Quarterly Profit	\$1,483.00	\$2,527.00	\$2,828.00	\$2,774.00	

*Figures for 1987 through 1989 have been restated to reflect acquisitions.

Source: Silicon Valley Group, Inc.
 Annual Reports and Forms 10-K
 Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	NA	NA	63.00	68.00	59.00
International	NA	NA	37.00	32.00	41.00
Europe	NA	NA	21.00	17.00	18.00
Asia/Pacific	NA	NA	7.00	10.00	22.00
ROW	NA	NA	9.00	5.00	1.00

NA = Not available

Source: Silicon Valley Group, Inc.
 Annual Reports and Forms 10-K
 Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	80.00	80.00
Indirect Sales	20.00	20.00
Distributors	10.00	10.00
Manufacturers' Representatives	10.00	10.00

Source: Dataquest (1990)

1990 SALES OFFICE LOCATIONS

North America—18
Europe—14
Asia/Pacific—9
ROW—2

SVG Lithography S.A.R.L. (France)
Thermco Products GmbH (Germany)
Thermco Semiconductor Equipment Ltd. (England)

Asia/Pacific

Silicon Valley Group K.K. (Japan)
SVG Lithography (Japan)
Thermco Systems (Far East) Ltd. (Hong Kong)

MANUFACTURING LOCATIONS

North America

Track Systems Division—San Jose, California

Manufacturing activities include photoresist processing equipment; brush scrubbers; high-pressure cleaners; vacuum bake vapor prime; chill plates; coaters; developers; interfaces to steppers, etchers, inspection systems, and host computers; hotplate ovens; and multiple hotplate ovens.

Thermco Systems Division—Orange and San Jose, California

Manufacturing activities include horizontal thermal systems, the Vertical Thermal Reactor (VTR), and CVD systems.

SVG Lithography Systems—Wilton, Connecticut

Manufacturing activities include step-and-scan lithography equipment, projection aligners, and X-ray step-and-repeat systems.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

1990

Perkin-Elmer Corporation

SVG acquired a controlling interest in Perkin-Elmer Corporation's Optical Lithography Operation in a complex deal worth \$40 million. The new company, known as SVG Lithography Systems, Inc. (SVGL), will run the operation; approximately two-thirds of its stock will be owned by SVG.

1988

Thermco Systems

Silicon Valley Group acquired Thermco Systems, a manufacturer of oxidation/diffusion furnaces and LPCVD systems, for approximately \$22.7 million.

1987

Anicon

SVG acquired Anicon, a manufacturer of CVD equipment, for \$6.9 million.

SUBSIDIARIES

North America

Silicon Valley Group International Inc. (United States)

SVG International Service (United States)

SVG Lithography Systems, Inc. (United States)

Thermco Systems Inc. (United States)

Europe

SVG Europe Ltd. (England)

SVG France S.A.R.L. (France)

SVG Halbleiter Anlagen GmbH (Germany)

SVG Lithography Europe B.V. (Netherlands)

SVG Lithography GmbH (Germany)

KEY OFFICERS

Gerald M. Starek

Chairman of the board

Papken S. Der Torossian

President and chief executive officer

Vahe A. Sarkissian

President and chief executive officer, SVG Lithography Systems, and vice president, Silicon Valley Group

Nicholas E. Miller

President, Thermco Systems Division, and vice president, Silicon Valley Group

H. F. Ken Machado

President, Track Systems Division, and vice president, Silicon Valley Group

Patrick O'Conner

Vice president, Corporate Planning

Russell G. Weinstock

Vice president, Finance, and chief financial officer

Charles Desmond

Vice president, Corporate Sales

PRINCIPAL INVESTORS

Prudential Insurance Co. of America—7.9 percent
Brinson Partners—7.7 percent

FOUNDERS

Information is not available.

Table 4
Comprehensive Financial Statement
Fiscal Year Ending September
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987*	1988*	1989*
Total Current Assets	\$36,698.0	\$38,677.9	\$46,165.0	\$51,504.0	\$66,886.0
Cash	23,637.0	1,636.4	3,209.0	13,127.0	10,396.0
Receivables	5,629.0	24,018.7	9,730.0	12,794.0	29,370.0
Marketable Securities	0	6,619.2	26,259.0	14,384.0	1,400.0
Inventory	6,855.0	5,980.8	6,243.0	9,140.0	21,592.0
Other Current Assets	577.0	422.8	724.0	2,059.0	4,128.0
Net Property, Plants	\$1,750.0	\$3,171.8	\$4,942.0	\$5,027.0	\$7,860.0
Other Assets	\$233.0	\$262.8	\$3,636.0	\$3,221.0	\$10,165.0
Total Assets	\$38,681.0	\$42,112.5	\$54,743.0	\$59,752.0	\$84,911.0
Total Current Liabilities	\$3,938.0	\$4,319.4	\$8,901.0	\$8,912.0	\$22,687.0
Long-Term Debt	0	0	\$544.0	\$169.0	0
Other Liabilities	\$364.0	\$408.1	\$1,018.0	\$1,154.0	\$1,632.0
Total Liabilities	\$4,302.0	\$4,727.5	\$10,463.0	\$10,235.0	\$24,319.0
Total Shareholders' Equity	\$34,380.3	\$37,385.0	\$44,280.0	\$49,517.0	\$60,592.0
Common Stock	15,748.7	16,107.1	19,854.0	20,651.0	24,328.0
Other Equity	0	0	0	0	(2,214.0)
Retained Earnings	18,631.6	21,277.9	24,426.0	28,866.0	38,478.0
Total Liabilities and Shareholders' Equity	\$38,682.3	\$42,112.5	\$54,743.0	\$59,752.0	\$84,911.0
Income Statement	1985	1986	1987*	1988*	1989*
Revenue	\$36,864.0	\$27,842.0	\$39,300.0	\$48,969.0	\$131,080.0
US Revenue	NA	NA	24,759.0	33,299.0	77,337.0
Non-US Revenue	NA	NA	14,541.0	15,670.0	53,743.0
Cost of Sales	\$15,130.0	\$12,378.0	\$18,160.0	\$22,169.0	\$71,546.0
R&D Expense	\$4,660.0	\$4,686.0	\$5,808.0	\$7,006.0	\$15,177.0
SG&A Expense	\$7,945.0	\$8,036.0	\$11,813.0	\$14,877.0	\$28,951.0
Capital Expense	NA	\$1,914.0	\$625.0	\$1,740.0	\$1,837.0
Pretax Income	\$10,823.0	\$4,739.0	\$5,293.0	\$6,628.0	\$15,758.0
Pretax Margin (%)	29.36	17.02	13.47	13.54	12.02
Effective Tax Rate (%)	47.00	44.20	40.50	33.00	39.00
Net Income	\$5,734.0	\$2,646.0	\$3,148.0	\$4,440.0	\$9,612.0
Shares Outstanding, Thousands	8,764.0	8,876.0	9,892.0	9,879.0	10,196.0
Per Share Data					
Earnings	\$0.65	\$0.30	\$0.32	\$0.45	\$0.94
Dividend	0	0	0	0	0
Book Value	\$3.92	\$4.21	\$4.48	\$5.01	\$5.94

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending September
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987*	1988*	1989*
<i>Liquidity</i>					
Current (Times)	9.32	8.95	5.19	5.78	2.95
Quick (Times)	7.58	7.57	4.49	4.75	2.00
Fixed Assets/Equity (%)	5.09	8.48	11.16	10.15	12.97
Current Liabilities/Equity (%)	11.45	11.55	20.10	18.00	37.44
Total Liabilities/Equity (%)	12.51	12.65	23.63	20.67	40.14
<i>Profitability (%)</i>					
Return on Assets	-	6.55	6.50	7.76	13.29
Return on Equity	-	7.37	7.71	9.47	17.46
Profit Margin	15.55	9.50	8.01	9.07	7.33
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	12.64	16.83	14.78	14.31	11.58
Capital Spending % of Revenue	0	6.87	1.59	3.55	1.40
Employees	297	268	344	382	932
Revenue (\$K)/Employee	\$12,412.12	\$10,388.81	\$11,424.42	\$12,819.11	\$14,064.38
Capital Spending % of Assets	0	4.54	1.14	2.91	2.16

*Figures for 1987 through 1989 have been restated to reflect acquisitions.
 NA = Not available

Source: Silicon Valley Group, Inc.
 Annual Reports and Forms 10-K
 Dataquest (1990)

Tokyo Electron Ltd.

2-30-7, Sumiyoshi-cho
Fuchu City, Tokyo, Japan
Telephone: 0423-33-8111
Fax: 0423-33-8480
Telex: 2832475
Dun's Number: 69-054-9777

Date Founded: 1963

CORPORATE STRATEGIC DIRECTION

Tokyo Electron Ltd. (TEL) was founded in 1963 as an electronic products distributor. Currently, TEL manufactures semiconductor manufacturing equipment and measuring instruments as well as pursuing its original trade. Sales for fiscal year ended September 1990 grew rapidly, led by semiconductor manufacturing equipment.

TEL has three divisions: Semiconductor Equipment, Computer Systems, and Electronic Parts and Components. The Company has formed strategic joint ventures in all three divisions that allow it to trade technologies and products.

Revenue for year ended September 1990 totaled ¥190.0 billion (US\$1.3 billion), an increase of 9.7 percent over the previous year's total of ¥173.2 billion (US\$1.4 billion). (Percentage changes refer only to ¥ amounts; US\$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) Net income for year ended September 1990 totaled ¥11.0 billion (US\$77.2 million), an increase of 21.7 percent over the previous year's figure of ¥9.0 billion (US\$70.5 million). Sixty-five percent of sales were of semiconductor manufacturing equipment, 22 percent were of electronic components, and the remaining 13 percent were of computer systems. Tokyo Electron's export sales accounted for 52 percent of revenue for fiscal year ended September 1990.

R&D expenditure totaled ¥4.8 billion (US\$33.7 million) for year ended September 1990, an increase of 55 percent over the previous year's figure of ¥3.1 billion (US\$24.2 million). Capital expenditure for year ended September 1990 totaled ¥6.1 billion (US\$42.8 million), an increase of nearly 30 percent over the previous year's figure of ¥4.7 billion (US\$36.6 million). Tokyo Electron employed 1,819 people the end of September 1990.

Due to the lack of complete financial information, no financial statements are included in this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

Semiconductor Equipment

Because the introduction of highly integrated semiconductors requires rapid technological progress, success depends on the timely introduction of advanced processing technology into the market. The Company's strategy is to apply its skills as a trading enterprise with an extensive information network to identify the trends and seize the major portion of the market through the timely introduction of international products. Secondly, the Company plans to improve products to meet user specifications and back them up with reliable after-sales service.

Products in the Semiconductor Equipment division include photolithography/clean, doping/thermal processing, deposition, inspection/measurement/repair, and test equipment produced with various manufacturers through joint ventures.

Computer Systems

TEL offers complete systems of factory automation equipment used in the design, production, and inspection stages of semiconductor manufacturing, printed circuit boards, and machinery/equipment. Products in the Computer Systems Division include mechanical CAE/CAD/CAM/CAT systems, specified application

equipment, scientific and technical computers, and electrical CAE/CAD/CAM/CAT systems.

Electronic Parts and Components

Products in the Electronic Parts and Components Division include semiconductors, integrated circuits, discrete devices, and electronic components such as connectors, IC sockets, and switching power supplies.

Manufacturers of the mentioned electronic components include Advanced Micro Devices, Fujitsu, Western Digital, Winchester Electronics, and VLSI Technology, to name a few.

Further Information

For further information about the Company's business segments, please contact the appropriate Dataquest industry service.

1990 SALES OFFICE LOCATIONS

North America—1
Europe—1
Asia/Pacific—9

MANUFACTURING LOCATIONS

Asia/Pacific

TEL Kyushu Ltd., Japan
Semiconductor production equipment, including coaters/developers and LCD production equipment
TEL Sagami Ltd., Japan
Oxidation/diffusion furnace systems and LP-CVD systems
TEL Tohoku Ltd., Japan
Various semiconductor equipment
TEL Yamanashi Ltd., Japan
Semiconductor production equipment including wafer probers, coater/developers, plasma-etching equipment, and ozone strip equipment

SUBSIDIARIES

North America

TEL America Inc. (United States)

Europe

TEL Service Europe B.V. (Netherlands)

Asia/Pacific

TEL Kyushu Ltd. (Japan)
TEL Sagami Ltd. (Japan)
TEL Tohoku Ltd. (Japan)
TEL Tokyo Electron FE (Japan)
TEL Yamanashi Ltd. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

ITR Corporation

TEL is marketing test equipment manufactured by ITR. The CXI-5400 is an automatic system for testing assembled surface-mount technology (SMT)-type printed circuit boards.

Ultra Network Technologies Inc.

TEL will distribute Ultra Network Technologies networking systems to Fujitsu, which will support Ultra's gigabit-per-second network on its M-series mainframes and VP-series supercomputers.

Structural Dynamics Research Corporation

TEL began marketing I-DEAS Level V, an enhanced version of the I-DEAS CAE software, from Structural Dynamics Research.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Tokuo Kubo
Chairman of the board

Toshio Kodaka
President

Noboru Fuse
Senior managing director

Zenju Kasama
Senior managing director

Akira Inoue
Senior managing director

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

Tokyo Ohka Kogyo Co., Ltd.

1-403, Kosugi-cho, Nakahara-ku
Kawasaki City, Kanagawa Prefecture, Japan

Telephone: (044) 722-7181

Fax: (044) 733-0398

Dun's Number: Not Available

Date Founded: 1940

CORPORATE STRATEGIC DIRECTION

Established in 1940, Tokyo Ohka Kogyo Co., Ltd., offers a wide range of products including electronics materials, chemical products, synthetics, photopolymer printing plates, offset printing plates, and related processing equipment. Tokyo Ohka's consolidated revenue was ¥43,914 million (US\$342.4 million) for fiscal year ended March 31, 1989. Consolidated net income totaled ¥5,357 million (US\$41.8 million) for fiscal 1989. Photoresists accounted for 35 percent of sales, chemical products 28 percent, processing equipment 14 percent, printing materials 14 percent, and other products 9 percent. Expenditure for R&D totaled ¥1,377 million (US\$10.7 million) for fiscal 1989.

No financial statements are included in this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

In 1968, Tokyo Ohka developed the OMR81, the first negative semiconductor photoresist made in Japan. The Company later developed the positive photoresist OFPR series, the electron-beam photoresist OEPR series for VLSI manufacturing, and the ODUR series for deep ultraviolet (UV) irradiation. Currently, Tokyo Ohka offers a full line of negative and positive photoresists for diverse applications. In addition to photoresists, the Company provides developers, strippers, and rinsing solutions as well as processing equipment, which includes etching machines, ashing machines, and photoresist coating machines. Tokyo Ohka developed a fully automatic single-wafer processing plasma etching machine in 1977 and followed this with a full line of semiconductor processing equipment. The Company also offers a wide array

of photoresists for use in printed circuit board (PCB) manufacturing and chemical milling applications.

Further Information

For further information about the Company's business segments, please contact the appropriate Dataquest industry service.

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

Asia/Pacific

Kumagaya Ohka Co., Ltd., Japan
Chemicals

Sudama Denshi Kogyo Co., Ltd., Japan
Materials for the electronics industry

Tokyo Alumetal Kogyo Co., Ltd., Japan
Plates for offset printing

Yamanashi Photopoly Ohka Co., Ltd., Japan
Photopolymer printing plates

SUBSIDIARIES

North America

Ohka America, Inc. (United States)

Europe

Ohka (UK), Ltd. (United Kingdom)

PRINCIPAL INVESTORS

Information is not available.

**ALLIANCES, JOINT VENTURES, AND
LICENSING AGREEMENTS**

Information is not available.

FOUNDERS

Information is not available.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Takeo Ito

Chairman of the board of directors and president

Dr. Hisashi Nakane

Vice president

Hatsuo Matsumoto

Executive director

Union Carbide Corporation

39 Old Ridgebury Road
Danbury, Connecticut 06817-0001

Telephone: (203) 794-6440

Fax: (203) 794-2826

Dun's Number: 00-128-9008

Date Founded: 1917

CORPORATE STRATEGIC DIRECTION

Incorporated in 1917, Union Carbide Corporation is a worldwide leader in industrial technology and is one of the 50 largest US industrial corporations. The Company designs, manufactures, and markets chemicals and plastics, industrial gases and related products, metals and carbons, batteries, home and automotive products, and specialty products. Union Carbide is divided into three specific business groups: Union Carbide Chemicals and Plastics Company Inc., representing 66 percent of total sales; Union Carbide Industrial Gases Inc., representing 25 percent of total sales; and UCAR Carbon Company, Inc., representing 9 percent of total sales. Seventy-five percent of UCAR's business and 17 percent of Industrial Gases' business is dependent upon the steel industry.

Total revenue for fiscal year 1989 grew 5.1 percent to \$8.7 billion* from \$8.3 billion in fiscal year 1988. Net income decreased 13.4 percent to \$573.0 million for fiscal year 1989 from \$662.0 million for fiscal year 1988. Union Carbide employs 45,987 people worldwide.

Union Carbide sales are produced principally through its direct sales force. Although domestic sales dominate the percentage of total revenue generated, international sales have slowly been increasing at a constant pace of 2 to 3 percent over the past five years. In fiscal year 1989, domestic sales accounted for 66.2 percent and international sales accounted for 33.8 percent of total revenue. Europe represented 12.0 percent and Latin America 11.0 percent of international sales. Union Carbide is currently focusing and building on trading and sales activities abroad.

In fiscal years 1989, 1988, and 1987, Union Carbide respectively spent \$181.0 million, \$159.0 million, and \$159.0 million on R&D. These figures respectively

total 2.0 percent, 1.9 percent, and 2.3 percent of total revenue. Sponsored primarily by Union Carbide, R&D activities are conducted to develop new products, processes, or services, and improve existing ones. The Chemicals and Plastics group has eight facilities within the United States and four internationally. The Industrial Gases group has five domestic facilities and two internationally. The UCAR Carbon Company's R&D activities are carried on primarily in Parma, Ohio.

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.

BUSINESS SEGMENT STRATEGIC DIRECTION

Chemicals and Plastics

Union Carbide was one of the founders of the US petrochemical industry when it started to manufacture ethylene and other coproducts and derivatives. Since then, Union Carbide Chemicals and Plastics Company Inc. has branched out into developing numerous other chemicals and plastics. It is the world's largest producer of ethylene oxide/glycol. Its UNIPOL process is the lowest-cost process for polyethylene production and is widely licensed throughout the world. Union Carbide is also the largest producer of oxygenated solvents in the United States and is the leader in oxo-alcohols process technology. Union Carbide produces the following product groups: ethylene oxide and derivatives, polyethylene, solvents and coatings materials, and other specialty chemicals. The

*All dollar amounts are US dollars.

ethylene oxide and derivatives group consists of ethylene glycol for antifreeze, polyester fiber and PET resins, surfactants for detergents, ethanolamines, and ethyleneamines. This group also produces both high-volume and specialty polyethylene resins for many plastic products: film and wrap, bags, pipes, containers and drums, wire and cable insulation, and a variety of molded products. Solvents and coatings materials consist of alcohols, acetates, acrylates, latex, coatings resins, and glycol ethers. Other specialty chemicals produced by Union Carbide are water-soluble polymers for personal care, silicones, polyvinyl acetate for additives to plastics, UCON fluids for hydraulic and heat transfer fluids and for lubricants, acrolein, and gluteraldehyde for biocide and custom intermediates.

Industrial Gases

Union Carbide Industrial Gases Inc. is the largest producer of oxygen, nitrogen, argon, hydrogen, helium, and specialty gases in the United States, Canada, and Brazil, as well as one of the three largest

producers throughout the world. Numerous areas utilize industrial gases: chemicals, steel and aluminum production, electronics, food freezing, rubber and plastic production, metalworking and welding, medicine, oil and gas extraction, pulp and paper, glass production, aerospace, and environmental cleanup.

Carbon Products

UCAR Carbon Company accounts for the smallest portion of Union Carbide Corporation's business; however, within its field, UCAR is the world's largest producer of graphite electrodes and other carbon and graphite products for the basic metals industries.

Further Information

For more information on Union Carbide's business segments, please contact Dataquest's Semiconductor Equipment and Materials Service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$6,390.0	\$6,343.0	\$6,914.0	\$8,324.0	\$8,744.0
Percent Change	-	(0.74)	9.00	20.39	5.05
Capital Expenditure	\$501.0	\$524.0	\$502.0	\$671.0	NA
Percent of Revenue	7.84	8.26	7.26	8.06	NA
R&D Expenditure	\$181.0	\$148.0	\$159.0	\$159.0	\$181.0
Percent of Revenue	2.83	2.33	2.30	1.91	2.07
Number of Employees	52,117	50,292	43,119	43,992	45,987
Revenue (\$K)/Employee	\$122.61	\$126.12	\$160.35	\$189.22	\$190.14
Net Income	(\$581.0)	\$496.0	\$232.0	\$662.0	\$573.0
Percent Change	-	185.37	(53.23)	185.34	(13.44)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$2,241.00	\$2,277.00	\$2,141.00	\$2,085.00	
Quarterly Profit	\$201.00	\$186.00	\$139.00	\$47.00	

NA = Not available

Source: Union Carbide Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	73.41	71.81	69.11	69.17	66.25
International	26.59	28.19	30.89	30.83	33.75
Canada	4.90	3.80	4.30	5.15	5.30
Europe	10.11	11.78	12.67	11.16	12.04
Latin America	7.45	8.18	9.23	9.33	10.99
Others	4.13	4.43	4.69	5.19	5.42

Source: Union Carbide 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 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

Chemical and Plastics Manufacturing

North America

Acushnet, Massachusetts
Precision coating equipment
Alsip, Illinois
Latexes
Bensenville, Illinois
Printed circuit chemicals
Bound Brook, New Jersey
Coatings resins, phenolic resins, phenoxy resins,
polyethylene compounding, synthetic thickeners
Clear Lake, Wisconsin
Conformal coating services
Cowansville, Quebec, Canada
Polyethylene film
Edison, New Jersey
Lanolin derivatives
Garland, Texas
Latexes
Henderson, Kentucky
Dielectric fluid
Indianapolis, Indiana
Coating and bonding systems
Institute, West Virginia
Carbowax polyethylene glycol, hydroxethyl
cellulose, polyethyleneoxide, ketones, tergitol
surfactants
Mamaroneck, New York
Lanolin derivatives
Montreal East, Quebec, Canada
Chemicals
Moses Lake, Washington
Polycrystalline silicon
Prentiss, Canada
Ethylene oxide and glycol
Seadrift, Texas
Alkanolamines, ethylene oxide and glycol, glycol
ethers, olefins, polyethylene, polypropylene,
tergitol surfactants

Sistersville, West Virginia
Antifoams and emulsions, organofunctional silanes
and silicone surfactants, silicone fluids
Somerset, New Jersey
Latexes
South Charleston, West Virginia
Alkylalkanolamines, brake fluids, ketones,
miscellaneous specialty products, niac polyols and
catalysts, propylene glycol, coatings resins, ucon
fluids
Sunnyvale, California
Photoresists
Taft (Star Plant), Louisiana
Polyethylene
Taft, Louisiana
Acrolein and derivatives, acrylic monomers,
ultraviolet curing equipment, alkylene amines,
cycloaliphatic epoxides, ethylene oxide and glycol,
glycol ethers, olefins
Texas City, Texas
Olefins, organic acids and esters, alcohols, tergitol
surfactants, vinyl acetate, coatings resins
Torrance, California
Latexes
Tucker, Georgia
Latexes
Washougal, Washington
Crystal products

Europe

Northampton, United Kingdom
Conformal coatings
Solingen, Germany
Photoresists
Termoli, Italy
Organofunctional silanes
Vilvoorde, Belgium
Lanolin derivatives

Asia/Pacific

Ekala, Sri Lanka
Latex
Jakarta, Indonesia
Latex
Jurong, Singapore
Latex
Kowloon, Hong Kong
Latex silicones
Nonthaburi, Thailand
Latex
Seoul, South Korea
Photoresists
Seremban, Malaysia
Latex, silicones

ROW

Aratu, Brazil
 Hydroxyethyl cellulose
 Barranquilla, Colombia
 Silicones
 Bayamon, Puerto Rico
 Latexes
 Buenos Aires, Argentina
 Silicones
 Cubatao, Brazil
 Polyethylene
 Guayaquil, Ecuador
 Latexes
 Sao Paulo, Brazil
 Silicones

Industrial Gases Manufacturing

Domestic facilities for the manufacturing of industrial gases are spread over 100 plants, some of which are located at customer facilities throughout the United States. The following are principal manufacturing facilities for products other than oxygen, nitrogen, and argon.

North America

Bushton, Kansas
 Gaseous and liquid helium
 East Chicago, Indiana
 Specialty gases
 Fort Saskatchewan, Alberta, Canada
 Industrial gases
 Houston, Texas
 Specialized industrial services
 Indianapolis, Indiana
 Coatings service
 Kansas City, Missouri
 Coatings service
 Kearney, New Jersey
 Specialty gases
 Montreal, Quebec, Canada
 Industrial gases
 Niagara Falls, New York
 Gaseous and liquid hydrogen
 North Haven, Connecticut
 Coatings service
 Norwood, Massachusetts
 Membrane systems
 Oakville, Ontario, Canada
 Industrial gases
 Ontario, California

Gaseous and liquid hydrogen
 Prentiss, Canada
 Industrial gases
 Sarnia, Ontario, Canada
 Industrial gases
 Sault Ste. Marie, Ontario, Canada
 Industrial gases
 Selkirk, Manitoba, Canada
 Industrial gases
 Tonawanda, New York
 Air separation equipment
 Torrance, California
 Specialty gases
 Tracy, Canada
 Industrial gases
 Ulysses, Kansas
 Gaseous and liquid helium

Europe

Antwerp, Belgium
 Industrial gases
 Biebesheim, Germany
 Industrial gases
 Creil, France
 Industrial gases
 Geneva, Switzerland
 Coatings service
 Gijon, Spain
 Industrial gases
 Navarro, Italy
 Coatings service
 Oevel, Belgium
 Industrial gases
 Ratigen, Germany
 Coatings service
 Southam, United Kingdom
 Coatings service
 St. Etienne, France
 Coatings service
 Swindon, United Kingdom
 Coatings service

Asia/Pacific

Changwon City, South Korea
 Industrial gases and coatings service
 Gibeugn, South Korea
 Industrial gases
 Kozuki-Cho, Japan
 Coatings service
 Okegawa, Japan
 Coatings service

ROW

Brazil

Industrial gases, air separation equipment, welding,
and related products

Carbon Manufacturing

North America

Clarksburg, West Virginia
Graphite specialties
Clarksville, Tennessee
Graphite electrodes
Cleveland, Ohio
Specialty inorganic materials
Columbia, Tennessee
Graphite electrodes
Irving, California
Graphite tooling
Lawrenceburg, Tennessee
Carbon and graphite products
Niagara Falls, New York
Calcined coal
Robinson, Illinois
Calcined petroleum coke
Welland, Ontario, Canada
Graphite electrodes
Yabucoa, Puerto Rico
Graphite electrodes

Europe

Aigueblanche, France
Graphite electrodes
Calais, France
Graphite electrodes
Caserta, Italy
Graphite electrodes
Forno Allione, Italy
Graphite electrodes
Pamplona, Spain
Graphite electrodes
Sheffield, United Kingdom
Graphite electrodes and graphite products

Asia/Pacific

Kozuki-Cho, Japan
Specialty inorganic materials

ROW

Candeias, Brazil
Carbon cathodes, graphite electrodes

SUBSIDIARIES

North America

Union Carbide Canada Ltd. (Canada)
Union Carbide Caribe Inc. (United States)
Union Carbide Communications Co. Inc. (United States)
Union Carbide Eastern Inc. (United States)
Union Carbide Engineering and Hydrocarbons Service Co. Inc. (United States)
Union Carbide Engineering and Technology Services (Africa and Middle East) Inc. (United States)
Union Carbide Ethylene Oxide/Glycol Co. (United States)
Union Carbide Europe Inc. (United States)
Union Carbide Finance Corp. (United States)
Union Carbide Foreign Sales Corp., Virgin Islands (United States)
Union Carbide Grafito Inc. (United States)
Union Carbide Imaging Systems Inc. (United States)
Union Carbide Industrial Services Co. (United States)
Union Carbide Inter-America Inc., Delaware (United States)
Union Carbide Inter-America Inc., New Jersey (United States)
Union Carbide International Capital Corp. (United States)
Union Carbide International Sales Corp. (United States)
Union Carbide Middle East Ltd. (United States)
Union Carbide Pan America Inc. (United States)
Union Carbide Petrochemical International (FCS) Corp., Virgin Islands (United States)
Union Carbide Polyolefins Development Co. Inc. (United States)
Union Carbide Puerto Rico Inc. (Puerto Rico)
Union Carbide Southern Africa (USA) Inc. (United States)
Union Carbide Subsidiary C Inc. (United States)
Union Carbide Turkey Inc. (United States)

Europe

Union Carbide Austria GmbH (Austria)
Union Carbide Benelux N.V. (Belgium)
Union Carbide Deutschland GmbH (Germany)
Union Carbide France S.A. (France)
Union Carbide Hellas Ltd. (Greece)
Union Carbide Iberica S.A. (Spain)
Union Carbide Italia S.p.A. (Italy)
Union Carbide M.S. S.p.A. (Italy)

Union Carbide Navarra S.A. (Spain)
 Union Carbide Norden AB (Sweden)
 Union Carbide Services Ltd. (United Kingdom)
 Union Carbide U.K. Ltd. (United Kingdom)

Asia/Pacific

Union Carbide Asia Ltd. (Hong Kong)
 Union Carbide Formosa Co. Ltd. (Taiwan)
 Union Carbide India Ltd. (India)
 Union Carbide Indonesia P.T. (Indonesia)
 Union Carbide Japan K.K. (Japan)
 Union Carbide Korea Ltd. (South Korea)
 Union Carbide Pakistan Ltd. (Pakistan)
 Union Carbide Philippines (Far East) Inc.
 (Philippines)
 Union Carbide Services Eastern Ltd. (Hong Kong)
 Union Carbide Thailand Ltd. (Thailand)

ROW

Union Carbide Agricultural Products Ltd.
 (Zimbabwe)
 Union Carbide Argentina S.A.I.C.S. (Argentina)
 Union Carbide Commercial Chile Ltda. (Chile)
 Union Carbide Commercial Nicaragua S.A.
 (Nicaragua)
 Union Carbide do Brasil Ltda. (Brazil)
 Union Carbide Land & Investment Ltd. (Zimbabwe)
 Union Carbide Management Services Ltd.
 (Zimbabwe)
 Union Carbide Mexicana S.A. (Mexico)
 Union Carbide Overseas Finance Corp. N.V.
 (Netherlands Antilles)
 Union Carbide Ranches Ltd. (Zimbabwe)
 Union Carbide South Africa Ltd. (South Africa)
 Union Carbide Zimbabwe Ltd. (Zimbabwe)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Guardsman Products

Guardsman Products was given the rights to develop, produce, and sell the UNICARB paint system from Union Carbide Chemicals and Plastics.

Elekeiroz do Nordeste Industrias Quimicas

A joint venture calls for production of 80,000 metric tons per year of butanol and 2-ethylhexanol in Brazil.

1989

Mitsubishi Petrochemical Company Limited

Under the agreement, Mitsubishi acquired a license to construct a worldscale polypropylene plant using the UNIPOL PP technology jointly developed by Union Carbide and Shell Chemical. Union Carbide acquired an option to obtain a license and sublicensing rights for the use of Mitsubishi's family of high-activity polypropylene catalysts.

Kanegafuchi Chemical Industry Co.

A joint venture calls for the production of silicon polymer.

Sekisui America

Union Carbide and Sekisui America jointly formed Hexatec Polymers to make toner resins for North and South American markets. Hexatec Polymers will supply custom styrene-acrylic resins for toners used in copying machines and laser printers.

Ivax

Union Carbide and Ivax jointly formed Baker Cummins Dermatologicals to manufacture and market dermatological products.

ENIQ

Union Carbide and ENIQ will construct an oxochemicals plant in Camacari, Brazil, to begin production of butanols and 2-ethylhexanol by 1992.

DNA Plant Technology

Union Carbide and DNA Plant Technology jointly formed Agri-Diagnostics Association to manufacture and market on-site test kits to detect diseases, contaminants, and pollutants in agricultural areas.

Wei T'o Associates

Wei T'o licensed its paper-preservation technology to Union Carbide.

Schenectady Chemicals

Union Carbide licensed its phenolic washed resins technology to Schenectady Chemicals, which will supply the resins to Union Carbide's customers after Union Carbide stops production of the resins in Bound Brook, New Jersey.

1988

UOP Inc.

A joint venture was established with UOP, Inc., a subsidiary of Allied-Signal Inc. The joint venture, called UOP, will help strengthen Union Carbide's position as a supplier of technology, products, and services to the petroleum refining, petrochemical, and gas-processing industries.

1987

Nan Ya Plastics

Nan Ya Plastics was licensed to use the low-pressure oxo technology Union Carbide jointly licensed with Davy-McKee and Johnson-Mathey for a new plant in Taiwan.

MERGERS AND ACQUISITIONS

1989

Argi-Diagnostic Associates

Union Carbide partly acquired Agri-Diagnostic, a developer and marketer of kits for detecting contaminants and agricultural pollutants.

BP Chemicals

BP Chemicals sold its silicone surfactant business to Union Carbide.

KEY OFFICERS

Robert D. Kennedy

Chairman, president and chief executive officer

Joseph E. Geoghan

Vice president and general counsel

John B. Powers

Vice president, Strategic Planning

Cornelius C. Smith, Jr.

Vice president, Community & Employee Health, Safety & Environmental Protection

J. Clayton Stephenson

Vice chairman, chief financial and administrative officer

H. William Lichtenberger

Vice president and president, Chemicals & Plastics Business Group

John R. MacLean

Vice president and president, Industrial Gases Business Group

Robert P. Krass

Vice president and president, Carbon Products Business Group

PRINCIPAL INVESTORS

Delaware Management Company Inc.—5.7 percent

FOUNDERS

Information is not available.

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	\$4,426.0	\$2,414.0	\$2,555.0	\$2,883.0	\$2,787.0
Cash	24.0	38.0	201.0	146.0	142.0
Receivables	1,114.0	1,085.0	1,294.0	1,413.0	1,474.0
Marketable Securities	406.0	261.0	0	0	0
Inventory	831.0	746.0	827.0	1,032.0	932.0
Other Current Assets	2,051.0	284.0	233.0	292.0	239.0
Net Property, Plants	\$4,527.0	\$4,379.0	\$4,344.0	\$4,416.0	\$4,584.0
Other Assets	\$717.0	\$778.0	\$993.0	\$1,142.0	\$1,175.0
Total Assets	\$9,670.0	\$7,571.0	\$7,892.0	\$8,441.0	\$8,546.0
Total Current Liabilities	\$2,382.0	\$1,881.0	\$1,811.0	\$2,455.0	\$2,328.0
Long-Term Debt	\$1,713.0	\$3,057.0	\$2,863.0	\$2,295.0	\$2,080.0
Other Liabilities	\$1,556.0	\$1,628.0	\$1,971.0	\$1,855.0	\$1,755.0
Total Liabilities	\$5,651.0	\$6,566.0	\$6,645.0	\$6,605.0	\$6,163.0
Total Shareholders' Equity	\$4,019.0	\$1,005.0	\$1,247.0	\$1,836.0	\$2,383.0
Common Stock	212.0	205.0	209.0	214.0	142.0
Other Equity	199.0	961.0	1,140.0	1,216.0	(52.0)
Retained Earnings	3,774.0	2,061.0	2,098.0	2,605.0	2,293.0
Less: Treasury Stock	(166.0)	(2,222.0)	(2,200.0)	(2,199.0)	0
Total Liabilities and Shareholders' Equity	\$9,670.0	\$7,571.0	\$7,892.0	\$8,441.0	\$8,546.0
Income Statement	1985*	1986	1987	1988	1989
Revenue	\$6,390.0	\$6,343.0	\$6,914.0	\$8,324.0	\$8,744.0
US Revenue	4,691.0	4,555.0	4,778.0	5,758.0	5,793.0
Non-US Revenue	1,699.0	1,788.0	2,136.0	2,566.0	2,951.0
Cost of Sales	\$4,597.0	\$4,343.0	\$4,773.0	\$5,465.0	\$5,875.0
R&D Expense	\$181.0	\$148.0	\$159.0	\$159.0	\$181.0
SG&A Expense	\$735.0	\$740.0	\$779.0	\$822.0	\$924.0
Capital Expense	\$501.0	\$524.0	\$502.0	\$671.0	NA
Pretax Income	(\$906.0)	\$212.0	\$391.0	\$1,128.0	\$878.0
Pretax Margin (%)	-	3.34	5.66	13.55	10.04
Effective Tax Rate (%)	43.90	30.20	34.00	38.90	NA
Net Income	(\$581.0)	\$496.0	\$232.0	\$662.0	\$573.0
Shares Outstanding, Millions	202.8	127.7	132.2	137.6	141.6
Per Share Data					
Earnings	(\$2.78)	\$4.78	\$1.76	\$4.88	\$4.07
Dividend	\$1.13	\$1.50	\$1.50	\$1.15	NA
Book Value	\$19.82	\$7.87	\$9.43	\$13.34	\$16.83

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
<i>Liquidity</i>					
Current (Times)	1.28	1.41	1.41	1.17	1.20
Quick (Times)	0.89	0.95	0.95	0.75	0.80
Fixed Assets/Equity (%)	435.72	348.36	348.36	240.52	192.36
Current Liabilities/Equity (%)	187.16	145.23	145.23	133.71	97.69
Total Liabilities/Equity (%)	653.33	532.88	532.88	359.75	258.62
<i>Profitability (%)</i>					
Return on Assets	-	5.75	3.00	8.11	6.75
Return on Equity	-	19.75	20.60	42.95	27.16
Profit Margin	(9.09)	7.82	3.36	7.95	6.55
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	2.83	2.33	2.30	1.91	2.07
Capital Spending % of Revenue	7.84	8.26	7.26	8.06	NA
Employees	52,117	50,292	43,119	43,992	45,987
Revenue (\$K)/Employee	\$122.61	\$126.12	\$160.35	\$189.22	\$190.14
Capital Spending % of Assets	6.62	6.64	6.36	7.95	NA

*1985 is restated. In addition, 1985 includes certain reclassifications to conform to the 1986 presentation. Amounts for 1985 were adjusted to reflect the stock dividend in March 1986.
 NA = Not available

Source: Union Carbide Corporation
 Annual Reports and Forms 10-K
 Dataquest (1990)

Varian Associates, Inc.

611 Hansen Way
Palo Alto, California 94303
Telephone: (415) 493-4000
Fax: (415) 493-0307
Dun's Number: 00-912-0817

Date Founded: 1948

CORPORATE STRATEGIC DIRECTION

Varian Associates, Inc., together with its subsidiaries, is engaged in the research, development, manufacture, and marketing of various products and services for the fields of communications, defense, industrial production, scientific and industrial research, health care, and environmental monitoring. The Company's principal lines of business are electron devices and systems and equipment including analytical instruments, semiconductor equipment, and medical and industrial products.

Varian's operations are grouped into two segments: Electron Devices and Systems and Equipment. The Electron Devices and Systems segment includes a broad line of electron devices and systems used in broadcasting, communications, and other commercial and military applications. The Equipment segment includes analytical instruments widely used in the fields of chemistry, physics, biology, life sciences, and metallurgy; semiconductor equipment used for semiconductor wafer fabrication; and medical and industrial products including linear accelerators used for cancer therapy and industrial testing and inspection, as well as vacuum pumps and systems, gauges, and leak detectors used in a variety of industrial applications.

Total revenue increased by 15 percent to \$1.34 billion* in fiscal 1989 from \$1.17 billion in fiscal 1988. Net earnings increased 14 percent to \$31.5 million in fiscal 1989 from \$27.8 million in fiscal 1988. Varian employs 12,100 people worldwide.

Research and development expenditure totaled \$83 million in fiscal 1989, representing 6 percent of revenue.

*All dollar amounts are in US dollars.

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 distribution channels is not available. Table 3, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Electron Devices and Systems Segment

Varian's Electron Devices and Systems segment is organized around two major areas of activity, Electron Devices and Systems. Electron Devices, the larger of the two, holds world leadership positions in microwave, power grid, and special-purpose electron tubes, and has an expanding position in gallium arsenide (GaAs)-based solid-state components and night vision devices. The Systems area includes power amplifiers and other systems used in satellite communications, high-power transmitters for radar, radio and television broadcasting, and other communications applications, as well as electronic countermeasures and instrumentation. Approximately one-half of the segment's sales are for defense applications, including electronic countermeasures, radar, and missile guidance. About one-third of its sales are for communication applications, including radio and television broadcasting and satellite communications. Industrial and medical markets, such as X-ray generation and imaging, also are served.

Equipment Segment

The Company's largest business segment, Equipment, is organized around three major groups, Semiconductor Equipment, Analytical Instruments, and Medical and Industrial Products.

The Semiconductor Equipment Group manufactures process equipment used to make semiconductor devices such as integrated circuits. The major product lines are ion implantation and sputter deposition. Varian is a leader in the development, manufacture, and application of equipment utilizing ion implantation and sputter-coating in semiconductor wafer processing. Backlog for this business amounted to \$125 million and \$113 million in fiscal 1989 and 1988, respectively.

The Analytical Instruments Group manufactures, sells, and services a variety of scientific instruments for analyzing chemical substances. The substances analyzed include metals, inorganic materials, organic compounds, polymers, natural substances, and biochemicals. The products include liquid and gas chromatographs, nuclear magnetic resonance (NMR) spectrometers, ultraviolet visible and atomic absorption spectrophotometers, and associated data products. Typical applications are biochemical research, measurement of the chemical composition of mixtures, studies of the chemical structures of pure compounds, quality control of manufactured materials, chemical analysis of natural products, and the satisfaction of environmental and regulatory chemical measurement needs. The major markets served are the pharmaceutical and chemical industries, chemical

and life science academic research, government laboratories, and specific areas of the health care industry. Backlog for this business amounted to \$56 million and \$49 million in fiscal 1989 and 1988, respectively.

The Medical and Industrial Products Group manufactures linear accelerators, simulators, supplies, and systems. Linear accelerators are used in cancer therapy and for industrial radiographic applications. Varian's leading CLINAC series of accelerators, marketed to hospitals and clinics worldwide, generate therapeutic X-rays and electron beams for cancer treatment. LINATRON linear accelerators are used in industrial applications for x ray examination of heavy metallic structures for quality control and materials irradiation for sterilization. Backlog for this business amounted to \$236 million and \$222 million in fiscal 1989 and 1988, respectively.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service.

Table 1
Five-Year Corporate Highlights (Thousands of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$935,888.0	\$891,139.0	\$982,776.0	\$1,170,558.0	\$1,343,632.0
Percent Change	-	(4.78)	10.28	19.11	14.79
Capital Expenditure	-	-	-	-	-
Percent of Revenue	-	-	-	-	-
R&D Expenditure	\$72,211.0	\$82,290.0	\$80,726.0	\$80,222.0	\$83,071.0
Percent of Revenue	7.72	9.23	8.21	6.85	6.18
Number of Employees	11,900	11,600	11,900	11,800	12,100
Revenue (\$K)/Employee	\$78.65	\$76.82	\$82.59	\$99.20	\$111.04
Net Income	\$26,122.0	(\$14,870.0)	\$21,365.0	\$27,758.0	\$31,519.0
Percent Change	-	(156.93)	(243.68)	29.92	13.55
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$358.62	\$333.50	\$364.10	\$317.70	
Quarterly Profit	\$12.03	\$9.10	\$10.00	\$7.60	

Source: Varian
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	80.14	77.20	76.42	75.35	77.40
International	19.86	22.80	23.58	24.65	22.60
Japan	6.00	4.00	4.00	6.00	6.00
Europe	9.00	12.00	14.00	12.00	10.00
Asia/Pacific	3.00	4.00	2.00	3.00	4.00
ROW	2.00	3.00	3.00	3.00	2.00

Source: Varian
Annual Reports and Forms 10-K
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Tempe, Arizona

Activities of the Tempe Electronics Division include printed circuit board assembly.

Fremont, Palo Alto, and Santa Clara, California

Thin Film Technology Division is located in each of these cities. Activities include the production of integrated processing systems, chemical vapor deposition (CVD) systems, sputtering systems, molecular beam epitaxy systems, and memory disk sputtering systems.

Palo Alto, California

The Microwave Power Division, Traveling-Wave Tube Division, Coupled Cavity Tube Division, Electro Optical Sensors Division, NMR Instrument Division, and Radiation Division are located in Palo Alto, California. Activities include the production of klystrons, gytrons, traveling-wave tubes, coupled cavity tubes, klystode tubes, night-vision devices, NMR spectrometers, and medical and industrial linear accelerators.

San Carlos, California

Activities of the Eimac, San Carlos Division include the production of power-grid tubes and ancillary hardware, and X-ray subsystems.

Santa Clara, California

The Solid State Microwave Division, III-V Device Center, Microwave Equipment Division, and Varian-TEL Ltd. are located in Santa Clara. Activities include the production of solid-state oscillators, amplifiers and subsystems, GaAs and indium-phosphide devices and integrated devices, GaAs foundry, power amplifiers and transmitters, power supplies, and semiconductor manufacturing equipment.

Sunnyvale and Walnut Creek, California

Activities of the Walnut Creek Instrument Division include the production of gas and liquid chromatographs, data systems, and laboratory information management systems.

Beverly, Massachusetts

Activities of the RF Subsystems Division include production of RF and IF/log amplifiers, microwave signal processing equipment and subsystems.

Beverly and Gloucester, Massachusetts

An Extron Division is located in both cities. Activities include the production of ion implantation equipment and rapid thermal processing equipment.

Georgetown, Ontario

The Canada Microwave Division's activities include the production of power supplies, klystrons, traveling-wave tubes, and millimeter-wave tubes.

Dallas, Texas

Activities of the Continental Electronics Division include the production of high-power transmitters and power amplifiers.

Salt Lake City, Utah

Activities of the Eimac, Salt Lake Division involve the production of power-grid tubes, cavity amplifiers, oscillators, and X-ray tubes.

Europe

Cambridge, England

Activities of Varian TVT Ltd. include the production of UHF, VHF, and FM transmitters and systems.

Crawley, England

Activities of Varian-TEM Ltd. include the production of cancer therapy planning simulators.

Asia/Pacific

Melbourne, Australia

Activities of the Varian Techtron Pty. Ltd. include the production of atomic absorption and UV-Vis spectrometers.

SUBSIDIARIES

North America

Analytichem International Inc. (United States)

Mansfield Insurance Co. (United States)

Varian Associates Ltd. (United States)

Varian Canada Inc. (Canada)

Varian China Ltd. (United States)

Varian Export Corp. (United States)

Varian Instruments Ltd. (United States)
 Varian Instruments of Puerto Rico Inc. (United States)
 Varian Investment Corp. (United States)
 Varian Microwave Equipment Ltd. (United States)
 Varian Pacific Inc. (United States)
 Varian Realty Inc. (United States)
 Varian Semiconductor Equipment Co. Inc. (United States)
 Varian U.K. Ltd. (United States)

Europe

N.V. Varian Benelux S.A. (Belgium)
 Varian AB (Sweden)
 Varian AG (Switzerland)
 Varian Benelux B.V. (The Netherlands)
 Varian Electronics ApS (Denmark)
 Varian FSC B.V. (The Netherlands)
 Varian GmbH (Austria)
 Varian GmbH (Germany)
 Varian International AG (Switzerland)
 Varian SA (France)
 Varian S.p.A (Italy)
 Varian-TEM Ltd. (United Kingdom)
 Varian TVT Ltd. (United Kingdom)

Asia/Pacific

Varian Australia Pty. Ltd. (Australia)
 Varian Pty. Ltd. (Australia)
 Varian Taiwan Ltd. (Taiwan)
 Varian Techtron Pty. Ltd. (Australia)

ROW

Varian Industria e Comercia Ltd. (Brazil)
 Varian S.A. (Mexico)

dynamic random-access memory (DRAM) chips and 32-bit microprocessors.

ASEA Brown Boveri

Varian signed a letter of understanding with ASEA Brown Boveri AG (ABB) of Baden, Switzerland, under which Varian will assume installation and service responsibilities for ABB radiotherapy equipment. Under the arrangement, Varian would also purchase certain related ABB technology, including rights to its newly developed Dynaray-ID imaging system.

Finnigan Corporation

Varian and Finnigan Corporation entered into an agreement under which Varian will purchase from Finnigan the basic technology and knowledge to manufacture ion trap mass detectors used with Varian's gas chromatographs in varied analytical applications. Additionally, Varian will pay unspecified royalties on units manufactured under Finnigan patents. Varian will distribute worldwide a version of Finnigan's ITS 40 gas chromatograph/ion trap mass detection system, which is manufactured exclusively by Finnigan.

1988

Tokyo Electron (TEL)

Varian and TEL entered into an agreement under which Varian will exclusively distribute, sell, and service TEL's semiconductor products in the United Kingdom, the United States, and several European markets. In addition, Varian will distribute the TEL photoresist coater/developer, Clean Track Mark II, which is used for Mb DRAM production, and the TEL Diffusion Furnace/LPCVD System.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Tokyo Electron

Varian and Tokyo Electron (TEL) entered into a joint venture, a semiconductor equipment company called Varian-TEL, to produce a vertical diffusion furnace system. The system is focused on fabricating lines that produce products such as 4Mb

MERGERS AND ACQUISITIONS

1989

Watkins-Johnson

Varian acquired Watkins-Johnson's line of space communications equipment. Varian will merge the Watkins-Johnson traveling-wave tube, power supply, amplifier, and exploratory products into its Microwave Equipment Division product lines.

Machlett Laboratories

Varian acquired Machlett Laboratories, which makes X-ray and power grid tubes. Most of Machlett's equipment will be relocated to Varian's Eimac Division facilities in San Carlos, California, and Salt Lake City, Utah. Machlett was previously a subsidiary of Raytheon.

KEY OFFICERS

J. Tracy O'Rourke

Chairman of the board and chief executive officer

Allen J. Lauer

Senior vice president and president, Analytical Instruments

Al D. Wilunowski

Vice president and president, Electron Devices

Alan J. Bennet

Vice president, Research

Stanley Z. Cole

Vice president and director, Patents and Licensing

Richard M. Levy

Senior vice president and president, Semiconductor Equipment

John J. Cooper

Vice president and general counsel

Gary E. Simpson

Vice president, Corporate Communications

Ernest M. Felago

Vice president, Human Resources

PRINCIPAL INVESTORS

Battermarch Financial Management—9.4 percent

Neuberger and Berman—8.9 percent

Pioneering Management Corp.—7.0 percent

Prudential Insurance Co. of America—6.1 percent

Table 3
Comprehensive Financial Statement
Fiscal Year Ending September
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$473,830.0	\$505,420.0	\$537,448.0	\$589,922.0	\$643,237.0
Cash	13,491.0	7,978.0	27,937.0	11,539.0	-
Receivables	188,474.0	190,403.0	205,242.0	252,469.0	263,738.0
Marketable Securities	-	-	-	-	-
Inventory	213,899.0	211,819.0	230,754.0	245,455.0	285,725.0
Other Current Assets	57,966.0	95,220.0	73,515.0	80,459.0	93,774.0
Net Property, Plants	\$246,849.0	\$254,272.0	\$255,719.0	\$241,660.0	\$252,771.0
Other Assets	\$24,127.0	\$30,463.0	\$36,437.0	\$24,247.0	\$35,273.0
Total Assets	\$744,806.0	\$790,155.0	\$829,604.0	\$855,829.0	\$931,281.0
Total Current Liabilities	\$247,133.0	\$304,480.0	\$327,568.0	\$336,477.0	\$414,201.0
Long-Term Debt	\$46,188.0	\$50,824.0	\$3,814.0	\$35,179.0	\$54,914.0
Other Liabilities	\$22,256.0	\$23,921.0	\$25,806.0	\$33,171.0	\$34,885.0
Total Liabilities	\$315,577.0	\$379,225.0	\$357,188.0	\$404,827.0	\$1,129,799.0
Total Shareholders' Equity	\$429,229.0	\$410,930.0	\$438,116.0	\$451,002.0	\$427,281.0
Converted Preferred Stock	-	-	-	-	-
Common Stock	21,313.0	21,448.0	21,966.0	21,674.0	19,896.0
Other Equity	155,488.0	157,476.0	168,437.0	159,537.0	111,356.0
Retained Earnings	252,428.0	232,006.0	247,713.0	269,791.0	296,029.0
Total Liabilities and Shareholders' Equity	\$744,806.0	\$790,155.0	\$795,304.0	\$855,829.0	\$931,281.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$935,888.0	\$891,139.0	\$982,776.0	\$1,170,558.0	\$1,343,632.0
U.S. Revenue	750,000.0	688,000.0	751,000.0	882,000.0	1,040,000.0
Non-U.S. Revenue	185,888.0	203,139.0	231,776.0	288,558.0	303,632.0
Cost of Sales	\$643,209.0	\$646,212.0	\$676,382.0	\$809,635.0	\$961,728.0
R&D Expense	\$72,211.0	\$82,290.0	\$80,726.0	\$80,222.0	\$83,071.0
SG&A Expense	\$167,198.0	\$181,463.0	\$197,263.0	\$211,032.0	\$232,305.0
Capital Expense	-	-	-	-	-
Pretax Earnings	\$54,137.0	(\$40,173.0)	\$31,895.0	\$43,378.0	\$50,829.0
Pretax Margin (%)	5.78	(4.51)	3.25	3.71	3.78
Effective Tax Rate (%)	30.00	(63.00)	33.00	36.00	38.00
Net Earnings	\$26,122.0	(\$14,870.0)	\$21,365.0	\$27,758.0	\$31,519.0
Shares Outstanding, Millions	21.3	21.5	22.0	21.7	19.9
Per Share Data					
Earnings	\$1.19	(\$0.70)	\$0.98	\$1.27	\$1.53
Dividend	-	-	-	-	-
Book Value	\$20.14	\$19.12	\$19.94	\$20.81	\$21.48

Table 3 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending September
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.92	1.66	1.64	1.75	0.62
Quick (Times)	1.05	0.96	0.94	1.02	0.34
Fixed Assets/Equity (%)	57.51	61.88	58.37	53.58	59.16
Current Liabilities/Equity (%)	57.58	74.10	74.77	74.61	243.40
Total Liabilities/Equity (%)	73.52	92.28	81.53	89.76	264.42
<i>Profitability (%)</i>					
Return on Assets	-	(1.94)	2.64	3.29	3.53
Return on Equity	-	(3.54)	5.03	6.24	7.18
Profit Margin	2.79	(1.67)	2.17	2.37	2.35
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	7.72	9.23	8.21	6.85	6.18
Capital Spending % of Revenue	0	0	0	0	0
Employees	11,900	11,600	11,900	11,800	12,100
Revenue (\$K)/Employee	\$78.65	\$76.82	\$82.59	\$99.20	\$111.04
Capital Spending % of Assets	0	0	0	0	0

Source: Varian
Annual Reports and Forms 10-K
Dataquest (1990)

X



Table of Contents

SEMICONDUCTOR APPLICATION MARKETS

COMPANY BACKGROUNDS

Company	Fiscal Year-End
American Telephone & Telegraph Company	December
Apple Computer, Inc.	September
Digital Equipment Corporation (DEC)	June
Eastman Kodak Company	December
General Electric Company	December
GM Hughes Electronics Corporation	December
Groupe Bull	December
Hewlett-Packard Company	October
International Business Machines Corporation (IBM)	December
ITT Corporation	December
Lockheed Corporation	December
Motorola, Incorporated	December
NCR Corporation	December
Northern Telecom Limited	December
Raytheon Company	December
Rockwell International Corporation	September
Tandy Corporation	June
TRW Incorporated	December
Unisys Corporation	December
Xerox Corporation	December

American Telephone & Telegraph Company

550 Madison Avenue
New York, New York 10022
Telephone: (212) 605-5500
Fax: (212) 605-6248
Dun's Number: 00-698-0080

Date Founded: 1885

CORPORATE STRATEGIC DIRECTION

American Telephone & Telegraph Company (AT&T), incorporated in 1885, provides long distance telecommunications services through the Company's World-wide Intelligent Network and systems, products, and services that combine communications and computers. Its mission is to become the global leader in enabling customers to reap the benefits of information technology. AT&T markets its products and services to businesses, government, consumers, the telecommunications industry, and electronic equipment manufacturers.

In January 1984, AT&T divested itself of the exchange telecommunications, exchange access, and printed directory advertising portions of the 22 Bell Operating Companies (BOCs), as well as the cellular advanced mobile communications service business. All the former Bell System territory in the continental United States was divided into 161 geographic areas, which have been termed Local Access and Transport Areas (LATA).

AT&T provides interstate and intrastate interLATA long distance telecommunications services throughout the United States and provides interconnection with telecommunications systems worldwide. In the continental United States, AT&T provides long distance services over its own networks using lightwave, satellite, wire and coaxial cable, and microwave radio technology. International telecommunications services are provided via undersea cable and satellite transmission facilities. AT&T is subject to the jurisdiction of the Federal Communications Commission (FCC) with respect to interstate and international rates, lines and services, and other matters. In March 1989, the FCC adopted a system of regulating AT&T known as "price caps," under which AT&T's prices, rather than its earnings level, will be limited.

Total revenue increased by 3 percent to \$36 billion* in fiscal 1989 from \$35 billion in fiscal 1988. Net income increased significantly to \$2.7 billion in fiscal 1989 from a loss of \$1.7 billion in fiscal 1988. AT&T employs 283,500 people worldwide.

Research and development expenditures totaled \$2.7 billion in fiscal 1989, representing 7.3 percent of revenue. Capital spending expenditures totaled \$3.3 billion in fiscal 1989, representing 7.3 percent of revenue.

As of December 31, 1989, AT&T operated 18 manufacturing facilities domestically and 11 manufacturing facilities in international locations including Mexico, Singapore, Spain, and Thailand. Also, with the addition of two new AT&T Microelectronics semiconductor design centers located in Paris and Milan, AT&T operates a total of nine design centers worldwide, including locations in England, France, Italy, Singapore, Spain, and West Germany. In addition, AT&T operates 425 AT&T Phone Center stores in the United States.

AT&T's revenue comes from sales from services, sales from products, and rental revenue. Sales from services represent 59 percent of the Company's revenue; sales from products, 32 percent; and rental revenue, 9 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. Table 4, a comprehensive financial statement, is at the end of this profile.

*All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

AT&T's business units and supporting divisions are clustered into the following functional groups: the Communications Services Group, the Communications Products Group, the Data Systems Group, the Network Systems Group, the Federal Systems Group, and the International Group.

The Communications Services Group

The Communications Services Group addresses the needs of large and small businesses, the federal government, state and local governments, and consumers for voice, data, and image telecommunications services. Business units within this group provide regular and custom long distance communications services, including message telecommunications service (MTS), wide-area telecommunications service (WATS), toll free or 800 service, 900 services, private-line services, and integrator services digital network (ISDN) technology-based services. They also provide special long distance services including AT&T Calling Card services, special calling plans, and domestic and international operators.

The Communications Products Group

The Communications Products Group addresses the equipment needs of large and small businesses, the federal government, state and local governments, and consumers. Business units in this group offer products such as private branch exchanges (PBXs) including the Definity 75/85 system and the System 25, and other business communications systems, corded and cordless residence telephones, public telephones, answering systems, typewriters and word processors, security systems, facsimile machines, modems, and the Merlin and Spirit communications systems.

The Data Systems Group

The Data Systems Group includes business units that provide computer and data networking products and systems and the UNIX Operating System and related software. The group particularly addresses the market

for data networking—systems for connecting a few computers or many computer networks. Products include mini- and personal computers, data terminals, local area network (LAN) products, printers, and UNIX System V software.

The Network Systems Group

The Network Systems Group includes business units that primarily manufacture, market, engineer, and install switching systems, transmission systems, cable and wire products, cellular systems, and operations systems for AT&T, local exchange carriers, other carriers, private businesses, government agencies, overseas telephone administrations, and others. Switching systems include the 5ESS switch; transmission systems include lightwave and digital radio products, digital cross-connect and multiplex products, and digital loop carrier products; cable and wire products include optical fiber, copper and optical fiber cable, and related apparatus; and operations systems include mechanized systems for managing telecommunications networks.

The Network Systems Group also includes AT&T Microelectronics, a business unit that produces two broad categories of components: integrated circuits (ICs) and other electronics components such as discrete components, power systems, and printed wiring boards, which are included in most AT&T products and systems. Some of these components are sold commercially to other companies.

The Federal Systems Group

The Federal Systems business unit markets and maintains special design products and systems; related special services; and other AT&T products, systems, and services to and for the federal government.

The International Group

The International Group supports AT&T business units in providing products and systems to international customers, provides AT&T's communications services internationally, and sells submarine cable systems.

Further Information

For further information about the Company's business segments, please contact the appropriate industry services.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$34,417	\$34,213	\$33,768	\$35,210	\$36,112
Percent Change	3.71	(0.59)	(1.30)	4.27	2.56
Capital Expenditure	\$4,031	\$3,587	\$3,482	\$3,942	\$3,391
Percent of Revenue	11.71	10.48	10.31	11.20	9.39
R&D Expenditure	\$2,228	\$2,278	\$2,453	\$2,572	\$2,652
Percent of Revenue	6.47	6.66	7.26	7.30	7.34
Number of Employees	337,600	316,900	303,000	304,200	283,500
Revenue (\$K)/Employee	\$101.94	\$107.96	\$111.44	\$111.44	\$111.44
Net Income	\$1,557	\$139	\$2,044	(\$1,669)	\$1,370
Percent Change	NA	(91.07)	1,370.50	(181.65)	261.59
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$8,659.00	\$9,256.00	\$8,896.00	\$8,354.00	
Quarterly Profit	\$594.00	\$699.00	\$699.00	\$705.00	

NA = Not available

Source: AT&T Company
 Annual Reports and Forms 10-K
 Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	100.00	100.00	100.00	100.00	100.00
International	0	0	0	0	0

Source: AT&T Company
 Annual Reports and Forms 10-K
 Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	100.00	100.00

Source: Dataquest (1990)

1990 SALES OFFICE LOCATIONS

United States—3,000
International—More than 100

MANUFACTURING LOCATIONS

North America

Allentown, Pennsylvania
ICs, microprocessors, communications devices,
thin film devices
Burlington, North Carolina
Military electronic systems, metal fabrication,
power equipment, commercial electronic systems
Columbus, Ohio
Electronic switching systems
Denver, Colorado
Digital PBX products, Merlin controllers
Lee's Summit, Missouri
ICs, transistors, diodes, relays, surge protectors,
switches, varistors, thermistors
Little Rock, Arkansas
Display terminals, data terminals, STARLAN local
area network products, controllers,
communications system
Mesquite, Texas
Power supply, interconnect products, off-line
switches
Montgomery, Illinois
Data modems, data communications equipment,
printed wire boards
Norcross, Georgia
PIC exchanges, lightguide cable, CONNECS
North Andover, Massachusetts
Lightwave transmission systems, digital carrier
terminal systems
Oklahoma City, Oklahoma
Switching systems, computers
Omaha, Nebraska
Network distribution apparatus, electronic cable
and wire, metal fabrication
Orlando, Florida
ICs
Phoenix, Arizona
Exchange cable, custom and connector cable,
switchboard and inside wire

Reading, Pennsylvania
ICs, lightwave devices, optoelectronic devices,
microwave devices, magnetic bubbles
Richmond, Virginia
Multilayer printed wiring boards
Shreveport, Louisiana
Electronic business sets, public phones, Merlin and
Spirit systems
Staten Island, New York
Cable

Europe

Broendby, Denmark
Optical fibers
Hilversum, Netherlands
Digital switching system, transmission equipment
Spain
Chips manufacturing
Wicklow, Ireland
Transmission equipment, digital microwave
systems

Asia/Pacific

Bangkok, Thailand
Semiconductor assembly and testing
Seoul, Korea (2)
Fiber optic cable, switching equipment, lightwave
systems, telephones
Singapore (2)
Semiconductor assembly and testing, telephones
Taiwan
Switch and transmission equipment

ROW

Matamoros, Mexico
Transformers, inductors, other components

SUBSIDIARIES

North America

Actuarial Sciences Associates, Inc. (United States)
American Transtech Inc. (United States)
AT&T Communications Inc. (United States)
AT&T Communications of California, Inc. (United
States)
AT&T Communications of Delaware, Inc. (United
States)

AT&T Communications of Illinois, Inc. (United States)
 AT&T Communications of Indiana, Inc. (United States)
 AT&T Communications of Maryland, Inc. (United States)
 AT&T Communications of Michigan, Inc. (United States)
 AT&T Communications of the Midwest, Inc. (United States)
 AT&T Communications of the Mountain States, Inc. (United States)
 AT&T Communications of Nevada, Inc. (United States)
 AT&T Communications of New England, Inc. (United States)
 AT&T Communications of New Hampshire, Inc. (United States)
 AT&T Communications of New Jersey, Inc. (United States)
 AT&T Communications of New York, Inc. (United States)
 AT&T Communications of Ohio, Inc. (United States)
 AT&T Communications of the Pacific Northwest, Inc. (United States)
 AT&T Communications of Pennsylvania, Inc. (United States)
 AT&T Communications of the South Central States, Inc. (United States)
 AT&T Communications of the Southern States, Inc. (United States)
 AT&T Communications of the Southwest, Inc. (United States)
 AT&T Communications of Virginia, Inc. (United States)
 AT&T Communications of Washington, D.C., Inc. (United States)
 AT&T Communications of West Virginia, Inc. (United States)
 AT&T Communications of Wisconsin, Inc. (United States)
 AT&T Credit Corporation (United States)
 AT&T Information Systems Inc. (United States)
 AT&T Microelectronica de Espana S.A. (United States)
 AT&T Nassau Metals Corporation
 AT&T Network Systems International (United States)
 AT&T of Puerto Rico, Inc. (Puerto Rico)
 AT&T of the Virgin Islands, Inc. (Virgin Islands)
 AT&T Paradyne Corporation (United States)
 AT&T Resource Management Corporation (United States)

AT&T Ricoh Company, Ltd. (United States)
 AT&T Technologies, Inc. (United States)
 Bell Telephone Laboratories, Inc. (United States)

Europe

AT&T International Inc. (Spain)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Olin Hunt Specialty Products

AT&T Bell Laboratories will license the secrets of a new ultraviolet photoresist to Olin Corporation's Olin Hunt Specialty Products. This process claims to enable chips to be fabricated to design rules as fine as 0.3 micron without resorting to x-ray lithography. The Olin unit will produce and market the chemical under license, and it is expected to be available for use within 18 months.

1989

Hampshire Instruments Inc.

AT&T Bell Laboratories and Hampshire Instruments Inc. agreed to work jointly in three areas of x-ray lithography development. The agreement includes work in x-ray optics, reticle technology, and x-ray resists. To support the joint-development work, Hampshire Instruments has built a Class 100 clean room equipped with a Hampshire Series 5000 X-Ray Stepper, metrology capability, and a reticle pilot line.

ICI Advanced Materials

AT&T Bell Laboratories and ICI Advanced Materials have jointly developed a family of radio frequency and microwave resonators constructed with high-temperature superconductors.

GTE

AT&T and GTE entered into a joint venture to develop new technology and capabilities for GTE's digital switching systems. The new company is known as AG Communications Systems Corporation. Under the agreement, AT&T has a 49 percent interest in the joint venture, acquired at a cost of approximately \$112 million and will increase its ownership to 80 percent in 5 years and to 100 percent in 15 years.

Pyramid Technology Corporation

AT&T and Pyramid Technology Corporation entered into a strategic partnership to jointly develop a new generation of high-performance UNIX-based systems. The agreement also includes provisions for AT&T to market the systems on an OEM basis.

Paradigm Technology

AT&T Microelectronics and Paradigm Technology will codevelop high-speed random access memory (SRAM) chips.

Digital Equipment Corporation

AT&T and Digital Equipment Corporation will develop an application interface between PBX and VAX platforms that will bring integrated voice and data applications to desktops.

Intel

AT&T and Intel entered into an agreement to collaborate on marketing LAN and ISDN circuits.

1988

Sun Microsystems Inc.

AT&T and Sun Microsystems entered into a strategic alliance whereby the companies will work together to develop a merged-version UNIX.

Zenith

AT&T and Zenith entered into an agreement under which both companies are codeveloping high-definition television (HDTV) systems.

Telefonica

AT&T and Telefonica, Spain's national telephone company, entered into a joint venture. The new company, known as AT&T Microelectronica de Espana S.A., will produce ICs.

MERGERS AND ACQUISITIONS

1989

Italtel S.p.A.

AT&T acquired a 20 percent share in Italtel S.p.A. in exchange for a 20 percent interest in AT&T Network Systems International B.V. (AT&T NSI) plus \$135 million in cash. Italtel is a manufacturer of public and private telecommunications systems based in Italy.

ISTEL Group Ltd.

AT&T acquired ISTEL Group Ltd., an information technology services company based in the United Kingdom, for approximately \$285 million.

CIR

AT&T swapped its 22.0 percent stake in Ing. C. Olivetti & C. S.p.A.'s voting stock for an 18.6 percent share in CIR, a diversified holding company.

1988

Sun Microsystems Inc.

AT&T acquired an interest in Sun Microsystems Inc., a computer company. During 1989, AT&T raised its ownership in Sun to 16.4 percent. AT&T expects to raise its ownership to 20 percent by the end of 1990.

AT&T Network Systems International (NSI)

AT&T acquired a majority interest in NSI, AT&T's joint venture with N.V. Philips, by increasing its ownership to 60 percent.

Compania Telefonica Nacional de Espana

AT&T owns 80 percent of AT&T Microelectronica de Espana S.A., a joint venture to produce integrated circuits with Compania Telefonica Nacional de Espana.

Ricoh of Japan

AT&T owns 51 percent of AT&T Ricoh Company, Ltd., a joint venture with Ricoh of Japan to manufacture a Japanese version of AT&T's Merlin II system.

Taiwanese Government

AT&T owns 70 percent of AT&T Taiwan Telecommunications Co., Ltd., a joint venture with the Taiwanese government to manufacture switching systems.

GoldStar Group of Republic of Korea

AT&T owns 44 percent of a joint venture with the GoldStar Group to manufacture and market switching products and distribute AT&T 3B computers in Korea. AT&T also owns 50 percent of a joint venture with GoldStar to manufacture fiber-optic cable for the Korean market.

Nordic Kable and Wire Works (NKT)

AT&T owns 51 percent of Lycom, a joint venture with Nordic Kable and Wire Works to manufacture optical fiber in Denmark.

22 Japanese Companies

AT&T owns 50 percent of Japan ENS Corp., a joint venture with 22 Japanese companies to provide value-added network services in Japan.

MERGERS AND ACQUISITIONS

1989

Paradyne Corp.

AT&T acquired Paradyne, a leading modem manufacturer, for \$250 million.

KEY OFFICERS

Robert E. Allen

Chairman and chief executive officer

W. Frank Blount

Group executive, Communications Products

Harold W. Burlingame

Senior vice president, Human Resources

Robert M. Kavner

Group executive, Data Systems and Federal Systems

Marilyn Laurie

Senior vice president, Public Relations

William B. Marx

Group executive, Network Systems

Victor A. Pelson

Group executive, Communications Services

Ian M. Ross

President, AT&T Bell Laboratories

Morris Tanenbaum

Vice chairman and chief financial officer

Randall L. Tobias

Vice chairman

Sam R. Willcoxon

Group executive, International

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	\$16,651	\$15,572	\$15,322	\$15,602	\$15,291
Cash	2,214	2,602	2,787	2,021	1,183
Receivables	8,943	7,820	8,038	8,907	9,555
Marketable Securities	0	0	0	0	0
Inventory	4,546	3,519	3,157	3,392	3,206
Other Current Assets	948	1,631	1,340	1,282	1,347
Net Property, Plants	\$22,261	\$21,078	\$20,808	\$15,280	\$15,919
Other Assets	\$1,485	\$2,233	\$3,343	\$4,270	\$6,477
Total Assets	\$40,397	\$38,883	\$39,473	\$35,152	\$37,687
Total Current Liabilities	\$11,422	\$11,217	\$10,889	\$11,225	\$12,237
Long-Term Debt	\$7,684	\$7,309	\$7,917	\$8,128	\$8,144
Other Liabilities	\$6,658	\$6,807	\$6,212	\$4,334	\$4,568
Total Liabilities	\$25,764	\$25,333	\$25,018	\$23,687	\$24,949
Total Shareholders' Equity	\$14,633	\$13,550	\$14,455	\$11,465	\$12,738
Converted Preferred Stock	0	0	0	0	0
Common Stock	1,069	1,072	1,074	1,074	1,076
Other Equity	8,483	8,544	8,605	8,613	8,700
Retained Earnings	5,081	3,934	4,776	1,778	2,962
Total Liabilities and Shareholders' Equity	\$40,397	\$38,883	\$39,473	\$35,152	\$37,687
Income Statement	1985	1986	1987	1988	1989
Revenue	\$34,417	\$34,213	\$33,768	\$35,210	\$36,112
Cost of Sales	\$18,099	\$18,312	\$16,651	\$23,575	\$16,547
R&D Expense	\$2,228	\$2,278	\$2,453	\$2,572	\$2,652
SG&A Expense	\$11,104	\$11,101	\$11,148	\$12,130	\$12,635
Capital Expense	\$4,031	\$3,587	\$3,482	\$3,942	\$3,391
Pretax Income	\$2,546	\$133	\$3,185	(\$3,382)	\$3,992
Pretax Margin (%)	7.40	0.39	9.43	(9.61)	11.05
Effective Tax Rate (%)	38.80	NA	35.80	NA	34.00
Net Income	\$1,557	\$139	\$2,044	(\$1,669)	\$2,697
Shares Outstanding, Millions	1,058	1,071	1,073	1,075	1,077
Per Share Data					
Earnings	\$1.37	\$0.05	\$1.88	(\$1.55)	\$2.50
Dividend	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
Book Value	\$13.83	\$12.65	\$13.47	\$10.67	\$11.83

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
<i>Liquidity</i>					
Current (Times)	1.46	1.39	1.41	1.39	1.25
Quick (Times)	1.06	1.07	1.12	1.09	0.99
Fixed Assets/Equity (%)	152.13	155.56	143.95	133.28	124.97
Current Liabilities/Equity (%)	78.06	82.78	75.33	97.91	96.07
Total Liabilities/Equity (%)	176.07	186.96	173.08	206.60	195.86
<i>Profitability (%)</i>					
Return on Assets	NA	0.35	5.22	(4.47)	7.41
Return on Equity	NA	0.99	14.60	(12.88)	22.49
Profit Margin	4.52	0.41	6.05	(4.74)	7.47
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	6.47	6.66	7.26	7.30	7.34
Capital Spending % of Revenue	11.71	10.48	10.31	11.20	9.39
Employees	337,600	316,900	303,000	304,200	283,500
Revenue (\$K)/Employee	\$101.94	\$107.96	\$111.44	\$115.74	\$127.38
Capital Spending % of Assets	9.98	9.23	8.82	11.21	9.00

NA = Not available

Source: AT&T Company
 Annual Reports and Forms 10-K
 Dataquest (1990)

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.

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.

*All dollar amounts are in US dollars.

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 IIfx

The Macintosh IIfx personal computer versatile design allows it to be used in either a vertical or horizontal orientation. The Macintosh IIfx 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 IIfx 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 IIfx 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 IIfx, including the 68030 microprocessor, the 68882 coprocessor, 1MB

of RAM, and the Apple SuperDrive. The Macintosh IIfx 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 IIfx

The Macintosh IIfx personal computer has a 25-MHz 68030 microprocessor and performs up to 45 percent faster than the Macintosh IIfx and Macintosh IIfx computers. To speed the processing of complex mathematical functions, a 68882 math coprocessor comes standard with the Macintosh IIfx. 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 IIfx and IIfx. 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 IIfx 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 tool for custom software solutions.

Macintosh IIfx

Introduced in March 1990, the Macintosh IIfx runs up to twice as fast as the 25-MHz Macintosh IIfx. 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 Apple-Fax Modem, 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

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 IIxt

The Apple LaserWriter IIxt 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 IIxt is Apple's mainstream network laser printer for both individuals and work groups.

LaserWriter IIcx

The Apple LaserWriter IIcx can be used by individuals or work groups. It offers the same characteristics and 11 font families as the LaserWriter IIxt; however, it prints up to four times faster than LaserWriter IIxt 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.

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)

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

Clarix 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.

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 Gasse

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

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

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
<i>Liquidity</i>					
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
<i>Profitability (%)</i>					
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
<i>Other Key Ratios</i>					
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)

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.

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

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 multi-chip 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

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.

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.

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)

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
 Connell, 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)

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 Altersversorgungs-
gesellschaft 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 Altersversorgungs-
gesellschaft 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 mar-
keting program

Combustion Engineering

Plant systems joint marketing

Cullinet

Voice-processing products; VAX/IBM communica-
tions

Calma

MicroVAX II-based mechanical CAD systems

Cincinnati Bell

Billing management systems for cellular nets

Daisy Systems

MicroVAX II-based workstations for CAE

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

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

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

KEY OFFICERS

Kenneth H. Olsen

President

Winston R. Hindle, Jr.

Senior vice president, Corporate Operations

FOUNDERS

Kenneth H. Olsen (MIT)

Stanley C. Olsen (MIT)

Harland Anderson (MIT)

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

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
<i>Liquidity</i>					
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
<i>Profitability (%)</i>					
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
<i>Other Key Ratios</i>					
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)

Eastman Kodak Company

343 State Street
Rochester, New York 14650
Telephone: (716) 724-4000
Fax: (716) 724-0663
Dun's Number: 00-220-6183

Date Founded: 1880

CORPORATE STRATEGIC DIRECTION

Eastman Kodak Company was founded by George Eastman in 1880. Since its development of the first snapshot camera in 1888, Kodak has branched out into numerous new frontiers. Today, Kodak develops, manufactures, and markets imaging, information systems, chemicals, and health products. Kodak reorganized its overall Company operations into four area segments. They are as follows: the Information Systems segment, the Imaging segment, the Chemicals segment, and the Health segment. Kodak has a cluster of divisional units for each segment, and each is responsible for its product, research, manufacturing, and marketing worldwide.

Total revenue increased 8 percent to \$18.4 billion* in fiscal 1989 from \$17.0 billion in fiscal 1988. Sales for the year grew at a steady rate in virtually every one of Kodak's business segments. Net income was down 62 percent to \$529.0 million for fiscal 1989 from \$1.4 billion in fiscal 1988. Kodak attributed the decrease to the significant expenses related to its restructuring efforts and the impact of general inflation on operating costs, higher interest expense, and exchange-rate fluctuations. Kodak employs 137,750 people throughout the world.

Kodak spent \$1.3 billion, \$1.1 billion, and \$992.0 million in research and development (R&D) during fiscal 1989, 1988, and 1987, respectively. These figures accounted for 6.8, 6.7, and 7.5 percent of total revenue for the respective years. R&D groups are located primarily in Rochester, New York; Kingsport, Tennessee; Longview, Texas; Rensselaer, New York; and Malvern, Pennsylvania. These groups' strategy is to closely cooperate with manufacturing units and marketing organizations in order to develop new products and applications to serve existing and new markets. Kodak protects its investment

in R&D and its freedom to use its inventions by obtaining patents wherever feasible.

In fiscal year 1989, Kodak's revenue was generated mostly through the US market; however, over the past five years, domestic sales have slowly decreased while international sales have slowly increased. Domestic sales have fallen from representing 78.0 percent of total revenue in fiscal year 1985 to 69.5 percent of total revenue in fiscal year 1989. Europe has been the biggest contributor to international sales, totaling 22.6 percent in fiscal year 1989. The financial section provides a breakdown of revenue by geographic region for the past five years.

Kodak uses many different types of channels to distribute its products. Imaging products and services, which account for the greatest amount of sales, are distributed primarily through dealers; however, Kodak also uses independent retail outlets and independent national distributors. Information Systems segment products are sold and leased directly to users as well as marketed overseas through independent national distributors. Chemical products are marketed by the direct sales force and manufacturing distributors. Health care products have the greatest number of sales channels including dealers, independent distributors, wholesalers, jobbers, hospitals, retail drugstores, variety outlets, department stores, and food stores.

In 1976, a lawsuit was filed by Polaroid Corporation against Eastman Kodak Company. It resulted in a decision from the US District Court in Boston on October 11, 1985, holding that Kodak's PR-10 instant film and EK4 and EK6 instant cameras infringed upon seven Polaroid patents. An injunction, effective January 9, 1986, restricted further manufacturing or sale of such products in the United States. The US Court of Appeals for the Federal Circuit maintained the decision on April 25, 1986, and the United States

*All dollar amounts are in US dollars.

Supreme Court denied Kodak's petition for certiorari on October 6, 1986.

The case was returned to the US District Court in Boston for trial on issues such as if Kodak's infringement of any of the patents was willful and deliberate, whether damages were adequate to compensate Polaroid for Kodak's infringement, the prejudgment interest on this amount and if the damage award should be tripled, whether costs should be taxed against either party, and whether Polaroid is entitled to its reasonable attorney fees. Trial of these issues ended on November 20, 1989, at which time Polaroid stated claims for damage of \$3.9 billion in lost profits, \$2.2 billion in prejudgment interest, and increased damages of \$7.8 billion. In addition, Polaroid requested reimbursement for attorney fees, costs, and postjudgment interest. Kodak has contested the amount of damage declared by Polaroid and has asserted that Polaroid's damages should be based on a reasonable royalty. It has denied that Polaroid is entitled to increased damages and attorney fees. Kodak plans to charge the amount of the judgment against its future earnings.

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 profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Information Systems Segment

The Information Systems segment comprises businesses that serve the imaging and information needs of business, industry, and government. Kodak manufactures and markets a wide range of components of information systems products and offers service agreements to support these products. Its product line consists of graphic arts film, microfilm products, magnetic media, applications software, copiers, printers, and other business equipment. These products are targeted toward the commercial printing and publishing, office automation, and government markets.

The Information Systems segment is divided into two groups: Commercial Systems and Imaging Information Systems. The Commercial Systems Group links

two of Kodak's largest customer bases in Copy Products and Graphics Imaging Systems Divisions with equipment manufacturing and customer service. Copy Products markets products such as the Kodak ColorEdge full-color copier, a line of high-end plain paper copiers, and the Kodak Ektaprint 1392. Graphics Imaging Systems markets products such as the Kodak Signature color-proofing system, the Designmaster electronic stripping station, and Kodak Aqua-Image products. The Imaging Information Systems Group is made up of two business units, the Business Imaging Systems Division and the Federal Systems Division. These business units serve markets having customers that are usually the earliest users of advanced electronic imaging and information systems technologies.

According to Dataquest, Kodak captured 11.7 percent of the low-volume and 4.5 percent of the midvolume document image management systems worldwide market share during 1989. In 1985, Kodak came out with its first electronic image management system, the Kodak Image Management System (KIMS). KIMS is a series of distributed, multiuser configurations based on DEC's MicroVAX servers and workstations. Other components of KIMS include optical disk drives and jukeboxes, scanners, and laser printers connected to a local area network (LAN). Storage can be done on Kodak's microfilm library unit, an optical disk jukebox, or standalone optical disk drives depending on the system. KIMS multifunctional workstations consist of a 19-inch display, a mouse, either a word processing or nonword processing keyboard, and a digital controller; a customer may choose the VAXstation 3100 as the workstation choice. Kodak provides two levels of KIMS: the KIMS 3000 series for department-level imaging and the KIMS 5000 series for enterprise-wide imaging. KIMS image management offers the following software packages: Desktop software, Work-In-Process software, and Image Server software. The KIMS 4500 enables the use of microfilm as an archival medium. It is a computer-assisted microfilm retrieval system using Kodak's automated microfilm library. In replacement of its PC Image Handler system, Kodak introduced the KIMS 4000 in October 1988. The KIMS 4000 is not compatible with the rest of the KIMS line and is targeted toward low-volume application users.

Revenue from the Information Systems segment represented 22.8, 23.1, and 26.3 percent of total revenue during 1989, 1988, and 1987, respectively. Sales reached \$4.2 billion in fiscal year 1989, up 7.0 percent from fiscal year 1988. Within the

United States, sales increased 5.0 percent over fiscal year 1988 to \$2.7 billion in fiscal year 1989. International sales totaled \$1.6 billion for fiscal year 1989, a 9.0 percent increase over fiscal year 1988. However, the Information Systems segment showed a loss of \$360.0 million for fiscal year 1989 compared with operating earnings of \$311.0 million in fiscal year 1988. The loss occurred because of restructuring costs. Without that expenditure, earnings from operations would have totaled \$57.0 million.

Imaging Segment

The products of the Imaging segment are used for capturing, recording, or displaying an image. Kodak manufactures and markets a variety of imaging system components. For amateur photography, Kodak manufactures and markets cameras, projectors, films, processing services, photographic papers, batteries, and chemicals. Kodak products for nonamateur photography include films, photographic papers, photographic plates, chemicals, processing equipment, and audiovisual equipment. For these products, Kodak targets professional photofinishers and photographers, as well as customers in the motion picture, television, audiovisual, industrial, financial, commercial, and government markets.

The Imaging segment products are Kodak's greatest revenue generator. During 1989, 1988, and 1987, the imaging segment accounted for 38, 39, and 47 percent, respectively, of total revenue. Sales for the Imaging segment increased 5 percent to \$7.0 billion in fiscal year 1989, up from \$6.6 billion in fiscal year 1988. Within the United States, domestic sales rose 7 percent to \$3.1 billion for fiscal year 1989 from \$2.9 billion for fiscal year 1988. International sales totaled \$3.9 billion for fiscal year 1989, representing an increase of 4 percent over fiscal year's 1988 figure of \$3.7 billion. Net income fell 36 percent in fiscal year 1989 to \$821.0 million. Thirty percent of this decrease was due to restructuring costs and unfavorable exchange rates.

In 1989, The Walt Disney Company signed a 15-year, multimillion dollar contract with Kodak. Kodak will be the official supplier of film, batteries, camera, and other allied photographic products for Disney. The agreement also makes Kodak the exclusive photographic consultant to all Disney theme parks in the United States and to the new Euro Disneyland scheduled to open near Paris, France, in 1992. Kodak possesses a similar agreement with theme parks run by Universal Studios. Kodak will also be an official sponsor of the 1992 Summer Olympic Games in

Barcelona, Spain, and of the 1992 Winter Olympic Games in Albertville, France, as well as a sponsor of the 1992 US Olympic Team.

Chemical Segment

The Chemical segment divides its segment into four groups: olefin, acetyl, polyester, and specialty chemical products. Olefin refers to ethylene and propylene. Ethylene and propylene are used as intermediates in manufacturing processes leading to a variety of products: alcohols, solvents, and plasticizers sold to paint, chemical, and plastics manufacturers; and polyethylene and polypropylene plastics used in applications such as plastic film and automotive parts. Ethylene oxide is converted into ethylene glycol, a necessary material for polyester products.

Acetyl products are derived from acetaldehyde, itself derived from ethylene, and from synthesis gas derived from coal. A succession of conversion steps produces acetic acid and acetic anhydride. These chemicals are reacted with purchased wood pulp and cotton linters to produce cellulose esters. Cellulose esters are used to make acetate yarn, photographic film base, TENITE cellulosic plastics, and filter tow for use in filter cigarettes. Cellulose esters are also sold to the trade for a variety of applications.

Polyester products use, as a starting material, purchased paraxylene, which is a purified material derived from petroleum. Paraxylene is used to make terephthalic acid that is either converted to dimethyl terephthalate (DMT) or purified terephthalate acid (PTA). The DMT and PTA is reacted with ethylene glycol to produce polyester polymer. These polyester polymers are marketed for a variety of plastic uses, including bottles for beverages. Kodel polyester fibers are used in textile yarn for knitting, sewing thread, fiberfill, nonwovens, and industrial end-use applications. Other Kodak units use this polymer in their polyester film base.

Specialty and fine chemical products include photographic chemicals sold to the Kodak Imaging segment, health and nutrition products, and high-technology organic chemicals including complex intermediates sold to pharmaceutical companies for further conversion to prescription drugs.

Sales for the Chemicals segment for fiscal year 1989 increased 13 percent to \$3.5 billion from \$3.1 billion for fiscal year 1988. Net income for the year was \$643.0 million, accounting for a 2 percent increase over fiscal year 1988.

Health Segment

The Health segment manufactures and sells pharmaceutical products including medicines prescribed by physicians or made specifically for use in hospitals. These products also consist of bulk pharmaceuticals, intermediates, and other life-science chemicals sold principally to other manufacturers. Consumer health products include over-the-counter medicines. Kodak provides X-ray film, screens, cassettes, processors, and chemicals for radiography markets and also offers blood analysis equipment and consumables. The Health segment also markets household, do-it-yourself, and personal care products such as disinfectants, all-purpose cleaners, floor-care products, rodenticides, septicides, wood stains, concrete and wood protectors, deodorants, and hair-care products.

In fiscal year 1989, sales for the Health segment grew 11 percent to \$4.0 billion from \$3.6 billion in fiscal year 1988. Net income was \$487 million in fiscal year 1989 in comparison with \$591 million in fiscal year 1988.

Further Information

For more information on Kodak's business segments, please contact Dataquest's Copying and Duplicating Industry Service and/or Document Imaging Management System.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$10,631.0	\$11,550.0	\$13,305.0	\$17,034.0	\$18,398.0
Percent Change	-	8.64	15.19	28.03	8.01
Capital Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
R&D Expenditure	\$838.0	\$1,059.0	\$992.0	\$1,147.0	\$1,253.0
Percent of Revenue	7.88	9.17	7.46	6.73	6.81
Number of Employees	128,950	121,450	124,400	145,300	137,750
Revenue (\$K)/Employee	\$82.44	\$95.10	\$106.95	\$117.23	\$133.56
Net Income	\$332.0	\$374.0	\$1,178.0	\$1,397.0	\$529.0
Percent Change	-	12.65	214.97	18.59	(62.13)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$3,900.00	\$4,500.00	\$5,112.00	\$4,890.00	
Quarterly Profit	\$200.00	\$60.00	\$329.00	(\$60.00)	

NA = Not available

Source: Eastman Kodak Company
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America*	77.99	73.23	70.02	68.86	69.52
International	22.01	26.77	29.98	31.14	30.48
Europe	17.74	20.87	22.32	21.73	22.55
Other	4.27	5.90	7.66	9.41	7.93

*North America consists of sales from the US, Canada, and Latin America.

Source: Eastman Kodak Company
Annual Reports and Forms 10-K
Dataquest (1990)

1990 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Batesville, Arkansas
Chemical manufacturing
Belle Mead, New Jersey
Health product manufacturing
Canada
Imaging and health product manufacturing
Columbia, South Carolina
Chemical manufacturing
Kingsport, Tennessee
Chemical manufacturing
Lincoln, Illinois
Health product manufacturing
Longview, Texas
Chemical manufacturing
Myerstown, Pennsylvania
Health product manufacturing
Rochester, New York
Copiers, photographic goods, chemical and health
product manufacturing
Windsor, Colorado
Photographic goods and health product
manufacturing

Europe

England
Imaging and chemical manufacturing
France
Imaging and health product manufacturing
Germany
Imaging manufacturing
Ireland
Imaging manufacturing
United Kingdom
Health product manufacturing

Asia/Pacific

Australia
Imaging manufacturing

ROW

Brazil
Imaging manufacturing
Mexico
Imaging manufacturing
Puerto Rico
Health product manufacturing

SUBSIDIARIES

North America

Cook-Waite Laboratories, Inc. (United States)
Cyclotomics, Inc. (United States)
Datatape Incorporated (United States)
Dorothy Gray, Ltd. (United States)
Eastman Canada, Inc. (Canada)
Eastman Chemical International Ltd. (United States)
Eastman Chemical Products, Inc. (United States)
Eastman Gelatine Corporation (United States)
Eastman Kodak Credit Corporation (United States)
Eastman Kodak International Capital Company, Inc.
(United States)
Eastman Kodak International Sales Corporation
(United States)
Eastman Technology, Inc. (United States)
Electronic Pre-Press Systems, Inc. (United States)
Holston Defense Corporation (United States)
Interactive Systems Corporation (United States)
International Biotechnologies, Inc. (Canada)
Kodak Canada, Inc. (Canada)
Minwax Company, Inc. (United States)
Mustang Pipeline Company (United States)
Northfield Pharmaceuticals Limited (United States)
Ogilvie Products, Inc. (United States)
Pinto Pipeline Company of Texas (United States)
R. D. Acquisition Corp. (United States)
Sterling Drug, Inc. (United States)
Sterling Drug Limited (Canada) Eastmanchem, Inc.
(Canada)
Sterling Pharmaceuticals, Inc. (United States)
Sterling Products International, Inc. (United States)
The SDI Divestiture Corp. (United States)
The Sydney Ross Company (United States)
The d-Con Company, Inc. (United States)
Thompson & Formby, Inc. (United States)
Torrey Pines Realty Company, Inc. (United States)
Tussy Cosmetics, Inc. (United States)
Ultra Technologies, Inc. (United States)
Winthrop Products, Inc. (United States)

Europe

Eastman Kodak International Finance B.V. (Netherlands)
 Ecotona Fibres Ltd. (England)
 Hinds GmbH (Germany)
 Kodak A.G. (Germany)
 Kodak AB (Sweden)
 Kodak Ireland Limited (Ireland)
 Kodak Limited (England)
 Kodak Nederland B.V. (The Netherlands)
 Kodak Norge A/S (Norway)
 Kodak Oy (Finland)
 Kodak Portuguesa Limited (Portugal)
 Kodak S.A. (Spain)
 Kodak S.p.A. (Italy)
 Kodak S.A. (Switzerland)
 Kodak A.S. (Denmark)
 Kodak-Pathe (France)
 Maggioni-Winthrop S.p.A. (Italy)
 N.V. Kodak S.A. (Belgium)
 Pharma-Investi S.A. (Spain)
 Saxet (UK) Ltd. (United Kingdom)
 Schulke & Mayr GmbH (Germany)
 Sterling Drug (Ireland) Ltd. (Ireland)
 Sterling Pharmaceutica Portuguesa Lda (Portugal)
 Sterling-Winthrop S.A. (Spain)
 Sterling-Winthrop Group Ltd. (England)
 Sterling-Winthrop, S.A. (France)
 Sterwin A.G. (Switzerland)
 Valda S.A. (France)
 Veraline S.A. (France)

Asia/Pacific

Eastman Kodak (Japan) Ltd. (Japan)
 K.K. Kodak Information Systems (Japan)
 Kodak (Australasia) Proprietary Limited (Australia)
 Kodak (Export Sales) Ltd. (Hong Kong)
 Kodak (Far East) Purchasing, Inc.
 Kodak Imagic K.K. (Japan)
 Kodak Japan Ltd. (Japan)
 Kodak Korea Ltd. (South Korea)
 Kodak New Zealand Limited (New Zealand)
 Kodak Philippines, Ltd. (Philippines)
 Kodak (Singapore) Pte. Limited (Singapore)
 Kodak Taiwan Limited (Taiwan)
 Komal S.B. (Malaysia)
 Sterling Products Pty. Limited (Australia)
 Sterling-Winthrop K.K. (Japan)

ROW

Farmaceutica Argentina S.A. (Argentina)
 Foto Interamericana de Peru, Ltd. (Peru)

Industria Fotografica Interamericana, S.A. de C.V. (Mexico)
 Industria Mexicana de Foto Copiadoras, S.A. de C.V. (Mexico)
 Kodak Brasileira C.I.L. (Brazil)
 Kodak Caribbean, Limited
 Kodak Chilena S.A.F. (Chile)
 Kodak (Egypt), S.A. (Egypt)
 Kodak Export Limited
 Kodak (Kenya) Limited (Kenya)
 Kodak Mexicana, Ltd. (Mexico)
 Kodak Panama, Ltd.
 Kodak Uruguay, Ltd.
 Kodak Venezuela, S.A. (Venezuela)
 Laboratorios Kodak Limitada
 Productos Sterling de Mexico, S.A. de C.V. (Mexico)
 Sterling Products (Nigeria), Ltd. (Nigeria)
 Sterling-Winthrop Products, Inc. (Panama)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS*
*1990***Matsushita Electric Corporation of America**

Kodak and Matsushita Electric have a joint-venture manufacturing facility, the Matsushita-Ultra Tech Battery Corporation, within the Corporate Ridge Industrial Park in Columbus, Georgia. The facility is a 160,000-square-foot plant that manufactures alkaline batteries for Kodak and Panasonic.

*1989***The Walt Disney Company**

Kodak and The Walt Disney Company signed a 15-year, multimillion-dollar contract, making Kodak the official supplier of film, batteries, cameras, and other allied photographic products for Disney.

Unisys Corporation

An original-equipment manufacturer (OEM) agreement was signed for Kodak to design and manufacture high-speed, cut-sheet, electrophotographic printer engines for Unisys Corporation.

*Alliances, joint ventures, licensing agreements, mergers, and acquisitions are traced back only to 1987.

Digital Equipment Corporation

An agreement was signed for Kodak to sell its image management system through DEC. The agreement includes DEC selling Kodak products as part of its computer networks. In addition, DEC will sell Kodak's Imagelink scanners, optical disk systems and libraries, and Ektaprint 1392 printers.

Cultor

Kodak and Cultor formed a 50/50 joint-venture company to produce and market biotechnology chemicals and industrial enzymes.

MEDSTAT Systems

Kodak and MEDSTAT have a service agreement to use MEDSTAT databases and analytical computing services to control the rising cost of Kodak's group health insurance.

Rhone-Poulenc Animal Nutrition

Rhone-Poulenc has acquired an exclusive worldwide license for Kodak's coatings technology and know-how to include protecting the active elements in the stomach of ruminants with polymers or other material.

Rank Cintel

Kodak and Rank Cintel are jointly developing a high-definition telecine, used to transfer film images to video.

Oldelift

Kodak will begin marketing Oldelift's enhanced X-ray imaging systems in the United States along with Philips Medical Systems of North America.

BP Chemicals International

BP Chemicals' gas phase technology will be used by Kodak for its PE plant being built in Longview, Texas.

Archer-Daniels-Midland Co.

An agreement was signed to commercialize Kodak's amino-acid technology for use in animal feed. Under the agreement, ADM has exclusive worldwide marketing and manufacturing rights.

Digital Equipment Corporation

Kodak and DEC entered a marketing agreement in which both companies will work together to market a PostScript networked printer. The two companies will offer DEC customers the expanded option of high-volume, high-quality networked printing with Kodak's Ektaprint 1392 printer, model 24.

Olivetti

Kodak and Olivetti will jointly develop, manufacture, and market 5.25-inch and 3.5-inch optical disk drives for PCs.

Iomega Corporation

Iomega signed an OEM agreement with Kodak whereby Iomega will supply its Bernoulli 5.25-inch 20-megabyte removable mass-storage drives for use in the Kodak Ektaprint Input Processor (KIP).

1988

PMP Distribution, Inc.

An agreement was signed in which PMP will handle US sales and distribution of the Kodak Displaymaker videographics system and related accessories.

1987

Cygnat Systems

A multimillion dollar original-equipment manufacturer agreement gives Kodak limited rights to manufacture Cygnat's Series 1800 Expandable Jukebox. Kodak will incorporate the Series 1800 Expandable Jukebox into its integrated office system, called the Kodak KIMS system.

MERGERS AND ACQUISITIONS

1988

Sterling Drug, Inc.

Kodak acquired Sterling Drug, which enabled Kodak to add new products, markets, and abilities to its growing Eastman Pharmaceuticals organization.

KEY OFFICERS

Kay R. Whitmore

Chairman, chief executive officer, and president

Robert L. Long

Senior vice president, Corporate Planning

Edwin P. Przybylowics
Senior vice president, Research

Richard T. Bourns
Senior vice president, Manufacturing and
Distribution

Frank P. Strong, Jr.
Group vice president, Commercial Systems Group

Earnest W. Deavenport
Group vice president, Eastman Chemical Company

Leo J. Thomas
Group vice president, Health Group

Lawrence J. Matteson
Group vice president, Imaging Information
Systems Group

Wilbur J. Prezzano
Group vice president, International Group

William E. Fowble
Group vice president, Photographic Products
Group

PRINCIPAL INVESTORS

Information is not available.

FOUNDER

George Eastman

Table 3
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	\$5,677.0	\$5,811.0	\$6,791.0	\$8,684.0	\$8,591.0
Cash	161.0	145.0	702.0	848.0	1,095.0
Receivables	2,346.0	2,563.0	3,144.0	4,071.0	4,245.0
Marketable Securities	652.0	468.0	290.0	227.0	184.0
Inventory	1,940.0	2,072.0	2,178.0	3,025.0	2,507.0
Other Current Assets	578.0	563.0	477.0	513.0	560.0
Net Property, Plants	\$5,977.0	\$6,276.0	\$6,663.0	\$8,013.0	\$8,628.0
Other Assets	\$488.0	\$815.0	\$1,244.0	\$6,267.0	\$6,433.0
Total Assets	\$12,142.0	\$12,902.0	\$14,698.0	\$22,964.0	\$23,652.0
Total Current Liabilities	\$3,325.0	\$3,791.0	\$4,140.0	\$5,850.0	\$6,573.0
Long-Term Debt	\$988.0	\$911.0	\$2,382.0	\$7,779.0	\$7,376.0
Other Liabilities	\$1,267.0	\$1,812.0	\$2,163.0	\$2,555.0	\$3,061.0
Total Liabilities	\$5,580.0	\$6,514.0	\$8,685.0	\$16,184.0	\$17,010.0
Total Shareholders' Equity	\$6,562.0	\$6,388.0	\$6,013.0	\$6,780.0	\$6,642.0
Converted Preferred Stock	NA	NA	NA	NA	NA
Common Stock	621.0	622.0	933.0	934.0	934.0
Other Equity	(769.0)	(767.0)	(2,059.0)	(2,076.0)	(2,094.0)
Retained Earnings	6,710.0	6,533.0	7,139.0	7,922.0	7,802.0
Total Liabilities and Shareholders' Equity	\$12,142.0	\$12,902.0	\$14,698.0	\$22,964.0	\$23,652.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$10,631.0	\$11,550.0	\$13,305.0	\$17,034.0	\$18,398.0
US Revenue*	8,291.0	8,457.6	9,315.9	11,729.0	12,790.0
Non-US Revenue	2,340.0	3,092.4	3,989.1	5,305.0	5,608.0
Cost of Sales	\$7,129.0	\$7,613.0	\$8,004.0	\$9,727.0	\$11,075.0
R&D Expense	\$838.0	\$1,059.0	\$992.0	\$1,147.0	\$1,253.0
SG&A Expense	\$2,378.0	\$2,693.0	\$3,190.0	\$4,495.0	\$4,857.0
Capital Expense	NA	NA	NA	NA	NA
Pretax Income	\$530.0	\$598.0	\$1,984.0	\$2,263.0	\$925.0
Pretax Margin (%)	4.99	5.18	14.91	13.29	5.03
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	\$332.0	\$374.0	\$1,178.0	\$1,397.0	\$529.0
Shares Outstanding, Millions	227.3	338.6	334.7	324.2	324.3
Per Share Data					
Earnings	\$1.46	\$1.10	\$3.52	\$4.31	\$1.63
Dividend	NA	NA	NA	NA	NA
Book Value	\$28.87	\$18.87	\$17.97	\$20.91	\$20.48

Table 3 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.71	1.53	1.64	1.48	1.31
Quick (Times)	1.12	0.99	1.11	0.97	0.93
Fixed Assets/Equity (%)	91.09	98.25	110.81	118.19	129.90
Current Liabilities/Equity (%)	50.67	59.35	68.85	86.28	98.96
Total Liabilities/Equity (%)	85.04	101.97	1,444.44	238.70	256.10
<i>Profitability (%)</i>					
Return on Assets	-	2.99	8.54	7.42	2.27
Return on Equity	-	5.78	19.00	21.84	7.88
Profit Margin	3.12	3.24	8.85	8.20	2.88
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	7.88	9.17	7.46	6.73	6.81
Capital Spending % of Revenue	NA	NA	NA	NA	NA
Employees	128,950	121,450	124,400	145,300	137,750
Revenue (\$K)/Employee	\$82.44	\$95.10	\$106.95	\$117.23	\$133.56
Capital Spending % of Assets	NA	NA	NA	NA	NA

*US revenue includes sales from Canada.
 NA = Not available

Source: Eastman Kodak Company
 Annual Reports and Forms 10-K
 Dataquest (1990)

General Electric Company

3135 Easton Turnpike
Fairfield, Connecticut 06431
Telephone: (203) 373-2431
Fax: (203) 373-2658
Dun's Number: 00-136-7960

Date Founded: 1892

CORPORATE STRATEGIC DIRECTION

General Electric Company (GE) is one of the world's largest diversified manufacturers of technological products and services. The Company's operations are highly decentralized. Its management units are grouped according to the principal industries in which the Company participates. General Electric operates in thirteen business areas: Aerospace, Communications and Services, Electrical Distribution and Control, Industrial and Power Systems, Medical Systems, Plastics, Aircraft Engines, Transportation Systems, Motors, Broadcasting, Lighting, Appliances, and Financial Services.

Approximately one-fifth of GE's external sales are to agencies of the US government, which is the Company's largest single customer. Most of those sales are of aerospace products and services, aircraft engines, and related products and services.

International sales were \$6.8 billion,* representing 12.4 percent of total revenue in 1989. GE has majority, minority, or other joint venture interests in a number of foreign companies engaged primarily in manufacturing and distributing products and providing services outside the United States similar GE's domestic activities. These include cooperation with the Czechoslovakian Aviation Industry on a turboprop aircraft to be powered by GE's CT7-9B turboprop engines; a mobile communications joint venture with Ericsson of Sweden; establishment of joint ventures in appliances, power generation, and electrical equipment with GEC of the United Kingdom; initiation of joint ventures in motors with Robert Bosch of Germany; and an agreement to acquire a majority interest in the Tungsram Company of Hungary.

*All dollar amounts are in US dollars.

Total revenue increased 9 percent to \$54.6 billion in fiscal 1989 from \$50.1 billion in fiscal 1988. Net earnings increased 16 percent to \$3.9 billion in fiscal 1989 from \$3.4 billion in fiscal 1988. General Electric employs 275,000 people worldwide.

R&D expenditure totaled \$1.3 billion in fiscal 1989, representing 2.4 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. Information about revenue by distribution channel is not available. Table 3, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Aerospace

GE Aerospace has begun to counter the expected declines in US defense procurement levels and increasing global competition by reducing costs, enhancing efficiency and productivity, and strategically positioning itself for the 1990s. Key among those actions was the establishment of the Aerospace Operations Division, which is responsible for all manufacturing, purchasing, sourcing, and quality control throughout GE's aerospace business. Also, GE is restructuring its aerospace unit in Syracuse, New York, into two new divisions to concentrate on the sonar and radar markets. The sonar unit will be named the Ocean Systems Division, headquartered in Syracuse; the radar unit will be called Government Electronic Systems Division, headquartered in Morristown, New Jersey.

GE Aerospace expanded its business base in 1989 by winning several important competitive bids. The new programs include the US Army's Tactical Command and Control System (ATCCS) and the US Air Force's next generation of 20 Navstar global positioning satellites and flight controls for the C-17 transport aircraft.

Orders from international customers and technology licensing to foreign partners amounted to nearly \$1 billion, more than double those of the year before. Major contracts from overseas were received for communications satellites, surveillance radars, and flight simulators.

GE's diverse line of aerospace programs ranges from satellites and radar air defense systems to undersea combat systems and sonars. Products also include military data systems, visual simulation systems, armament systems, transmissions and turret stabilization systems for tracked vehicles, fire control and guidance systems, automated test systems, and aircraft electronics and communications systems.

Communications and Services

The six operating components of the Communications and Services business segment provide computers, satellites, and other advanced technologies for communications applications. GE Information Services supplies network-based services that integrate computers, software, and communications systems to a variety of industries, including worldwide financial, energy, and transportation businesses. GE American Communications provides satellite communications.

GE Mobile Communications formed a joint venture with Ericsson of Sweden that will produce mobile radio systems and cellular telephones for the international market and will serve the US and Canadian markets for cellular telephone systems.

GE Governmental Services provides technical, scientific, and management services for federal, state, and local governments. GE Consulting Services provides consulting and software services, and GE Computer Services provides service, rental, leasing, and repair of computers and other related equipment.

Electrical Distribution and Control

GE Electrical Distribution and Control provides products that protect and control electrical power and equipment. This group introduced its new integrated

Spectra Series line of panelboards, switchboards, busways, and Spectra RMS circuit breakers in 1989.

Internationally, GE established a joint business interest with GEC of the United Kingdom. Under the 50-50 joint venture, GE's Italian-based affiliate (COGEMEC) was combined with GEC's Belgian-based Vynicker N.V. and French-based Unelec to create a European business that manufactures and markets distribution and control equipment in the European market.

Industrial and Power Systems

GE Industrial and Power Systems serves worldwide utility, industrial, and governmental customers with products for the generation, transmission, and distribution of electricity, and related installation, engineering, and repair devices.

Medical Systems

GE Medical Systems serves the global market through three regional organizations: General Electric CGR serving the European market, GE Medical Systems-Asia serving the Asia/Pacific market, and GE Medical Systems-Americas serving the US market. These organizations provide magnetic resonance (MR) scanners, computed tomography (CT) scanners, and X-ray, nuclear imaging, ultrasound, and other diagnostic equipment and supporting services sold to domestic and international hospitals and medical facilities.

In 1989, General Electric CGR made a number of key product introductions, including the Stenoscope II mobile surgical system and the compact Saturne 41 linear accelerator for radiation oncology. Also in 1989, GE acquired GEC's medical equipment sales and services activities in the United Kingdom.

GE Medical Systems-Asia continued to strengthen its Asian market presence through GE's 75 percent-owned Japanese joint venture, Yokogawa Medical Systems, which opened a new headquarters and manufacturing facility near Tokyo. New products introduced in 1989 include new computed tomography products such as Sytec 3000 and CT Pace Plus systems and the RT 6800 color-flow ultraflow scanner.

GE Medical Systems-Americas' major product introductions in 1989 included the Signa Advantage MR system and the CT HiLight Advantage system. During the year, GE positioned itself with intentions of becoming a world leader in the emerging area of positron emission tomography (PET). It formed an alliance with Scanditronix AB of Sweden in which GE acquired Scanditronix's PET scanner business. GE also entered into a joint development agreement with Hamamatsu Photonics of Japan involving light detection devices for use in PET scanners.

Other Businesses

GE's other businesses comprise Plastics, Aircraft Engines, Transportation Systems, Motors, Broadcasting, Lighting, Appliances, and Financial Services.

Further Information

For more information about the Company's business segments, please contact Dataquest's Components Group.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$29,252.0	\$36,725.0	\$48,158.0	\$50,089.0	\$54,574.0
Percent Change	-	25.55	31.13	4.01	8.95
Capital Expenditure	-	-	-	-	-
Percent of Revenue	0	0	0	0	0
R&D Expenditure	\$1,069.0	\$1,300.0	\$1,194.0	\$1,155.0	\$1,334.0
Percent of Revenue	3.65	3.54	2.48	2.31	2.44
Number of Employees	304,000	359,000	257,000	298,000	275,000
Revenue (\$K)/Employee	\$96	\$102	\$187	\$168	\$198
Net Income	\$2,277.0	\$2,492.0	\$2,915.0	\$3,386.0	\$3,939.0
Percent Change	-	9.44	16.97	16.16	16.33
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$11,898.00	\$13,431.00	\$13,000.00	\$16,200.00	
Quarterly Profit	\$849.00	\$972.00	\$945.00	\$1,173.00	

Source: General Electric Company
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	88.55	89.90	92.11	90.82	87.60
International	11.45	10.10	7.89	9.18	12.40
Europe	4.00	4.00	3.00	4.00	5.00
Asia/Pacific	3.00	3.00	2.00	3.00	4.00
ROW	4.00	3.00	3.00	3.00	2.00

Source: General Electric Company
Annual Reports and Forms 10-K
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

Worldwide

General Electric's operations are carried on at 209 manufacturing plants located in 35 states in the United States and Puerto Rico and 82 manufacturing plants located in 22 other countries.

SUBSIDIARIES

North America

Caribe General Electric Products Inc. (United States)
 Employers Reinsurance Corp. (United States)
 General Electric Canadian Holdings Ltd. (Canada)
 General Electric Capital Corp. (United States)
 General Electric Financial Services Inc. (United States)
 Kidder, Peabody Group Inc. (United States)
 National Broadcasting Company Inc. (United States)

Europe

General Electric Plastics B.V. (Sweden)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Czechoslovakian Aviation Industry

General Electric Aircraft Engines will cooperate with the Czechoslovakian Aviation Industry on a turboprop aircraft to be powered by GE's CT7-9B turboprop engines. The deal has been approved by both governments. GE expects more than \$300 million in business from the deal, not counting spare parts.

Ishikawajima-Harima Heavy Industries Company, Ltd. (IHI)

General Electric has invited IHI to participate in the development of the GE90 jet engine, designed for use with large cargo planes. GE will invest 60 percent, IHI up to 10 percent, and other companies, including two European manufacturers, will provide the remainder.

Samsung Aerospace Industries

Samsung Aerospace Industries (South Korea) will manufacture F404-GE-402 enhanced performance engine (EPE) parts under a normal licensed coproduction agreement with General Electric Aircraft Engines. GE has a three-phase, five-year contract to supply 252 of the engines to South Korea for use in 120 F/A-18 fighter aircraft from McDonnell Douglas. The license deal calls for all but the sensitive technology to be transferred to Samsung.

1989

General Electric Plc (GEC)

General Electric and GEC, an unrelated corporation in the United Kingdom, formed a joint venture to combine their interests in appliances and electrical controls.

Fanuc

General Electric and Fanuc (Luxembourg), a producer of numerical and freely programmable machine tools, formed a 50-50 joint venture. The new company, GE Fanuc, will build numerical and freely programmable machine tools.

EniChem Synthesis

General Electric and EniChem Synthesis, a fine chemicals arm of the Enimont Group in Italy, entered into a licensing agreement. Under the agreement, EniChem Synthesis will license its technology for making dimethylcarbonate and diphenylcarbonate to GE.

Tungsram

General Electric and Tungsram (Hungary) formed a joint venture to offer a range of domestic and energy-saving lighting, as well as halogen lamps.

Ericsson

General Electric and Ericsson (Sweden) formed a joint venture, Ericsson-GE Mobile Communications, to manufacture mobile radio equipment, cellular telephones, and Mobitex mobile data communications gear that will be sold worldwide.

Thomson-CSF and Eurodisplay

General Electric, Thomson-CSF, and Eurodisplay jointly formed Thomson-LCD (France) to manufacture liquid-crystal displays (LCDs) for Sextant Avionique systems. Production of the LCDs, which will initially be used in military aircraft and warships, will begin in the latter half of 1990.

Asahi Diamond Industrial

General Electric and Asahi Diamond Industrial will form a joint venture, SP Pacific, to develop a process to produce technical-use diamonds inexpensively in various forms and quantities. Wear-resistant diamond coatings are expected to be the joint venture's first pursuit.

Mitac

General Electric and Mitac's defense business division formed a joint venture, Getac, to offer workstations and information equipment in Taiwan. General Electric will provide the financial and technical support, and Mitac will handle supervision. Eventually, the new venture will export its products outside Taiwan, using Mitac's distribution channel.

Scanditronix AB

General Electric and Scanditronix AB (Sweden) entered into a strategic alliance in which GE acquired Scanditronix's PET scanner business.

Hamamatsu Photonics

General Electric and Hamamatsu Photonics (Japan) entered into a joint development agreement involving light detection devices for use in PET scanners.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

John F. Welch, Jr.

Chairman of the board and chief executive officer

Lawrence A. Bossidy

Vice chairman of the board and executive officer

Edward E. Hood, Jr.

Vice chairman of the board and executive officer

Paul W. Van Orden

Executive vice president

Dennis D. Dammerman

Senior vice president, Finance

Frank P. Doyle

Senior vice president, Relations

Benjamin W. Heineman, Jr.

Senior vice president, general counsel and secretary

Jack O. Peiffer

Senior vice president, Executive Management

Walter L. Robb

Senior vice president, Research and Development

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

Table 3
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	\$12,546.0	\$14,288.0	\$15,739.0	\$80,663.0	\$94,451.0
Cash	1,606.0	1,698.0	1,834.0	2,456.0	2,258.0
Receivables	6,040.0	7,208.0	6,782.0	47,311.0	54,231.0
Marketable Securities	951.0	221.0	858.0	24,410.0	31,307.0
Inventory	3,949.0	5,161.0	6,265.0	6,486.0	6,655.0
Other Current Assets	-	-	-	-	-
Net Property, Plants	\$7,900.0	\$9,841.0	\$9,255.0	\$13,611.0	\$15,646.0
Other Assets	\$5,716.0	\$10,462.0	\$13,926.0	\$16,591.0	\$18,247.0
Total Assets	\$26,162.0	\$34,591.0	\$38,920.0	\$110,856.0	\$128,344.0
Total Current Liabilities	\$8,919.0	\$11,461.0	\$12,671.0	\$61,800.0	\$73,902.0
Long-Term Debt	\$753.0	\$4,351.0	\$4,491.0	\$15,082.0	\$16,110.0
Other Liabilities	\$2,819.0	\$3,670.0	\$5,278.0	\$15,517.0	\$17,442.0
Total Liabilities	\$12,491.0	\$19,482.0	\$22,440.0	\$92,399.0	\$107,454.0
Total Shareholders' Equity	\$13,671.0	\$15,109.0	\$16,480.0	\$18,466.0	\$20,890.0
Common Stock	579.0	579.0	584.0	584.0	584.0
Other Equity	331.0	358.0	18.0	(68.0)	(46.0)
Retained Earnings	12,761.0	14,172.0	15,878.0	17,950.0	20,352.0
Total Liabilities and Shareholders' Equity	\$26,162.0	\$34,591.0	\$38,920.0	\$110,865.0	\$128,344.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$29,252.0	\$36,725.0	\$48,158.0	\$50,089.0	\$54,574.0
US Revenue	25,903.0	33,016.0	44,359.0	45,490.0	47,805.0
Non-US Revenue	3,349.0	3,709.0	3,799.0	4,599.0	6,769.0
Cost of Sales	\$20,843.0	\$26,187.0	\$29,649.0	\$28,831.0	\$29,700.0
R&D Expense	\$1,069.0	\$1,300.0	\$1,194.0	\$1,155.0	\$1,334.0
SG&A Expense	\$4,594.0	\$5,963.0	\$5,979.0	\$6,250.0	\$6,692.0
Capital Expense	-	-	-	-	-
Pretax Income	\$3,432.0	\$3,689.0	\$3,277.0	\$4,721.0	\$5,703.0
Pretax Margin (%)	11.73	10.04	6.70	9.43	10.45
Effective Tax Rate (%)	33.30	32.50	34.30	28.30	30.90
Net Income	\$2,277.0	\$2,492.0	\$2,915.0	\$3,386.0	\$3,939.0
Shares Outstanding, Millions	455.4	456.3	902.9	902.1	904.8
Per Share Data					
Earnings	\$5.00	\$5.46	\$3.20	\$3.75	\$4.36
Dividend	\$2.23	\$2.37	\$1.32	\$1.46	\$1.70
Book Value	\$30.02	\$33.11	\$18.25	\$20.47	\$23.09

Table 3 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.41	1.25	1.24	1.31	1.28
Quick (Times)	0.96	0.80	0.75	1.20	1.19
Fixed Assets/Equity (%)	57.79	65.13	56.16	73.71	74.90
Current Liabilities/Equity (%)	65.24	75.86	76.89	334.67	353.77
Total Liabilities/Equity (%)	91.37	128.94	136.17	500.37	514.38
<i>Profitability (%)</i>					
Return on Assets	-	8.20	7.93	4.52	3.29
Return on Equity	-	17.32	18.46	19.38	20.02
Profit Margin	7.78	6.79	6.05	6.76	7.22
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	3.65	3.54	2.48	2.31	2.44
Capital Spending % of Revenue	0	0	0	0	0
Employees	304,000	359,000	257,000	298,000	275,000
Revenue (\$K)/Employee	\$96	\$102	\$187	\$168	\$198
Capital Spending % of Assets	0	0	0	0	0

Source: General Electric Company
Annual Reports and Forms 10-K
Dataquest (1990)

GM Hughes Electronics Corporation

3044 West Grand Boulevard

Detroit, Michigan 48202

Telephone: (313) 556-3510

Fax: (313) 974-4487

Dun's Number: 00-535-6613

Date Founded: 1985

CORPORATE STRATEGIC DIRECTION

GM Hughes Electronics Corporation (GMHE), through its two major subsidiaries, Hughes Aircraft Company (Hughes) and Delco Electronics Corporation, is a world leader in advanced automotive, defense, and space electronics. GMHE became a wholly owned subsidiary of General Motors effective December 31, 1985, coincident with GM's acquisition of Hughes for \$2.7 billion.*

Hughes and Delco Electronics continued joint and separate work in 1988 to develop new automotive electronic products and systems. Hughes was involved in almost 150 different projects to transfer aerospace technologies to automotive uses, both in motor vehicles and in plants. Two of the earliest projects to pay off have been the development of an automotive Head Up Display (HUD), and a holographic Center High-Mounted Stop Light (CHMSL).

The Company's total revenue increased 1 percent to \$11.4 billion in fiscal 1989 from \$11.2 billion in fiscal 1988. Net income decreased 3 percent to \$632.4 million in fiscal 1989 from \$653.3 million in fiscal 1988. GMHE employs 75,000 people worldwide.

Research and development expenditures totaled \$592 million in fiscal 1989, representing 5 percent of revenue. In 1989, the Hughes Research Laboratories claimed that it had developed the world's fastest transistor. The device is operated at a frequency of 250 GHz (250 billion cycles per second), 20 percent faster than any previously reported speed.

Capital spending totaled \$649 million in fiscal 1989, representing 6 percent of revenue.

*All dollar amounts are in U.S. dollars.

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

Hughes Aircraft Company

In fiscal 1989, Hughes Aircraft revenue totaled \$7.44 billion, up from \$7.40 billion in fiscal 1988. New orders totaled \$8.7 billion, up from \$6.4 billion in the prior year.

In response to changing conditions in Hughes' lines of business, the Company has begun to broaden its business base to nonmilitary areas while still serving the military market. This new strategy also includes being more selective when bidding on development contracts that require front-end investment to ensure that the probable long-term financial return is adequate, increasing international business by upgrading existing systems and codeveloping or coproducing new systems with international partners, and expanding Hughes' business in such commercial areas as telecommunications and simulation and training.

Hughes is organized into seven operating groups, six of which are engaged in prime contract business. The seventh group supplies high-technology components to the Company's systems group and also markets its products externally. The seven operating groups are Electro-Optical and Data Systems, Ground Systems, Missiles Systems, Radar Systems, Space and Communications, Training and Support Systems, and Industrial Electronics.

The Electro-Optical and Data Systems Group designs and manufactures electro-optical sensors, weapon control systems, and information processing systems for space, aircraft, and surface applications.

The Ground Systems Group develops and builds systems for automated airspace management, jam-resistant communications, land- and ship-based radar, undersea warfare, military displays, sonar, and electronic warfare systems.

The Missile Systems Group designs, develops, and manufactures tactical guided missiles, guidance and control systems, and launchers.

The Radar Systems Group produces airborne radar or weapon control systems for three of the four current frontline U.S. tactical aircraft. The group designs and builds avionics systems, airborne radar reconnaissance/surveillance systems, airborne electronic warfare systems, data links, and related displays and controls, including automotive displays.

The Space and Communications Group produces spacecraft for national defense, communications, weather observation, and scientific space exploration. It also provides large-scale information processing systems and services, and operates and sells satellite communications services and terrestrial private business networks. Two-thirds of this business is related to national defense.

The Training and Support Systems Group designs and develops advanced simulation, visual, and display systems for a variety of commercial and military requirements. The organization also designs and fabricates various automatic test systems and provides integrated logistic support for aerospace products worldwide. The group became a major competitor in the training and simulation market with the acquisition of Rediffusion Simulation, which has facilities in Canada and Texas. Rediffusion Simulation is one of the world's largest suppliers of civil and military flight simulators. Also, in December 1988, Hughes acquired Honeywell's Training and Control Systems Division, one of the leading providers of

electronic-simulation-based military training systems. The group also established Hughes Training Systems Inc. to provide the total training services required for military and civil aircrews.

The Industrial Electronics Group develops, produces, and markets high-technology components for a variety of industrial, defense, commercial, and scientific applications. One-third of the group's efforts are dedicated to supplying the specialized custom components required by the Company's systems organizations. The balance of the group's sales are made to customers in the electronics and associated industries.

In addition to Hughes' seven operating groups, the Company has three major organizations that provide research and development innovations, and the unique products and technology required by the major systems groups. The three laboratories are the Hughes Research Laboratories, the Santa Barbara Research Center, and the Hughes Microelectronics Center.

Delco Electronics Corporation

In fiscal 1989, Delco Electronic's total revenue was \$4.0 billion, up from \$3.8 billion in fiscal 1988.

Delco Electronics consists of six strategic business units (SBUs): International, Automotive Electronics, Audio Systems, Instrumentation and Air Controls, IC Delco and Delco Systems Operations, and Delco Systems Operations. IC Delco and Delco Systems Operations fabricates custom ICs to support Delco products.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service. Dataquest tracks GM Hughes Electronics through its Military Aerospace Technology Market Industry Service Group.

Table 1
Five-Year Corporate Highlights (Millions of U.S. Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$9,503.8	\$10,440.0	\$10,481.0	\$11,243.6	\$11,359.0
Percent Change	-	9.85	0.39	7.28	1.03
Capital Expenditure	\$744.0	\$700.6	\$469.4	\$533.0	\$648.5
Percent of Revenue	7.83	6.71	4.48	4.74	5.71
R&D Expenditure	\$392.8	\$408.1	\$416.0	\$550.9	\$592.0
Percent of Revenue	4.13	3.91	3.97	4.90	5.21
Number of Employees	105,000	102,000	100,000	97,000	75,000
Revenue (\$K)/Employee	\$90.51	\$102.35	\$104.81	\$115.91	\$151.45
Net Income	\$339.8	\$445.1	\$521.1	\$653.3	\$632.4
Percent Change	-	30.99	17.07	25.37	(3.20)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$3,012.40	\$2,881.30	\$2,577.00	\$2,888.30	
Quarterly Profit	\$172.90	\$203.10	\$110.60	\$145.80	

Source: GM Hughes
Annual Reports and Forms 10-K
Dataquest
1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	89.10	89.34	88.38	87.65	86.53
International	10.90	10.66	11.62	12.35	13.47

Source: GM Hughes
Annual Reports and Forms 10-K
Dataquest
1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	90.00	90.00
Indirect Sales	10.00	10.00

Source: Dataquest
1990

1990 SALES OFFICE LOCATIONS—HUGHES AIRCRAFT COMPANY

North America—12
Europe—10
Japan—1
Asia/Pacific—4
ROW—2

1990 SALES OFFICE LOCATIONS—DELCO ELECTRONICS CORPORATION

North America—3
Europe—4
Japan—1
Asia/Pacific—4

MANUFACTURING LOCATIONS—HUGHES AIRCRAFT COMPANY

*Missiles Systems Group: Canoga Park, California;
Tucson, Arizona; La Grange, Georgia*

This group specializes in the development and production of advanced tactical guided missile systems. Associated fields of interest include missile guidance and propulsion systems, missile launch equipment, and ancillary subsystems and components; production of the Phoenix (AIM-54C) long air-to-air missile; and production of the Tube-launched, Optically-tracked, Wire-guided (TOW) heavy antitank missile. The Missile Systems Group also has a contract to develop a wireless version. The group also produces the Maverick (AGM-65DF/F/G) air-to-ground missile for the Air Force and Marine Corps with Raytheon as the second source; the AMRAAM (AIM-120A) Advanced Medium-Range Air-to-Air Missile, which replaces the Sparrow (AIM-7) with Raytheon again as the second source. The AMRAAM program also includes defense systems, land combat systems, missile development, naval systems, and strike systems; production of the Angle Rate Bombing Set (ARBS) for improving day and night bombing accuracy for

the A-4M Skyhawk and AV-8B Harrier, production of the IR guidance section for the Air Force's GBU-15 air-to-surface glide weapon; and validation/demonstration of the Advanced Anti-Tank Weapon System Medium (AAWSM).

Radar Systems Group: El Segundo, California

This group engages principally in the development and production of aerospace radars, radar-based avionics systems, synthetic aperture radars, airborne weapon control systems, aerospace displays and controls, aerovehicle dedicated data links, airborne electronic countermeasures/countermeasures equipment, and airborne computers. It also is involved in the production of aircraft and missile instrumentation and airborne and underwater telemetry equipment; the F-14 program, the F-15 program, the F/A-18 program, and product operations; production of the APG-65 radar used on the F/A-18 Hornet and selected for the upgrade on the German F-4F Phantom; production of the APG-70 radar, replacing the APG-63, which will be installed in the F-15s and dual-role F-15Es; production of the APG-71 radar for the F-144D Super Tomcat, whose predecessor was the AWG-9 System; development and production of the AXQ-14 Data Link, a two-way communications system providing an extended weapon control capability for the GBU-15 guided weapon; production of the Advanced Synthetic Aperture Radar System (ASAR-2) for the Air Force TR-1, which provides real-time, high-resolution ground maps; development and production of Head Up Display (HUD) for Sweden's JAS-39 Gripen fighter-attack-reconnaissance aircraft; development of laser radar, teamed with General Dynamics, for the Cruise Missile Advanced Guidance Demonstration Program; development of the Airborne Shared Aperture Program to integrate radar, electronic countermeasures, and electronic support measures into one system; and modification of the AWG-9 weapons control system on the F-14.

Space and Communications Group: El Segundo, California

This group specializes in the development and production of earth satellites for telecommunications, earth observation, and meteorology; and payloads for space exploration. Additional responsibilities include deep-space communications equipment. Supporting

capabilities include sophisticated antenna systems design; hydraulic, mechanical and thrust-generating components for space station keeping and altitude control; space-qualified microwave and electronics components; and space environmental test facilities. Other activities include development and production of commercial systems, defense information systems, government electronic systems, product operations, and systems applications; new work with INTELSAT; development of a space battery; preliminary design for the National Test Bed; and production of Ireland and Japan's first commercial communications satellite systems.

Ground Systems Group: Fullerton, California

This group develops and produces automated command-and-control and tactical air defense environment systems, civilian air traffic control systems, communications systems and equipment, radar systems, electronic warfare systems, sonar systems and sonar-guided torpedos, data processing and display systems, land mine warfare systems, command-and-control systems, quality systems, operations systems, software engineering, and training systems. It also is involved in the development and production of the UYQ-21 navy tactical display system, an automated air traffic control system for Korea, and air defense radars for Norway. It has a development contract for replacement of the U.S. air traffic control system and is involved in the production and development of weapon control display systems for the navy, the army's Enhanced Position Location Reporting System (EPLRS), a sonar based on low-frequency acoustic sensors, TPQ-36 radar, TPQ-37(V)4 radar, Surveillance Towed Array Sonar Systems, electronics for a battlefield mine, and SLQ-17A Naval Electronic Warfare system.

Electro-Optical and Data Systems Group: El Segundo, California

This group engages principally in the development and production of electro-optical sensors and fire control systems for use in space, airborne, and surface applications; tactical and high-energy laser systems; and aerospace computers, signal and data processors, and software systems. Additional responsibilities include design and manufacturing of components, materials, and processes. Advanced tactical programs, product operations, software engineering, space and strategic systems, tactical engineering, tactical

programs, and technology support. Additional development and production include guidance electronic assemblies for the Trident II, thermal imaging and laser range finders for the M-1 tank, a thermal imaging system for the F/A-18 Hornet, a turret-mounted night vision system for U.S. customs, day-night vision sights for the TOW missile, a Marine Corps laser target-pinpointing device, an advanced carbon dioxide laser radar, a small-package advanced computer, the IMPRINT beyond visual range aircraft identification, laser range finders, the Sea Lite Beam Director (SLBD), a thermal imaging system for the army's Cobra helicopter, and the TOW weapon subsystem for the army's Bradley Fighting Vehicle.

Support Systems: Long Beach, California

This group designs and fabricates test equipment and training and engineering simulators. It provides integrated logistic support of aerospace products, including field engineering, field installation and modification, repairs, provisions, and training and technical publications. It also performs range systems engineering, site activation and operation, field service and support, support program development, and develops test and training systems. Additional development and production includes the weapons tactics trainer for the F/A-18 Hornet, a simulator for the Advanced Tactical Fighter (ATF), the REALSCENE high-resolution, real-time visual and sensor system, Weapon Systems Test Sets for the Marine Corps, and TOW testing for the Bradley Fighting Vehicle.

Research Laboratories: Malibu, California

This group engages in long-range applied research, principally in physics and electronics. Major areas of research include solid-state microwave devices and circuits; submicron microelectronics, VLSI techniques, and gallium arsenide (GaAs) integrated circuits; ion beam technology, including ion propulsion systems; lasers and electro-optical components; fiber and integrated optics; materials for infrared sensors; pattern recognition and artificial intelligence systems; display devices; and new electronic materials. The group also engages in chemical physics, exploratory studies, ion physics, optical circuits, optical physics, plasma physics, and silicon integrated circuits.

Santa Barbara Research Center: Goleta, California

This group engages in advanced infrared technology, electro-optical technology, and fire sensing and suppression systems.

Industrial Electronics Group: Torrance, California

This group develops and produces advanced systems components and equipment used in a variety of scientific, industrial, military, and commercial applications. Broad areas of interest include microwave and millimeter-wave instruments, devices, components, and systems; image sensing; storage and display devices; industrial and commercial lasers; production and automation equipment, multiplex wire and secure voice communication systems; hybrid microcircuits; connectors and cable assemblies; solar cells; high-power, high-frequency traveling wave tubes; memory modules for high-speed computers; microwave integrated circuits for phase-array radars using GaAs; and high-power hybrid microcircuits.

*Microelectronics Center: Carlsbad, California;
Newport, California*

This center develops and produces custom and semicustom monolithic integrated circuits, including gate arrays, very high-speed integrated circuit (VHSIC) class and other VLSI devices, and infrared focal plane components.

Other Industrial Electronics Group Facilities:

Irvine, California—This site has two facilities, one to develop and manufacture connecting devices and one to develop and manufacture microelectronic systems.

Carlsbad, California—This site develops and produces industrial products.

Newport Beach, California—This site develops and produces microelectronic circuits.

**MANUFACTURING
LOCATIONS—DELCO ELECTRONICS
CORPORATION**

Kokomo, Indiana

The Delco Systems Operating Group (DSO) produces computers, guidance, navigation, and avionics systems for commercial and military air and space vehicles, as well as armament systems for armored vehicles.

SUBSIDIARIES

North America

Advanced Electronics Systems International (United States)
Delco Electronics Corporation (United States)
Delco Electronics Overseas Corp. (United States)
Delco Electronics Service Corp. (United States)
ESAL Company (United States)
Hughes Advanced Systems Company (United States)
Hughes-Aircraft Alabama (United States)
Hughes Aircraft Co. Inc. (United States)
Hughes Aircraft Company (United States)
Hughes Aircraft Holdings Canada Inc. (Canada)
Hughes Aircraft International Services Co. (United States)
Hughes Aircraft Mississippi Inc. (United States)
Hughes Aircraft South Carolina (United States)
Hughes Aircraft Systems Canada Ltd. (Canada)
Hughes Aircraft Systems International (United States)
Hughes Communications Inc. (United States)
Hughes Foreign Sales Corp. (U.S. Virgin Islands)
Hughes Georgia Inc. (United States)
Hughes International Inc. (United States)
Hughes International Sales Corp. (United States)
Hughes Investment Management Co. (United States)
Hughes Missiles Electronics (United States)
Hughes Nadge Corp. (United States)
Hughes Network Systems Inc. (United States)
Hughes Optical Products Inc. (United States)
Hughes Simulation Systems Inc. (United States)
Hughes Systems International (United States)
Hughes Technical Services Co. (United States)
Hughes Training Systems, Inc. (United States)
International Electronics Systems (United States)
L-T Ranches Inc. (United States)
MDP Ltd. (United States)
Rediffusion Commercial Simulation Inc. (United States)
Rediffusion Simulation (Canada) Inc. (Canada)
Rediffusion Simulation Inc. (United States)
Santa Barbara Research Center (United States)
Spectrolab Inc. (United States)
Systems Building Corp. (United States)

Europe

Atlantic Satellites Ltd. (Ireland)
DCC Ltd. (United Kingdom)
Hughes Information Systems (Netherlands)
Hughes (U.K.) Ltd. (England)
Husint S.A. (Switzerland)

Asia/Pacific

GM Singapore Pte. Ltd. (Singapore)

ROW

Delnos S.A. de S.V. (Mexico)

1988

Honeywell

Hughes Aircraft acquired Honeywell's Training and Control Systems Division, one of the country's leading providers of electronic-simulation-based military training systems.

1987

MA-Comm

GM Hughes Electronics acquired M/A-Comm Telecommunications, a satellite communications company, for \$105 million. The acquired company is to operate under the name Hughes Network Systems as a division of Hughes Aircraft.

**ALLIANCES, JOINT VENTURES, AND
LICENSING AGREEMENTS**

1989

Perkin-Elmer

Hughes Aircraft and the Perkin-Elmer Corporation signed an agreement whereby Hughes is to purchase Perkin-Elmer's Electro-Optics Technology Division (EOTD), a leading provider of electro-optical systems for specialized scientific and military applications.

1987

Tektronix

Delco Electronics Corporation and Tektronix's Liquid Crystal Shutter Strategic Program Unit (LCS SPU) entered into a joint technology development agreement. The technology partnership gives Delco Electronics the exclusive license to use Tektronix LCS SPU's liquid crystal shutter display technology in automotive instrument panels.

KEY OFFICERS
*GM Hughes Electronics Corporation***Robert J. Schultz**

Chairman, president, and chief executive officer

Donald J. Almquist

Executive vice president and director

Malcom W. Currie

Executive vice president and director

*Hughes Aircraft Company***Malcom R. Currie**

Chairman and chief executive officer

D. Kenneth Richardson

President, chief operating officer, and director

James A. Abrahamson

Executive vice president

Michael T. Smith

Senior vice president, chief financial officer, director

*Delco Electronics Corporation***Donald J. Almquist**

Chairman, president, and chief executive officer

Harry G. Olsen

Vice president, chief financial officer, director

MERGERS AND ACQUISITIONS

1989

Sytek

Hughes Aircraft acquired Sytek, Inc., from General Instrument Corporation.

Western Union

Hughes Aircraft acquired Western Union Corporation's Westar communication satellite system. The agreement was subject to approval of the Federal Communications Commission, which was granted in November 1989. Westar includes three satellites in orbit and one yet to be launched. Hughes already operates three satellites as the Galaxy system, which primarily services cable TV and radio.

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$3,062.3	\$3,328.4	\$4,126.3	\$4,526.4	\$4,533.6
Cash	142.8	260.5	731.3	698.3	652.4
Receivables	769.2	779.4	908.2	903.6	937.7
Marketable Securities	-	-	-	7.5	3.6
Inventory	616.6	633.8	664.0	783.9	795.4
Other Current Assets	1,533.7	1,654.7	1,822.8	2,133.1	2,144.5
Net Property, Plants	\$2,529.2	\$2,767.2	\$2,750.6	\$2,805.0	\$2,991.8
Other Assets	\$4,293.7	\$4,286.3	\$4,249.7	\$4,476.4	\$4,674.7
Total Assets	\$9,885.2	\$10,381.9	\$11,126.6	\$11,807.8	\$12,200.1
Total Current Liabilities	\$2,960.9	\$2,946.2	\$3,427.3	\$3,424.3	\$3,197.3
Long-Term Debt	\$261.7	\$353.0	\$168.4	\$285.1	\$270.5
Other Liabilities	\$296.7	\$393.0	\$459.5	\$548.4	\$834.1
Total Liabilities	\$3,519.3	\$3,692.2	\$4,055.2	\$4,257.8	\$4,301.9
Total Shareholders' Equity	\$6,365.9	\$6,689.7	\$7,071.4	\$7,550.0	\$7,898.2
Converted Preferred Stock	-	-	-	-	-
Common Stock	6,365.9	6,365.9	6,365.9	6,365.9	6,365.9
Other Equity	-	-	3.3	3.6	7.4
Retained Earnings	-	323.8	702.2	1,180.5	1,524.9
Total Liabilities and Shareholders' Equity	\$9,885.2	\$10,381.9	\$11,126.6	\$11,807.8	\$12,200.1
Income Statement	1985	1986	1987	1988	1989
Revenue	\$9,503.8	\$10,440.0	\$10,481.0	\$11,243.6	\$11,359.0
U.S. Revenue	8,468.1	9,327.2	9,263.3	9,855.4	9,828.6
Non-U.S. Revenue	1,035.7	1,112.8	1,217.7	1,388.2	1,530.4
Cost of Sales	\$7,586.0	\$8,154.8	\$8,035.5	\$8,446.1	\$8,521.3
R&D Expense	\$392.8	\$408.1	\$416.0	\$550.9	\$592.0
SG&A Expense	\$830.5	\$851.5	\$882.9	\$1,094.4	\$1,112.3
Capital Expense	\$744.0	\$700.6	\$469.4	\$533.0	\$648.5
Pretax Income	\$541.8	\$811.2	\$899.2	\$983.9	\$987.7
Pretax Margin (%)	5.70	7.77	8.58	8.75	8.70
Effective Tax Rate (%)	37.30	45.10	42.00	35.50	36.00
Net Income	\$339.8	\$445.1	\$521.1	\$653.3	\$632.4
Shares Outstanding, Millions	131.0	127.8	130.8	127.9	95.7
Per Share Data					
Earnings	\$1.22	\$1.48	\$1.67	\$2.01	\$1.94
Dividends	-	-	-	-	-
Book Value	\$48.59	\$52.35	\$54.06	\$59.03	\$82.53

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.03	1.13	1.20	1.32	1.42
Quick (Times)	0.83	0.91	1.01	1.09	1.17
Fixed Assets/Equity (%)	39.73	41.37	38.90	37.15	37.88
Current Liabilities/Equity (%)	46.51	44.04	48.47	45.35	40.48
Total Liabilities/Equity (%)	55.28	55.19	57.35	56.39	54.47
<i>Profitability (%)</i>					
Return on Assets	-	4.39	4.85	5.70	5.27
Return on Equity	-	6.82	7.57	8.94	8.19
Profit Margin	3.58	4.26	4.97	5.81	5.57
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	4.13	3.91	3.97	4.90	5.21
Capital Spending % of Revenue	7.83	6.71	4.48	4.74	5.71
Employees	105,000	102,000	100,000	97,000	75,000
Revenue (\$K)/Employee	\$90.51	\$102.35	\$104.81	\$115.91	\$151.45
Capital Spending % of Assets	7.53	6.75	4.22	4.51	5.32

Source: GM Hughes
Annual Reports and Forms 10-K
Dataquest
1990

Company Backgrounder by Dataquest

Groupe Bull

(Compagnie Des Machines Bull)

121, avenue de Malakoff

75764 Paris, Cedex 16, France

Telephone: (1)45 02 90 90

Fax: Not Available

Dun's Number: 05-180-2627

Date Founded: 1931

CORPORATE STRATEGIC DIRECTION

The companies of Groupe Bull market a wide range of information systems equipment and related services for scientific, industrial, commercial, and business applications in the public and private sectors. Compagnie des Machines Bull (CMB) is 93 percent owned by the French state. Groupe Bull was formed in France in 1983 from the combination of Cii Honeywell-Bull with Sems, Transac, and R2E.

The financial results of Groupe Bull include those of CMB, Bull SA, and Bull HN from January 1, 1989. The financial results of Zenith Data Systems, acquired from Zenith Electronics Corporation at the end of 1989, are reflected in the consolidated balance sheet of Groupe Bull as of December 31, 1989, and have no impact on the 1989 consolidated statement of income of the group.

Groupe Bull's consolidated 1989 revenue rose to FFr 32.7 billion (US\$5.12 billion) in 1989, from FFr 31.5 billion (US\$5.3 billion) in 1988. Due to the combined effects of slower growth in the global information technology market and the higher relative market share of lower-margin products, the group reported a net loss for the year of FFr 267 million, (US\$41.8 million) compared with net earnings of FFr 303 million (US\$50.8 million) in 1988. The net result includes a FFr 405 million (US\$63.5 million) provision for restructuring, covering essentially the recent operating and distribution work force reduction at Bull SA, in order to adapt the group to the new market environment. Sales outside France represented 62.6 percent of revenue. (Percentage changes refer only to FFr amounts; US\$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) Bull has begun to make a strong impression as

a truly global company, targeting the US market with increased advertising efforts.

In 1990, Bull announced that it would reorganize into four operating companies. Under this new structure, Bull SA (France) will have responsibility for development, manufacturing, and sales in France. Bull International N.V. will handle operations in Europe (excluding Italy and the United Kingdom), Africa, Latin America, and certain markets in Asia. Bull HN will continue to direct operations in the United States, Canada, Mexico, Italy, the United Kingdom, Australia, and certain Southeast Asian markets. Zenith Data Systems is now in charge of development, manufacturing, and sales of the group's microcomputer and workstation products worldwide. All of Bull's current microcomputer activities will be transferred to Zenith Data Systems, which will continue to operate as an independent entity with its own R&D, manufacturing, and sales resources.

Bull SA (France) focuses on the development of open, distributed systems, and provides particular market strengths with GCOS 7 proprietary platforms and solutions; UNIX-based systems developed with Bull HN through Bull XS, their jointly held subsidiary; OSI networking and communications products; artificial intelligence; multimedia application solutions; smart-card technology; and a range of peripherals. Bull SA (France) revenue in 1989 increased 3.5 percent over 1988, to FFr 20.1 billion. Bull SA (France) is responsible for the development, manufacturing, and sales of Bull systems in the French market. It is 100 percent owned by CMB, the parent company.

Bull International N.V., also 100 percent owned by CMB, has 6,000 employees.

Bull HN, headquartered in Billerica, Massachusetts, has 18,236 employees worldwide and markets to customers in 28 countries. Bull HN is held by CMB (69.4 percent), Honeywell (15.6 percent), and NEC (15.0 percent). Since 1972, Groupe Bull, Honeywell, and NEC have worked cooperatively in several ventures. Through this arrangement, NEC contributes technological skills in high-end mainframe systems, while the newly acquired Honeywell Federal Systems Group manages marketing and sales to the US government.

Bull HN provides particular market strength in the areas of GCOS 6 midrange and GCOS 8 large systems and solutions, UNIX-based systems, CASE tools and fourth-generation languages, open-systems software, database management, and transaction processing. In 1989, Bull HN revenue totaled US\$2.15 billion, down from US\$2.20 billion in 1988; net profit was US\$1.1 million.

Zenith Data Systems is responsible for all of Groupe Bull's microcomputer activities: worldwide development, manufacturing, and sales of portable and desktop computers and workstations. The Company will focus on end-user computing, local area networking, and development of future Extended Industry Standard Architecture (EISA) and Micro Channel Architecture (MCA) products. Although 100 percent owned by CMB, Zenith Data Systems operates as an independent entity within the group, retaining its own name yet remaining closely integrated within the group's corporate identity. Zenith Data Systems has 3,715 employees worldwide.

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 and 4, comprehensive financial statements, are at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Mainframes

GCOS 8, the proprietary operating system for the medium to very large systems DPS 8000, DPS 90, and DPS 9000, fully supports the open systems

approach and conforms with relational and industry standards to form an open alliance with UNIX.

Succeeding the Bull DPS 7 line, the Bull DPS 7000 family (19 models) targets central computers of large and medium-size businesses and distributed systems for larger companies. Technology (CMOS/VLSI), decentralized architecture (up to six CPUs), and software provide high-performance and availability features to these mainframes. The Bull DPS 7000 is manufactured in three countries and marketed worldwide.

The Bull DPS 6000 range introduced in 1989 is composed of four families that function within the same operating system. Current models support between 4 and 300 users and offer a range of processing power from 0.7 to 10.1 mips. The Bull DPS 6000 and GCOS 6 support multienvironment communications, transaction processing, office automation, decision support, and applications development. The Bull DPS 6000 also provides operating compatibility with the previous Bull DPS 6 and Mini 6 ranges. Many models in the Bull DPS 6000 range offer compatibility with the GCOS 6 and UNIX environments. The Company estimates that 60,000 systems have been installed worldwide.

The Bull DPX/2 product line has four product families including the PC-compatible microservers based on the Intel 80386 microprocessor, single and multiprocessor systems featuring the 68030 and 68040 Motorola microprocessor, and the high-end, RISC-based mainstream server. The Bull DPX/2 range is characterized by its compatibility with international standards and recommendations such as X/OPEN, POSIX, SVID, and ISO. It allows access to a large catalog of standard applications developed by numerous specialized companies.

Relational Data Base Communication (RDBC)

Relational Data Base Communication is an integrated decision support solution that combines advanced hardware, software, and firmware, and employs an innovative parallel processing architecture built upon low-cost, industry-standard microprocessors. RDBC is available for Bull HN's large systems family operating under GCOS 8, including the DPS 8000, DPS 9000, and DPS 90 computers.

Communications and Networking

Bull's networking infrastructure provides a flexible environment to meet the needs of its users. Bull's own architecture, ISO/DSA, provides a communications platform across the entire range of the group's systems from micros and minis to medium- and large-enterprise systems. ISO/DSA uses the same model on which the OSI standards are based, providing users with a smooth transition to OSI as standards evolve. In addition, comprehensive SNA interworking facilities are provided at all levels, from simple terminal controllers to units emulating network processors. For open systems and distributed computing environments, TCP/IP is being provided on all platforms to complete Bull's network offerings.

Application Software

Bull directs significant resources to the development and acquisition of software applications running on the Company's small, medium, and large computer systems. Customized software packages also support applications in the fields of science, engineering, financial management, business, education, banking, retailing, and the public sector.

Market Sector Approach

Bull realizes the increasing importance of application software and believes that differentiation in this area gives a supplier a competitive edge. Accordingly, Bull is focusing on five vertical markets—banking, insurance, retail and distribution, manufacturing, and the public sector—with the declared objective of sourcing, either by development or acquisition, products that will meet end-user requirements. This strategy applies across the entire range of Bull product offerings in relation to UNIX and proprietary platforms.

Personal Computers

In 1989, Zenith Data Systems introduced a new product, the MinisPort, to its line of portable computers. The notebook-style computer became the smallest and lightest portable in the Company's line. In 1990, the Company introduced discounts on the MinisPort and reduced the retail prices of selected accessories and add-on memory for all portable PCs.

Service and Support

Bull HN's Customer Services operation, headquartered in Newton, Massachusetts, provides all hardware and software service for Bull HN's US customers and specific international customers. The division has over 250 field locations providing optional on-site service, and more than a dozen walk-in/mail-in service and support centers.

UNIX-Based Products

Four groups handle marketing and sales within Groupe Bull. However, a fifth arm of the Company exists, which is dedicated to R&D and marketing of UNIX-based products. Groupe Bull has made a strong commitment to UNIX. The fifth branch, Bull XS, which uniquely supports UNIX, was created in 1986. It is an autonomous group able to move more quickly in the demanding and rapidly changing UNIX market. Bull is working closely with the Open Software Foundation (OSF) to integrate the distributed computing environment (DCE) concept into its architecture.

The Company is still committed to developing and supporting the multifunction proprietary systems that define Bull's product line, but there is now a strong move toward open systems dedicated to specific applications within a business, such as payroll accounting. The implementation of the strategy of DCE will be one of synergy between the Bull proprietary GCOS operating system and the open systems. The DCE concept supports and provides the communication link for different systems, even those of other companies, operating together as if they were one large, transparent system.

Globally, Bull has made a commitment of more than US\$100 million to its R&D of UNIX-based systems and to the idea of connectivity to the multifunction GCOS systems and to IBM. The new product line of UNIX-based systems runs under the operating system Bull Open Software (BOS) 2.0. This is based on AT&T UNIX System V with added features of BSD 4.3, and is XPG3PLUS- and POSIX-compliant.

Other

C2 security and disk mirroring are two technical features on which Bull has concentrated. The C2 level security features are available through the Security Option package, which provides help in planning, implementation, training, and support.

Table 1
Five-Year Corporate Highlights (Thousands of US Dollars)

	1985	1986	1987	1988	1989
Total Revenue (Excluding Taxes)	\$1,793,882.9	\$2,567,981.5	\$3,006,856.1	\$5,293,104.4	\$5,123,931.4
Rental and Services Income	\$751,129.1	\$1,072,002.0	\$1,274,409.2	\$2,237,699.7	\$2,120,891.6
Net Earnings/(Loss)	\$12,274.3	\$39,108.9	\$37,471.0	\$50,848.8	(\$41,769.2)
Cash Flow (Net Earnings + Depreciation)	\$146,810.7	\$251,218.9	\$301,691.2	\$475,765.3	\$360,940.8
Expenditure for Property	\$258,669.2	\$365,497.8	\$374,910.5	\$479,338.9	\$486,020.4
Number of Employees	26,403.0	26,804.0	26,337.0	45,557.0	43,617.0
(Revenue/Employee)	\$67.9	\$95.8	\$114.1	\$116.1	\$117.4
Exchange Rate (US\$1=FFr)	FFr 8.98	FFr 6.93	FFr 6.01	FFr 5.96	FFr 6.38

Source: Groupe Bull
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1988	1989
Western Europe	75.00	75.00
North America	18.00	18.00
Other Areas	7.00	7.00

Source: Groupe Bull
Annual Reports and Forms 10-K
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—50
Europe—48
Asia/Pacific—13
ROW—77

MANUFACTURING LOCATIONS

North America

Lawrence and Brighton, Massachusetts (Bull HN)

Phoenix, Arizona (Bull HN)

St. Joseph, Michigan (Zenith Data Systems)

Europe

Angers/Joue-les-Tours, France (Bull SA)

Barcelona, Spain (Bull SA)

Belfort, France (Bull SA)

Milan (Caluso), Italy (Bull HN)

Newhouse, Scotland (Bull HN)

Trappes, France (Bull SA)

Villeneuve d'Ascq, France (Bull SA)

ROW

Contagem, Brazil (Bull SA)

Bangalore, India (Bull SA)

SUBSIDIARIES

North America

Bull HN Information Systems Inc. (United States)

Europe

Subsidiaries of CMB (France)

Bull SA (France)

OGIC (Omnium de Gestion de Valeurs Industrielles
et Commerciales) (France)

SOFOM, SA (France)

Bull International N.V. (Netherlands)

Bull Data Systems N.V. (Netherlands)

European Computer Industry Research (France)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

SAS Institute

The SAS Institute and Groupe Bull signed an agreement to jointly develop fourth-generation software tools for Bull systems.

Motorola

Bull signed a licensing agreement with Motorola to have components of its CP8 smart cards manufactured and marketed by Motorola.

Information Builders

Groupe Bull signed a contract with Information Builders to market its fourth-generation language, FOCUS, on the GCOS 7 and 8 product lines.

Arthur Andersen and Co.

Arthur Andersen and Co. and Bull concluded a global agreement on the development and marketing of Andersen's Foundation Software Engineering Workshop for GCOS 7 and 8.

Mannesman Tally

Mannesman Tally is to supply Bull with eight ink jet and laser printer models on an OEM basis to complement Bull's dot matrix machines.

Convergent Technologies

Convergent Technologies and Bull renewed cooperation agreements for the development, manufacture, and sale of Bull Questar 400 workstations.

Cycare Systems

Cycare Systems, a health care VAR, contracted with Bull HN to sell Bull DPS 6, 6 PLUS, and XPS-100 UNIX-based systems.

GOSSNAB (Soviet Unions's State Committees for Supplies)

Bull re-signed cooperation agreements with GOSSNAB for progressive computerization of the USSR's regional distribution centers.

MIPS Computer Systems

Bull selected MIPS-supplied RISC technology for its high-end UNIX-based systems.

Relational Technology International

Bull and Relational Technology agreed to jointly produce and market the Ingres relational database system of the Bull DPX 2000 and DPX/2 UNIX-based platforms.

3Com Corp.

Bull Australia contracted with 3Com to manufacture 20,000 computer network workstations for 3Com over the next four years.

NEC

In the United States, NEC manufactures very large CPUs for Groupe Bull.

Olivetti

Bull and Olivetti conducted joint-venture activities in banking and secure information systems and ATM manufacturing operations.

France Telecom

France Telecom and Groupe Bull agreed to work jointly to extend and expand Bull's worldwide telecommunications network integrating voice and data.

The Hungarian Videoton group

The Hungarian Videoton group and Groupe Bull signed an accord marking their intention to establish an industrial and commercial partnership in information systems.

Roland Pampel

President and chief executive officer, Bull HN; chairman, Zenith Data Systems; and senior executive vice president, Groupe Bull

Didier Ruffat

President and chief executive officer, Bull International N.V.

Michel Bloch

Executive vice president, Corporate Strategy and Planning

Carlo Peretti

Chairman and chief executive officer, Bull HN Italy

Jean-Claude Albrecht

President and chief executive officer, Bull SA France

Jean Segonds

Executive vice president, Group Marketing

Ward MacKenzie

Executive vice president, Group Product Lines Management

Jacques Weber

Executive vice president, Group Systems Integration

John Frank

President and chief executive officer, Zenith Data Systems

MERGERS AND ACQUISITIONS

1989

Zenith Electronics Corporation

Groupe Bull acquired the computer business of Zenith Electronics Corporation, including Zenith Data Systems.

KEY OFFICERS

Francis Lorentz

Chairman and chief executive officer, Groupe Bull

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

Table 3
Comprehensive Financial Statement*
Fiscal Year Ending December
(Thousands of US Dollars)

Balance Sheet—Assets	1987	1988	1989
Property			
Land	\$25,100.3	\$30,781.2	\$31,510.0
Buildings	\$377,415.5	\$550,327.2	\$570,388.2
Machinery/Equipment	\$911,026.1	\$1,559,123.8	\$1,508,714.8
Less: Depreciation	(\$549,317.1)	(\$1,099,142.1)	(\$1,082,166.3)
Net	\$764,224.8	\$1,041,090.1	\$1,028,446.8
Rental Equipment	\$666,391.8	\$1,033,000.0	\$929,372.5
Less: Depreciation	(\$384,059.4)	(\$605,230.4)	(\$549,672.9)
Net	\$282,332.4	\$427,769.6	\$379,699.7
Total	\$1,046,557.2	\$1,468,859.7	\$1,408,146.4
Investments			
Goodwill	\$45,826.8	\$43,621.8	\$200,037.0
Investments	\$167,677.7	\$45,657.0	\$44,809.6
Other	\$19,229.1	\$45,152.7	\$90,684.5
Total	\$232,733.6	\$134,431.5	\$335,531.0
Inventories	\$391,129.5	\$712,808.6	\$961,962.3
Other Current Assets			
Trade Receivables	\$698,968.2	\$1,348,455.4	\$1,615,943.0
Capital Subscribed	\$49,388.2	0	0
Other Receivables	\$111,376.7	\$163,316.6	\$168,967.7
Market Securities	\$383,318.0	\$641,685.1	\$306,703.6
Cash	\$40,176.5	\$66,687.6	\$67,487.0
Total	\$1,283,227.6	\$2,220,144.6	\$2,159,101.3
Total Assets	\$2,953,647.9	\$4,536,244.5	\$4,864,741.0

Table 3 (Continued)
Comprehensive Financial Statement*
Fiscal Year Ending December
(Thousands of US Dollars)

Balance Sheet—Liabilities	1987	1988	1989
Stockholders' Equity			
Common Stock	\$802,707.3	\$809,446.6	\$906,539.8
Additional Paid-In Capital	\$13,844.1	\$13,965.3	\$13,033.8
Retained Earnings	(\$434,461.4)	\$7,037.9	(\$35,200.8)
Translation Adjustment	\$31,901.0	\$26,305.4	\$19,451.8
Total	\$805,006.0	\$856,755.2	\$903,824.6
Undated Subordinate Notes	0	\$199,851.0	\$161,812.9
Minority Interest	\$7,750.4	\$133,921.8	\$130,200.8
Long-Term Debt	\$804,008.5	\$1,085,967.6	\$1,303,060.8
Provisions	\$253,504.3	\$291,073.5	\$270,311.3
Deferred Taxes	\$6,936.8	\$16,468.6	\$11,730.5
Current Liabilities			
Trade Payables	\$413,939.9	\$594,359.2	\$72,507.4
Customer Advances	\$62,006.7	\$67,865.8	\$58,795.8
Income Taxes	\$8,132.6	\$47,534.7	\$18,718.4
Deferred Income	\$5,905.8	\$9,664.1	\$7,490.0
Accrued Liabilities	\$459,097.7	\$818,862.4	\$820,148.6
Current Maturities	\$56,617.5	\$143,876.7	\$182,289.4
Advance Contributions of French State	0	\$168,632.6	\$6,491.9
Short-Term Borrowing	\$45,777.7	\$56,418.0	\$179,770.1
Bank Overdrafts	\$24,964.1	\$44,993.3	\$84,597.7
Total	\$1,076,441.9	\$1,952,206.7	\$2,083,800.2
Total Liabilities	\$2,953,647.9	\$4,536,244.5	\$4,864,741.0

Table 3 (Continued)
Comprehensive Financial Statement*
Fiscal Year Ending December
(Thousands of US Dollars)

Statement of Earnings	1987	1988	1989
Sales	\$1,732,446.9	\$3,055,404.7	\$3,003,039.8
Rental, Service, and Other	\$1,274,409.2	\$2,237,699.7	\$2,120,891.6
Total Revenue	\$3,006,856.1	\$5,293,104.4	\$5,123,931.4
Cost of Revenue	(\$1,754,614.1)	(\$2,935,246.6)	(\$2,916,386.6)
Gross Margin	\$1,252,241.9	\$2,357,857.7	\$2,207,544.8
R&D	(\$258,159.6)	(\$536,396.1)	(\$459,356.2)
G&A	(\$912,991.0)	(\$1,613,892.1)	(\$1,646,251.8)
Earnings from Operations	\$81,091.3	\$207,569.5	\$101,936.7
Interest Expense	(\$140,618.6)	(\$162,868.8)	(\$166,984.3)
Interest Income	\$40,369.7	\$56,732.2	\$57,990.3
Other Income/(Expense)	\$52,353.6	\$4,386.2	(\$20,498.4)
Earnings Before Taxes	\$33,196.0	\$105,819.1	(\$27,555.7)
Provision for Income Taxes	(\$80,435.4)	(\$63,804.7)	(\$28,343.6)
Extraordinary Credit	\$74,500.0	\$13,161.4	\$16,937.7
Equity in Net Earnings	\$11,586.4	(\$2,783.2)	(\$4,064.2)
Minority Interests	(\$1,375.9)	(\$1,543.8)	\$1,256.7
Net Earnings/(Loss)	\$37,471.0	\$50,848.8	(\$41,769.2)
Exchange Rate (US\$1=FFr)	FFr 6.01	FFr 5.96	FFr 6.38

*As a result of reorganization and acquisitions, restated financial information prior to 1987 is not available.

Source: Groupe Bull
Annual Reports and Forms 10-K
Dataquest (1990)

Table 4
Comprehensive Financial Statement*
Fiscal Year Ending December
(Thousands of French Francs)

Balance Sheet—Assets	1987	1988	1989
Property			
Land	FFr 150,853.0	FFr 183,456.0	FFr 201,223.0
Buildings	FFr 2,268,267.0	FFr 3,279,950.0	FFr 3,642,499.0
Machinery/Equipment	FFr 5,475,267.0	FFr 9,292,378.0	FFr 9,634,653.0
Less: Depreciation	(FFr 3,301,396.0)	(FFr 6,550,887.0)	(FFr 6,910,714.0)
Net	FFr 4,592,991.0	FFr 6,204,897.0	FFr 6,567,661.0
Rental Equipment	FFr 4,005,015.0	FFr 6,156,680.0	FFr 5,934,973.0
Less: Depreciation	(FFr 2,308,197.0)	(FFr 3,607,173.0)	(FFr 3,510,211.0)
Net	FFr 1,696,818.0	FFr 2,549,507.0	FFr 2,424,762.0
Total	FFr 6,289,809.0	FFr 8,754,404.0	FFr 8,992,423.0
Investments			
Goodwill	FFr 275,419.0	FFr 259,986.0	FFr 1,277,436.0
Investments	FFr 1,007,743.0	FFr 272,116.0	FFr 286,154.0
Other	FFr 115,567.0	FFr 269,110.0	FFr 579,111.0
Total	FFr 1,398,729.0	FFr 801,212.0	FFr 2,142,701.0
Inventories	FFr 2,350,688.0	FFr 4,248,339.0	FFr 6,143,091.0
Other Current Assets			
Trade Receivables	FFr 4,200,799.0	FFr 8,036,794.0	FFr 10,319,412.0
Capital Subscribed	FFr 296,823.0		
Other Receivables	FFr 669,374.0	FFr 973,367.0	FFr 1,079,028.0
Market Securities	FFr 2,303,741.0	FFr 3,824,443.0	FFr 1,958,609.0
Cash	FFr 241,461.0	FFr 397,458.0	FFr 430,972.0
Total	FFr 7,712,198.0	FFr 13,232,062.0	FFr 13,788,021.0
Total Assets	FFr 17,751,424.0	FFr 27,036,017.0	FFr 31,066,236.0

Table 4 (Continued)
Comprehensive Financial Statement*
Fiscal Year Ending December
(Thousands of French Francs)

Balance Sheet—Liabilities	1987	1988	1989
Stockholders' Equity			
Common Stock	FFr 4,824,271.0	FFr 4,824,302.0	FFr 5,789,163.0
Additional Paid-in Capital	FFr 83,203.0	FFr 83,233.0	FFr 83,234.0
Retained Earnings	(FFr 2,611,113.0)	FFr 41,946.0	(FFr 224,792.0)
Translation Adjustment	FFr 191,725.0	FFr 156,780.0	FFr 124,219.0
Total	FFr 4,838,086.0	FFr 5,106,261.0	FFr 5,771,824.0
Undated Subordinate Notes	FFr 0.0	FFr 1,191,112.0	FFr 1,033,337.0
Minority Interest	FFr 46,580.0	FFr 798,174.0	FFr 831,462.0
Long-Term Debt	FFr 4,832,091.0	FFr 6,472,367.0	FFr 8,321,346.0
Provisions	FFr 1,523,561.0	FFr 1,734,798.0	FFr 1,726,208.0
Deferred Taxes	FFr 41,690.0	FFr 98,153.0	FFr 74,911.0
Current Liabilities			
Trade Payables	FFr 2,487,779.0	FFr 3,542,381.0	FFr 463,032.0
Customer Advances	FFr 372,660.0	FFr 404,480.0	FFr 375,470.0
Income Taxes	FFr 48,877.0	FFr 283,307.0	FFr 119,536.0
Deferred Income	FFr 35,494.0	FFr 57,598.0	FFr 47,831.0
Accrued Liabilities	FFr 2,759,177.0	FFr 4,880,420.0	FFr 5,237,469.0
Current Maturities	FFr 340,271.0	FFr 857,505.0	FFr 1,164,100.0
Advance Contrib. of Fr. State	0	FFr 1,005,050.0	FFr 41,457.0
Short-Term Borrowing	FFr 275,124.0	FFr 336,251.0	FFr 1,148,012.0
Bank Overdrafts	FFr 150,034.0	FFr 268,160.0	FFr 540,241.0
Total	FFr 6,469,416.0	FFr 11,635,152.0	FFr 13,307,148.0
Total Liabilities	FFr 17,751,424.0	FFr 27,036,017.0	FFr 31,066,236.0

Table 4 (Continued)
Comprehensive Financial Statement*
Fiscal Year Ending December
(Thousands of French Francs)

Statement of Earnings	1987	1988	1989
Sales	FFr 10,412,006.0	FFr 18,210,212.0	FFr 19,177,412.0
Rental, Service, and Other	FFr 7,659,199.0	FFr 13,336,690.0	FFr 13,544,014.0
Total Revenue	FFr 18,071,205.0	FFr 31,546,902.0	FFr 32,721,426.0
Cost of Revenue	(FFr 10,545,231.0)	(FFr 17,494,070.0)	(FFr 18,624,045.0)
Gross Margin	FFr 7,525,974.0	FFr 14,052,832.0	FFr 14,097,381.0
R&D	(FFr 1,551,539.0)	(FFr 3,196,921.0)	(FFr 2,933,449.0)
G&A	(FFr 5,487,076.0)	(FFr 9,618,797.0)	(FFr 10,512,964.0)
Earnings from Operations	FFr 487,359.0	FFr 1,237,114.0	FFr 650,968.0
Interest Expense	(FFr 845,118.0)	(FFr 970,698.0)	(FFr 1,066,362.0)
Interest Income	FFr 242,622.0	FFr 338,124.0	FFr 370,326.0
Other Income/(Expense)	FFr 314,645.0	FFr 26,142.0	(FFr 130,903.0)
Earnings Before Taxes	FFr 199,508.0	FFr 630,682.0	(FFr 175,971.0)
Provision for Income Taxes	(FFr 483,417.0)	(FFr 380,276.0)	(FFr 181,002.0)
Extraordinary Credit	FFr 447,745.0	FFr 78,442.0	FFr 108,164.0
Equity in Net Earnings	FFr 69,634.0	(FFr 16,588.0)	(FFr 25,954.0)
Minority Interests	(FFr 8,269.0)	(FFr 9,201.0)	FFr 8,025.0
Net Earnings/(Loss)	FFr 225,201.0	FFr 303,059.0	(FFr 266,738.0)
Exchange Rate (\$US1=FFr)	FFr 6.01	FFr 5.96	FFr 6.38

*As a result of reorganization and acquisitions, restated financial information prior to 1987 is not available.

Source: Groupe Bull
 Annual Reports and Forms 10-K
 Dataquest (1990)

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.

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

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

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 two 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 Micrografix 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.

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.

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)

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

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 Ltda. (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)

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 manufacturers.

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.

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.

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.

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 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

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

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

FOUNDERS

William R. Hewlett (stepped down as vice president of the board of directors in February 1987)

David Packard

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

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
<i>Liquidity</i>					
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
<i>Profitability (%)</i>					
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
<i>Other Key Ratios</i>					
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)

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

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;

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.

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.

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 OS/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.

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.

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)

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 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 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 multi-
 media 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 com-
 munication 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.)

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 Plan-
ning

Patrick A. Toole

Senior vice president

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

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
<i>Liquidity</i>					
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
<i>Profitability (%)</i>					
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
<i>Other Key Ratios</i>					
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)

ITT Corporation

320 Park Avenue
New York, New York 10022
Telephone: (212) 752-6000
Fax: (212) 940-2243
Dun's Number: 00-121-6845

Date Founded: 1920

CORPORATE STRATEGIC DIRECTION

ITT (International Telephone and Telegraph) Corporation is a diversified, multinational enterprise that ranks among the largest corporations in the world. The Company is engaged principally in the areas of defense, electronic components, fluid technology, automotive, and diversified services. In addition, ITT owns a 37 percent equity interest in Alcatel N.V., a large telecommunications equipment manufacturer company, and a 2.84 percent equity interest in Compagnie Generale d'Electricite. As of May 1990, ITT appears to be willing to sell some or all of Alcatel N.V. ITT was founded in 1920 by Sosthenes Behn. The Company was originally conceived as a duplicate of American Telephone and Telegraph (AT&T) for the telecommunications market outside of the United States.

Total revenue increased by 3.6 percent to \$20 billion* in fiscal 1989 from \$19.4 billion in fiscal 1988. Net income increased 13 percent to \$922 million in fiscal 1989 from \$817 million in fiscal 1988. ITT employs 119,000 worldwide.

R&D expenditure totaled \$553 million in fiscal 1989, representing 2.8 percent of revenue. ITT's research, development, and engineering activities are coordinated through its work headquarters in New York City and are carried out in laboratory and engineering facilities at most manufacturing divisions and subsidiaries. The Company also has major research centers in Belgium, Germany, Italy, Spain, the United Kingdom, and 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. Table 3, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Industrial and Defense Technology

Defense

ITT designs, produces, and operates numerous types of tactical communications equipment for the military, navigation, and air traffic control systems for civilian and military aircraft, and air and battle-field surveillance radar. Also, ITT is involved in the upgrading, maintenance, and training services for military and other customers. A substantial portion of this business segment is performed for the US government under primary contracts and subcontracts.

At the beginning of 1990, orders on hand were close to \$3 billion and several major ITT defense programs were entering or were in the volume production phase. Among the more significant are SINCGARS, the US Army's standard combat radio system; Generation III night vision goggles; ASPJ, a key US Navy tactical aircraft self-protection system; and ANDVT, which provides the army with secure voice and data communication for radio and telephone networks.

In 1989, major new contracts included a \$28.5 million project for the maintenance of a US Air Force communications network in Greece and Turkey, a \$125.8 million follow-on contract for an air force electronic countermeasure jamming system, \$9.8 million for an army radar jamming system, and a \$34 million contract for the navy to build a high-quality secure voice and data system to link air, land, and sea forces.

*All dollar amounts are in US dollars.

In May 1990, ITT formed the ITT Aerospace/Communications Division, made up of the Aerospace/Optical Division. The reorganization will take effect immediately and sales are expected to be \$460 million in 1990, according to ITT.

Electronic Components

ITT operates in several European countries and in North America, producing a wide variety of electronic connectors, components, and semiconductor devices that are used in industrial, professional, and telecommunications equipment as well as in appliances and automobiles. These products are sold through ITT's direct sales offices and distribution organizations.

ITT Semiconductor is a key supplier of cost-efficient digital signal processors for the new generation of European direct-broadcast TV systems. ITT Electromechanical Component's innovative STAR CARD is a reliable, fast, and portable alternative to floppy disks, memory cartridges, or internal memory changes.

During 1989, ITT Canon operations in Santa Ana, California, and Whitby, Ontario, were awarded a contract to supply all of the connector requirements for a leading supercomputer manufacturer. ITT Canon is also a major supplier of sophisticated connectors for medical imaging equipment.

Fluid Technology

Fluid technology, a varied segment, covers fluid handling products, which include a wide range of pumps; controls and instrumentation products, including high-technology instruments for control and monitoring of fluids and energy conservation; and a broad

range of valves. Most of this segment's operations are carried out in North America and Europe. Principal customers are industrial users and construction contractors, process industries, and water and wastewater utilities. Original equipment manufacturer (OEM) sales are made directly and through independent distributors.

Automotive

Through operations located in Europe and North and South America, ITT manufactures a broad range of automotive products, including brake systems, suspension systems, body and chassis components, and numerous electromechanical and electronic components. It is an original equipment market supplier to automotive manufacturers worldwide. Approximately two-thirds of the sales from this automotive segment are made in Europe. ITT continues to expand its manufacturing operations in the United States to supply parts based on European technology for cars produced by manufacturers in the United States.

Diversified Services

ITT is involved in the businesses of insurance, finance, information services, and hotel and community development services.

Further Information

For more information about the Company's business segments, please contact the appropriate Dataquest industry service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$13,781.0	\$16,271.0	\$18,195.0	\$19,355.0	\$20,054.0
Percent Change	-	18.07	11.82	6.38	3.61
Capital Expenditure	-	-	-	-	-
Percent of Revenue	0	0	0	0	0
R&D Expenditure	\$564.0	\$542.0	\$505.0	\$516.0	\$553.0
Percent of Revenue	4.09	3.33	2.78	2.67	2.76
Number of Employees	232,000	123,000	120,000	117,000	119,000
Revenue (\$K)/Employee	\$59.40	\$21.21	\$151.63	\$165.43	\$168.52
Net Income	\$294.0	\$494.0	\$965.0	\$817.0	\$922.0
Percent Change	-	68.03	95.34	(15.34)	12.85
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$4,830.00	\$5,215.00	\$4,922.00	\$5,087.00	
Quarterly Profit	\$200.00	\$244.00	\$221.00	\$257.00	

Source: ITT Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	-	74.13	73.01	71.40	71.44
International	-	25.87	26.99	28.60	28.56
Europe	-	20.00	23.00	25.00	24.56
ROW	-	6.00	4.00	4.00	4.00

Source: ITT Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

United States

Europe

Belgium
Germany
Italy
Spain

Asia/Pacific

Australia
New Zealand
Taiwan

SUBSIDIARIES

North America

Carbon Industries Inc. (United States)
Federal Electric Corp. (United States)
Hartford Fire Insurance Co. (United States)
Hartford International Insurance Corp. (United States)
ITT Business Services Corp. (United States)
ITT Canada Ltd. (Canada)
ITT Commercial Finance Corp. (United States)
ITT Communications and Information Services Inc. (United States)
ITT Community Development Corp. (United States)
ITT Consumer Financial Corp. (United States)
ITT Diversified Financial Corp. (United States)
ITT Federal Bank F.S.B. (United States)
ITT Financial Corp. (United States)
ITT Hartford Group Inc. (United States)
ITT Industries Inc. (United States)
ITT Industries of Canada Ltd. (Canada)
ITT Investment Holdings Inc. (United States)
ITT Lester Industries Inc. (United States)
ITT Lyndon Life Insurance Co. (United States)
ITT Lyndon National Life Insurance Co. (United States)

ITT Lyndon Property Insurance Co. (United States)
ITT Raynier Inc. (United States)
International Standard Electric Corporation (United States)
Lyndon Insurance Co. (United States)

Europe

Alfred Teves GmbH (Germany)
Deutsche ITT Handelsgesellschaft GmbH (Germany)
ITT (United Kingdom) Ltd. (United Kingdom)
ITT Gesellschaft für Beteiligungen GmbH (Germany)
ITT Industries-France Inc. (France)
ITT Netherlands Inc. (Netherlands)
ITT Reiss International GmbH (Germany)
London and Edinburgh Insurance Group Ltd. (United Kingdom)
SWF Auto-Electric GmbH (Germany)
Transatlantische Beteiligungs AG (Germany)
Zwolsche Algemeene N.V. (Netherlands)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

ITT and 16 other US companies entered a limited partnership to pursue the high-definition TV (HDTV) market. The limited partnership will work with the US government to develop, fund, and manage HDTV consortia. In addition, the partnership will guide HDTV technology to other US firms.

MERGERS AND ACQUISITIONS

1989

Allis-Chalmers

ITT acquired Allis-Chalmers' pump business for \$69 million. ITT will operate the business, which includes centrifugal pump manufacturing and spare parts, as ITT A-C Pump.

1988

Compagnie Generale d'Electricite

ITT acquired a 2.84 percent interest in Compagnie Generale d'Electricite, but sold its investment in Compagnie Generale d'Electricite in February 1990.

BICC-Vero Electronic

ITT acquired BICC-Vero Electronic's connectors division and Sealectro, electrical connectors producers, for approximately £35 million.

KEY OFFICERS

Rand V. Araskog

Chairman and chief executive officer

DeRoy C. Thomas

President and chief operating officer

M. Cabell Woodward, Jr.

Vice chairman and chief financial officer

Howard J. Aibel

Executive vice president and general counsel

Daniel P. Weadock

Executive vice president and president, ITT
COINS

D. Travis Engen

Senior vice president and president, ITT Defense
Inc.

Raymond J. Gill

Senior vice president and president, ITT Fluid
Technology Corporation

Heinz F. Roessle

Senior vice president and president, ITT Electronic
Components, Inc.

PRINCIPAL INVESTORS

Bankers Trust Co.—6.8 percent

FOUNDERS

Sosthenes Behn

Table 3
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	\$5,012.0	\$3,630.0	\$3,644.0	\$35,313.0	\$38,543.0
Cash	200.0	759.0	802.0	880.0	649.0
Receivables	2,185.0	1,661.0	1,187.0	11,813.0	12,954.0
Marketable Securities	-	-	-	18,574.0	20,741.0
Inventory	2,061.0	1,001.0	1,243.0	1,308.0	1,327.0
Other Current Assets	566.0	209.0	412.0	2,738.0	2,872.0
Net Property, Plants	\$4,414.0	\$3,232.0	\$3,174.0	\$3,411.0	\$3,558.0
Other Assets	\$4,849.0	\$6,060.0	\$6,536.0	\$3,217.0	\$3,402.0
Total Assets	\$14,275.0	\$12,922.0	\$13,354.0	\$41,941.0	\$45,503.0
Total Current Liabilities	\$3,847.0	\$2,450.0	\$2,259.0	\$31,534.0	\$34,915.0
Long-Term Debt	\$2,577.0	\$2,527.0	\$2,478.0	-	-
Other Liabilities	\$1,379.0	\$797.0	\$798.0	\$2,372.0	\$2,531.0
Total Liabilities	\$7,803.0	\$5,774.0	\$5,535.0	\$33,906.0	\$37,446.0
Total Shareholders' Equity	\$6,470.0	\$7,146.0	\$7,820.0	\$8,035.0	\$8,057.0
Converted Preferred Stock	322.0	321.0	278.0	278.0	977.0
Common Stock	141.0	141.0	136.0	134.0	123.0
Other Equity	600.0	951.0	897.0	675.0	(672.0)
Retained Earnings	5,407.0	5,733.0	6,509.0	6,948.0	7,629.0
Total Liabilities and Shareholders' Equity	\$14,273.0	\$12,920.0	\$13,355.0	\$41,941.0	\$45,503.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$13,781.0	\$16,271.0	\$18,195.0	\$19,355.0	\$20,054.0
US Revenue	-	12,062.0	13,284.0	13,820.0	14,327.0
Non-US Revenue	-	4,209.0	4,911.0	5,535.0	5,727.0
Cost of Sales	\$5,471.0	\$6,362.0	\$7,003.0	\$7,597.0	\$7,710.0
R&D Expense	\$564.0	\$542.0	\$505.0	\$516.0	\$553.0
SG&A Expense	\$916.0	\$946.0	\$879.0	\$926.0	\$925.0
Capital Expense	-	-	-	-	-
Pretax Income	\$413.0	\$1,071.0	\$1,293.0	\$1,129.0	\$1,237.0
Pretax Margin (%)	3.00	6.58	7.11	5.83	6.17
Effective Tax Rate (%)	37.80	49.40	14.80	19.80	23.50
Net Income	\$294.0	\$494.0	\$965.0	\$817.0	\$922.0
Shares Outstanding, Millions	142.0	152.0	150.0	143.0	138.0
Per Share Data					
Earnings	\$1.70	\$3.12	\$6.41	\$5.70	\$6.52
Dividend	\$1.00	\$1.00	\$1.06	\$1.30	\$1.51
Book Value	\$0.05	\$0.05	\$0.05	\$0.06	\$0.06

Table 3 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.30	1.48	1.61	1.12	1.10
Quick (Times)	0.77	1.07	1.06	1.08	1.07
Fixed Assets/Equity (%)	68.22	45.23	40.59	42.45	44.16
Current Liabilities/Equity (%)	59.46	34.28	28.89	392.46	433.35
Total Liabilities/Equity (%)	120.60	80.80	70.78	421.98	464.76
<i>Profitability (%)</i>					
Return on Assets	-	3.63	7.35	2.96	2.11
Return on Equity	-	7.26	12.90	10.31	11.46
Profit Margin	2.13	3.04	5.30	4.22	4.60
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	4.09	3.33	2.78	2.67	2.76
Capital Spending % of Revenue	0	0	0	0	0
Employees	232,000	123,000	120,000	117,000	119,000
Revenue (\$K)/Employee	\$59.40	\$132.28	\$151.63	\$165.43	\$168.52
Capital Spending % of Assets	0	0	0	0	0

Source: ITT Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

Lockheed Corporation

4500 Park Grandeur Boulevard

Calabasas, California 91399

Telephone: (818) 712-2000

Fax: (818) 712-2329

Dun's Number: 00-825-5283

Date Founded: 1932

CORPORATE STRATEGIC DIRECTION

Lockheed Corporation's primary businesses include research, development, and production of aerospace and defense products and systems. The vast majority of these activities are defense-related product and system offerings sold to the US government, with a small percent also sold to foreign governments. Lockheed also provides an array of products to commercial customers worldwide.

Lockheed's business segments were realigned in 1987. The Missiles, Space, and Electronics Systems segment was divided into the Missiles and Space Systems segment and the Electronics Systems segment to reflect the operations of Sanders Associates, a defense electronics company acquired in 1986, and Lockheed Electronics Company. As of 1989, Lockheed's continuing operations are reported in four segments: Missiles and Space Systems, Aeronautical Systems, Technology Services, and Electronics Systems.

Lockheed encounters extensive competition in all of its lines of business from numerous other companies. Therefore, the Company must undertake continual, long-term, substantial efforts to maintain existing levels of business. In some cases, this involves investment in fixed assets. Since all US government agencies emphasize the technical and managerial capabilities of corporations seeking to do business with them, the degree to which Lockheed may participate in future government business depends largely on the effectiveness and innovativeness of its R&D programs, its cost-effectiveness, and the readiness of its facilities, equipment, and personnel to undertake the programs for which it may be competing.

A significant portion of Lockheed's sales are associated with long-term contracts and programs in

which there are significant inherent risks. Some of these are the uncertainty of economic conditions, dependence on congressional appropriations and administrative allotment of funds, changes in governmental policies that may reflect military and political developments, time required for design and development, significant changes in contract scheduling, complexity of designs and the quickness with which product lines become obsolete owing to technological advances, constant necessity for design improvements, intense competition for available government business, difficulty of forecasting costs and schedules when bidding on developmental and highly sophisticated technical work, and other factors characteristic of the industry.

Foreign sales involve additional risks because of the possible changes in economic and political conditions.

Total revenue decreased 5.2 percent to \$9.9 billion* in fiscal 1989 from \$10.4 billion in fiscal 1988. Net earnings decreased 99.7 percent to \$2.0 million in fiscal 1989 from \$624.0 million in fiscal 1988. Lockheed employs 82,500 people worldwide.

R&D expenditure totaled \$500 million in fiscal 1989, representing 5 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 backgrounder.

*All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

Missiles and Space Systems

Lockheed's Missiles and Space Systems Group participates in military and civilian space systems, strategic fleet ballistic missiles, and tactical defense and communication systems, in addition to providing technical and management services for the US space program, the Department of Defense, and other government agencies. The Missiles and Space Systems Group is Lockheed's largest, providing 48 percent of sales in fiscal 1989; Space Systems alone accounted for 31 percent that year.

Aeronautical Systems

Lockheed's Aeronautical Systems Group participates in the design and production of special mission and high-performance aircraft and systems for military and civilian operations, antisubmarine warfare, and reconnaissance and surveillance. In addition to producing aircraft, Lockheed provides aeronautical support services, aircraft modification, maintenance of military and commercial aircraft at domestic and overseas bases, and related logistics and other services. The Aeronautical Systems Group accounted for 26 percent of Lockheed's sales in fiscal 1989.

Technology Services

Lockheed's Technology Services Group, formed as part of its corporate restructuring in 1989, brings together five Lockheed companies that provide customers with support services. Over half of the

Technology Services' activities are with NASA. Lockheed is responsible for the space shuttle ground processing and provides engineering and sciences support for other major NASA operations. Technology Services also serves other federal customers, commercial markets, and state and local governments with diverse technologies. This group contributed 14 percent to Lockheed's sales in fiscal 1989.

Electronic Systems

Lockheed's Electronic Systems Group participates in the development and manufacture of radio frequency, infrared, electro-optical, and command, control, and communications countermeasures systems; radar; air-space management systems; surveillance systems; automatic test equipment; antisubmarine warfare systems; microwave systems; and fire control systems. This group contributed 11 percent to Lockheed's sales in fiscal 1989. Dataquest estimates Lockheed to be one of the top 20 military/aerospace electronics systems market companies as of 1990.

Other

Lockheed is involved in a number of classified programs.

Further Information

For more information about the Company's business segments, please contact the appropriate Dataquest industry service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$9,386.0	\$10,161.0	\$11,078.0	\$10,433.0	\$9,891.0
Percent Change	-	8.26	9.02	(5.82)	(5.20)
Capital Expenditure	-	-	-	-	-
Percent of Revenue	0	0	0	0	0
R&D Expenditure	\$399.0	\$441.0	\$506.0	\$503.0	\$500.0
Percent of Revenue	4.25	4.34	4.57	4.82	5.06
Number of Employees	84,500	94,200	97,200	85,600	82,500
Revenue (\$K)/Employee	\$111.08	\$107.87	\$113.97	\$121.88	\$119.89
Net Income	\$401.0	\$408.0	\$421.0	\$624.0	\$2.0
Percent Change	-	1.75	3.19	48.22	(99.68)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$1,995.00	\$2,451.00	\$2,107.00	\$3,032.00	
Quarterly Profit	\$62.00	\$77.00	(\$32.00)	\$62.00	

Source: Lockheed Corporation
 Annual Reports and Forms 10-K
 Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	99.33	96.78	97.54	97.60	97.34
International	0.67	3.22	2.46	2.40	2.66

Source: Lockheed 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)

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Lockheed Shipbuilding Company (LSC); Seattle, Washington, and Gulfport, Mississippi
Production of air cushion landing craft for the Marine Corps and amphibious assault ships

Aeronautical Systems Group

North America

Lockheed Aeronautical Systems Company; Burbank, California

Development of an early warning and control version of the P-3 Orion; production of the TR-1, a tactical reconnaissance derivative of the U-2, for the US Air Force; providing support and modification programs for such aircraft as its L-1011 TriStar commercial jetliner, S-3A Viking subhunter, and SR-71 reconnaissance plane; teamed with Boeing and General Dynamics for a demonstration and validation program to produce two Advanced Tactical Fighter (ATF) prototypes designated YF-22A; designing advanced materials and structures, including composites; production of wing components for the C-17 under subcontract from McDonnell Douglas; upgrading the S-3A Viking to the S-3B configuration with a Weapons System Improvement Program

Kelly Johnson Research and Development Center; Burbank, California

Advanced R&D for aerospace vehicles, including a new Weapons Systems Simulation Center (WSSC) for work on the F-22

Murdock Engineering Company; Irving, Texas

Production and assembly of components for the C-5B, F-15, and CH-46/47

Lockheed Aeromod Center (LACI); Greenville, South Carolina

Providing aircraft maintenance and modification services

Lockheed Support Systems, Inc.; Chino, Los Angeles, Palmdale, and Upland, California; Meridian, Mississippi; Johnston, Pennsylvania; Charleston, South Carolina; Arlington, Texas; and Clarksburg, West Virginia

Providing technical, administrative, training, and management assistance and services on a worldwide basis for the maintenance, repair, modification, and logistic support of facilities, equipment, and vehicles; flight assembly and flight testing

Lockheed Aeronautical Systems Company—Georgia; Marietta, Georgia

Rewing the existing fleet of C-5A aircraft; manufacturing C-5B aircraft; conducting research into advanced technologies including the propfan, laminar control, advanced materials, artificial intelligence, and futuristic flight stations; using a High Technology Test Bed aircraft as a flying laboratory for testing advanced aviation technologies; producing the MC-130H Combat Talon; developing a prototype electronic countermeasures system for the Marine's KC-130 Hercules (MC-SATIN); designing a flight station for the C-141B Starlifter

Lockheed Aeronautical Systems Company—Ontario; Ontario, California

Modifies and maintains aircraft, including special configurations for electronic warfare and C3I; also provides training, technical assistance, and support services

Missiles and Space Systems Group

North America

Lockheed Missiles and Space Company; Huntsville, Alabama; Palo Alto, San Diego, Santa Clara, Santa Cruz, Sunnyvale, and Vandenberg Air Force Base, California; Cape Canaveral, Florida; Kings Bay, Georgia; Charleston, South Carolina; Austin, Texas; and Bremerton, Washington

Involved in Strategic Defense Initiative (SDI) surveillance, discrimination, and battle management research programs and SSTs; development of MILSTAR, the next-generation military satellite communications system, for the Department of Defense (DOD); developing SDI's Exoatmospheric Vehicle Interceptor Subsystem (EVIS), a midcourse interceptor for the army; developing (Austin Division) the Aquila remotely piloted vehicle (RPV), a compact aircraft that can fly unmanned military surveillance, reconnaissance, and target acquisition missions, and a derivative called the Altair; developing SDI Boost Surveillance and Tracking System (BSTS) satellite development; upgrading the Tomahawk missile weapon control system (PLSS); designing and developing computer software for the Space Station Geostationary Earth Science Space

Platforms; design, production, and support of the Trident II Missile System, Hubble space telescope, and Submarine Laser Communications Satellite (SLCSAT)

Lockheed Engineering and Management Services Company, Inc. (LEMSCO); Houston, Texas

Providing a broad spectrum of technical services for a number of government agencies, including the NASA centers at Houston; White Sands, New Mexico; Greenbelt, Maryland; Bay St. Louis, Mississippi; the US Army's White Sands Missile Range in New Mexico; the Dugway Proving Ground in Utah; and the Environmental Protection Agency (EPA) at Las Vegas, Nevada; using technologies including systems simulations and payload development, remote sensing and environmental monitoring, test range operations and maintenance, computer sciences, space sciences, and facilities management; and support services for a high-energy laser facility

Lockheed Space Operations Company (LSOC); Titusville, Florida

Responsibility for the preparation, landing, and turnaround activities of the Space Shuttle fleet; working (Lompoc, California) on US Air Force shuttle requirements at Vandenberg Air Force Base

Electronics Systems Group

North America

Lockheed Electronics Company, Inc. (LEC); Orlando, Florida; Denville and Plainfield, New Jersey

Producing automated weapons control and radar systems such as the Mk86 weapon control system and the AIMS corocular phased-array antenna, both for the US Navy; producing modification kits to substantially improve the accuracy of the Vulcan anti-aircraft gun for the US Army; designing and integrating automated air traffic control systems; developing and producing custom hybrid microcircuits, electronic warfare systems, automatic test equipment, and ordnance products; computerized information storage and retrieval systems and special-purpose tape recorders; instrumentation calibration, environmental testing, and environmental stress screening services

Sanders Associates, Inc.; Nashua, New Hampshire

Producing the ALQ-126B Electronic Countermeasure System, which protects US Navy and Marine Corps and Allied forces fighter and attack aircraft from radar-directed weapons; the ALQ-164, a pod-mounted version of the ALQ-126B for US Marine Corps AV-8 aircraft; the ALQ-94, ALQ-137, and ALQ-189, which protect

US Air Force F-111, FB-111, and EF-111 aircraft from radar-directed weapons; POET (AM-6988/A) Primed Oscillator Expendable Transponder, which decoys radar-directed weapons; the ALQ-156 Missile Warning System, which is a radar system that detects incoming missiles and initiates appropriate countermeasures; the ALQ-147 and ALQ-144 Infrared Countermeasures Systems, which protect fixed and rotary wing aircraft from heat-seeking missiles; the ALQ-149, a system for the US Navy's EA 6B aircraft for jamming communications and early warning radars; prototype for the ALQ-191 helicopter countermeasures set; the Command, Control, and Communications Countermeasures Systems (C3CM); the BRD-7/8 Tactical Direction Finding Systems; the SLR-16 Acquisition Set and SRD-19 Direction Finding Set; the OL-82 AYS and OL-5004 AYS Airborne Acoustic Processors; the Self-Propelled Array Buoys (SPRAY); the Advanced Target Simulator; Surface Ship Low-Frequency Sonar; Low-Frequency Sonar; the Mk4 Acoustic Jammer; Forward Alerting Radar (FAAR) (MPQ-49); the Low Altitude Aircraft Detection System (LAADS); Tracked Search and Target Acquisition Radar (TRACKSTAR); the Antiradiation Missile Alarm Sensor (ARM Alarm); the Radar Antiboat Intrusion Detection System (RAIDS); the Fleet Area Control and Surveillance Facilities (FACTS); the ALM-166 Tester, which supports the ALQ-147 IRCM System; the ALM-178 Tester, which supports the ALQ-144 IRCM System; the USM-406C(V) Operational Level Test Set; the USM-464 Countermeasures Test Set; the USM-392B Circuit Card Test Set; the USM-458B EW Test System; Trident II Navigation Displays; Shipboard Radar Graphics Indicators; displays; the Automatic Data Link Processing System; B-1B Indicators; the Patriot Operator Tactics Trainer (OTT); the ASW Trainer (Device 14A12); Airborne Electronic Warfare Trainers; the Simulated Antiarmor Gunnery System (STAGS) for the army and the marine corps; the Model 4313 Lofar Trainer for the navy; and teamed with General Electric on the demonstration/validation phase of INEWS

Countermeasures Division; Nashua, New Hampshire
Manufacturing major on-board pod and expendable countermeasures systems for all branches of the armed services

Defense and Information Systems Division; Merrimack, New Hampshire

Producing sophisticated tactical radar systems, low-altitude air defense systems, high-resolution militarized computer graphics displays, training and simulation systems, air traffic control and air

space management systems, and automated test systems for checking out air force and navy aircraft electronic warfare systems.

Surveillance Systems Division; Hudson, New Hampshire

Producing systems and subsystems tailored to requirements for intelligence, C3CM, and antisubmarine warfare

Electronic Components Business Division; Litchfield, Manchester, and Milford, New Hampshire

Producing high-technology microwave systems and subsystems; integrated modules and specialized components for ECM, ESM, radar, and space communications; and an array of advanced flexible circuits, multilayer boards, and flexible/rigid systems for government and commercial markets

SUBSIDIARIES

North America

CalComp (United States)

Datacom Systems Corp. (United States)

Lockheed Aeronautical Systems Co. (United States)

Lockheed Air Terminal Inc. (United States)

Lockheed Aircraft Service Co. (United States)

Lockheed Data Plan Inc. (United States)

Lockheed Datacom Corp. (United States)

Lockheed Electronics Co. Inc. (United States)

Lockheed Engineering and Sciences Co. Inc. (United States)

Lockheed Finance Corp. (United States)

Lockheed Georgia International Services Inc. (United States)

Lockheed Missiles and Space Co. Inc. (United States)

Lockheed Space Operations Co. (United States)

Lockheed Support Systems (United States)

Metier Inc. (United States)

Murdock Engineering Co. (United States)

Sanders Associates Inc. (United States)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Industri Pesawat Terbang Nusantara, P.T. (IPTN)

Lockheed and IPTN of Indonesia signed a memorandum of understanding for potential joint business efforts.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Daniel M. Tellep

Chairman of the board, chief executive officer

Robert A. Fuhrman

Vice chairman of the board, chief operating officer

Kenneth W. Cannestra

Group president, Aeronautical Systems

Donald C. Jones

Group president, Technology Services

John N. McMahon

Group president, Missiles and Space Systems

Val P. Peline

Group president, Electronic Systems

PRINCIPAL INVESTORS

H. C. Simmons—17.9 percent

FOUNDERS

Information is not available.

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	\$2,598.0	\$2,891.0	\$3,164.0	\$3,292.0	\$3,398.0
Cash	63.0	71.0	40.0	269.0	86.0
Receivables	1,548.0	1,556.0	1,868.0	1,816.0	1,786.0
Inventory	928.0	1,098.0	1,069.0	1,067.0	1,266.0
Other Current Assets	59.0	166.0	187.0	140.0	260.0
Net Property, Plants	\$1,283.0	\$1,758.0	\$1,828.0	\$1,858.0	\$1,903.0
Other Assets	\$303.0	\$1,337.0	\$1,468.0	\$1,493.0	\$1,491.0
Total Assets	\$4,184.0	\$5,986.0	\$6,460.0	\$6,643.0	\$6,792.0
Total Current Liabilities	\$2,638.0	\$2,876.0	\$3,455.0	\$3,474.0	\$2,895.0
Long-Term Debt	\$35.0	\$1,244.0	\$918.0	\$693.0	\$1,835.0
Other Liabilities	-	-	-	-	-
Total Liabilities	\$2,673.0	\$4,120.0	\$4,373.0	\$4,167.0	\$4,730.0
Total Shareholders' Equity	\$1,511.0	\$1,866.0	\$2,087.0	\$2,476.0	\$2,062.0
Common Stock	65.0	66.0	66.0	66.0	70.0
Other Equity	454.0	462.0	347.0	484.0	707.0
Retained Earnings	992.0	1,338.0	1,674.0	1,926.0	1,285.0
Total Liabilities and Shareholders' Equity	\$4,184.0	\$5,986.0	\$6,460.0	\$6,643.0	\$6,792.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$9,386.0	\$10,161.0	\$11,078.0	\$10,433.0	\$9,891.0
US Revenue	9,323.0	9,834.0	10,806.0	10,183.0	9,628.0
Non-US Revenue	63.0	327.0	272.0	250.0	263.0
Cost of Sales	\$9,395.0	\$10,505.0	\$10,264.0	\$9,733.0	\$9,838.0
R&D Expense	\$399.0	\$441.0	\$506.0	\$503.0	\$500.0
SG&A Expense	-	-	-	-	-
Capital Expense	-	-	-	-	-
Pretax Income	\$408.0	\$421.0	\$726.0	\$601.0	(\$40.0)
Pretax Margin (%)	4.35	4.14	6.55	5.76	(0.40)
Effective Tax Rate (%)	42.00	43.00	40.00	34.00	34.00
Net Income	\$401.0	\$408.0	\$421.0	\$624.0	\$2.0
Shares Outstanding, Millions	65.7	66.0	65.7	60.2	62.6
Per Share Data					
Earnings	\$12.16	\$12.56	\$13.08	\$17.98	\$0.13
Dividend	\$0.75	\$0.95	\$1.30	\$1.55	\$1.75
Book Value	\$23.00	\$28.27	\$31.77	\$41.13	\$32.94

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
<i>Liquidity</i>					
Current (Times)	0.98	1.01	0.92	0.95	1.17
Quick (Times)	0.63	0.62	0.61	0.64	0.74
Fixed Assets/Equity (%)	84.91	94.21	87.59	75.04	92.29
Current Liabilities/Equity (%)	174.59	154.13	165.55	140.31	140.40
Total Liabilities/Equity (%)	176.90	220.79	209.54	168.30	229.39
<i>Profitability (%)</i>					
Return on Assets	-	8.02	6.77	9.52	0.03
Return on Equity	-	24.16	21.30	27.35	0.09
Profit Margin	4.27	4.02	3.80	5.98	0.02
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	4.25	4.34	4.57	4.82	5.06
Capital Spending % of Revenue	0	0	0	0	0
Employees	84,500	94,200	97,200	85,600	82,500
Revenue (\$K)/Employee	\$111.08	\$107.87	\$113.97	\$121.88	\$119.89
Capital Spending % of Assets	0	0	0	0	0

Source: Lockheed Corporation
 Annual Reports and Forms 10-K
 Dataquest (1990)

Company Backgrounder by Dataquest

Motorola, Incorporated

1303 E. Algonquin Road

Schaumburg, Illinois 60196

Telephone: (708) 576-5000

Fax: (708) 576-7653

Dun's Number: 00-132-5463

Date Founded: 1928

CORPORATE STRATEGIC DIRECTION

Motorola, Incorporated, is the largest semiconductor producer based in the United States. Founded in 1928 for the purpose of manufacturing automobile radios, Motorola has grown from a radio equipment and communications manufacturer to a \$9.6 billion* Fortune 100 company with operations in diverse electronics markets.

Semiconductor operations were established in 1948, early in the history of the semiconductor industry, instigated by automobile radio applications. Today, Motorola maintains one of the broadest product lines of all semiconductor manufacturers and offers electronic products in other sectors as well.

Motorola is engaged in the design, manufacture, and sales of electronic equipment and components, including electronic communications systems, semiconductors, information systems products, military and aerospace electronic equipment, and automotive and industrial electronic equipment.

Motorola's Communication Products Sector and Semiconductor Products Sector accounted for 33 and 30 percent, respectively, of total revenue during 1989. The General Systems Group represented the highest rate of growth, accounting for 19 percent of sales, in 1989, up from 13 percent in 1988.

Motorola's total revenue increased 16.6 percent to \$9.6 billion in fiscal 1989 from \$8.3 billion in fiscal 1988. Net income increased 11.9 percent to \$498.0 million in fiscal 1989 from \$445.0 million in fiscal 1988. Motorola employs approximately 104,000 people worldwide.

Over the past five years, the domestic market has slowly been losing its impact on Motorola's total

revenue figure. During fiscal 1985, North American sales accounted for 92.6 percent of total revenue. In fiscal 1989, the percentage decreased to 62.3 percent. International sales have steadily become more and more significant, climbing from 7.4 percent of total revenue in fiscal 1985 to 37.7 percent in fiscal 1989. Motorola anticipates that during 1990, there will be more rapid economic growth in Asia and Europe than in the United States.

Motorola believes that a strong commitment to R&D drives long-term growth. During fiscal 1989, 1988, and 1987, R&D expenditure totaled \$784.0, \$665.0, and \$524.0 million, respectively. These figures represented 8.2, 8.1, and 9.8 percent, respectively, of total revenue. R&D activities focus principally on the development of new products and enhancement of existing products. Technical data and product application ideas are exchanged among Motorola's industry segments on a regular basis.

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.

BUSINESS SEGMENT STRATEGIC DIRECTION

Semiconductor Products Sector

In an era of increasing specialization and niche market-oriented companies, Motorola represents an unusual breed of US semiconductor manufacturer. As the largest US chipmaker, Motorola continues to be one of the few remaining broad-based semiconductor suppliers in the nation. The Company considers its

*All dollar amounts are in US dollars.

wide product breadth to be critical to its semiconductor strategy and has charted a course that provides an extensive product portfolio.

The Company's semiconductor revenue in 1989 was \$3.04 billion, an increase of 11 percent over 1988. The semiconductor products segment accounted for 30 percent of total sales for fiscal 1989, down from 32 percent in fiscal 1988. According to Dataquest, Motorola possessed 5.8 percent of the 1989 worldwide semiconductor market, ranking it fourth among more than 138 vendors. A review of Motorola's product portfolio shows that the Company is manifestly strong in the areas of discrete devices and analog, logic, and microcomponent products. It is investing to establish a stronger position in memory through the development of a competitive fast SRAM offering, as well as a strategic position in DRAMs under a technology agreement with Toshiba.

Discrete Devices

Although many semiconductor producers had abandoned discrete products for integrated circuits, Motorola remains an important force in discretely such as transistors, diodes, and thyristors. In a market dominated by Japanese companies, Motorola had been the leading supplier and was dislodged from the number one position only in 1987 by Toshiba. Motorola held onto the number two position in 1989 with 10.1 percent of the worldwide market share, with discrete revenue amounting to \$775 million.

Within the discrete market, Motorola holds strong positions in all the major product areas. Producing both power transistors and small-signal transistors (SSTs) in MOSFET and bipolar technologies, Motorola held 12.0 percent of the 1989 worldwide transistor market. Motorola also held 8.7 percent of the 1989 worldwide diode market. The Company's strengths are in Zener and power diodes.

Serving the broad range of discrete markets also requires a broad range of capabilities, including advanced submicron technology for such products as radio frequency (RF) semiconductors and power MOS devices plus leading-edge manufacturing and packaging technologies for mature, high-volume semiconductors. These new technologies often combine discrete and integrated circuit technologies to provide new products containing substantial added value. The Company also offers a broad range of silicon pressure sensing devices including a new fully signal-conditioned integrated pressure sensor.

Optoelectronics

Motorola's optoelectronic products include emitter/detectors, optocouplers, optointerrupters, and fiber-optic switches and components. However, with revenue of \$25 million during fiscal 1989, Motorola is a small player in the \$1.7 billion optoelectronics market. Dataquest found Motorola to rank nineteenth in the worldwide optoelectronics market during 1989.

Analog

Motorola's growing portfolio of analog circuits is targeted primarily toward automotive, telecommunications, and consumer applications. Using bipolar and CMOS technologies, Motorola has developed a variety of proprietary and custom devices. In 1989, Motorola held 4.7 percent market share and ranked fifth in the worldwide analog market, according to Dataquest.

Logic

Motorola offers a variety of logic products in standard logic, gate arrays, and custom products. The Company has long been a leading producer of standard logic circuits, producing a variety of products in TTL, ECL, and CMOS technologies. In the standard logic arena, Motorola is a major market participant, ranking sixth in the bipolar and digital logic markets and third in the MOS logic market during 1989, according to Dataquest.

Application-Specific ICs (ASICs)

In addition to working closely with key customers to offer high-performance system solutions in both CMOS and bipolar technologies, a key feature of Motorola's strategy in the ASIC market is to drive the industry standards for computer-aided design (CAD) actively in order to accelerate the availability and utility of open architecture alternatives.

During 1989, Motorola introduced a new design concept, Customer-Defined Arrays, for ASICs. Customer-Defined Arrays combine array- and cell-based chip architectures with multiple process technologies on a single circuit. Motorola's new Open Architecture CAD System gives customers a complete ASIC development environment using industry-standard workstations and leading third-party design and verification tools.

Motorola is the leading supplier of ECL gate arrays to the merchant market. Motorola's MCA III has yielded 2,200-gate and 10,000-gate ECL arrays featuring typical delays in the range of 100 to 150ps. In 1990, Motorola extended the line with the introduction of

TTL/ECL versions in 750-, 2,200-, and 6,200-gate densities. The next generation of bipolar arrays, the MCA V, will be fabricated in submicron technology with four layers of metal, offering gate densities exceeding 100,000. Other architectural features will include a BiCMOS process option, built-in testability, and over 700-lead tape-automated bonding (TAB) packaging.

In CMOS process technology, Motorola has a family of high-density CMOS gate arrays manufactured in a 1.0-micron process. The HDC Series utilizes a sea-of-gates architecture and ranges in gate count from approximately 3,000 to 105,000 gates. The next generation of these CMOS arrays, the H4C Series, will be manufactured in a submicron process and will offer a configurable base array option in densities exceeding 300K gates. High I/O applications are driving the migration to CMOS TAB packaging.

Microcomponents

Motorola is a leading participant in the microcomponents market. The Company has been a long-time supplier of proprietary microprocessors, microcontrollers, and microperipherals to this market. With estimated revenue of \$803 million in an approximately \$8.2 billion market, it ranks as the third-largest microcomponent manufacturer in the world. Motorola has ranked consistently as the number three supplier to this market, behind Intel and NEC. According to Dataquest, Motorola claimed market share of 9.8 percent in 1989, unchanged from 1988.

Motorola is the leading supplier of 8-bit microcontrollers in terms of units shipped. The Company's 68HC11 has gained very favorable market acceptance. A leading application for these 8-bit MCUs is in the automotive industry. The Company is also prominent in high-end microprocessors, where it has a full line of products, including high-performance floating-point coprocessors and DSP support. Motorola had a head start in the emerging 32-bit microprocessor market with its 68020/68030 devices. Because the M68000 microprocessor, a 16-bit microprocessor introduced in 1979, had a 32-bit internal architecture, Motorola was able to upgrade 16-bit data bus paths to a full 32-bit architecture with the 68020 two years before its competitors. In early 1987, Motorola produced silicon for the 68030, a second-generation 32-bit microprocessor that incorporated such functions as a paged MMU, an instruction cache, and a data cache with burst-fillable mode in a Harvard-style architecture. These devices have found homes in a variety of applications, including business systems, artificial intelligence platforms, robotics,

telecommunications, multiprocessor systems, military products, and most prominently, in technical workstations.

During 1989, Motorola introduced its next-generation complex-instruction-set computing (CISC) microprocessor, the MC68040. With 1.2 million transistors, the MC68040 delivers 20 million instructions per second and a sustained rate of 3.5 million floating-point operations per second (mflops) at 25 MHz. It is compatible with the software base of the M68000 family. It has been endorsed as a platform for future products by 36 customers, including Apple Computer, Bull, Commodore, Hewlett-Packard/Apollo, Nixdorf, and Unisys.

Motorola also unveiled the 68332, a 32-bit embedded microcontroller. It is based on Motorola's 68020 central processing unit and has been chosen by General Motors for control functions in future vehicles. The 68302 Integrated Multiprotocol Processor was developed for communications applications. The Company also introduced the 68HC16 microcontroller family, its first 16-bit MCU device, to provide a smooth migration path from 8-bit to 32-bit microcontroller applications.

Motorola's 88000 reduced-instruction-set computing (RISC) family of 32-bit microprocessors, first introduced in 1988, has been endorsed by more than 50 computer and telecommunications systems manufacturers, with more than 20 systems already announced. More than 300 software packages are under development for the 88000, using its applications software compatibility standard.

In 1989, the CPUAX, the new superchip containing 4 million transistors, was designed by TRW and fabricated by Motorola under the US Department of Defense Very High Speed Integrated Circuits (VHSIC) Phase 2 program. This 0.5-micron device can perform 200 Mflops and can automatically configure and repair itself. Initially intended by TRW for defense and space applications, Motorola plans to use the processing knowledge in future commercial products.

In digital signal processing, Motorola has introduced its 96002 Media Engine, a 32-bit IEEE floating-point processor. Based on the same architecture as the Company's 24-bit fixed-point device, the 96002 is able to create vivid color graphics while generating stereo sound.

Memories

Motorola manufactures a variety of DRAMs and fast SRAMs, using CMOS technology. The Company has developed a strategic supply position in DRAMs as a part of its technology agreement with Toshiba. Motorola is producing 1-megabit DRAMs in two of its own fabrication facilities and in its joint venture with Toshiba in Sendai, Japan (which also produces a variety of microcomponents).

Additionally, Motorola has developed a highly competitive portfolio of fast SRAMs, with capacities up to 1 megabit. This includes the industry's fastest 256-kilobit device, featuring an access time of 15 nanoseconds.

During 1989, Dataquest ranked Motorola 12th in the worldwide MOS memory market with a market share of 2.5 percent. Motorola's MOS memory revenue totaled \$407.0 million.

Communication Products Sector

The Communication Products Sector accounted for 33.0 percent of Motorola's 1989 net sales, or \$3.31 billion. This sector produces a wide variety of radio communications equipment, including base stations, digital voice communications systems, high-frequency single-banded radio systems, mobile/portable data communications and FM two-way radio communications systems, and radio paging systems. Motorola can claim the distinction of being the first foreign supplier to join Japanese competitors in selling to Japan's national telephone company, Nippon Telegraph and Telephone Company. Motorola is a market leader in radio paging equipment.

Within the past year, Motorola unveiled a number of new communications products. The Wrist Watch Pager, which was developed jointly with Timex Corporation, combines a numeric display pager with a digital watch and is compatible with existing paging systems used throughout the world. Motorola introduced an alphanumeric display model of its Bravo pager, and its new KeyNote tone and voice pager, which is 40 percent smaller than its predecessor, is available in analog and digital signaling formats. Motorola's new Fascinator encryption technology for mobile two-way radios was currently endorsed by the National Security Agency for Type I encryption. An advanced trunking version of the Company's Spectra mobile radio, which can be equipped with digital voice security, was also introduced in 1989.

General Systems Sector

The General Systems Sector includes the Motorola Cellular Group and Motorola Computer Systems Group, formerly Four-Phase Systems, acquired in 1982. The General Systems Sector accounted for 20 percent of Motorola's total revenue in fiscal 1989, a 6 percent increase from fiscal 1988. The Cellular Sector produces mobile and portable subscriber products and telephone systems, conventional car telephone systems, electronic mobile exchanges, IMTS car telephones, and low-density cellular base stations. As a leader in the fast-growing cellular telephone industry, Motorola is one of the top suppliers of cellular telephone systems as well as mobile and portable phones. More than half of the Company's cellular revenue comes from outside the United States. Motorola believes that in many underdeveloped countries with only limited wireline systems, cellular radiotelephones may become the principal telecommunications system.

The MICRO TAC personal telephone was introduced in April 1989. It is the smallest and lightest cellular phone currently on the market, it is the size of a wallet or checkbook, fits into a pocket or purse, and offers the same power, features, and performance as larger cellular phones. Later in the year, Motorola introduced the 9800 XL cellular phone and enhanced the MICRO TAC for in-car use with a new 3-watt extended system package.

The Computer Systems Group develops, manufactures, markets, and services multiuser, supermicro-class computers and board-level products. The group's products are based on industry standards, such as the VMEbus hardware standard, the UNIX operating system, and industry-standard peripheral interfaces. Computer products are marketed to end-user customers, original equipment manufacturers (OEMs), value-added resellers (VARs), and distributors worldwide. Motorola's 68000 microprocessors and the 88000 series RISC microprocessors are at the core of the VME board-level products.

Information Systems

The Information Systems Products Segment accounted for 6 percent, or \$552.0 million, of Motorola's total revenue for fiscal 1989. The products are designed and manufactured by the Information Systems Group, which consists of Codex Corporation and Universal Data Systems, Inc. (UDS). Codex manufactures and sells high-speed leased-line and dial modems; data/voice, time division, and statistical multiplexers; network management and

control systems; X.25 networking equipment; and local area network (LAN) interconnection products. These products are offered alone and, increasingly, in systems, which have been configured to transmit information between dispersed business machines, terminals, other peripheral devices, and host computers. Codex also sells communications products it does not manufacture. Codex made the following additions to its product lines during 1989: enhancements to its high-end 9800 Network Management System for medium- to large-network users; two new entry-level products for X.25 networks, and US availability of its international high-end 6600 Series Packet Network products; and the 6310 EtherSpan Bridge, a LAN multiplexing bridge linking T1 and high-speed LAN data traffic.

UDS manufactures and sells data communications modems, multiplexers, digital data systems (DDS) service units, and Integrated Services Digital Network (ISDN) equipment. UDS introduced several new products, including a V.32 plug-in modem for the IBM PS/2 computer family, as well as models conforming to the new CCITT international standards for error correction and data compression.

Government Electronics Group

The Government Electronics Group is engaged in the design, development, and production of electronic systems and products. During fiscal 1989, it accounted for 7 percent of Motorola's total revenue. The group produces diversified military and space electronic equipment, including aerospace telecommunications systems, military communications equipment, radar systems, data links, display

systems, positioning and navigation systems, instrumentation products, countermeasures systems, missile guidance equipment, electronic ordnance devices, and drone electronic systems.

Major contracts awarded in 1989 included a \$70.0 million contract for the development of new architecture for Block I of the US Army Joint STARS Ground Station Module. This system, which incorporates Motorola's 68030 32-bit microprocessor, will provide surveillance capability for combat, battle management, and peacetime verification. A \$14.6 million contract was awarded from General Electric for 20 telemetry tracking and command transponders for the GPS BLOCK IIR program of navigational satellites.

Automotive and Industrial Electronics Group

The Automotive and Industrial Electronics Group manufactures and markets solid-state electronic ignition systems, engine management controls, sensors, automotive instruments, and other automotive electronic products. These products are sold to OEMs, including foreign and domestic automobile manufacturers, heavy vehicle manufacturers, and farm equipment manufacturers.

Further Information

For further information about Motorola's business segments, please contact the appropriate Dataquest industry service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$5,443.0	\$5,888.0	\$6,727.0	\$8,250.0	\$9,620.0
Percent Change	-	8.18	14.25	22.64	16.61
Capital Expenditure	\$641.0	\$567.0	\$658.0	\$899.0	\$1,120.0
Percent of Revenue	11.78	9.63	9.78	10.90	11.64
R&D Expenditure	\$457.0	\$481.0	\$524.0	\$665.0	\$784.0
Percent of Revenue	8.40	8.17	7.79	8.06	8.15
Number of Employees	90,200	94,400	97,700	102,000	104,000
Revenue (\$K)/Employee	\$60.34	\$62.37	\$68.85	\$80.88	\$92.50
Net Income	\$72.0	\$194.0	\$308.0	\$445.0	\$498.0
Percent Change	-	169.44	58.76	44.48	11.91
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$2,175.0	\$2,385.0	\$2,408.0	\$2,652.0	
Quarterly Profit	\$123.0	\$154.0	\$89.0	\$132.0	

Source: Motorola, Incorporated
Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	73.50	70.00	66.70	63.90	62.30
International	26.50	30.00	33.30	36.10	37.70

Source: Motorola, Incorporated
Annual Reports

1990 SALES OFFICE LOCATIONS

North America—209

Europe—21

Asia/Pacific—19

Japan—4

ROW—11

MANUFACTURING LOCATIONS

North America

Albuquerque, New Mexico

Communications products

Arlington Heights, Illinois

Cellular telephone products

Austin, Texas

CMOS logic, MOS digital/analog, ASICs, MCUs,
FSRAMs, complex MPUs

Boynton Beach, Florida

Communications products

Carlisle, Pennsylvania

Communications products

Chandler, Arizona

Semiconductor products

Cupertino, California

General information system products

Elma, New York

Automotive electronics products

Fort Worth, Texas

Communications products

Franklin Park, Illinois

Communications products

Huntsville, Alabama

Modems

Lawndale, California

Semiconductor products

Mansfield, Massachusetts

Data communications products

Mesa, Arizona

MPUs, ASICs, DRAMs, MOS digital/analog,
telecom, regulators, op amps, automotive bipolar
logic, gate arrays, logic

Mt. Pleasant, Iowa

Communications products

Northbrook, Illinois

Automotive electronics products

Phoenix, Arizona

Power products, RF power products, small-signal
sensors, thyristors, TMOS power, Zener diodes,
rectifiers

Plantation, Florida

Communications products

Schaumburg, Illinois

Communications products

Seguin, Texas

Automotive electronics products

Tempe, Arizona

Semiconductor products, general information
system products

Vega Baja, Puerto Rico

Communications products

Willowdale, Canada

Communications products

Europe

Basingstoke, England

Communications products

Bordeaux, France

Semiconductor products

Camberly, England

Communications products

Copenhagen, Denmark

Communications products

E. Kilbride, Scotland

MCUs, logic, MOS digital/analog, MPUs, memory

Flensburg, Germany

Communications products

Munich, Germany

Semiconductor products

Stotfield, England

General information system products

Swindon, England

Cellular telephone products

Taunusstein, Germany

Communications products

Toulouse, France

Power products, telecom, consumer, regulators, op
amps, auto, rectifiers

Asia/Pacific

Aizu Wakamatsu, Japan

Logic, power, standard cells, MCUs, memory

Chung Li, Taiwan

Communications products, semiconductor products

Kowloon, Hong Kong

Semiconductor products

Kuala Lumpur, Malaysia

Semiconductor products

Manila, Philippines

Communications products, semiconductor products

Melbourne, Australia

Communications products

Penang, Malaysia

Communications products

Sendai, Japan
DRAMs, SRAMs, FSRAMs, ASICs, MCUs
Seoul, Korea
Communications products, semiconductor products
Seremban, Malaysia
Small-signal products
Singapore
Communications products
Tokyo, Japan
Communications products

ROW

Arad, Israel
Communications products
Guadalajara, Mexico
Power products
Leon, Mexico
Communications products
San Jose, Costa Rica
Communications products
Tel Aviv, Israel
Communications products, general information
system products

SUBSIDIARIES

North America

Codex Corp. (United States)
Motorola Canada Ltd. (Canada)
Motorola Components De Puerto Rico Inc. (Puerto Rico)
Motorola Credit Corp. (United States)
Motorola Data International Inc. (United States)
Motorola International Corp. (United States)
Motorola International Development Corp. (United States)
Motorola Portatiles de Puerto Rico Inc. (Puerto Rico)
Motorola Portavoz de Puerto Rico Inc. (Puerto Rico)
Motorola Telcarro de Puerto Rico Inc. (Puerto Rico)
Universal Data Systems (United States)

Europe

Motorola GmbH (Germany)
Motorola Ltd. (United Kingdom)
Motorola Semiconducteurs S.A. (France)

Asia/Pacific

Motorola Asia Ltd.. (Hong Kong)
Motorola Electronics Pte. Ltd. (Singapore)
Motorola Electronics Taiwan Ltd. (Taiwan)

Motorola Korea Ltd. (South Korea)
Motorola Malaysia Sdn. Bdh. (Malaysia)
Motorola Semiconductor Sdn. Bdh. (Malaysia)

ROW

Motorola de Mexico S.A. (Mexico)
Motorola Israel Ltd. (Israel)
Motorola Storno S.A. (Mexico)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

IBM

Motorola and IBM formed a joint venture to provide a nationwide radio data information service in the United States. The new company, called ARDIS, will give companies with mobile work forces access to company computer databases and information systems through two-way radio data terminals.

1989

Digital Equipment Corporation (DEC)

The companies will jointly design a fiber distributed-data interface chip set that Motorola will manufacture and market.

Oracle

Oracle will port its popular ORACLE relational database management system and related ORACLE tools to Motorola's M88000-based computer systems.

Philips International

The companies will cooperate on VSLI integrated circuits for interactive compact discs.

IBM

Motorola will fund and assign personnel to an R&D program for an X-ray lithograph project.

Thomson-CSF

Thomson-CSF will standardize its military and defense products to Motorola's M88000 RISC microprocessor family.

Interphase Corp.

Motorola bought 20 percent of this disk controller maker.

1988

Unisoft Group

Unisoft is acting as Motorola's exclusive agent for future products based on UNIX Release V.

Data General

Data General is to develop an ultrahigh-speed version of the M88000 RISC microprocessor family.

Omnirel

The two companies jointly introduced power MOSFET devices intended for military applications.

1987

Signetics

Signetics is the sole second source for Motorola's 68010 16-bit microprocessor.

Toshiba

Motorola installed Toshiba's CMOS process for submicron geometries at its MOS 6 wafer fab in Mesa, Arizona.

FutureNet

Motorola bundled its 62A gate-array library with design software from FutureNet.

Tangent Systems, Toshiba

The companies had a one-year channelless CAD tool agreement.

National Semiconductor (NS)

NS licensed Motorola to use its TAB packaging technology.

Gary L. Tooker

President and chief operating officer

Christopher B. Galvin

Senior executive vice president and assistant chief operating officer

Carl E. Lindholm

Executive vice president, International Operations

Arnold S. Brenner

Executive vice president and general manager, Japanese Group

Levy Katzir

Senior vice president and general manager, New Enterprises

Arthur P. Sundry

President and general manager, Communications Sector

James A. Norling

President and general manager, Semiconductor Products Sector

Edward F. Staiano

President and general manager, General Systems Sector

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

KEY OFFICERS

George M. C. Fisher

Chairman of the board and chief executive officer

Table 3
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	\$2,109.0	\$2,239.0	\$2,707.0	\$3,380.0	\$3,915.0
Cash	19.0	42.0	47.0	195.0	231.0
Receivables	813.0	851.0	1,101.0	1,400.0	1,683.0
Marketable Securities	157.0	143.0	211.0	145.0	202.0
Inventory	801.0	819.0	909.0	1,144.0	1,173.0
Other Current Assets	319.0	384.0	439.0	496.0	626.0
Net Property, Plants	\$1,981.0	\$2,140.0	\$2,329.0	\$2,854.0	\$3,337.0
Other Assets	\$280.0	\$303.0	\$285.0	\$476.0	\$434.0
Total Assets	\$4,370.0	\$4,682.0	\$5,321.0	\$6,710.0	\$7,686.0
Total Current Liabilities	\$1,185.0	\$1,371.0	\$1,668.0	\$2,691.0	\$2,751.0
Long-Term Debt	\$705.0	\$334.0	\$344.0	\$343.0	\$755.0
Other Liabilities	\$196.0	\$223.0	\$301.0	\$301.0	\$377.0
Total Liabilities	\$2,086.0	\$1,928.0	\$2,313.0	\$3,335.0	\$3,883.0
Total Shareholders' Equity	\$2,284.0	\$2,754.0	\$3,008.0	\$3,375.0	\$3,803.0
Common Stock	358.0	385.0	388.0	389.0	391.0
Other Equity	486.0	817.0	843.0	851.0	878.0
Retained Earnings	1,440.0	1,552.0	1,777.0	2,135.0	2,534.0
Total Liabilities and Shareholders' Equity	\$4,370.0	\$4,682.0	\$5,321.0	\$6,710.0	\$7,686.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$5,443.0	\$5,888.0	\$6,727.0	\$8,250.0	\$9,620.0
US Revenue*	4,000.0	4,124.0	4,482.0	5,269.0	5,997.0
Non-US Revenue*	1,443.0	1,764.0	2,245.0	2,981.0	3,623.0
Cost of Sales	\$3,406.0	\$3,647.0	\$4,059.0	\$5,040.0	\$5,905.0
R&D Expense	\$457.0	\$481.0	\$524.0	\$665.0	\$784.0
SG&A Expense	\$1,464.0	\$1,431.0	\$1,659.0	\$1,957.0	\$2,289.0
Capital Expense	\$641.0	\$567.0	\$658.0	\$899.0	\$1,120.0
Pretax Income	\$45.0	\$265.0	\$416.0	\$612.0	\$646.0
Pretax Margin (%)	0.83	4.50	6.18	7.42	6.72
Effective Tax Rate (%)	-	46.00	40.00	34.00	34.00
Net Income	\$72.0	\$194.0	\$308.0	\$445.0	\$498.0
Shares Outstanding, Millions	119.0	126.5	128.9	129.7	130.0
Per Share Data					
Earnings	\$0.61	\$1.53	\$2.39	\$3.43	\$3.83
Dividend	\$0.64	\$0.64	\$0.64	\$0.67	\$0.76
Book Value	\$19.19	\$21.77	\$23.34	\$26.02	\$29.25

Table 3 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.78	1.63	1.62	1.26	1.42
Quick (Times)	1.10	1.04	1.08	0.83	1.00
Fixed Assets/Equity (%)	86.73	77.71	77.43	84.56	87.75
Current Liabilities/Equity (%)	51.88	49.78	55.45	79.73	72.34
Total Liabilities/Equity (%)	91.33	70.01	76.89	98.81	102.10
<i>Profitability (%)</i>					
Return on Assets	-	4.29	6.16	7.40	6.92
Return on Equity	-	7.70	10.69	13.94	13.88
Profit Margin	1.32	3.29	4.58	5.39	5.18
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	8.40	8.17	7.79	8.06	8.15
Capital Spending % of Revenue	11.78	9.63	9.78	10.90	11.46
Employees	90,200	94,400	97,700	102,000	104,000
Revenue (\$K)/Employee	\$60.34	\$62.37	\$68.85	\$80.88	\$92.50
Capital Spending % of Assets	14.67	12.11	12.37	13.40	14.57

*Dataquest estimate

Source: Motorola, Incorporated
 Annual Reports
 Dataquest (1990)

NCR Corporation

1700 South Patterson Boulevard

Dayton, Ohio 45479

Telephone: (513) 445-5000

Fax: (513) 445-1238

Dun's Number: 00-131-6090

Date Founded: 1884

CORPORATE STRATEGIC DIRECTION

NCR Corporation was founded in 1884 by John H. Patterson and Frank J. Patterson, when they paid \$6,500* for controlling interest in the National Cash Register Company. The Company has grown into a world leader in the developing, manufacturing, marketing, installing, and servicing business information processing systems for worldwide markets. In 1989, NCR realized revenue of approximately \$6 billion.

NCR has developed a new corporate strategy for the 1990s. NCR's Open Cooperative Computing (O.C.C.) strategy is based on three essential elements: open systems, the appropriate distribution of computing functions throughout the business environment, and an end-user focus. The new strategy will focus primarily on the customers needs, from product design to customer service. Customers expect their information systems to enhance organizational productivity and improve customer service. These benefits can be achieved only if people throughout the organization can access information easily and naturally. NCR has decentralized infrastructure, allowing more freedom in the decision-making process.

The company's products and services are grouped into six major categories:

- Industry-specific technical workstations/processors for retail, financial, manufacturing, and other markets.
- General-purpose personal computers, office automation computers and video display terminals.
- Multiuser computer systems (small and medium) for departmental use and interactive/batch processing

- Large computer systems for on-line transaction as well as batch processing
- Communications processors
- Synergistic products and services including semi-conductors, data centers, field engineering, software services, education, business forms/supplies, and financing

NCR also entered the document-imaging market by releasing the Document Management System in April of 1990.

NCR describes itself as a large supplier of OEM products, as well as a non-NCR maintenance company. This strategy forms a synergy between NCR and its client base.

Although the United States remains its largest single market, with approximately 41 percent of sales during 1989, the Company is actively present in 120 countries. NCR has structured its global activities into four major geographic regions: the domestic US market; Europe; the Pacific (Canada, Australia, and the Far East); and the Middle East, Latin America, and Africa. Since 1986, revenue from regions outside the United States has represented more than half of the Company's total consolidated revenue.

Europe accounts for approximately 32 percent of total revenues for fiscal 1989. Within Europe, NCR is currently most active in Spain—servicing the finance, manufacturing/wholesale, and government sectors—and in West Germany—servicing the transportation, building, and wholesale sectors as well as the government sector.

Total revenue decreased less than 1 percent to \$5.95 billion in fiscal 1989 from \$5.99 billion in fiscal 1988. The slight decline in fiscal 1989 was a result of the continued softness of the US market and

*All dollar amounts are in US dollars.

the adverse effects the exchange rate had on international sales. Net income declined by 6.15 percent to \$412 million in fiscal 1989, down from \$439 million in fiscal 1988. NCR also bought over 9 million shares of its own common stock as part of a buy-back plan. This expenditure also contributed to the decline of net income for fiscal 1989.

NCR increased its R&D spending by 6.7 percent, totaling \$446 million in fiscal 1989 compared with \$416 million in fiscal 1988. This increase was necessary to maintain market share in the heavily competitive retail sector, as well as to develop a line of 486 microchannel based personal computer systems.

Capital expenditures totaled \$1.104 billion and represented 18.54 percent of revenue. This was a slight decrease when compared with the 1988 numbers of \$1.114 billion and 18.60 percent of revenue. NCR reduced the number of employees from 60,000 in fiscal 1988 to 56,000 in fiscal 1989 in an attempt to cut costs. Revenue per employee increased from \$99,830 in 1988 to \$106,360 in 1989.

NCR's product development policy is based on open architecture and the selective use of industry standards to provide flexible open systems. This approach is intended to prevent NCR's clients from feeling locked into a vendor's proprietary architecture or operating system and to provide NCR-compatibility to other competing vendors.

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

Workstations

Dataquest estimates that NCR had a market share of less than 1 percent of the 1989 technical workstation/personal computer worldwide market.

NCR's workstation market consists of industry-specific workstations/processors for industry applications, general-purpose computers such as personal computers, and automation computers using various general applications.

In 1990, NCR unveiled new X-Station network display graphics workstations (three color and two gray scale) for UNIX-based systems that provide up to a 200 percent increase in graphics processing performance over traditional solutions. This increase is made possible by the use of a split-server architecture.

Personal Computers

In 1989, NCR introduced the PC486/MC personal computer, a microchannel-based i486 system. This computer offers a high-performance platform for DOS, OS/2, and UNIX operating systems. In 1990, NCR introduced the PC486/MC33, which is similar to the PC486/MC except that it runs 32 percent faster, operating at 33 MHz. NCR also introduced three personal computers based on the Intel 80386 microprocessor. The NCR PC386sx/MC is a 16-MHz 32/16-bit desktop computer based on microchannel architecture. The NCR 386sx is very similar to the 386sx/MC, except it does not include the microchannel architecture. The PC 925 is a 25-MHz personal computer designed for those using large spreadsheets, extensive databases and CAD/CAM/CAE applications. The NCR PC386sx/MC, NCR 386sx, and NCR PC 925 can function as a personal computer/workstation or a server.

Support for these personal computers include NCR's version of MS OS/2 1.1 released in March 1989. MS OS/2 1.1 is a powerful multitasking operating system that provides the Presentation Manager Application environment, as well as support for file sizes larger than 32MB. NCR also supplies the 386/ix product family with products designed to provide users of 386-based personal computers with the functionality of UNIX System V, Release 3.2, as well as the ability to run MS-DOS programs under UNIX. The NCR TR/ix software allows businesses running 386/ix UNIX personal computers to add token-ring-linked, DOS-based PC workstations to their networks.

NCR does not have a strong presence in the display terminal market. Worldwide, NCR has less than 1 percent market share in processing terminal market for 1989. Dataquest estimates that NCR shipped a total of 3,500 display units worldwide during 1989.

Proprietary Computer Systems

The Company announced the System 10000 Model 85 in 1990. The 85 is an extension of the 10000 family of multiuser products at the high end. The new model nearly doubles the power of a Model 75. The Model 85 is comprised of multiple dyadic processors connected via the NCR-developed SCSI Inter-Processor Bus. NCR also released Token-Ring and Ethernet TCP/IP software. This software allows the System 10000's ITX operating system to work together with the NCR TOWERS, the NCR 9800 systems, personal computers, and non-NCR products.

Mainframe Computer Systems

Dataquest estimates that NCR had 1.37 percent of the 1989 systems/mainframe worldwide market share in fiscal 1989.

NCR announced the fourth release of the NCR 9800 family of large processors. The 9800 system includes the Application Processor 4, Release 4 of the VRX/E operating system, and a PC console. The AP4 uses special-purpose applications processors to provide the advantages of increased application availability and communications that UNIX can provide.

TOWER Products/UNIX

The NCR TOWER 32 family of UNIX processors was expanded with three new models in 1989: The NCR 32/300, 32/500, and 32/700. All three models provide extensive file server and communications capabilities; for example, the Access 2000 that was released in May 1990. The Access 2000 is a hardware and software solution that allows hospital users to network information from many applications using their desktop computing device and an NCR TOWER. The Access 2000, running on a UNIX-based NCR TOWER 32/700 supermicrocomputer, allows multiple terminal emulation sessions for several host processors. The NCR TOWER Operating System, NCR's version of UNIX, contains utilities, libraries, and features from AT&T's System V, Release 3.2. As a result, NCR TOWER family is fully compatible

with the AT&T System Interface Definition and X/Open standards, offering a wide range of compatible software options.

UNIX

NCR was the first major computer vendor to offer a general-purpose UNIX platform, the NCR TOWER, in 1982. NCR continues to promote and influence the development of open systems standards. Current UNIX platforms include TOWERVIEW: X Window and UNIX desktop. NCR is placing greater emphasis on the indirect sales channel for UNIX systems in 1990 than in the past. Sales of proprietary systems are declining. Proprietary systems are sold primarily through direct sales to existing accounts. The company expects overall growth for the UNIX market to be much higher than 10 percent in the fiscal 1990.

Document-Imaging Systems

In 1990, NCR entered the image-processing market by announcing its Document Management System (DMS). The DMS is an integrated computer hardware and software solution based on industry-standard architecture, allowing users to integrate DMS with existing information systems. NCR will provide a full range of imaging products, including Image Item Processing Systems, Point of Service Image Processing Systems, and Office Image Services.

Semiconductors

In 1989, sales revenue for semiconductors was \$120 million, compared with \$132 million in 1988. Most of semiconductor sales were in North America. Sales were primarily in three product categories: MOS logic, MOS microcomponents, and MOS memory.

Further Information

For further information about the Company's business segments, please contact the appropriate Dataquest industry service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$4,317	\$4,882	\$5,641	\$5,990	\$5,956
Percent Change	5.96	13.09	15.55	6.19	(0.57)
Capital Expenditure	\$871	\$960	\$1,058	\$1,114	\$1,104
Percent of Revenue	20.18	19.66	18.76	18.60	18.54
R&D Expenditure	\$299	\$321	\$357	\$416	\$446
Percent of Revenue	6.93	6.58	6.3	6.94	7.49
Number of Employees	62,000	62,000	62,000	60,000	56,000
Revenue (\$K)/Employee	\$69.62	\$78.74	\$90.98	\$99.83	\$106.36
Net Income	\$315	\$337	\$419	\$439	\$412
Percent Change	(8.16)	6.98	24.33	4.77	(6.15)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$1,250.00	\$1,527.08	\$1,390.65	\$1,788.00	

Source: NCR Corporation
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	54.00	49.00	45.00	42.00	41.00
International	46.00	51.00	55.00	58.00	59.00
Europe	22.00	28.00	32.00	32.00	32.04
All Others	24.00	23.00	23.00	26.00	26.96

Source: NCR Corporation
Annual Reports
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988*	1989*
Direct Sales	74.33	74.33
Indirect Sales	25.67	25.67
OEMs	9.94	9.94
VARs	15.73	15.73

*Computer systems only

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—215
 Japan—55
 Europe—165
 Asia/Pacific—100
 ROW—160

MANUFACTURING LOCATIONS

North America

Blaine, Minnesota
 Data communications systems, networking software
 Cambridge, Ohio
 Programmable terminal systems, retail peripherals, UPC and EAN scanners, printed circuit boards
 Colorado Springs, Colorado
 ROMs, SCSI controllers, CRT and graphics controllers, microcontrollers, DSAP, ASICs
 Dayton, Ohio
 Workstations, terminals, system software, peripherals
 Fort Collins, Colorado
 ASIC devices, semiconductor design tools, ICs, VLSI fabrication, software, GAPP
 Hauppauge, New York
 Video display terminals, computer systems
 Ithaca, New York
 Printers
 Lake Mary, Florida
 Mainframe computers, VRX/E system, MULTI-TRAN, Database systems, VLSI engineering
 Mountain View, California
 Computer output microfilm systems
 Norcross, Georgia
 Advanced retail systems
 Waterloo, Canada
 Proof and encoder systems, item processing software
 West Columbia, South Carolina
 NCR TOWER, UNIX System V-based Tower, TMX modular financial terminals, branch processors
 Wichita, Kansas
 Disk/tape file subsystems, printers, SCSI boards

Japan

Naka-gun
 Terminals, printers

Europe

Augsburg, West Germany
 PCs
 Dundee, Scotland
 ATM, peripheral and support devices
 Inverkeithing, Scotland
 Self-service products

ROW

Puebla, Mexico
 Terminals, TOWER products, printed circuit board assemblies
 Sao Paulo, Brazil
 Terminals, coin dispensers

SUBSIDIARIES

North America

Applied Digital Data Systems Inc.
 NCR Canada Inc. (Canada)
 NCR Comten Inc. (United States)
 NCR Credit Corp. (United States)
 NCR International Inc. (United States)

Japan

NCR Japan Ltd. (70 percent owned)

Europe

NCR France, S.A. (France)
 NCR GmbH (West Germany)
 NCR Nederland N.V. (Netherlands, 95 percent)
 NCR Espana, S.A. (Spain)
 NCR Switzerland (Switzerland)
 NCR Ltd. (United Kingdom)
 NCR Commercial, S.A. DE C.V. (Denmark)

Asia/Pacific

NCR Australia Pty. Ltd. (Australia)
 NCR Hong Kong Ltd. (Hong Kong)

ROW

NCR Argentina Saic (Argentina)
NCR Manufacturing Ltd.
NCR Nigeria Ltd. (Nigeria, 60 percent)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

American Business Computer (ABC)

NCR and American Business Computer have agreed to a marketing referral agreement to market a full line of electronic data interchange (EDI) products.

American Business Computer, BASS, Bonafide, Micro Enhancements, Retail Management Systems, and Supermation

NCR formed an agreement with these six leading software vendors to develop software products for retailers to run on NCR systems.

Origin Technologies

NCR Corporation announced that Origin Technologies of Miami Beach, Florida, has entered into a joint marketing agreement to develop application software and installations for the NCR 5682 retail self-service terminal.

Software Earnings, Inc.

NCR and Software Earnings, Inc., entered into a joint marketing agreement to provide check-processing systems for the banking industry.

Sritek, Inc.

NCR Corporation has named Sritek, Inc., of Macedonia, Ohio, to the list of companies to market the NCR TOWER family of supermicrocomputers and personal computers.

Teradata Corporation

NCR and Teradata Corporation agreed to jointly develop their parallel processing technologies for general-purpose business computer systems. This agreement will last for three years and will be based in Southern California.

Victor Frost, University of Kansas

NCR Computer Integrated Manufacturing (CIM) Systems Integration Center in Wichita, Kansas, and the Kansas Technology Enterprise Corporation (KTEC) have issued an \$89,000 grant to Victor

Frost, a Kansas University professor, for research at the University's Telecommunications and Information Sciences Laboratory (TISL).

1989

Businessland Inc.

NCR announced an international agreement with Businessland, expanding the distribution channels for NCR's line of personal computers. Businessland will market the entire line of personal computers through 125 worldwide centers.

Microsoft Corporation

Entered long-term agreement for Microsoft's complete line of work group software products.

Novell

Entered strategic alliance. NCR codeveloped and is the first licensee of Novell's Portable NetWare. Continued cooperation for the development of UNIX server products for PC LANs.

Samsung

Entered six-year agreement that gives NCR the right to make and market Samsung SRAMs in return for Samsung's license of NCR's high-density ROMs.

KEY OFFICERS

Charles E. Exley, Jr.

Chairman of the board and chief executive officer

Gilbert P. Williamson

President

William F. Buster

Executive vice president

R. Elton White

Executive vice president

PRINCIPAL INVESTORS

The Capital Group, Inc.—5.2 percent

FOUNDERS

John H. Patterson

Frank J. Patterson

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	\$2,569	\$2,580	\$2,875	\$3,007	\$2,707
Cash & Short-Term Investments	794	669	712	824	784
Receivables	974	1,056	1,173	1,174	1,146
Marketable Securities	0	0	0	0	NA
Inventory	696	672	763	744	561
Other Current Assets	105	183	227	265	216
Net Property, Plants	\$647	\$734	\$836	\$907	\$919
Other Assets	\$724	\$769	\$830	\$803	\$874
Total Assets	\$3,940	\$4,083	\$4,541	\$4,717	\$4,500
Total Current Liabilities	\$1,207	\$1,222	\$1,859	\$1,776	\$1,813
Long-Term Debt	\$232	\$129	\$110	\$222	\$233
Other Liabilities	\$182	\$336	\$411	\$479	\$469
Total Liabilities	\$1,621	\$1,687	\$2,380	\$2,477	\$2,515
Total Shareholders' Equity	\$2,319	\$2,396	\$2,161	\$2,240	\$1,985
Converted Preferred Stock	0	0	0	0	0
Common Stock	544	544	544	544	353
Other Equity	(426)	(591)	(1,165)	(1,441)	10
Retained Earnings	2,201	2,443	2,782	3,137	1,622
Total Liabilities and Shareholders' Equity	\$3,940	\$4,083	\$4,541	\$4,717	\$4,500
Income Statement	1985	1986*	1987*	1988*	1989*
Revenue	\$4,317	\$4,882	\$5,641	\$5,990	\$5,956
US Revenue	2,352	2,396	2,559	2,500	2,442
Non-US Revenue	1,965	2,486	3,082	3,490	3,514
Cost of Sales	\$2,276	\$2,585	\$3,045	\$3,202	\$3,209
R&D Expense	\$299	\$321	\$357	\$416	\$446
SG&A Expense	\$1,203	\$1,387	\$1,519	\$1,621	\$1,605
Capital Expense	\$871	\$960	\$1,058	\$1,114	\$1,104
Pretax Income	\$563	\$623	\$766	\$787	\$739
Pretax Margin (%)	13.04	12.76	13.58	13.14	12.41
Effective Tax Rate (%)	44.00	46.00	45.00	44.00	44.20
Net Income	\$315	\$337	\$419	\$439	\$412
Shares Outstanding, Millions	100	98	93	82	70.6
Per Share Data					
Earnings	\$3.15	\$3.42	\$4.51	\$5.33	\$5.38
Dividend	\$0.88	\$0.92	\$1.00	\$1.24	\$1.32
Book Value	\$4.31	\$4.09	\$4.30	\$3.66	\$3.56

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*
<i>Liquidity</i>					
Current (Times)	2.13	2.11	1.55	1.69	1.49
Quick (Times)	1.55	1.56	1.14	1.27	1.18
Fixed Assets/Equity (%)	27.90	30.63	38.69	40.49	46.30
Current Liabilities/Equity (%)	52.05	51.00	86.02	79.29	91.34
Total Liabilities/Equity (%)	69.90	70.41	110.13	110.58	126.70
<i>Profitability (%)</i>					
Return on Assets	8.37	8.40	9.72	9.48	8.94
Return on Equity	14.33	14.29	18.39	19.95	19.50
Profit Margin	7.30	6.90	7.43	7.33	6.92
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	6.93	6.58	6.33	6.94	7.49
Capital Spending % of Revenue	20.18	19.66	18.76	18.60	18.54
Employees	62,000	62,000	62,000	60,000	56,000
Revenue (\$K)/Employee	\$69.62	\$78.74	\$90.98	\$99.83	\$106.36
Capital Spending % of Assets	22.11	23.51	23.30	23.62	24.53

*The years 1986 through 1989 have been restated to reflect the adoption of FASB Statement No. 94.
 NA = Not available

Source: NCR Corporation
 Annual Reports and Forms 10-K
 Dataquest (1990)

Northern Telecom Limited

3 Robert Speck Parkway
Mississauga, Ontario, Canada L4Z3C8
Telephone: (416) 897-9000
Fax: (416) 275-1143
Dun's Number: 05-781-2224

Date Founded: 1914

CORPORATE STRATEGIC DIRECTION

Northern Telecom Limited, a global supplier of fully digital telecommunications switching systems, is 53.1 percent owned by BCE Inc. BCE's core business is telecommunications, in which Northern Telecom plays an important role. Northern Telecom generated 27 percent of BCE's total revenue for 1989.

Northern Telecom operates exclusively in the telecommunications equipment market. This business focus consists of the research and design, development, manufacture, marketing, sale, installation, financing, and service of central office switching equipment, business communications systems and terminals, transmission equipment, cable and outside plant products, and other products and services.

Northern Telecom is seeking to expand the international portion of its operations through acquisitions and joint ventures worldwide. Among these is a new joint venture to manufacture digital telecommunications systems in Hungary. An agreement was also reached whereby British Telecom will distribute Northern Telecom's new Meridian business communications systems in the United Kingdom. Northern Telecom is seeking to increase sales in Japan through the acquisition of a 20 percent stake in Sanko Telecom, a Japanese manufacturer of telecommunications equipment. The Company also is pursuing ventures in Australia and the Caribbean. This commitment to expanding operations is demonstrated by the 55 percent increase in non-North American revenue in 1989.

Northern Telecom's total revenue for fiscal 1989 was \$6.1 billion,* up 13 percent over 1988 revenue of \$5.4 billion. Revenue increases in the following business segments contributed to the overall growth: central office switching, business communications

systems and terminals, transmission, and cable and outside plant product divisions. Canadian revenue increased 18 percent to \$2.5 billion, or 41 percent of total 1989 sales. Revenue growth resulted mainly from increased capital spending programs by the telephone operating companies. US revenue was \$3.6 billion, or 59 percent of total 1989 revenue. This was an 8 percent increase from the \$3.4 billion in revenue for 1988. The increase in US sales was across product lines, but was primarily from the sale of central office switching equipment. Revenue by destination for 1989 was \$3.5 billion, \$2.0 billion, and \$588.4 million for the United States, Canada, and other areas, respectively. Revenue increased in all international markets, primarily because of higher shipments to Japan and other Pacific Rim countries and the Caribbean and Latin American markets.

Net income amounted to \$376.5 million in fiscal 1989. This represented an 18 percent increase over the 1988 prerestructuring figure of \$301 million, or an increase of 114 percent over the postrestructuring earnings of \$166 million. Improvement in net income is seen as the result of restructuring and cost reduction programs, as well as an increased sales effort.

Northern Telecom conducts the major part of its R&D activities through its Bell-Northern Research Ltd. (BNR) subsidiary, owned 70 percent by Northern Telecom and 30 percent by Bell Canada. R&D expenditure totaled \$29.8 million, or 12 percent of total revenue. This was concentrated in the fiber-optic and transmission areas, and resulted in the introduction of the new FiberWorld family of telecommunications products in October 1989 and Meridian products in 1990. Capital expenditure in fiscal 1989 amounted to \$370.0 million, or 6 percent of total revenue. Northern Telecom expects 1990 capital spending to be approximately the same as in 1989. Northern Telecom conducts business in more than 70 countries and employs over 47,500 people worldwide.

*All dollar amounts are in US dollars.

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 background.

BUSINESS SEGMENT STRATEGIC DIRECTION

Northern Telecom separates its business into five areas: central office switching, transmission equipment, business communications systems and terminals, cable and outside plant, and other, which includes interest income from its finance subsidiaries.

Central Office Switching

Central office switching equipment is used by companies to connect one customer with another. Northern Telecom has a full line of digital office switches, the DMS family of products. Dataquest estimates that Northern Telecom ranked second in the US central office switching market with 39 percent market share in 1989. The Company's central office switching revenue in 1989 was \$3.26 billion, up 12 percent from \$2.91 billion in 1988. This segment accounted for 53 percent of Northern Telecom's total revenue in 1989.

Transmission Equipment

Transmission equipment is used for carrying information (such as voice and data) between locations (such as between home or business and a central office). Revenue from this segment in 1989 totaled \$631 million (10 percent of total revenue), an increase of nearly 11 percent over 1988 revenue of \$571 million. Over the past three years, much of the Transmission Group's resources have been devoted to the development of FiberWorld. Northern Telecom estimates that by 1992, more than \$1 billion will have been invested in FiberWorld and related development.

With FiberWorld, Northern Telecom becomes the first telecommunications manufacturer to offer a family of switching and transmission products necessary for the construction, operation, and service of an end-to-end fiber-optic network. FiberWorld products include the S/DMS TransportNode, the S/DMS SuperNode, and the S/DMS AccessNode.

The S/DMS TransportNode carries voice, data, and video signals from point to point over long distances, between offices, or in local networks. It increases the capacity of the network up to four times and makes more efficient use of the available capacity of fiber optics. The S/DMS SuperNode is the broadband switching component in the FiberWorld system, increasing the power and capability of the high-capacity DMS SuperNode introduced in 1987. The architecture of the S/DMS SuperNode, in a single switch, provides a combination of voice network switching, SONET-network switching, and the new asynchronous transfer mode switching. S/DMS AccessNode provides the link between the user and the services made possible by the carrying capacity of S/DMS TransportNode and the processing power of S/DMS SuperNode.

Northern Telecom and BNR have contributed extensively to the development of Integrated Services Digital Network (ISDN) and the standards and protocols used to connect the public telecommunications network and subscriber apparatus. ISDN delivers end-to-end digital communication for voice, data, and visual information. Northern Telecom's Meridian 1 Communications Systems product line supports ISDN capability.

Business Communications Systems and Terminals

Business communications systems and terminals accounted for 24 percent, or \$1.5 billion, of Northern Telecom's total revenue in 1989. These systems are primarily internal switching systems, usually located on business premises, that permit a number of local telephones or terminals to communicate with each other, with or without the use of the public telephone network. These systems consist of software running on various types of equipment that enables the transmission of data through complex communications systems on an international scale. Private branch exchanges (PBXs) are business communications systems, normally located on a customer's premises, that control voice and data communication among telephone terminals ranging in number from less than a dozen to several thousand. Dataquest estimates that Northern Telecom ranked second in the US PBX market and captured a 20.5 percent market share based on 1.5 million PBX units and total number of lines.

Meridian 1 effectively merges Northern Telecom's current PBX products—the Meridian SL-1 and the Meridian SL-100—into a single, modular product

portfolio. Its complete set of common features and applications is available across the entire product line to accommodate a growth range from 30 to 60,000 lines, offering double the line capacity of any previously available business communications system.

Two advanced customer services for Meridian users already in place in the United States are interactive computer-based training at the user's site and immediate access to product information via digital compact discs.

Cable and Outside Plant

Cable and outside plant revenue was \$529 million (9 percent of total revenue), an increase of 17 percent from 1988 revenue of \$451 million. Northern Telecom attributes this growth to increased sales of communications cable in Canada and the United States.

Other

Other revenue, principally comprising R&D for customers and interest income of the finance subsidiaries, totaled \$196 million in 1989, a 21 percent increase over the 1988 figure of \$162 million.

Semiconductors

The Company has an integrated strategy of manufacturing 40 to 50 percent of the semiconductor components it needs. Northern Telecom has CMOS fab facilities located in Ottawa, Ontario, and San Diego, California, to make custom digital and mixed analog/digital semiconductors for its telecommunications equipment. None of the Northern Telecom's semiconductor production is available on the merchant market.

Further Information

For further information about the Company's business segments, please contact the appropriate Dataquest industry service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$4,262.9	\$4,383.6	\$4,914.5	\$5,407.5	\$6,105.5
Percent Change	-	2.83	12.11	10.03	12.91
Capital Expenditure	NA	NA	NA	\$500.7	\$370.0
Percent of Revenue	0	0	0	9.26	6.06
R&D Expenditure	\$430.0	\$474.5	\$587.5	\$710.6	\$729.8
Percent of Revenue	10.09	10.82	11.95	13.14	11.95
Number of Employees	46,549	46,202	48,778	50,136	47,572
Revenue (\$K)/Employee	\$91.58	\$94.88	\$100.75	\$107.86	\$128.34
Net Income	\$273.8	\$286.6	\$328.8	\$183.2	\$376.5
Percent Change	-	4.67	14.72	(44.28)	105.51
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$1,379.7	\$1,523.8	\$1,414.8	\$1,787.2	
Quarterly Profit	NA	NA	NA	NA	

NA = Not available

Source: Northern Telecom Limited
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
Canada	28.38	29.95	33.10	37.97	40.71
International	71.62	70.05	66.90	62.03	59.29

Source: Northern Telecom Limited
Annual Reports and Forms 10-K
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988*	1989*
Direct Sales	95	95
Indirect Sales	5	5
Distributors	2	2
Dealers	3	3

*Dataquest estimate

Source: Dataquest (1990)

SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Ann Arbor, Michigan, United States
Private branch exchanges
Atlanta, Georgia, United States
Transmission equipment
Aylmer, Quebec, Canada
Transmission equipment
Belleville, Ontario, Canada
Business telephones
Brampton, Ontario, Canada
Central office switches
Calgary, Alberta, Canada
Key telephones
Concord, New Hampshire, United States
Network monitoring equipment
Dallas, Texas, United States
Private branch exchanges
London, Ontario, Canada
Residential telephones
Marlton, New Jersey, United States
Datacom equipment and phones
Minneapolis, Minnesota, United States
Datacom equipment
Minnetonka, Minnesota, United States
Business systems
Montreal, Quebec, Canada
Wire and cables
Morristown, New Jersey, United States
Network monitoring equipment
Morton Grove, Illinois, United States
Datacom equipment
Nashville, Tennessee, United States
Telephones
Ottawa, Ontario, Canada
Semiconductors
Raleigh-Durham, North Carolina, United States
Central office switches
San Diego, California, United States
Semiconductors
Santa Clara, California, United States
Private branch exchanges
Saskatoon, Saskatchewan, Canada
Optical fibers

West Palm Beach, Florida, United States
Datacom equipment and phones
Winnipeg, Manitoba, Canada
Transmission equipment

SUBSIDIARIES

North America

Bell-Northern Research, Inc., California (United States)
Bell-Northern Research Ltd. (Canada)
Northern Telecom (CALA) Corporation, Florida (United States)
Northern Telecom Canada Limited (Canada)
Northern Telecom Electronics Corporation (Canada)
Northern Telecom Finance Corporation, Tennessee (United States)
Northern Telecom Inc., Tennessee (United States)
Northern Telecom World Trade Corporation (Canada)

Europe

Bell-Northern Research Limited (England)
Netas-Northern Electric Telekomunikasyon A.S. (Turkey)
Northern Telecom AG (Switzerland)
Northern Telecom Europe Limited (England)
Northern Telecom GmbH (Germany)
Northern Telecom International (Netherlands)
Northern Telecom (Ireland) Limited (Ireland)
NT Meridian S.A. (France)

Asia/Pacific

AWA-Nortel Pty. Limited (Australia)
Northern Telecom (Asia) Limited (Hong Kong)
Northern Telecom Industries Sdn. Bhd. (West Malaysia)
Northern Telecom Japan Inc. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Hewlett-Packard (HP)

HP licensed its version of UNIX, HP-UX, to Northern Telecom. It is the first time HP has licensed HP-UX to an outside vendor. Northern Telecom has agreed to use HP-UX for its

telecommunications switching systems. The value of the pact has been estimated at several hundred million dollars over the next few years.

Cybernetics Systems International (CSI)

Under an agreement between Northern Telecom and CSI, Northern Telecom's customers with automatic call distribution (ACD) requirements will be offered a software application that helps them schedule employees, manage assignments, and record and forecast work loads. The marketing agreement enables Northern Telecom to offer a comprehensive solution for ACD environments.

Centigram Communications Corporation

Northern Telecom and Centigram Communications entered into a joint sales and marketing agreement that addresses the needs of businesses with mixed PBX networks, including both Northern Telecom and non-Northern Telecom PBXs.

NYNEX Business Information Systems Company

NYNEX and Northern Telecom launched a new joint venture, NYNEX Meridian Systems. The new company will employ 1,000 people and will provide sales and service for all Northern Telecom equipment. Northern Telecom holds the majority interest in the venture.

British Telecom

British Telecom was awarded exclusive rights as distributor for Northern Telecom's newly announced Meridian 1 global business communications system.

Austria Telecommunications GmbH and BHG Telecommunications

Northern Telecom entered a joint venture in Hungary with these two firms to manufacture a wide range of DMS-based digital public switching systems for the Hungarian telecommunications network, as well as digital switching systems for private and business customers in Hungary and export markets. The new firm will provide Northern Telecom with a manufacturing base and a marketing bridgehead into the emerging Eastern European telecommunications marketplace.

1989

Digital Equipment Corporation (DEC)

DEC's VAX computers will be integrated with the voice functions of Northern Telecom's SL-1 PBX.

NYNEX

The companies have a data networking joint venture.

Digital Equipment Corporation (DEC)

The companies have a data networking joint venture.

1988

STC

The companies undertook joint research and development programs.

China Tong Guang

The companies undertook a joint venture to manufacture and market Northern Telecom's digital PBXs and digital telephone sets.

Ameritech

The companies agreed to jointly develop ISDN applications for products and services to be offered by both companies.

Motorola

The companies agreed to jointly develop ISDN applications for products and services to be offered by both companies.

MERGERS AND ACQUISITIONS

1990

AWA Limited

Northern Telecom purchased the remaining 40 percent of its joint venture with AWA Limited and formed NorTel Australia.

1989

Microtel Limited

Northern Telecom acquired Microtel's central office switching business.

KEY OFFICERS

Paul G. Stern

Chairman of the board, president, and chief executive officer

David G. Vice

Vice chairman, Products and Technology

J. Derek M. Davis

Executive vice president, Corporate Strategy

Donald A. Noble

Executive vice president, Corporate Strategy

John A. Roth
Executive vice president, Product Line
Management

Clive V. Allen
Senior vice president, Technology

Stephen N. Bowen
Senior vice president, Public Affairs

Martin G. Mand
Senior vice president, Finance, and chief financial
officer

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

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	\$2,404.5	\$2,840.3	\$3,189.2	\$2,641.9	\$4,091.4
Cash	81.9	362.3	126.2	79.2	169.5
Receivables	1,007.1	1,150.8	1,340.0	1,620.9	1,946.0
Marketable Securities	519.0	657.0	1,008.0	0	967.0
Inventory	780.2	651.4	690.9	820.3	856.2
Other Current Assets	16.7	19.1	24.0	121.5	152.9
Net Property, Plants	\$1,065.1	\$1,097.9	\$1,263.3	\$1,480.6	\$1,485.0
Other Assets	\$20.4	\$22.9	\$553.8	\$1,755.7	\$798.6
Total Assets	\$3,490.0	\$3,961.1	\$5,006.3	\$5,878.2	\$6,375.0
Total Current Liabilities	\$952.0	\$994.9	\$1,577.7	\$2,154.5	\$2,164.5
Long-Term Debt	\$107.6	\$101.0	\$430.1	\$577.5	\$816.0
Other Liabilities	\$448.8	\$616.0	\$438.0	\$474.4	\$452.7
Total Liabilities	\$1,508.4	\$1,711.9	\$2,445.8	\$3,206.4	\$3,433.2
Total Shareholders' Equity	\$1,981.6	\$2,249.2	\$2,560.5	\$2,671.8	\$2,941.8
Converted Preferred Stock	350.8	354.3	227.2	241.0	246.3
Common Stock	720.5	755.8	801.9	858.9	921.3
Other Equity	(120.5)	(127.1)	10.4	(32.4)	(102.0)
Retained Earnings	1,030.8	1,266.2	1,521.0	1,604.3	1,876.2
Total Liabilities and Shareholders' Equity	\$3,490.0	\$3,961.1	\$5,006.3	\$5,878.2	\$6,375.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$4,262.9	\$4,383.6	\$4,914.5	\$5,407.5	\$6,105.5
Canadian Revenue	1,209.9	1,312.8	1,626.6	2,053.0	2,485.5
Non-Canadian Revenue	3,053.0	3,070.8	3,287.9	3,354.5	3,620.0
Cost of Sales	\$2,078.9	\$2,760.5	\$2,915.5	\$3,218.4	\$3,718.6
R&D Expense	\$430.0	\$474.5	\$587.5	\$710.6	\$729.8
SG&A Expense	\$701.9	\$764.6	\$938.2	\$1,088.2	\$1,131.5
Capital Expense	NA	NA	NA	\$500.7	\$370.0
Pretax Income	\$432.0	\$441.1	\$488.7	\$234.9	\$515.1
Pretax Margin (%)	10.13	10.06	9.94	4.34	8.44
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	\$273.8	\$286.6	\$328.8	\$183.2	\$376.5
Shares Outstanding, Millions	116.0	116.9	235.8*	237.6	240.9
Per Share Data					
Earnings	\$2.36	\$2.45	\$1.39	\$0.70	\$1.47
Dividend	\$0.36	\$0.40	\$0.23	\$0.26	\$0.28
Book Value	\$17.08	\$19.24	\$10.90	\$11.24	\$12.21

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
<i>Liquidity</i>					
Current (Times)	1.52	2.85	2.02	1.23	1.89
Quick (Times)	1.03	2.20	1.58	0.85	1.49
Fixed Assets/Equity (%)	53.75	48.81	49.34	55.42	50.48
Current Liabilities/Equity (%)	79.62	44.23	61.62	80.64	73.58
Total Liabilities/Equity (%)	76.12	76.11	95.52	120.01	116.70
<i>Profitability (%)</i>					
Return on Assets	-	7.69	7.33	3.37	6.15
Return on Equity	-	13.55	13.67	7.00	13.41
Profit Margin	6.42	6.54	6.69	3.39	6.17
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	10.09	10.82	11.95	13.14	11.95
Capital Spending % of Revenue	0	0	0	9.26	6.06
Employees	46,549	46,202	48,778	50,136	47,572
Revenue (\$K)/Employee	\$91.58	\$94.88	\$100.75	\$107.86	\$128.34
Capital Spending % of Assets	0	0	0	8.52	5.80

*Two-for-one division of common shares, year restated
 NA = Not available

Source: Northern Telecom Limited
 Annual Reports and Forms 10-K
 Dataquest (1990)

Raytheon Company

141 Spring Street
Lexington, Massachusetts 02173
Telephone: (617) 862-6600
Fax: (617) 860-2172
Dun's Number: 10-116-6999
Date Founded: 1922

CORPORATE STRATEGIC DIRECTION

Raytheon Company conceives, develops, manufactures, and sells electronic systems and subsystems, equipment, and components for government and commercial use. The Company also is involved in other businesses such as aircraft products, energy services, major appliances, heavy construction equipment, and publication of textbooks. In 1989, Raytheon was ranked as the 53rd largest industrial company by *Fortune Magazine*.

Raytheon is organized into five major business areas: electronics, aircraft products, energy services, major appliances, and other lines. The Company's principal business is to design, engineer, manufacture, and service advanced electronic devices, equipment, and systems for both government and commercial customers. The electronics business segment accounted for 61 percent of the Company's revenue in fiscal 1989.

Total revenue increased by 7.4 percent to about \$8.8 billion* in fiscal 1989 from \$8.2 billion in fiscal 1988. Net income increased 8.0 percent to \$528.8 million in fiscal 1989 from about \$489.6 million in fiscal 1988. Raytheon employs 77,600 people worldwide.

R&D expenditure totaled \$274.7 million in fiscal 1989, representing 3.1 percent of revenue. Capital spending totaled \$413.9 million in fiscal 1989, representing 4.7 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.

*All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

Electronics Businesses

In government electronics, Raytheon is a leading supplier of tactical missile systems from ground-based air defense missile systems such as the Patriot, Raytheon's largest program, to advanced air-to-air missiles such as AMRAAM. It also leads in air-to-ground missiles such as Maverick and in ship-launched missiles such as Standard-2.

Raytheon builds a variety of shipboard radar systems; almost every ship in the US Navy carries at least one Raytheon radar system. Raytheon also holds a dominant position in the development of large, ground-based, phased-array radars for early warning and strategic surveillance.

Raytheon also builds satellite communications systems and terminals for the US Air Force and Navy and is developing an electronic aircraft identification system for use by US and NATO forces. The Company produces advanced electronic countermeasure systems for shipboard and airborne use.

Raytheon is developing advanced automation displays for the FAA's multibillion-dollar modernization program. The Company also will produce up to 102 Doppler weather radar systems for the FAA to provide warning of wind shear conditions around the nation's airports.

Also, Raytheon develops submarine and ship-surface-ship sonar systems, combat control systems, displays, and minehunting equipment.

In its commercial electronics business, Raytheon produces a full range of solid-state components as well as broadcast, industrial, and microwave tubes. Industrial electronics products include Sorensen power supplies, Switchcraft jacks and plugs, and custom electronic components from Raytheon Semiconductor Division.

Aircraft Products

Beech Aircraft Corporation, a Raytheon subsidiary, supplies aircraft to the general aviation market. It produces jet, turboprop, and piston engine planes used by individuals, businesses, commuter airlines, and governments. In addition to providing sales and service support to commercial customers, Beech also sells aircraft, target drones, and services to the US government.

Energy Services

Through Raytheon's subsidiaries, The Badger Company Inc., United Engineers and Constructors International Inc., and Seismograph Service Corp., Raytheon designs, constructs, and maintains petroleum, petrochemical, chemical processing, electrical generating, and industrial plants and conducts worldwide exploration and related services for the oil and gas industries.

Major Appliances

Raytheon's major appliances business group consists of the Amana Refrigeration Inc., Caloric Corp., and Speed Queen Co. subsidiaries.

Other Lines

Raytheon also is involved in publishing textbooks and instructional materials for elementary and secondary school and college use through its D.C. Heath subsidiary. Also, Raytheon provides construction and road-building equipment to the resurfacing and pavement recycling market through its Cedarapids Inc. subsidiary.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service. Dataquest tracks Raytheon through its MilAero Technology Service.

Table 1
Five-Year Corporate Highlights (Thousands of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$6,408,537.0	\$7,307,952.0	\$7,659,421.0	\$8,192,083.0	\$8,796,076.0
Percent Change	-	14.03	4.81	6.95	7.37
Capital Expenditure	\$346,427.0	\$341,471.0	\$354,182.0	\$421,300.0	\$413,900.0
Percent of Revenue	5.41	4.67	4.62	5.14	4.71
R&D Expenditure	\$260,251.0	\$253,990.0	\$266,123.0	\$271,032.0	\$274,652.0
Percent of Revenue	4.06	3.48	3.47	3.31	3.12
Number of Employees	73,000	75,000	76,500	76,200	77,600
Revenue (\$K)/Employee	\$87.79	\$97.44	\$100.12	\$107.51	\$113.35
Net Income	\$375,905.0	\$393,205.0	\$445,056.0	\$489,554.0	\$528,814.0
Percent Change	-	4.60	13.19	10.00	8.02
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$2,072.80	\$2,289.91	\$2,189.00	\$2,246.00	
Quarterly Profit	\$120.80	\$133.69	\$137.40	\$136.91	

Source: Raytheon Company
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	93.00	93.00	92.00	92.81	93.39
International	7.00	7.00	8.00	7.19	6.61
Europe	7.00	7.00	8.00	7.19	6.61

Source: Raytheon Company
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 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Andover, Bedford, Lowell, and Tewksbury, Massachusetts; Bristol, Tennessee

Missile Systems Division manufacturing activities include the Patriot surface-to-air missiles; Patriot/Hawk interoperability development; Hawk surface-to-air missiles; a new version of the Sparrow and Sea Sparrow missiles; Sidewinder air-to-air missiles; Maverick, AMRAAM, and Phoenix long-range missiles; Stinger air defense missiles; the Standard Missile-2; the Block 4 (Aegis Extended Range Version); and Agile Continuous Wave Acquisition Radar.

Marlborough, Sudbury, Waltham, and Wayland, Massachusetts

Equipment Division manufacturing activities include Air traffic control; military ground and satellite communication; naval radar and fire control; intelligence, warning, and space track radar; missile guidance components; displays; military computers; Pave Paws phased-array radar; Ballistic Missile Early Warning System radar; relocatable over-the-horizon backscatter radar systems for the navy; Milstar terminals; equipment for the navy's Aegis system; equipment for the NATO Sea Sparrow System; SPS-49 long-range air-search radar; Tartar fire-control radar; guidance electronics for Trident II missiles; an advanced family of military computers; the Ground-Based Surveillance Radar experiment for SDI; UYQ-21 standard shipboard displays; and TRC-170.

Goleta, California; Melville, New York

Electromagnetic Systems Division manufacturing activities include the ALQ-99, ALQ-184, SLQ-32, ALQ-142, ballistic reentry vehicle active decoys, and operational electronically steerable and simultaneous multibeam phased-array systems and subsystems.

East Providence and Portsmouth, Rhode Island

Submarine Signal Division manufacturing activities include antisubmarine warfare and advanced minehunting sonar.

Salina and Wichita, Kansas; Jackson, Missouri
Beech Aircraft Corporation manufactures the C-12F, C-12, C-12D, C-12J, T-34C, T-1, and missile targets for government customers.

SUBSIDIARIES

North America

Amana Refrigeration Inc. (United States)
Beech Aircraft Corporation (United States)
Caloric Corp./Modern Maid (United States)
Cedarapids Inc. (United States)
D.C. Heath and Co. (United States)
GeoQuest Systems (United States)
Microwave and Power Tube Division (United States)
Raytheon Canada Ltd.(Canada)
Raytheon Marine Co. (United States)
Raytheon Service Co. (United States)
Research Division (United States)
Seismograph Service Corp. (United States)
Semiconductor Division (United States)
Sorensen Co. (United States)
Speed Queen Co. (United States)
Switchcraft Inc. (United States)
The Badger Company Inc. (United States)
United Engineers and Constructors International Inc. (United States)

Europe

BSG (Germany)
Cossor Electronics Ltd. (England)
Data Logic Ltd. (England)
Electrical Installations Ltd. (England)
Lacroix and Kress (Germany)
REMCO SA (Spain)
TAG Semiconductors Ltd. (Switzerland)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Hughes Aircraft and Messerschmitt-Boelkow Blohm

Raytheon, Hughes Aircraft, and Messerschmitt-Boelkow-Blohm (Germany) agreed to start licensed joint production of the Advanced Medium-Range Air-to-Air Missile (AMRAAM) in Europe.

1988

Digital Equipment Corporation (DEC)

Raytheon introduced three new militarized VAX computers under license from DEC. The three models use the same architecture and software as the DEC machines, with six custom CMOS chips acting as the core processor.

Mitsubishi Heavy Industries Ltd.

Raytheon and Mitsubishi Heavy Industries entered into a licensing agreement calling for Mitsubishi to assemble surface-to-air (SAM) Patriot missile systems under license from Raytheon.

Showa Denko

Raytheon and Showa Denko entered into a marketing agreement calling for Showa Denko to market Raytheon's infrared optical materials and parts of zinc selenide in Japan.

1987

Cossor Electronics Ltd.

Raytheon with Cossor Electronics signed a memorandum of understanding to enter into a joint development effort on the US Mark XV IFF (Identification Friend or Foe) and the UK NIS (NATO Identification System).

Interatom

Raytheon and Interatom entered into a licensing agreement calling for Interatom to sell and service certain Raytheon industrial lasers and production systems in Europe.

Standard Havens Inc.

Raytheon acquired 96 percent of Standard Havens, an asphalt equipment firm.

KEY OFFICERS**Thomas L. Phillips**

Chairman and chief executive officer

Dennis J. Picard

President

E. Leonard Kane

Senior vice president, Human Resources

Philip A. Phallon

Senior vice president, Corporate Marketing

Philip W. Cheney

Vice president, Engineering

John F. Harding

Vice president, Contracts

Aldo Massara

Vice president, International Affairs

Gerald A. Smith

Vice president, Washington Operations

John R. Pasquariello

Vice president, Manufacturing

MERGERS AND ACQUISITIONS

1989

GeoQuest Systems

Raytheon acquired GeoQuest Systems, a privately held computer technology developer. GeoQuest will continue to operate autonomously.

Balinger Schalttechnik

Raytheon acquired Balinger Schalttechnik, an electronic and electromechanical control subsystem supplier.

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

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	\$1,875,611.0	\$2,009,656.0	\$2,436,579.0	\$2,844,292.0	\$3,104,481.0
Cash	33,113.0	42,333.0	89,518.0	108,056.0	99,250.0
Receivables	622,783.0	652,362.0	681,575.0	709,024.0	671,481.0
Marketable Securities	250,890.0	183,547.0	-	-	-
Inventory	635,708.0	573,224.0	667,715.0	726,264.0	851,961.0
Other Current Assets	333,117.0	558,190.0	997,771.0	1,300,948.0	1,481,789.0
Net Property, Plants	\$1,080,971.0	\$1,103,683.0	\$1,217,408.0	\$1,355,198.0	\$1,456,296.0
Other Assets	\$484,433.0	\$442,560.0	\$408,243.0	\$540,015.0	\$777,516.0
Total Assets	\$3,441,015.0	\$3,555,899.0	\$4,062,230.0	\$4,739,505.0	\$5,338,293.0
Total Current Liabilities	\$1,437,258.0	\$1,552,623.0	\$2,168,428.0	\$2,577,166.0	\$2,822,047.0
Long-Term Debt	\$74,775.0	\$48,698.0	\$44,743.0	\$41,340.0	\$45,982.0
Other Liabilities	-	-	-	-	\$44,118.0
Total Liabilities	\$1,512,033.0	\$1,601,321.0	\$2,213,171.0	\$2,618,506.0	\$2,912,147.0
Total Shareholders' Equity	\$1,928,982.0	\$1,954,578.0	\$1,849,059.0	\$2,120,999.0	\$2,426,146.0
Converted Preferred Stock	-	-	-	-	-
Common Stock	77,668.0	74,078.0	67,699.0	66,373.0	65,620.0
Other Equity	115,748.0	137,709.0	171,140.0	185,359.0	184,709.0
Retained Earnings	1,735,566.0	1,742,791.0	1,610,220.0	1,869,267.0	2,175,817.0
Total Liabilities and Shareholders' Equity	\$3,441,015.0	\$3,555,899.0	\$4,062,230.0	\$4,739,505.0	\$5,338,293.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$6,408,537.0	\$7,307,952.0	\$7,659,421.0	\$8,192,083.0	\$8,796,076.0
US Revenue	5,959,939.0	6,796,395.0	7,046,667.0	7,603,083.0	8,215,076.0
Non-US Revenue	448,598.0	511,557.0	612,754.0	589,000.0	581,000.0
Cost of Sales	\$5,066,163.0	\$5,843,007.0	\$6,123,418.0	\$6,536,521.0	\$6,996,512.0
R&D Expense	\$260,251.0	\$253,990.0	\$266,123.0	\$271,032.0	\$274,652.0
SG&A Expense	\$591,478.0	\$661,948.0	\$668,705.0	\$743,512.0	\$779,277.0
Capital Expense	\$346,427.0	\$341,471.0	\$354,182.0	\$421,300.0	\$413,900.0
Pretax Income	\$599,846.0	\$652,185.0	\$685,424.0	\$705,539.0	\$757,663.0
Pretax Margin (%)	9.36	8.92	8.95	8.61	8.61
Effective Tax Rate (%)	37.30	39.70	35.10	30.60	30.20
Net Income	\$375,905.0	\$393,205.0	\$445,056.0	\$489,554.0	\$528,814.0
Shares Outstanding, Thousands	81,670.0	77,041.0	72,764.0	66,373.0	65,620.0
Per Share Data					
Earnings	\$4.60	\$5.10	\$6.12	\$7.31	\$7.96
Dividend	\$1.60	\$1.75	\$1.85	\$2.00	\$2.20
Book Value	\$23.62	\$25.37	\$25.41	\$31.96	\$36.97

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
<i>Liquidity</i>					
Current (Times)	1.30	1.29	1.12	1.10	1.10
Quick (Times)	0.86	0.93	0.82	0.82	0.80
Fixed Assets/Equity (%)	56.04	56.47	65.84	63.89	60.03
Current Liabilities/Equity (%)	74.51	79.44	117.27	121.51	116.32
Total Liabilities/Equity (%)	78.39	81.93	119.69	123.46	120.03
<i>Profitability (%)</i>					
Return on Assets	-	11.24	11.68	11.12	10.49
Return on Equity	-	20.25	23.40	24.66	23.26
Profit Margin	5.87	5.38	5.81	5.98	6.01
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	4.06	3.48	3.47	3.31	3.12
Capital Spending % of Revenue	5.41	4.67	4.62	5.14	4.71
Employees	73,000	75,000	76,500	76,200	77,600
Revenue (\$K)/Employee	\$87.79	\$97.44	\$100.12	\$107.51	\$113.35
Capital Spending % of Assets	10.07	9.60	8.72	8.89	7.75

Source: Raytheon Company
Annual Reports and Forms 10-K
Dataquest (1990)

Rockwell International Corporation

600 Grant Street
Pittsburgh, Pennsylvania 15219
Telephone: (412) 565-2000
Fax: (412) 565-7388
Dun's Number: 00-825-5523

Date Founded: 1928

CORPORATE STRATEGIC DIRECTION

Rockwell International Corporation is a multi-industry company engaged in the research, development, manufacturing, and marketing of products for commercial and government markets.

Revenue totaled \$12.5 billion *in 1989, a 4.8 percent increase over the previous year's revenue of \$11.9 billion. This increase was because of higher sales in the electronics, automotive, and graphics industries, as well as in space systems operations within the aerospace industry. The mix of the Company's sales in 1989 showed growth in the commercial industry, including international, while the sales to the US government decreased 3 percent to 44 percent of total sales. US commercial business sales totaled \$4.0 billion while international commercial sales totaled \$3.0 billion. The US government sales totaled \$5.5 billion, with the Department of Defense and National Aeronautics and Space Administration (NASA) responsible for \$3.5 billion and \$2.0 billion, respectively.

The Company encompasses four product divisions: Aerospace, Electronics, Automotive, and Graphics. An important shift is taking place in the Company's structure. Electronics is now the largest sector, and growth is coming increasingly from commercial and international markets. The Electronics Division is responsible for 39.2 percent (\$4.9 billion) of total revenue for fiscal 1989. In electronics, through its subsidiary Allen-Bradley, Rockwell is a leader in global industrial automation technologies. Avionics supplies instrumentation, communication, and navigation for air transport and business aircraft manufactured outside the Soviet Union. Rockwell Telecommunications provides hardware used by most long

distance telephone operating companies and communications networks in the United States. The Company produces defense-related electronic systems that play mission-critical roles in sea/air/land strategic communication.

The Aerospace Division is responsible for 31.2 percent (\$3.9 billion) of total revenue. Within this division are two segments, the Space Systems and Aircraft, that accounted for \$2.8 billion and \$1.1 billion, respectively. Under the Space Systems segment are the Space Transportation Systems Division, the Rocketdyne Division, and the Rockwell Space Operations Company, all of which contract out to NASA and the US government.

The Automotive Division's revenue totaled \$2.4 billion and represented 19.4 percent of total revenue. This division is segmented into two groups, Heavy Vehicles and Light Vehicles. More than two-thirds of division sales volume worldwide is derived from the Heavy Vehicles business—axles, brakes, and other components for medium- and heavy-duty trucks, buses, trailers, and off-highway users. In fiscal 1989, the largest percentage sales growth was shown by Light Vehicles, which is served by the Automotive Body & Chassis Systems organization. This group serves passenger-car and light-truck original equipment manufacturers (OEMs) in Europe, North America, Brazil, and Australia, providing total-design engineering and manufacturing expertise for products including door-window system modules and sunroof systems.

The Graphics Division's sales exceeded \$1 billion for the first time, totaling \$1.1 billion, or 8.9 percent of total revenue. Technologically advanced new products accounted for approximately 40 percent of the total. These products include the Colorliner and Headliner Offset T70 presses for large-circulation

*All dollar amounts are in US dollars.

newspapers. In 1989, the Graphics Division acquired the Baker Perkins printing machinery business from APV Plc. This business is now named Rockwell PMC and serves the high-quality and high-volume publication and commercial printing markets.

The remaining 2.3 percent of total revenue comprises other income and gains on sales of businesses.

Net income of \$734.9 million for fiscal 1989 showed a decrease of 9.5 percent, down from \$811.9 million in fiscal 1988. Earnings from the electronics businesses for 1989 were up 29 percent from 1988, primarily reflecting significant volume improvements in avionics and the Allen-Bradley industrial automation businesses. Aerospace earnings decreased 15 percent in fiscal 1989, while automotive earnings showed a slight decrease. Graphics increased 98 percent over fiscal 1988, reflecting the successful introduction of new products.

Capital expenditure in 1989 totaled \$609 million and was used primarily for facilities and equipment dedicated to new products, improving quality, and increasing productivity. The Company expects capital expenditure to be about the same in fiscal 1990. Rockwell International employed 108,715 people in 1989.

R&D expenditure in 1989 totaled \$1.7 billion, posting a 6.3 percent increase over fiscal 1988 while representing 13.6 percent of total revenue. Of the \$1.7 billion, \$476 million was Company-initiated and the remainder was related to contracts with the US government.

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 background.

BUSINESS SEGMENT STRATEGIC DIRECTION

Electronics

The Electronics Division represents defense electronics, telecom, avionics, and Allen-Bradley industrial

automation. The US defense electronics budget is expecting zero to negative real growth over the next several years, thus affecting Rockwell's Electronics Division.

In telecommunications, Rockwell is one of the nation's principal suppliers of transmission systems, switching systems, and line conditioning and line termination equipment to telephone companies. Dataquest estimates that the Company ranks first in the standalone automatic call distributors (ACDs) market, with 57.4 percent share in 1989. During 1989, Rockwell became active in the Far East market for the first time with sales to Nippon Telegraph and Telephone of Japan. Rockwell International is one of the world's leading suppliers of image modems for facsimile machines. Modems are the central focus of the Company's semiconductor product business, which derives 60 percent of its sales internationally, the majority coming from Japan.

In avionics, the Company plans to sustain fleet growth in the large commercial aircraft and regional airline segment of the general aviation market. Rockwell introduced systems for automatic flight control, in-flight monitoring, and maintenance information displays to broaden the existing product range from a base in communications and navigation equipment. According to Rockwell, the Company has gained market share and holds the leading position with about 40 percent of the addressed market.

Allen-Bradley industrial automation showed strong performances from both its expanding lines of industrial automation products and its traditional lines of electromechanical industrial control devices. In 1989, Allen-Bradley began shipping the Pyramid Integrator, which consists of a family of automation products developed in partnership with Digital Equipment Corporation (DEC) and incorporating its MicroVAX computer. Allen-Bradley acquired Creonics, Inc., to broaden its motion control product line. Also, a new joint venture with Hyundai Electronics Industries is manufacturing, selling, and supporting programmable controllers in South Korea.

Aerospace

Rockwell's Aerospace Division engages in the research, development, and manufacture of military aircraft, manned and unmanned space systems, rocket engines, advanced space-based surveillance systems, and high-energy laser and other directed-energy programs.

Dataquest estimates that Rockwell obtained a 2.5 percent share with \$2.2 billion in revenue in the military aerospace electronic equipment market. The major focus of this division in 1989 was the construction of a new shuttle orbiter (the Endeavour) and its main engines. Rockwell's subsidiary Rocketdyne is under contract with NASA to build the Space Station Freedom's power system. Engines for expendable launch vehicles constitute an increase in the large rocket engine business. The Company is currently producing 28 NAVSTAR Global Positioning System (GPS) satellites. The Company is also competing for design of the National Aero Space Plane (NASP) airframe and for its propulsion system.

Graphics

The Graphics Division surpassed \$1 billion for the first time in fiscal 1989. This was largely because of the introduction of the Goss Colorliner press and the Headliner Offset T70 press. These two new presses are used in the production of colored newspapers. In an effort to serve the Japanese newspaper press market more effectively, Rockwell purchased from Ikegai

Corporation its 50 percent interest in its former Ikegai-Goss joint venture.

Automotive

The Automotive Division continued to increase its presence on international markets, from which 44 percent of its sales come. In 1989, Rockwell expanded its heavy vehicle drive-train product line to include a new family of manual transmissions for North American 1990 models. Also introduced in 1989 were clutches for heavy-duty trucks. To add to the Company's strong plastics market presence, Rockwell acquired Butler Polymet, a major supplier of structural thermoplastic composites. This expanded capability supplements the existing sheet molding compound business, which supplies exterior body panels used on nearly 40 percent of the heavy-duty trucks manufactured in North America.

Further Information

For further information on the Company's business segments, please contact the appropriate Dataquest industry service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$11,337.6	\$12,295.7	\$12,123.4	\$11,946.3	\$12,518.1
Percent Change	-	8.45	(1.40)	(1.46)	4.79
Capital Expenditure	\$614.4	\$543.6	\$474.1	\$554.8	\$609.0
Percent of Revenue	5.42	4.42	3.91	4.64	4.86
R&D Expenditure	\$1,500.0	\$1,400.0	\$1,400.0	\$1,600.0	\$1,700.0
Percent of Revenue	13.23	11.39	11.55	13.39	13.58
Number of Employees	123,266	121,194	116,148	112,160	108,715
Revenue (\$K)/Employee	\$91.98	\$101.45	\$104.38	\$106.51	\$115.15
Net Income	\$595.3	\$611.2	\$635.1	\$811.9	\$734.9
Percent Change	-	2.67	3.91	27.84	(9.48)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$2,869.3	\$3,161.7	\$3,212.1	\$3,275.0	
Quarterly Profit	\$160.0	\$270.7	\$178.1	\$126.1	

Source: Rockwell International Corporation
Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	92.00	89.00	89.00	84.00	85.60
International	8.00	11.00	11.00	16.00	14.4
Europe	5.00	7.00	7.00	10.00	10.20
All Others	1.00	1.00	1.00	3.00	4.20

Source: Rockwell International Corporation
Annual Reports

1989 SALES OFFICE LOCATIONS (Corporate Offices Only)

North America—13
Europe—2
Asia/Pacific—2
Japan—1

MANUFACTURING LOCATIONS

North America

Autonetics ICBM System Division, Anaheim, California
Guidance and control systems
Autonetics Marine System Division, Anaheim, California
Submarine navigation systems
Autonetics Sensors and Aircraft Division, Anaheim, California
Tactical and strategical sensor systems, ground electrical systems
Collins Defense Communications Division, Santa Ana, California
Airplane console radios, radio transmitters, transportable radio systems, defense communications systems
Collins Defense Communications Division, Cedar Rapids, Iowa
Airplane console radios, radio transmitters, transportable radio systems, defense communications systems
Collins Defense Communications Division, Richardson, Texas
Airplane console radios, radio transmitters, transportable radio systems, defense communications systems
Collins General and Air Transport Aviation Division, Cedar Rapids, Iowa
Test equipment/ATE, ground support equipment, cockpit instrumentation
Collins Government Avionics Division, Cedar Rapids, Iowa
Functional ATE, portable/field service ATE, avionics test equipment for military aircraft, cockpit instrumentation
Electronic Components Division, El Paso, Texas
Passive components

Maine Electronic Group, Lisbon, Maine
Connectors/packaging
Missile Systems Division, Duluth, Georgia
Nuclear missiles, missile components
North American Aircraft Operations, Los Angeles, California
Conventional missiles, military aircraft, airframe structures, spacecraft
Rocketdyne Division, Canoga Park, California
Nuclear missiles, nuclear energy components, space stations, engine systems, rocket engines, space shuttle main engines, space power systems
Rockwell DEL, Inc., Huntington Beach, California
EW communications systems, parallel tube transmitters, airborne jamming systems, combat simulation systems, optical collimators, RF environmental generators
Satellite and Space Electronics Division, Seal Beach, California
Spaceborne processors, surveillance satellites, laser radar, space-based laser R&D, signal/data processing equipment for space, satellite transponders, spaceborne receivers, navigation satellites, laser radar, infrared sensors
Semiconductor Products Division, Newport Beach, California
Microcomputers, intelligent display controllers, computer ICs, microprocessors, modem chip sets, data modem modules, image modem modules, secure communications ICs, cell-based ICs
Space Transportation Systems Division, Downey, California
Advanced launch systems, national aerospace planes, space shuttle orbiter, shuttle C, space-based interceptors
Strategic Defense Center, El Segundo, California
EW equipment, defense/government services, design engineering services

SUBSIDIARIES

North America

Allen-Bradley Company, Inc. (United States)
DataMyte Corporation (United States)
Decision Software Co., Inc. (United States)
Electronics Corp. (United States)
Rocketdyne (United States)
Rockwell Financial Service Corporation (United States)

Rockwell Graphic Systems, Inc. (United States)
Rockwell International & Suspension Systems Co.,
Inc. (United States)
Rockwell International Finance Corporation (United
States)
Rockwell International of Canada Ltd. (Canada)
Science Center (United States)
Springs & Stampings (United States)

Europe

Rockwell Compagnie Industrielle de Mecanismes,
S.A. (France)
Rockwell CVC S.R.L. (Italy)

ROW

Rockwell do Brazil Industria e Comercio Ltda.
(Brazil)

Creonics, Inc.

Allen-Bradley Group purchased Creonics to
broaden its motion control product line.

Butler Polymet

Rockwell International acquired Butler Polymet to
add to the Company's plastic presence.

1987

Valeo of France

Rockwell acquired Soma Europe Transmissions
from Valeo of France.

Communications Machinery

Rockwell acquired Communications Machinery for
\$40 million.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Hyundai Electronics Industries

Rockwell and Hyundai agreed to have Hyundai
manufacture, sell, and support programmable con-
trollers.

1988

Digital Equipment Corporation (DEC)

DEC licensed Rockwell's Allen-Bradley Division
to build its VAX computers for use in industrial
automation systems.

Microelectronics & Computer Corporation (MCC)—Research Consortium

Since 1982, Rockwell has been a member of the
MCC, a corporate research venture conducting
R&D in microelectronics and computer technology
owned by 19 US companies.

MERGERS AND ACQUISITIONS

1989

Baker Perkins Inc.

Rockwell International acquired the Baker Perkins
printing machinery business from APV Plc and
renamed it Rockwell PMC.

KEY OFFICERS

Donald Beall

Chairman of the board, chief executive officer

Kent Black

Executive vice president

Robert A. de Palma

Senior vice president, chief financial officer

Sam Iacobellis

Executive vice president

J. Tracy O'Rourke

Executive vice president

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

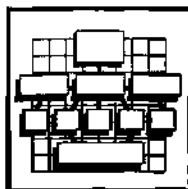
Table 3
Comprehensive Financial Statement
Fiscal Year Ending September
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$3,492.7	\$3,837.5	\$4,622.0	\$4,924.8	\$4,366.8
Cash	451.5	756.9	1,103.4	899.7	332.4
Receivables	1,724.9	1,703.2	1,990.1	2,209.0	2,137.2
Inventory	1,240.5	1,300.3	1,451.6	1,526.7	1,574.1
Other Current Assets	75.8	77.1	76.9	289.4	323.1
Investments	\$146.1	\$156.4	0	0	0
Net Property, Plants	\$2,523.8	\$2,620.4	\$2,669.1	\$2,640.4	\$2,594.2
Other Assets	\$1,170.2	\$1,089.1	\$1,448.1	\$1,643.3	\$1,977.8
Total Assets	\$7,332.8	\$7,703.4	\$8,739.2	\$9,208.5	\$8,938.8
Total Current Liabilities	\$3,317.5	\$3,411.4	\$3,992.4	\$3,795.9	\$3,482.2
Long-Term Debt	\$647.5	\$627.4	\$762.6	\$745.3	\$552.1
Other Liabilities	\$419.5	\$502.5	\$670.0	\$974.3	\$926.9
Total Liabilities	\$4,384.5	\$4,541.3	\$5,425.0	\$5,515.5	\$4,961.2
Total Shareholders' Equity	\$2,948.3	\$3,162.1	\$3,314.2	\$3,693.0	\$3,977.6
Converted Preferred Stock	1.6	1.4	2.5	2.3	2.1
Common Stock	155.3	155.3	190.8	200.2	209.5
Class A Common Stock	0	0	88.7	79.4	69.9
Other Equity	(51.8)	(265.0)	(67.4)	(305.1)	(541.0)
Retained Earnings	2,843.2	3,270.4	3,099.6	3,716.2	4,237.1
Total Liabilities and Shareholders' Equity	\$7,332.8	\$7,703.4	\$8,739.2	\$9,208.5	\$8,938.8
Income Statement	1985	1986	1987	1988	1989
Revenue	\$11,337.6	\$12,295.7	\$12,123.4	\$11,946.3	\$12,518.1
US Revenue	10,381.0	11,115.0	10,798.0	9,986.0	10,310.0
Non-US Revenue	956.6	1,180.7	1,325.4	1,960.3	2,208.1
Cost of Sales	\$9,090.7	\$9,913.0	\$9,560.3	\$9,508.8	\$9,986.2
R&D Expense	\$1,500.0	\$1,400.0	\$1,400.0	\$1,600.0	\$1,700.0
SG&A Expense	\$1,218.3	\$1,318.1	\$1,363.1	\$1,435.4	\$1,472.8
Capital Expense	\$614.4	\$543.6	\$474.1	\$554.8	\$609.0
Pretax Income	\$1,062.5	\$1,058.6	\$1,186.7	\$1,053.0	\$1,205.7
Pretax Margin (%)	9.37	8.61	9.79	8.81	9.63
Effective Tax Rate (%)	44.00	42.30	46.50	22.90	39.00
Net Income	\$595.3	\$611.2	\$635.1	\$811.9	\$734.9
Shares Outstanding, Millions	148.7	148.3	280.0	266.6	255.6
Per Share Data					
Earnings	\$4.00	\$4.12	\$2.27	\$3.04	\$2.87
Dividend	\$1.06	\$1.16	\$0.65	\$0.71	\$0.75
Book Value	\$19.83	\$21.32	\$11.84	\$13.85	\$15.56

Table 3 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending September
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.05	1.12	1.16	1.30	1.25
Quick (Times)	0.68	0.74	0.79	0.90	0.80
Fixed Assets/Equity (%)	85.60	82.87	80.54	71.50	65.22
Current Liabilities/Equity (%)	112.52	107.88	120.46	102.79	87.55
Total Liabilities/Equity (%)	148.71	143.62	163.69	149.35	124.73
<i>Profitability (%)</i>					
Return on Assets	-	8.13	7.73	9.05	8.10
Return on Equity	-	20.01	19.61	23.17	19.16
Profit Margin	5.25	4.97	5.24	6.80	5.87
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	13.23	11.39	11.55	13.39	13.58
Capital Spending % of Revenue	5.42	4.42	3.91	4.64	4.86
Employees	123,266	121,194	116,148	112,160	108,715
Revenue (\$K)/Employee	\$91.98	\$101.45	\$104.38	\$106.51	\$115.15
Capital Spending % of Assets	8.38	7.06	5.42	6.02	6.81

Source: Rockwell International Corporation
Annual Reports
Dataquest (1990)



Dataquest Vendor Profile

Semiconductor Equipment, Manufacturing, and Materials

September 28, 1992

Silicon Valley Group Inc.

Corporate Statistics

Location	San Jose, California
Chairman, CEO	Papken Der Torossian
President, COO	Vahe Sarkissian
Fiscal 1991 Revenue	\$234.8 Million
Fiscal Year Ends	September 30
Employees	1,605
Founded	1977

Corporate Overview

Silicon Valley Group Inc. (SVG) designs, manufactures, and markets equipment used in the fabrication of advanced semiconductor devices. The company's initial product development and market focus was in the area of automatic photoresist processing equipment (also known as track equipment). SVG expanded into the chemical vapor deposition (CVD) market in 1986 through development of a vertical thermal reactor (VTR) and the subsequent acquisition of Anicon Inc. in 1987. The combination of the VTR and Anicon product lines offered customers a range of capabilities for oxidation, diffusion, and low-pressure chemical vapor deposition (LPCVD) processes. In December 1988, SVG expanded its product offerings in this area through its acquisition of Thermco Systems, one of the world's largest suppliers of diffusion/oxidation furnaces. In May 1990, SVG made another significant acquisition through the purchase of Perkin-Elmer's optical lithography unit. This acquisition provided SVG with the highly advanced step-and-scan lithography technology pioneered by Perkin-Elmer in the late 1980s, in addition to a substantial installed base of projection aligner tools and technology. The outcome of this acquisition was the formation of SVG's first subsidiary, SVG Lithography Systems Inc. (SVGL).

For more information on Silicon Valley Group, please contact Peggy Marie Wood or Charles Boucher of Dataquest's Semiconductor Equipment, Manufacturing, and Materials service.

Corporate Organization and Management Team

SVG is divided into three operating groups. The company's Track Systems Division focuses on automatic photoresist processing equipment; its Thermco Systems Division offers oxidation, diffusion, and LPCVD

Dataquest®

 a company of
The Dun & Bradstreet Corporation

SEMM-SVC-VP-9201

This profile is the property of Dataquest Incorporated. Reproduction or disclosure in whole or in part to other parties shall be made upon the written and express consent of Dataquest. This report shall be treated at all times as a confidential and proprietary document for internal use only. The information contained in this publication is believed to be reliable but cannot be guaranteed to be correct or complete.

©1992 Dataquest Incorporated—Reproduction Prohibited

Dataquest is a registered trademark of A.C. Nielsen Company 0013774

processing systems; and its lithography subsidiary, SVG Lithography, focuses on step-and-scan lithography exposure tools and technology.

In June 1992, SVG announced a number of key executive assignments to augment and strengthen its management team. This reorganization reflects the company's intent to focus its efforts on customer satisfaction and corporate profitability through efficiency and teamwork. In particular, three of the management positions—corporate sales, customer service, and strategic relations—emphasize worldwide cross-divisional responsibility, reflecting the ever-increasing global nature of the SVG's customer base. Table 1 identifies the individuals in SVG's management team.

Corporate Financial History

Table 2 presents a summary of SVG corporate financial highlights for the past five years.

SVG has grown substantially over the past five years, primarily through the acquisition of the operations of other wafer fab equipment companies, specifically Anicon (February 1987), Thermco Systems (December 1988), and the optical lithography group of Perkin-Elmer Corporation (May 1990). Figure 1 shows SVG quarterly revenue and net income figures during the period of January 1986 through June 1992, with these three acquisitions duly noted.

As part of the SVGL acquisition, SVGL obtained R&D funding commitments for the Micrascan program from IBM and Sematech, in which payments are based on meeting specified product development milestones. It incurred costs of \$23.8 million in 1991 and \$4.7 million in 1990 related to such product development and recognized \$22.6 million and \$4.6 million, respectively, in related R&D funding. Because of these R&D funding commitments from IBM and Sematech, the ratio of the company's effective R&D funding level to total revenue is somewhat higher than that stated in its official financial figures in Table 2. In particular, the effect of outside R&D funding

Table 1
Silicon Valley Group's Management Team

Papken Der Torossian	Chairman, CEO
Vahe Sarkissian	President, COO
Edward Dohring	President, Track Systems Division
Edward Ward	President, Thermco Systems Division
Robert Richardson	President, SVG Lithography
Steven Jensen	Vice President of Sales
Allan Schwartz	Vice President of Service
Ken Machado	Vice President of Strategic Relations
Russell Weinstock	Chief Financial Officer
Dick Anderson	Vice President of Human Resources

Source: Silicon Valley Group

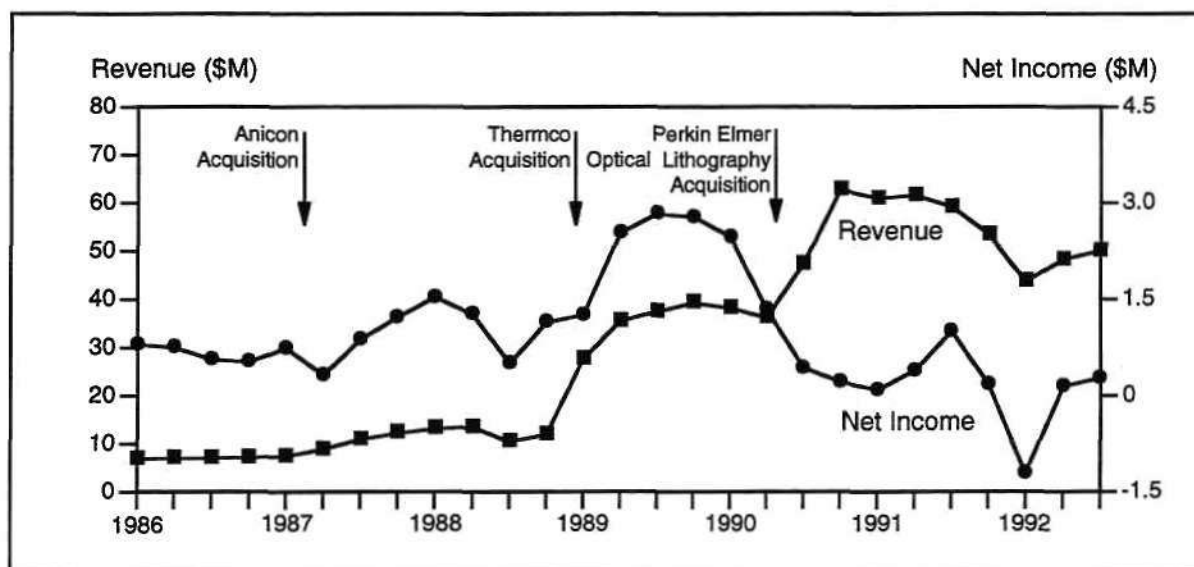
Table 2
Five-Year Corporate Highlights (Thousands of Dollars)

Fiscal Year	1987	1988	1989	1990	1991
Revenue	39,300	48,969	131,080	184,289	234,798
Percentage Change	41.1	24.6	167.7	40.6	27.4
Net Income	3,148	4,440	9,612	4,449	1,641
Net income As a Percent of Revenue	8.0	9.1	7.3	2.4	0.7
R&D	5,808	7,006	15,177	25,292	30,004
R&D As a Percent of Revenue	14.8	14.3	11.6	13.7	12.8
Employees	344	382	932	1,690	1,605
Revenue per Employee	114	128	141	109	146

Note: Data for 1987 through 1990 have been restated to reflect acquisitions.

Source: Silicon Valley Group Annual Reports and Forms 10-K, Dataquest (September 1992)

Figure 1
Silicon Valley Group Quarterly Revenue and Net Income



Source: Silicon Valley Group, Quarterly Financials, Dataquest (September 1992)

G2001607

sources for the company in 1991 was significant, providing an effective R&D-to-revenue ratio of 22 percent. The additional R&D funding of \$22.6 million added to the company's \$30.0 million R&D level in 1991 totaled \$52.6 million, which translated to an R&D investment run rate for the company of about \$1.0 million per week.

Regional Market Focus

Table 3 shows Dataquest's estimates for the company's wafer fab equipment revenue by region for the calendar years 1987 through 1991. (Please note that no revenue associated with service and spares is included in Dataquest's revenue estimates. Dataquest also has adopted certain bookkeeping practices to account for equipment revenue associated with SVG's acquisitions during this period. Refer to the notes at the bottom of Table 3 for further details.)

Table 3 shows that SVG has had a negligible presence in Japan, the world's largest regional market for wafer fabrication equipment. Its wafer fab equipment revenue in Japan in 1990, while showing an increase as a percentage of the company's total equipment revenue, primarily reflects the continuation of business activities for the projection aligner product families acquired from Perkin-Elmer's optical lithography group. The company's 1991 equipment revenue in Japan came entirely from the shipment of a handful of projection aligners and two of its advanced Micrascan tools.

Japan represents the world center for high-volume manufacturing of advanced semiconductor devices, and as such has represented the largest market for wafer fab equipment. During the period of 1988

Table 3
Silicon Valley Group Wafer Fab Equipment Revenue, by Region (Percentage of Dollars)

Calendar Year	1987	1988	1989	1990	1991
Total SVG Wafer Fab Equipment Revenue (\$M)	39.4	49.0	127.0	188.3	180.3
Percentage Revenue, by Region					
North America	62	62	59	60	60
Japan	2	6	1	5	7
Europe	20	17	20	19	18
Asia/Pacific-ROW	15	14	20	15	15

Notes:

Totals may not add to 100 percent because of rounding.

Calendar year estimates; no revenue associated with service and spares included.

Anicon acquired in February 1987. Dataquest's estimates for SVG in 1987 include all calendar year 1987 Anicon equipment revenue.

Thermco acquired in December 1988. Dataquest's estimates for SVG in 1988 exclude all calendar year 1988 Thermco equipment revenue.

Perkin Elmer's optical lithography group acquired in May 1990. Dataquest's estimates for SVG in 1990 include all calendar year 1990 Perkin-Elmer optical lithography equipment revenue.

Source: Dataquest (September 1992)

through 1991, Japan accounted for about 46 to 51 percent of world-wide wafer fab equipment expenditure. By not actively participating in this regional market, SVG effectively has reduced by half the total available market for its products. In addition, its ability to penetrate Japanese fab accounts in the United States and Europe has been negatively impacted by this policy because most Japanese companies building fabs outside of Japan choose to duplicate the equipment sets and materials used in existing facilities in order to ramp manufacturing as quickly as possible. Dataquest believes that this lack of presence in the Japanese market has serious long-term implications for SVG.

Company Products and Market Position

Table 4 shows Dataquest's estimates of SVG's worldwide wafer fab equipment revenue and market share, by major product segment. The following sections discuss the company's products, market position, and directions for each of its three operating groups.

Track Systems Division

Products

Automatic photoresist processing equipment performs a variety of steps necessary to process semiconductor wafers prior to lithographic exposure, including cleaning, adhesion promotion, and photoresist coating, as well as the steps required to treat wafers after exposure prior to the etching, including such steps as photoresist develop and bake. Track equipment is modular in design to allow configuration to specific customer requirements.

SVG offers four series of photoresist processing equipment. Its most advanced family of track systems, the 90 Series, was introduced in May 1990. This track system is designed for use in advanced fabrication processes with 0.5-micron geometries, such as that required for 16Mb and 64Mb DRAM production. The 90S system, introduced in 1992, is based on the 90 Series platform. By utilizing stacked modules, the 90S reduces system footprint by as much as 30 percent compared to the 90 Series, depending on the process. The 90S is targeted at 0.35-micron device production.

Other SVG track products include the 8800, 8600, and 8100 Series of track systems. The 8800 Series, introduced in 1987, is targeted at processing requirements down to 0.8-micron line geometries and was the first SVG track system to offer beltless wafer handling for improved contamination control. Both the 8600 and 8100 Series systems incorporate belt-based wafer transport systems and are targeted at the 1.0- and 2.0-micron and greater line-width processing regimes, respectively.

Market Position

The worldwide market for track equipment in calendar year 1991 was \$369 million, up 13 percent from its 1990 level of \$326 million. This healthy growth rate is of significance in light of the fact that the track equipment market is closely tied to purchases of lithography equipment, whose market declined 5 percent last year. Dataquest attributes the healthy growth rate in the 1991 track market to

Table 4
Silicon Valley Group Market Position, by Major Product Segment (Millions of Dollars)

Calendar Year	1987	1988	1989	1990	1991
Worldwide Revenue					
Track Division					
Track Equipment					
SVG Revenue	33.0	37.4	54.0	44.0	48.9
Total Market Revenue	167.7	253.4	333.6	326.0	368.6
SVG Market Share (%)	20	15	16	13	13
Thermco Division					
Vertical Tube CVD and Diffusion					
SVG Revenue	2.7	7.6	9.0	27.4	42.5
Total Market Revenue	23.3	86.5	176.8	302.6	391.6
SVG Market Share (%)	12	9	5	9	11
Horizontal Tube CVD and Diffusion					
SVG Revenue	0	0	62.0	48.0	37.3
Total Market Revenue	195.0	337.0	320.0	228.0	179.0
SVG Market Share (%)	0	0	19	21	21
Dedicated LPCVD Systems					
SVG Revenue	3.7	4.0	2.0	1.3	0.0
Total Market Revenue	30.2	55.6	79.6	97.2	89.9
SVG Market Share (%)	12	7	3	1	0
SVG Lithography					
Projection Aligners*					
SVG Revenue	0	0	0	37.0	21.2
Total Market Revenue	128.6	147.7	94.3	93.4	68.4
SVG Market Share (%)	0	0	0	40	31
Steppers					
SVG Revenue	0	0	0	30.6	30.4
Total Market Revenue	503.1	921.0	1,180.7	1,052.2	1,029.1
SVG Market Share (%)	0	0	0	3	3
Total SVG Wafer Fab Equipment Revenue	39.4	49.0	127.0	188.3	180.3

*Does not include shipments for nonsemiconductor applications.

Notes: Totals may not add to 100 percent because of rounding.

Calendar year estimates; no revenue associated with service and spares included.

Source: Dataquest (September 1992)

several factors. First, we believe that the average selling price (ASP) associated with a given track system increased at an accelerated pace last year. Track manufacturers are including more and more advanced modules and subsystems on their leading-edge product offerings, including vertical hot plates, random-access robotics, environmentally controlled chambers, and improved chemical dispense nozzles with sophisticated fluid volume controllers. Continued emphasis also is being placed on achieving tighter particle control throughout the entire track system. These items all directly contribute to a higher ASP per track system.

Dataquest also believes that a significant level of replacement systems was purchased for volume production lines and advanced R&D facilities last year, because the newer advanced track tools available in just the last few years have undergone substantial improvements relative to many tools currently in the installed base. Finally, the sluggish DRAM market has led many manufacturers to shift their product strategy from DRAMs to ASICs and other advanced logic products. As a result, we speculate that the market opportunity for standalone track systems last year expanded at a faster pace than might have otherwise been expected if DRAM activity had not been so slow. These three factors contributed to an accelerated growth rate in the track market in 1991. Because the significant shift in the product mix toward more advanced systems has already occurred, we expect future growth in the track market to keep pace with lithography expenditure.

SVG ranked third in the 1991 track market with \$49 million in sales. The company has suffered a decline in market share over the years because it has been unsuccessful in breaking into the world's largest regional market, Japan, and has had to face increasing levels of competition from Japanese competitors in the other parts of the world, including its home market of the United States. In 1987, SVG accounted for 20 percent of the worldwide track market. Five years later (1991), this market share position had eroded to 13 percent. Its major competitors in the track market are Japanese companies: Tokyo Electron Ltd. (including its U.S. and European activity through its joint venture partner, Varian/TEL) and Dainippon Screen. These two companies garnered 39 percent and 19 percent, respectively, of the 1991 worldwide track equipment market. In 1991, SVG's major advanced product offering was its 90 Series systems, which Dataquest estimates accounted for about half of SVG's total track revenue in that year.

Directions

The top three players in the track market—Tokyo Electron, Dainippon Screen, and SVG—dominated the track market throughout the 1980s. In 1982, they accounted for a combined share of 52 percent, which by last year had increased to a combined share of 71 percent; 10 other companies split the remaining 29 percent of the 1991 market. Clearly, the combination of advanced technology and random-access product offerings coupled with sufficient critical mass to support a global customer base has been key to the success of these larger players.

As with all of its products, one major concern facing SVG's Track Division is its lack of participation in the Japanese equipment market. For the past seven years, Japanese track companies have commanded greater than 98 percent of the track equipment market in Japan. By 1991, with Japan well established as the world's major semiconductor manufacturing region, the track market in Japan represented 49 percent of the worldwide track market. This means that non-Japanese track companies such as SVG participated in a market only half the size of the total worldwide market. This situation is even more serious for non-Japanese track companies because the Japanese track suppliers and the Varian/TEL joint venture have continued to increase their market penetration and together accounted for 36 percent share of the track market outside of Japan in 1991.

Dataquest recognizes that establishing business activities and relationships in Japan is costly and requires a long-term commitment. However, SVG must seriously evaluate the impact of its future market strategies when it is clear that the market available to the company is steadily shrinking as a percentage of the total. Dataquest believes that SVG's Track Division should focus on working more closely with the major stepper manufacturers, Nikon and Canon, for the development of interfaces to their latest steppers, even if only for beta site installations. This involvement would allow SVG and the Japanese stepper companies to gain a better understanding of the mechanical and electrical interfaces required for directly linking track and exposure tools. However, SVG faces considerable challenges in developing these closer ties. Not only does it face fierce competition from its well-entrenched Japanese track competitors, but its SVGL subsidiary now also competes directly against Nikon and Canon in the advanced stepper product arena.

Thermco Systems Division

Products

SVG's Thermco division designs, manufactures, markets, and services products that address the oxidation/diffusion and LPCVD steps of the semiconductor fabrication process, such as LPCVD oxide and nitride deposition, LPCVD polysilicon deposition, gate oxide growth, and various high-temperature annealing steps. Its current product offerings are designed as horizontal tube systems and vertical thermal reactors. These systems are configured to process large batches of wafers simultaneously, and thereby offer high wafer throughput.

SVG developed its first VTR in 1986 and has continued to upgrade the product to meet increasingly stringent manufacturing requirements. It augmented its SVG product in December 1988 with the acquisition of Thermco Systems, which provided an established horizontal tube diffusion and LPCVD product line, and a large installed base.

The Series 6000 VTR was introduced in 1988 and improved upon the VTR by incorporating the SECS I and SECS II interface to the

supervisory computer, and offered a retrofittable upgrade to 200mm wafers. The Series 6000 VTR was positioned to meet manufacturing requirements down to the 0.8-micron technology level. The Series 7000 VTR family was announced in February 1991, and improved upon the Series 6000 in the areas of particle control, process capability, and system reliability. The Series 7000 also incorporated an automatic quartz tube removal system to make tube changes easier and quicker. The Series 7000PLUS VTR was introduced in May 1992, and incorporated additional upgrades to the heating element and gas delivery system to further enhance the reliability and particle control characteristics. The Series 7000PLUS VTR enhancements were developed and tested in conjunction with National Semiconductor and Sematech through a Sematech Equipment Improvement Program (EIP). The series 7000 and 7000PLUS VTR products are designed for use in 4Mb and 16Mb production facilities, which use wafers up to 200mm in diameter and employ processes down to 0.5-micron geometries.

At Semicon/West in June 1992, SVG's Thermco Systems Division announced its most advanced product to date: the Series 8000 Advanced Vertical Processor (AVP), which features improved cost of ownership by increasing the load size for 200mm wafers. The system also provides enhanced wafer automation and supports automated manufacturing needs. The Series 8000 AVP is targeted at 0.35-micron production requirements, which will be utilized in 64Mb DRAM fabs.

Market Position

The worldwide market for horizontal and vertical diffusion and LPCVD equipment grew by a moderate 7.5 percent to \$570.6 million in 1991. Steep increases in diffusion tube ASPs were the main contributing factor for the slight market growth. Driving the robust price increases were the rapid displacement of horizontal system shipments by vertical systems, which are more expensive than horizontal systems on a price-per-tube basis, plus the fact that newer systems are incorporating many new features to improve defect control, system reliability, and process capability. Horizontal tube systems shipments had a compound annual growth rate (CAGR) of negative 4.9 percent from 1986 to 1991, while vertical tube systems grew at a CAGR of 99.5 percent for the same period. The industry is moving rapidly toward vertical diffusion and LPCVD systems because of the robust process capability for thermal oxidation and LPCVD oxide, nitride, and polysilicon deposition processes, combined with high wafer throughput and low particle contamination levels. Also fueling the drive toward vertical reactors is the shift toward 200mm wafers, which are very problematic in horizontal systems.

SVG held 14 percent of the combined vertical and horizontal diffusion and LPCVD equipment market in 1991, placing it third behind TEL and Varian/TEL with 31 percent combined share, and Kokusai Electric with 23 percent market share. Dataquest believes that SVG has correctly positioned itself with its early development of vertical

reactor technology. As is true for the company's other products, however, SVG has had difficulty penetrating the Japanese market with its VTR products, exhibiting virtually a complete absence in Japan. One reason for this has been the dominant position the Japanese occupy as consumers of vertical reactors. Japanese fabs accounted for 56 percent of all vertical systems shipped worldwide, with North American and Asia/Pacific-Rest of World companies absorbing 19 percent each, and European fabs responsible for the remaining 6 percent. The Japanese equipment suppliers, led by TEL and Kokusai, owned 93.1 percent of the 1991 vertical tube business in Japan, making it difficult for SVG to penetrate. SVG has, not surprisingly, performed the strongest in its home market, capturing 38.4 percent of the North American vertical furnace market in 1991. It has turned in only a lackluster performance in Europe and Asia/Pacific, however. If SVG is to sustain long-term growth in its vertical reactor business unit, it must devise a plan to increase its participation in the Asia/Pacific and Japanese regional markets.

Directions

The vertical systems market will continue to displace the horizontal tube market, and the vertical reactor product market is where SVG will fight for market share. SVG held 11 percent of the vertical tube equipment market in 1991, again in third place behind TEL and Varian/TEL (32 percent) and Kokusai (32 percent). Although SVG has been successful in ramping shipments of its VTR products, it faces stiff competition from the Japanese equipment companies. The heavy use of vertical furnace equipment in Japan has enabled Japanese equipment suppliers to dominate the Japanese market. Dataquest believes that the resurgence of the North American semiconductor market in 1993, driven by the microprocessor and communications product markets, represents an opportunity for SVG to capture market share as the North American equipment market grows as a fraction of the worldwide market. The Asia/Pacific market also represents a significant opportunity for SVG. Dataquest believes that it is essential for SVG to develop a strategy to compete in the Asia/Pacific market, which is expected to display healthy growth in 1993 as new 16Mb DRAM fabs are constructed and existing 4Mb and 16Mb DRAM fabs are expanded. The barriers present in Japan to SVG are not present in Korea, which affords an opportunity for SVG to prosper in that region.

Over the longer term, Dataquest expects the Japanese market for wafer fab equipment to recover as the Japanese economy improves and demand for semiconductors increases. The Japanese fab equipment market, so stagnant in 1992, cannot be dismissed, and will bounce back to its familiar status as one of the largest regional markets in the world. Ultimately, the Japanese market represents and will continue to represent a large portion of the total available market. If SVG is unable to participate in that market, it will severely restrict its total available market. Dataquest believes that it is crucial for SVG to formulate a strategy to allow it to compete in Japan. This may involve a partnership with a Japanese manufacturer of process equipment, which could be clustered with a VTR

system, such as a preclean module that would be used prior to gate oxidation, or DRAM capacitor dielectric deposition. Dataquest believes that a successful strategy must add substantial value to the package that SVG will market, preferably with a Japanese company's participation. It is unlikely that the differences between various standalone systems will be adequate to cause the Japanese fabs to turn away from their domestic suppliers.

SVG Lithography

Products

SVG Lithography has two major product families of exposure tools: projection aligners and step-and-scan lithography systems. The most advanced product in the Micralign family of projection aligners is the Micralign 700. This tool is used primarily in the fabrication of devices with minimum feature sizes greater than 1.25 microns, or in the production of less critical layers of more sophisticated integrated circuits. In addition to semiconductor device fabrication, SVGL's projection aligners are used in other nonsemiconductor market applications such as thin film head manufacturing and multichip module processing. A large installed base of Micralign systems exists throughout the world, and a significant portion of SVGL's revenue consists of sales of spares, accessories, refurbished systems, and upgrade kits and servicing of this installed base.

SVGL's Micrascan system is a step-and-scan lithography tool that combines the advantages of scanning projection aligners and step-and-repeat exposure tools (steppers). The step-and-scan technology allows for a larger exposure field than a traditional stepper in addition to the ability to expose the field while the wafer is in motion. Together, these features enable the Micrascan to achieve a high throughput level while maintaining fine-line processing capability.

The initial development work of the Micrascan was performed by Perkin-Elmer in conjunction with IBM. At the time of the acquisition of Perkin-Elmer's optical lithography group in May 1990, SVG took a majority interest in the operation (67 percent), with both Perkin-Elmer and IBM holding minority positions in the SVGL subsidiary. Since that time, SVG has acquired Perkin-Elmer's share in the operation such that today the company's ownership in its SVGL subsidiary has grown to 94 percent, with IBM maintaining its original position of 6 percent. In addition to IBM, Sematech has been actively involved in advanced Micrascan system development.

The first Micrascan systems were shipped in 1989 to IBM, SVGL's development partner, and were targeted at 0.5-micron processing for 16Mb DRAMs. In June 1992, the company introduced its next-generation system, the Micrascan 92. This tool was designed for patterning of 0.35-micron design features but has the ability to be extended to the 0.25-micron processing regime.

Market Position

According to Dataquest estimates, SVGL had projection aligner

equipment revenue for semiconductor applications of \$21 million in 1991. This revenue level translated to 31 percent share of the \$68 million market. SVGL's only competitor in this market segment is Canon, which commanded 69 percent share of the market. Projection aligners represent a mature segment of the semiconductor wafer fab equipment market because of the restriction on their ability to process sub-1.25-micron geometries. Dataquest expects this segment of the semiconductor applications market to experience relatively flat growth over the five-year period from 1991 to 1996. SVG is pursuing opportunities in nonsemiconductor application markets.

Steppers constitute the single largest market segment in the wafer fab equipment industry. Total stepper unit shipments to semiconductor manufacturers were 679 units in 1991, down 12 percent from the 1990 level of 771. Buoyed by the higher ASP of advanced i-line systems, the predominant tool choice of the product mix, worldwide stepper revenue was \$1.03 billion in 1991, reflecting a decline of a mere 2 percentage points from its 1990 level of \$1.05 billion. SVGL's position in the worldwide stepper market is still negligible. In 1991, it shipped only eight units, representing a little more than 1 percent of worldwide stepper shipments. Export shipments for the company last year included two units to Europe and two units to Japan, one of which was the highly publicized shipment to Toshiba in early 1991. As in the two previous years, IBM continued to be SVGL's major customer for the Micrascan in 1991. With the exception of the Toshiba shipment last year and a shipment to Sematech in 1990, Dataquest believes that all other units in the customer installed base are located at IBM facilities.

Much of SVGL's activity in 1991 was taken up with development of its new advanced Micrascan tool, which was introduced at Semicon/West in June 1992. It has invested significant time and resources to substantially improve the capability and cost of ownership on this advanced lithographic product offering. Designed for the 0.35-micron environment, the Micrascan 92 achieves improved performance and reliability while offering a 50 percent reduction in footprint as compared with its predecessor.

One key feature of the first-generation Micrascan system was its wide field of 20mm x 32.5mm. The Micrascan 92 slightly extends that field size to 22mm x 32.5 mm, which allows three 64Mb DRAM chips to be imaged per exposure. This large field size translates to a 50 percent improvement in exposure throughput as compared with today's advanced wide-field reduction steppers, which can image only two 64Mb DRAM chips per exposure. Although SVGL must first establish its position in the market with its 22mm x 32.5mm field size, Dataquest understands that the company is well positioned to deal with the larger chip sizes of future device generations. The advanced Micrascan series can be readily reconfigured to accept larger reticles (6 x 9 inches) that correspond to an exposure field of 22mm x 50mm.

In a key strategic move, SVGL will offer i-line capability on the Micrascan 92. The system's deep-UV platform has been designed to accept an i-line source and its corresponding optics. Dataquest believes that this may well prove to be a pivotal marketing decision for SVGL. This strategy allows the company to embrace customers already attracted to the benefits of the Micrascan technology but that are reluctant to abandon their i-line processing know-how for the unknown realm of deep-UV.

SVGL has announced an ASP of \$3.8 million for a deep-UV version of the Micrascan 92 and a \$2.9 million price point for an i-line version of the machine. These prices, while somewhat higher than existing stepper products, are still competitive given the technological capabilities of the system. These price points for the Micrascan 92 are unlikely to generate the sticker shock that occurred when the first-generation Micrascan was introduced in 1989. At that time, the Micrascan's price tag of \$4 million was in sharp contrast to the average stepper price of \$1.3 million. Since that time, there has been a significant shift in the stepper technology product mix away from the older g-line technology to new advanced systems. This in turn has contributed to higher stepper prices overall.

Directions

The Micrascan family of step-and-scan exposure tools represents not only the heart of the SVGL operations, but Dataquest believes that this one product family is absolutely vital to the entire corporation's long-term growth strategy. Dataquest believes that it is critical that SVG achieve product acceptance of the Micrascan 92 by device manufacturers other than IBM. A key factor in the company's strategy to expand its market position centers on developing a significantly closer relationship with the major Japanese semiconductor companies. Japan represents the world's largest market for not only steppers, but for wafer fab equipment in general. It is the production center for high-volume manufacturing of DRAMs, for which the Micrascan product is particularly well suited. SVG faces significant challenges, however, in opening up this market for a number of reasons.

First, Japanese stepper companies hold an overwhelming share of their home market on a unit basis (96 percent in 1991) and a dominant position in the world market overall (82 percent). Dataquest is aware of step-and-scan technology development programs in place at a number of the major stepper manufacturers, so SVG cannot assume that it will hold its unique technology position in this market for the long term. A second challenge to consider is that SVG as a corporation historically has been unsuccessful in establishing any type of presence in the Japanese market and by neglecting that region of the world throughout the 1980s has effectively cut the total available market for its products in half. Establishing business relationships and a direct presence in Japan takes not only considerable resources but also an extended period. We believe that SVG cannot afford the time it would take to restart its efforts in penetrating the Japanese market from scratch because of the significant competitive forces in the stepper market and the

possibility that competitors may introduce step-and-scan technologies of their own. The most effective route, then, is for SVG to partner with another company already active in Japan.

Dataquest believes that discussions have recently been held between SVG corporate management and key personnel of the Canon organization. Canon has one of the largest representative/distributor operations for wafer fab equipment in Japan, and in that sense would provide SVG with a strong partner. At the same time, however, Canon's own stepper operations are particularly strong in the marketplace and it is well positioned to parlay its projection aligner technology with its strong stepper technology base into developing its own step-and-scan machine. Dataquest believes that a partnership between SVG and Canon would hold both significant benefits as well as risks because of these factors. We would expect that, in addition to Canon, SVG is most likely pursuing other avenues for partnering in Japan. Regardless of SVG's ultimate choice for a partner in Japan, we believe that it will be vital that this relationship be firmly established within the next 6 to 18 months so that the company can be well positioned to take advantage of its front-runner position in step-and-scan technology for 64Mb DRAM evaluation, pilot, and production purchases.

One final factor that may also affect the long-term success of the Micrascan product family centers on the deep-UV photoresist material used to transfer the circuit image to the wafer. SVG has entered into an agreement with IBM for IBM to provide certain photoresist material for use with Micrascan systems. The photoresist material is available to SVGL in limited quantities only, can be sold by SVGL only to a limited set of customers, and is available for a limited period. Dataquest understands that although the IBM resist provides good results, it has the reputation for being not particularly user-friendly. SVG has noted that an alternative photoresist material is now available to SVGL and all potential Micrascan customers from a third party, but there can be no assurance that it will achieve acceptance by SVGL's customers. In the event that SVGL or its customers are unable to secure adequate supplies of the IBM photoresist or an acceptable substitute, the results of operations of SVGL and SVG could be adversely affected.

Dataquest Perspective

The size of a company clearly has become increasingly important as the wafer fab equipment industry matures. The sales level is critical because it relates to a company's ability to fund R&D for advanced technology development as well as support and service its customers on an international basis. Through its strategy of acquisitions in the latter half of the 1980s, SVG has successfully grown to be one of the largest independent wafer fab equipment companies in the world, with a broad portfolio of advanced product offerings. According to Dataquest estimates, SVG ranked seventh overall in the 1991 worldwide wafer fab equipment market, third in both the North American and European markets, and ninth in Asia/Pacific-Rest of World.

Dataquest believes that the single most critical issue facing the company will be development and implementation of a strategy to penetrate the Japanese market. SVG, however, faces well-entrenched competition in Japan for the products from both its Track and Thermco divisions. We believe that SVG should rally its efforts in this endeavor around its Micrascan advanced exposure system. The uniqueness of this product in today's marketplace provides SVG with an edge to establish a firm position in advanced lithography in both its traditional regional markets as well as Japan. Time is of the essence, however, because the highly competitive nature of the wafer fab equipment industry dictates that it will be difficult for SVG to hold this competitive edge for long.

SEMMS-1631265 B: 1
Mark FitzGerald
Senior Industrial Analyst
320-1264
Internal Distribution

Tandy Corporation

1800 One Tandy Center
Fort Worth, Texas 76102
Telephone: (817) 390-3700
Fax: (817) 390-2774
Dun's Number: 00-801-2635

Date Founded: 1927

CORPORATE STRATEGIC DIRECTION

Tandy Corporation is a multifaceted, multibillion dollar company. As a retail company, it is known for its nationwide chain of Radio Shack stores, Computer Centers, and dealer/franchise outlets and for the Scott-McDuff and VideoConcepts retail operations of its Tandy Name Brand Retail Group. As a manufacturer, it designs and manufactures more than a billion dollars of consumer electronics products and computers per year. As a corporate innovator, Tandy strives to identify areas of growth potential, including the acquisition of companies that complement its technology base in audio and video equipment, telephony, personal computers, and magnetic media.

Tandy's total revenue increased 10 percent to \$4.2 billion* in fiscal 1989 from \$3.8 billion in fiscal 1988. In order to sustain this growth through 1990, Tandy intends to focus on several factors, including revitalizing the demand for its low-end computers, resuming new store additions in the Name Brand Group, and augmenting Radio Shack's sales and profits through a sophisticated point-of-sale (POS) system.

In 1989, international sales accounted for less than 5 percent of total revenue. The Company was forced to close a major manufacturing facility in Korea due to political and civil unrest. However, strategic relationships involving original equipment manufacturing and technology sharing with Digital Equipment Corporation (DEC) and Matsushita/Panasonic have been established, and Tandy hopes to develop similar relationships that will allow it to expand into Europe in the 1990s. Also, Tandy opened a new manufacturing facility in Huizhou, China, to supply Tandy products to the domestic Chinese market and to export products.

*All dollar amounts are in US dollars.

Tandy does not report its R&D expenditure, but its seventh R&D center, added in fiscal 1989, is located in San Jose, California, and work has begun on a major technology center, located at Tandy's headquarters in Fort Worth, Texas. Capital expenditure totaled \$123 million in fiscal 1989, representing 3 percent of revenue. Most of these outlays were used for expansion of Tandy's manufacturing capabilities and for Radio Shack's remodeling and implementation of the POS system. This system is designed to increase sales growth through increased productivity rather than reliance upon new store expansion to fuel growth. This system should improve promotional planning, merchandising effectiveness, retail store control, and, ultimately, inventory turnover.

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

Retail Chains

Tandy's strength lies in the retail chains that it owns. Today, through its chain of Radio Shack outlets, Tandy is a leading distributor of electronic products. Tandy/Radio Shack claims to have the largest number of retail electronics outlets in the world. Through more than 4,800 Company-owned retail stores and 2,200 dealer/franchise outlets, Tandy distributes a product line of nearly 2,800 noncomputer items plus nearly 1,800 products, including a line of microcomputers, peripherals, software, and accessories. The

Company entered the name-brand consumer electronics market through purchases of the Scott-McDuff and VideoConcepts chains in 1985 and 1986, thereby forming the Tandy Name Brand Retail Group. The Name Brand division achieved an 11.3 percent same-store sales growth in 1989, in contrast to its essentially flat growth in 1988. In 1988, Tandy acquired GRiD Systems, a manufacturer of laptop personal computers. GRiD Systems Centers are now established in 61 major domestic markets and 7 locations in Canada and Europe.

Marketing Companies

Excluding GRiD Systems, Tandy's marketing companies achieved a 15.5 percent increase in sales in 1989 to complement a 19.0 percent increase in the previous year.

Memtek Products, the manufacturer and marketer of Memorex brand audio- and videotapes and accessories, expanded its product line and achieved a record year in sales. In addition to audio- and videotapes, Memtek has introduced universal remote controllers, audio and video head cleaners and headphones, and other accessory items in seven different product categories.

O'Sullivan Industries, a leading producer of ready-to-assemble electronics racks, desks, and cabinets, opened a new 335,000-square-foot plant in Virginia. This new facility provides added production capacity and manufactures high-capacity audio speakers that are being built as OEM products for sale by various foreign manufacturers in the United States.

Lika Corporation, a manufacturer of printed circuit boards, redirected its products away from high-volume, low profit margin products to higher profit margin lines of business—computers and telecommunications. Lika currently is ranked among the top 10 printed circuit board producers in the United States.

GRiD Systems Corporation designs, develops, manufactures, and markets field automation systems for laptop computers. Tandy formally realigned its computer marketing plan in March 1989 by positioning GRiD Systems as the operating unit with full responsibility for marketing computers to major corporate accounts, state governments, and the federal

government. GRiD had sales of \$130.4 million due in part to Computer Centers and value-added reseller (VAR) programs transferred from Radio Shack in 1989. Tandy also enhanced GRiD's product line to include desktop workstations and file servers, plus additional field support equipment, such as cellular telephones and facsimile machines.

A&A International manages the worldwide product and component sourcing, evaluation, quality control, and delivery for Tandy Electronics, Radio Shack, Memtek Products, GRiD Systems, and the Tandy Brand Name Retail Group. It also serves as a communications link between Tandy headquarters and major markets in Japan.

Personal Computers

In 1989, Tandy's unit sales of low-cost desktop computers, primarily for the home user, declined 13.4 percent. This decline was attributed to two factors: an industry-wide slowing in the low-end market, and the realignment of Radio Shack's computer marketing efforts toward its traditional sectors of strength—i.e., the home, the home office, small and medium-size businesses, and education. Tandy expects its DeskMate graphical user interface to expand the market for low-cost PCs by providing a high degree of user friendliness previously unavailable on such systems. SchoolMate offers similar ease-of-use for the education market with an integrated collection of classroom management applications and teaching utilities. Also, in August 1989, Tandy announced that a version of the Lotus 1-2-3 Spreadsheet would be available using the DeskMate graphical user interface. Until 1989, Tandy's low-priced, entry-level, desktop MS-DOS computers for the home and small business market were predominantly 8088-based, and constituted a major portion of Radio Shack's low-priced product mix. Partially offsetting the decline in 8088-based products was an increase in low-end 8086 and 80286 computer sales.

Although a viable market still exists for 8088 microprocessor-based computers, the market for this product has matured. As a result, it is likely that all new desktop computer products introduced by the Company will be 8086 or above. Dataquest estimates that Tandy ranked seventh in the worldwide personal computer market in 1989 with 3.2 percent market share.

Tandy's greatest competitive advantage in the PC market is that, with its extensive chain of retail stores, it is the only PC manufacturer with its own distribution channels. This advantage could prove vital as competition for the home market increases.

Business Computers

The acquisition of GRiD Systems and manufacturing agreements with DEC and Matsushita significantly strengthened Tandy's 1989 computer business by expanding upper-end desktop business computer and laptop and portable computer unit sales by 18.9 and 271.4 percent, respectively.

The higher average price of these upper-end business computers enabled 1989 total computer revenue to increase nearly 15 percent over 1988 in spite of the decline in sales of the low-cost desktop computers. In a further effort to tap the more profitable business market, Tandy introduced three new high-end desktop computers in February 1990. These included two PC-compatibles based on the Intel 80386 chip, the Tandy 4016 DX (which runs at 16 MHz) and the 4033 LX (which runs at about twice the speed of the 4016 DX), and the 2800 HD, a 12.5-pound laptop with a 20MB hard disk and an Intel 286 chip. The 2800 HD is the first laptop made by Tandy for Radio Shack. In 1989, Tandy captured less than 1 percent of the worldwide business computer market share.

Compact Discs

THOR-CD was first announced in 1988. It represents a breakthrough in rewritable compact disc (CD) technology. Tandy believes that THOR-CD is the only erasable CD technology in existence that is compatible with most current CD players. With the belief that THOR-CD could become the next major consumer electronics product, Tandy has devoted the new San Jose research facility toward its development.

Printers

Tandy manufactures and sells a line of printers for its desktop computers. This line includes fully formed (daisywheel), serial, and page printers. Tandy recently introduced several new serial printer models.

Further Information

For more information about the Company's business segments, please contact the appropriate Dataquest industry service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$2,841.4	\$3,036.0	\$3,452.2	\$3,793.8	\$4,180.7
Percent Change	-	6.85	13.71	9.90	10.20
Capital Expenditure	\$75.0	\$55.0	\$93.3	\$94.2	\$122.6
Percent of Revenue	2.64	1.81	2.70	2.48	2.93
R&D Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
Number of Employees	29,862	33,191	33,918	35,145	38,995
Revenue (\$K)/Employee	\$9.50	\$9.10	\$10.18	\$10.79	\$10.72
Net Income	\$189.0	\$197.7	\$242.3	\$316.3	\$323.5
Percent Change	-	4.60	22.56	30.54	2.28
Calendar Year*	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$985.98	\$1,456.59	\$1,013.50	NA	
Quarterly Profit	\$62.75	\$117.63	\$53.03	NA	

*Based on fiscal year ended June 30, 1990
 NA = Not available

Source: Tandy Corporation
 Annual Reports
 Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	93.76	97.36	98.37	98.23	96.65
International	6.24	2.64	1.63	1.77	3.35
Europe	4.08	NA	NA	NA	NA
Asia/Pacific	2.16	NA	NA	NA	NA

NA = Not available

Source: Tandy Corporation
 Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	0	0
Indirect Sales	100.00	100.00
Dealers	100.00	100.00

Source: Dataquest (1990)

1990 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

GRiD Systems Corporation, Fremont, California
GRiD portable computers
Lika Corporation, Salt Lake City, Utah
Printed circuit boards
Lika Corporation, Stockton, California
Printed circuit boards
O'Sullivan Industries, Inc., Lamar, Missouri
Furniture to be used with electronic products
O'Sullivan Industries, Inc., South Boston, Virginia
Furniture to be used with electronic products
T.C. Antennas, Fort Worth, Texas
Mobile CB radio equipment
Tandy Electronics Business Computers, Fort Worth, Texas
Manufacturing and final assembly of business computer products
Tandy Electronics Packaging, Fort Worth, Texas
Electronic parts packaging
Tandy Instruments, Fort Worth, Texas
Printed circuit board assemblies
Tandy Magnetics, Fort Worth, Texas
Cartridge and reel-to-reel tape
Tandy Molded Products, Fort Worth, Texas
Fabricates molded products
Tandy/Rank Home Video, Northbrook, Illinois
Video cassettes
Tandy Software Assembly, Fort Worth, Texas
Assembles computer diskette software, telephone and game cartridges

Asia/Pacific

T.C. Electronics (Taiwan) Corp.
Radios, tuners, modems, amplifiers, security devices, and telephones
Tandy Electronics China, Ltd.
Telephones and cassette tape recorders
Tandy Electronics Japan, Ltd.
Consumer electronics R&D

SUBSIDIARIES

North America

GRiD Systems Corporation
Lika Corporation
O'Sullivan Industries, Inc.
Tandy Credit Corporation
Tandy Electronics, Inc.
Tandy International Disc, Inc.
Tandy International Electronics, Inc.
Tandy Life Insurance Co.
Tandy Marketing (Canada) Ltd.
Tandy Properties, Inc.
Tandy Transportation
Trans World Electronics
200 Houston Street Associates

Europe

Victor Technologies Group (Sweden)

Asia/Pacific

A&A International (Japan)
Tandy Radio Shack Ltd. (Hong Kong)

ROW

Tandy FSC Ltd. (Jamaica)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

DEC

General Systems Business has been formed by DEC to sell Tandy 386-based PCs through VARs to the small-to-midsize business market. Tandy has had an ongoing OEM relationship with DEC.

Matsushita Electric

Matsushita Electric Industrial Co., Ltd., will develop 16- and 32-bit notebook-size PCs and will market the devices in the United States and Europe. Matsushita will commission the production of the PCs for the US market to Tandy. Tandy has had an ongoing OEM relationship with Matsushita/Panasonic.

Nokira-Mobira

Long known for its OEM cellular business with Tandy, Nokira has entered into a joint cellular telephone manufacturing venture with the Company.

Novell

Tandy will sell the full line of Novell's NetWare products in its Radio Shack and GRiD Computer Centers.

UNICO

UNICO's subsidiary, American Educational Computer (AEC), will comarket its Reading Skills Development Program (RSDP) with the Radio Shack Education Division. RSDP supports School-Mate, Tandy Corporation's local area network (LAN) for the classroom.

1989

Toshiba

Toshiba and Tandy's GRiD Systems formed a licensing agreement on patents for portable laptop computers.

Lotus Development

Tandy is to sell Lotus Development's Lotus Spreadsheet for DeskMate at Radio Shack stores and at 300 of its Radio Shack Computer Centers.

Open Desktop Group

Tandy, DEC, Locus Computing, Relational Technology, and The Santa Cruz Operation have joined together to pursue the development of new software tools that will make PCs easier to use with the UNIX operating system.

MERGERS AND ACQUISITIONS

1990

Datatronic AB

Tandy signed an agreement with Datatronic of Stockholm, Sweden, to acquire its Victor microcomputer and Micronic handheld computer subsidiaries in Europe for approximately \$120 million.

1988

GRiD Systems

Tandy Corporation purchased GRiD Systems in a stock transaction. GRiD Systems continues to manufacture and market portable computer products from its corporate headquarters in Fremont, California.

KEY OFFICERS

John V. Roach

Chairman of the board, chief executive officer and president

Herschel C. Winn

Senior vice president and secretary

John W. Burnam

Vice president

Ronald L. Parish

Vice president

Richard L. Ramsey

Vice president and controller

PRINCIPAL INVESTORS

Information is not available.

FOUNDER

David Tandy

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	\$1,456.8	\$1,419.4	\$1,388.8	\$1,986.0	\$1,942.4
Cash	90.2	273.6	58.4	188.2	58.4
Receivables	105.2	116.2	160.4	462.4	553.4
Marketable Securities	0	0	0	0	0
Inventory	1,197.4	982.9	1,128.4	1,287.8	1,285.4
Other Current Assets	64.0	46.7	41.6	47.6	45.2
Net Property, Plants	\$310.6	\$301.7	\$337.1	\$367.3	\$420.7
Other Assets	\$155.6	\$357.0	\$236.6	\$176.8	\$211.2
Total Assets	\$1,923.0	\$2,078.1	\$1,962.5	\$2,530.1	\$2,574.3
Total Current Liabilities	\$375.0	\$512.3	\$302.1	\$649.3	\$569.0
Long-Term Debt	\$320.1	\$164.0	\$168.2	\$153.6	\$113.6
Other Liabilities	\$164.4	\$95.3	\$112.2	\$124.1	\$108.9
Total Liabilities	\$859.5	\$771.6	\$582.5	\$927.0	\$791.5
Total Shareholders' Equity	\$1,063.5	\$1,306.5	\$1,380.0	\$1,603.1	\$1,782.8
Converted Preferred Stock	0	0	0	0	0
Common Stock	95.6	95.6	95.6	95.6	95.6
Other Equity	(135.5)	(90.1)	(60.0)	(101.9)	(192.5)
Retained Earnings	1,103.4	1,301.0	1,344.4	1,609.4	1,879.7
Total Liabilities and Shareholders' Equity	\$1,923.0	\$2,078.1	\$1,962.5	\$2,530.1	\$2,574.3
Income Statement	1985	1986	1987	1988	1989
Revenue	\$2,841.4	\$3,036.0	\$3,452.2	\$3,793.8	\$4,180.7
US Revenue	2,458.4	2,955.9	3,395.8	3,726.6	4,040.5
Non-US Revenue	383.0	80.1	56.4	67.2	140.2
Cost of Sales	\$1,291.8	\$1,471.3	\$1,700.1	\$1,870.4	\$2,148.5
R&D Expense	NA	NA	NA	NA	NA
SG&A Expense	\$1,102.1	\$1,077.7	\$1,205.6	\$1,341.1	\$1,441.6
Capital Expense	\$75.0	\$55.0	\$93.3	\$94.2	\$122.6
Pretax Income	\$351.4	\$387.0	\$458.8	\$514.7	\$527.4
Pretax Margin (%)	12.37	12.75	13.29	13.57	12.62
Effective Tax Rate (%)	46.20	48.20	46.60	38.50	38.70
Net Income	\$189.0	\$197.7	\$242.3	\$316.3	\$323.5
Shares Outstanding, Millions	89.5	89.2	89.9	89.5	88.8
Per Share Data					
Earnings	\$2.11	\$2.22	\$2.70	\$3.54	\$3.64
Dividend	0	0	\$0.38	\$0.58	\$0.60
Book Value	\$11.88	\$14.65	\$15.35	\$17.91	\$20.08

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
<i>Liquidity</i>					
Current (Times)	3.88	2.77	4.60	3.06	3.41
Quick (Times)	0.69	0.85	0.86	1.08	1.15
Fixed Assets/Equity (%)	29.21	23.09	24.43	22.91	23.60
Current Liabilities/Equity (%)	35.26	39.21	21.89	40.50	31.92
Total Liabilities/Equity (%)	80.82	59.06	42.21	57.83	44.40
<i>Profitability (%)</i>					
Return on Assets	-	9.88	11.99	14.08	12.68
Return on Equity	-	16.68	18.04	21.21	19.11
Profit Margin	6.65	6.51	7.02	8.34	7.74
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	NA	NA	NA	NA	NA
Capital Spending % of Revenue	2.64	1.81	2.70	2.48	2.93
Employees	29,862	33,191	33,918	35,145	38,995
Revenue (\$K)/Employee	\$9.50	\$9.10	\$10.18	\$10.79	\$10.72
Capital Spending % of Assets	3.90	2.65	4.75	3.72	4.76

NA = Not available

Source: Tandy Corporation
 Annual Reports
 Dataquest (1990)

TRW Incorporated

1900 Richmond Road
Cleveland, Ohio 44124
Telephone: (216) 291-7000
Fax: (216) 291-7629
Dun's Number: 00-417-9453

Date Founded: 1916

CORPORATE STRATEGIC DIRECTION

TRW Incorporated designs, manufactures, and sells products for the performance of systems engineering, research, and technical services for industry and the United States Government. TRW concentrates on four segments: Space & Defense, Automotive, Information Systems, and Other. TRW's main products and services included spacecraft, software and systems engineering support services, electronic systems, equipment and services, automotive original and replacement equipment, and information systems. TRW is a top 10 player in defense electronics, as well as a leader in satellite technology and command, control, communications, and intelligence.

Total revenue increased 5.1 percent to \$7.3 billion* in fiscal year 1989 from \$7.0 billion in fiscal year 1988. For fiscal year 1989, US sales accounted for 72.0 percent of total revenue and international sales for 28.0 percent. The Space & Defense segment was responsible for 43.0 percent of TRW's total revenue and 40.0 percent of its operating profit for fiscal year 1989; the Automotive segment was responsible for 47.0 and 49.0 percent, respectively; and the Information Systems segment was responsible for 10.0 and 11.0 percent, respectively. Net income totaled \$263.0 million for fiscal year 1989, representing a 0.8 percent growth over fiscal year 1988. TRW employs 74,300 people throughout the world.

In September 1989, TRW announced a corporate reorganization that was effective January 1, 1990. The reorganization goal is to better channel the Space & Defense segment's operations. Through the combining of the Federal Systems Group and the Defense Systems Group, TRW hopes to focus better on systems integration and software markets. To establish an avionics and surveillance group,

advanced electronics operations were integrated with ESL, Inc. In the future, TRW plans to concentrate more resources on non-Department of Defense (DOD) federal information systems integration markets and antisubmarine warfare markets.

During 1989, TRW was awarded several large contracts: a \$104.6 million air force contract for MX missile-engineering support, \$179 million in Strategic Defense Initiative-related laser contracts, a \$132.1 million army contract for communications equipment, a \$125 million USAF contract for engineering support services, and a \$102 million air force contract for space-defense surveillance system. TRW signed two contracts related to the multi-billion-dollar new government program, Global Change Initiative, a long-range project to use technology to help understand and preserve the planet's environment. One contract is a 15-month study to develop a preliminary design for the Earth Observing System Data and Information System; the other is to develop and manufacture key instruments for three satellites in that program.

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

Space & Defense

TRW's Space & Defense segment includes spacecraft, software and systems engineering support services, and electronic systems, equipment, and services. TRW designs and manufactures spacecraft equipment, propulsion subsystems, electro-optical and

*All dollar amounts are in US dollars.

instrument systems, spacecraft payloads, high-energy lasers, laser technology, and other high-reliability components. The software and systems engineering support services focus on the fields of antisubmarine warfare, security and counterterrorism, undersea surveillance, and other high-technology space and defense mission support systems. The electronic systems, equipment, and services sector encompass the design and manufacturing of communication systems, avionics systems, and other electronic technologies for space and defense applications. In fiscal years 1989 and 1988, sales to the United States Government accounted for 96 and 97 percent, respectively, of Space & Defense segment sales.

Automotive

TRW's Automotive segment concentrates on automotive original and replacement equipment. TRW designs, manufactures, and markets a wide range of steering, suspension, engine, safety, engineered fastening, electrical, electronic, electromechanical, hydraulic, and other components and systems as original equipment for cars, trucks, buses, farm machinery, and off-highway vehicles. For use as replacement parts, TRW markets a broad line of

engine and chassis parts and a general service line for cars, trucks, off-highway vehicles, and other miscellaneous uses.

Information Systems

TRW's Information Systems segment sells consumer and business credit information services, information systems engineering and integration services, and real estate information services for commercial applications, as well as maintenance services and support systems for computers and computer-related equipment.

Other

This segment includes solids control equipment and services sold primarily for use in oil and gas drilling, on-site environmental waste reduction and clean-up services, and coal combustion systems.

Further Information

For more information on TRW's business segments, please contact Dataquest's Semiconductor Applications Markets.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$5,917.2	\$6,036.0	\$6,821.0	\$6,982.0	\$7,340.0
Percent Change	-	2.01	13.01	2.36	5.13
Capital Expenditure	\$412.0	\$431.0	\$452.0	\$417.0	\$452.0
Percent of Revenue	6.96	7.14	6.63	5.97	6.16
R&D Expenditure	NA	NA	\$210.0	\$225.0	\$256.0
Percent of Revenue	0	0	3.08	3.22	3.49
Number of Employees	93,200	78,600	77,900	73,200	74,300
Revenue (\$K)/Employee	\$63.49	\$76.79	\$87.56	\$95.38	\$98.79
Net Income	(\$7.1)	\$218.0	\$243.0	\$261.0	\$263.0
Percent Change	-	3,170.42	11.47	7.41	0.77
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$1,785.00	\$1,844.00	\$1,792.00	\$1,919.00	
Quarterly Profit	\$69.00	\$70.00	\$60.00	\$64.00	

NA = Not available

Source: TRW Incorporated
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	78.71	74.69	74.27	72.36	72.02
International	21.29	25.31	25.73	27.64	27.98
Europe	11.90	16.73	17.61	18.19	18.32
Others	9.39	8.58	8.12	9.45	9.66

Source: TRW Incorporated
Annual Reports and Forms 10-K
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	90.00	90.00
Indirect Sales	10.00	10.00

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—57
Japan—2
Europe—3

MANUFACTURING LOCATIONS

As of December 1988, TRW's operations included 51 manufacturing facilities located in 14 states throughout the United States and 79 manufacturing facilities in 14 other countries. Of the domestic manufacturing facilities, 39 percent were used by the Space & Defense segment, 59 percent were used by the Automotive segment, and 2 percent were used by the Other segment. Of the foreign manufacturing facilities, 4 percent were used by the Space & Defense segment, 95 percent were used by the Automotive segment, and 1 percent was used by the Other segment.

SUBSIDIARIES

North America

ESL Incorporated
TRW Canada Limited
TRW Components International Inc.
TRW Export Sales Corporation
TRW Export Trading Corporation
TRW Fastening System Inc.
TRW International Finance Corporation
TRW Jeudy Inc.
TRW Valves Limited
TRW Vehicle Safety Systems, Inc.

Europe

Blucher Verwaltungs-GmbH
Tokai TRW & Co. Ltd.
TRW Auto Parts Limited
TRW Cam Gears Limited
TRW Ceramics Limited
TRW Connectors Limited

TRW Daut & Rietz GmbH & Co. Kg
TRW DO Brasil, S.A. (98.78%)
TRW Ehrenreich GmbH & Co. Kg
TRW European Tractor Electronics Co. Limited
TRW GmbH Fur Industrielle Beteiligungen
TRW Italia S.p.A.
TRW Messmer GmbH & Co. Kg
TRW Nelson Bolzenschweiss-Technik GmbH
TRW Presswerk Krefeld GmbH & Co. Kg
TRW Reda Pump Limited
TRW Repa GmbH
TRW Repa Limited (90%)
TRW Sabelt S.p.A.
TRW Thompson GmbH & Co. Kg
TRW Transportation Electronics Limited
TRW U.K. Limited
TRW United-Carr GmbH & Co. Kg
TRW United-Carr Limited
TRW Vehicle Safety Systems Limited

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Israel Aircraft Industries (IAI)/Dornier
TRW, IAI, and Dornier have jointly formed a minicomunications satellite development team.

Motorola Incorporated

TRW and Motorola together have built the world's first multimillion-device SuperChip. The CPUAX SuperChip is an advance microelectronic chip containing approximately 4 million 0.5-micron devices able to perform 200 million floating-point operations per second.

Dana Corporation

TRW and Dana will jointly design, engineer, and manufacture vehicle chassis modules. The joint venture is aimed at cutting development costs.

1989

CrossComm Corporation

An original equipment manufacturer and joint development agreement between TRW and CrossComm stated that CrossComm will supply its ILAN hardware and software to TRW for the next five years.

FEI Microwave, Inc.

A five-year original equipment manufacturer distribution agreement was made in which FEI Microwave will market and distribute microwave and millimeter-wave monolithic ICs for TRW.

Rane Corporation

TRW and Rane jointly formed Rane Power Steering, which will produce and market power steering gears for commercial vehicles.

Toyoda Machine Works, Ltd.

TRW and Toyoda Machine Works, Ltd., set up a joint venture in the United States to produce power steering pumps. The new company, Toyoda TRW Automotive Inc., is held 90 percent by Toyoda Machine and 10 percent by TRW.

Boge AG

TRW formed a joint venture company with Boge AG. Part of the joint venture entitles TRW to sell Boge shock absorbers and struts to North American vehicle producers. Additionally, Boge will license its advanced suspension technology to the joint venture company for use in North America.

Norment Industries Inc.

An agreement was made that linked TRW and Norment Industries' capabilities and expertise in the design, distribution, management, and maintenance of security products, systems, and services for commercial industrial and public applications. The two companies will jointly perform work in Japan and the Pacific Basin.

International Rectifier Corporation

Under a three-year agreement, TRW Components International Division will act as the exclusive overseas sales agent for International Rectifier Corporation's radiation-hardened (rad-hard) HEXFET power MOSFETs.

IBM

TRW licensed its image-processing technology to IBM for development of a new check-processing system for large banks.

1988

Ramtron Corporation

TRW's Microelectronics Center has licensed Ramtron's ferroelectric random-access memory (FRAM) technology. TRW will combine the FRAM technology with its rad-hard VHSIC CMOS process.

MERGERS AND ACQUISITIONS

1990

Monitoring Technology

TRW acquired 12 percent of Monitoring Technology. TRW wants to help Monitoring Technology develop its digital signal device that finds potential machine failures.

Societa Industria Prodotti Elettrici Affini

TRW acquired 70 percent of Societa Industria, a producer of electromechanical and electronic components for automotive applications. TRW renamed the company TRW SIPEA.

1989

Title USA Insurance Corporation

TRW acquired Title USA Insurance, which provides title insurance services in 26 states.

Active Control Systems, Inc.

TRW acquired Active Control Systems, enabling TRW to advance its development of active suspension systems and find applications for this product to production vehicles.

Industrias Pobesa SA

TRW acquired the assets of Industrias Pobesa SA, a manufacturer of wiring assemblies for trucks and off-highway vehicles.

Talley Industries

TRW acquired Talley Industries' vehicle airbag business.

Chilton

TRW acquired Chilton from Borg-Warner. Chilton will operate as part of TRW Information Systems Group.

Vitec Information Technologies

TRW acquired 10 percent of Visual Information Technologies.

KEY OFFICERS**Joseph T. Gorman**

Chairman of the board, president, and chief executive officer

J. R. Burnett

Executive vice president and deputy general manager, Space & Defense

Edsel D. Dunford

Executive vice president, Space & Defense

Jerry K. Myers

Executive vice president, Automotive

D. Van Skilling

Executive vice president, Information Systems and
Services

PRINCIPAL INVESTORS

TRW Employee Stock Ownership and Savings
Plan—16.2 percent

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	\$1,683.9	\$1,749.0	\$1,986.0	\$2,105.0	\$2,295.0
Cash	63.9	85.0	145.0	127.0	114.0
Receivables	851.1	999.0	1,233.0	1,286.0	1,431.0
Marketable Securities	NA	NA	NA	NA	NA
Inventory	518.9	513.0	487.0	419.0	480.0
Other Current Assets	250.0	152.0	121.0	273.0	270.0
Net Property, Plants	\$1,446.2	\$1,637.0	\$1,800.0	\$1,793.0	\$1,954.0
Other Assets	\$605.3	\$523.0	\$592.0	\$544.0	\$1,010.0
Total Assets	\$3,735.4	\$3,909.0	\$4,378.0	\$4,442.0	\$5,259.0
Total Current Liabilities	\$1,429.3	\$1,352.0	\$1,496.0	\$1,396.0	\$1,794.0
Long-Term Debt	\$775.1	\$913.0	\$990.0	\$1,036.0	\$1,218.0
Other Liabilities	\$516.1	\$446.0	\$475.0	\$444.0	\$498.0
Total Liabilities	\$2,720.5	\$2,711.0	\$2,961.0	\$2,876.0	\$3,510.0
Total Shareholders' Equity	\$1,014.9	\$1,198.0	\$1,417.0	\$1,566.0	\$1,749.0
Converted Preferred Stock	1.3	1.0	1.0	1.0	1.0
Common Stock	36.3	37.0	37.0	38.0	38.0
Other Equity	47.2	105.0	178.0	169.0	194.0
Retained Earnings	930.1	1,055.0	1,201.0	1,358.0	1,516.0
Total Liabilities and Shareholders' Equity	\$3,735.4	\$3,909.0	\$4,378.0	\$4,442.0	\$5,259.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$5,917.2	\$6,036.0	\$6,821.0	\$6,982.0	\$7,340.0
US Revenue	4,657.4	4,508.0	5,066.0	5,052.0	5,286.0
Non-US Revenue	1,259.8	1,528.0	1,755.0	1,930.0	2,054.0
Cost of Sales	\$4,585.9	\$4,678.0	\$5,290.0	\$5,565.0	\$5,779.0
R&D Expense	NA	NA	\$210.0	\$225.0	\$256.0
SG&A Expense	\$928.3	\$953.0	\$1,005.0	\$780.0	\$780.0
Capital Expense	\$412.0	\$431.0	\$452.0	\$417.0	\$452.0
Pretax Income	\$235.2	\$370.0	\$415.0	\$420.0	\$399.0
Pretax Margin (%)	3.97	6.13	6.08	6.02	5.44
Effective Tax Rate (%)	43.10	41.20	41.40	37.90	34.10
Net Income	(\$7.1)	\$218.0	\$243.0	\$261.0	\$263.0
Shares Outstanding, Millions	29.0	58.9	59.7	60.2	60.6
Per Share Data					
Earnings	(\$0.27)	\$3.55	\$3.95	\$4.23	\$4.25
Dividend	\$3.00	\$3.05	\$1.60	\$1.63	\$1.72
Book Value	\$33.96	\$19.93	\$23.41	\$25.70	\$25.70

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
<i>Liquidity</i>					
Current (Times)	1.18	1.29	1.33	1.51	1.28
Quick (Times)	0.82	0.91	1.00	1.21	1.01
Fixed Assets/Equity (%)	142.50	136.64	127.03	114.50	111.72
Current Liabilities/Equity (%)	140.83	112.85	105.58	89.14	102.57
Total Liabilities/Equity (%)	268.06	226.29	208.96	183.65	200.69
<i>Profitability (%)</i>					
Return on Assets	(0.38)	5.70	5.86	5.92	5.42
Return on Equity	(1.40)	19.70	18.59	17.50	15.87
Profit Margin	(0.12)	3.61	3.56	3.74	3.58
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	0	0	3.08	3.22	3.49
Capital Spending % of Revenue	6.96	7.14	6.63	5.97	6.16
Employees	93,200	78,600	77,900	73,200	74,300
Revenue (\$K)/Employee	\$63.49	\$76.79	\$87.56	\$95.38	\$98.79
Capital Spending % of Assets	11.03	11.03	10.32	9.39	8.59

NA = Not available

Source: TRW Incorporated
Annual Reports and Forms 10-K
Dataquest (1990)

Unisys Corporation

Post Office Box 500
Blue Bell, Pennsylvania 19424-0001
Telephone: (215) 542-4011
Fax: (215) 542-6850
Dun's Number: 00-535-8932

Date Merged: November 13, 1986

CORPORATE STRATEGIC DIRECTION

Unisys Corporation, formed in 1986 by the merger of Sperry and Burroughs, is a leading information systems company with 1989 revenue of \$10.1 billion.* Unisys manufactures computers ranging from networked workstations through mainframes and is a major supplier of defense electronics. Information systems and related services and supplies constitute the largest segment of Unisys' operations. Although Unisys faces tough global competitors, it has successfully hurdled many of the problems encountered by the merger.

Unisys has grown steadily since its creation; however, during the past two years, this growth has slowed dramatically. Growth in 1988 represented only a 2 percent change in revenue, down from 31 and 48 percent changes during fiscal years 1987 and 1986, respectively. The Company has developed a growth strategy based on increasing software cost-effectiveness and speed, expanding open and interoperable architectures, and improving multiple information flow capabilities. The Company specializes in interconnecting and unifying multivendor or incompatible systems.

Total revenue increased 2.0 percent to \$10.1 billion in fiscal 1989, up from \$9.9 billion in fiscal 1988. Net loss equaled \$639.0 million for fiscal 1989, a 193.9 percent decrease from fiscal 1988. Unisys attributed the loss to a large charge for restructuring, unfavorable market conditions, the effects of actions taken by the Company in response to high cost structure and high inventory levels, losses associated with its defense business, and interest costs associated with higher debt levels. During the third quarter, Unisys decided to significantly cut its cost structure and, hence, recorded a \$231 million restructuring

charge consisting of \$127 million for a work force reduction of approximately 8,000 employees, \$56 million relating to consolidation of manufacturing facilities, and \$48 million for other facility consolidations and discontinuation of certain products and businesses. Through these actions, Unisys hopes to rearrange and simplify organizational structures, eliminate redundancies, and streamline manufacturing material costs, resulting in reducing the Company's annual cost base by approximately \$500 million by the end of 1990.

Unisys sells its products and services worldwide, primarily through its direct sales force. Unisys also uses original equipment manufacturers (OEMs) and value-added resellers (VARs) as well as distributors in some foreign countries. Unisys has operations in approximately 120 countries and employs approximately 80,000 people, about three-fourths of whom are located within the United States. Throughout the past five years, Unisys basically has maintained an even split between revenue generated domestically and internationally. During fiscal years 1989, 1988, and 1987, international sales accounted for 49, 46, and 44 percent of total revenue, respectively. International sales are generated from the Asia/Pacific, European, and Central and South American markets.

Within the European market, Unisys has become well established in Spain, where there is a strong demand for high-end 2200 mainframes, UNIX systems, and PCs. Unisys is the largest UNIX supplier in Spain and holds a strong position in the corporate resource computers (CRC) segment and in smaller systems, particularly in the small department computer (SDC) market. Unisys anticipates continued fast growth throughout the early 1990s. Unisys also conducts a great amount of business in France, Italy, and the United Kingdom.

Unisys has been able to maintain a high level of R&D investment principally because of aggressive cost control and economies of scale achieved during the

*All dollar amounts are in US dollars.

past two years. Research and development increased from \$713 million in fiscal 1988 to \$782 million in fiscal 1989. Capital expenditure decreased in fiscal 1989 to \$615 million or 6.1 percent of total revenue, down from \$673 million in fiscal 1988.

On December 6, 1989, Unisys announced that its Santa Clara (HDA) manufacturing and refurbishment operations had been sold to a group of managers led by Michael Haltom. The new company, Sequel Inc., is headed by Mr. Haltom, who was vice president of Peripherals Group Manufacturing Operations for Unisys, and has hired over 600 former Unisys employees. The sale included a long-term agreement stating that Sequel will supply a variety of new and refurbished HDAs for Unisys' 14-inch disk drive products. Unisys believes that the new relationship is enabling it to concentrate on the value-added features of the disk storage systems that it designs for its mainframe customers. The Company plans to direct its research and development efforts at the disk-controller level and to optimize the performance and reliability of the disk cabinet components obtained from Sequel and other OEMs.

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 Systems

According to Dataquest, Unisys held a 7.15 percent share of the worldwide computer marketplace, excluding PCs, in 1989 (this figure is based upon total revenue). Unisys divides its product portfolio into two main segments: Commercial Information Systems, representing three-fourths of total revenue, and Defense Systems, representing one-fourth. Within these two segments, Unisys further classifies its products into six specific classes. Mainframes and peripherals comprise a complete line of small-to-large mainframes and related communication processors and peripheral products such as printers, storage devices, and document-handling equipment. This class of products contributed close to \$3 billion, or 30 percent of total revenue, for fiscal 1989.

Distributed systems and workstations accounted for 15 percent of total revenue. This class is made up of departmental systems, intelligent workstations, UNIX OS-based equipment, terminals, and personal computers. Software and related services consists of application and systems software along with related professional services and amounted to \$1.8 billion, or 18 percent of total revenue. Representing 19 percent of total revenue generated, equipment maintenance results from charges for preventive maintenance, spare parts, and other repair activities. Custom products and services, which include specialized information processing systems marketed mainly to governmental defense agencies, contributed 16 percent of total revenue, totaling \$1.6 billion in sales. Other means generate 2 percent of Unisys' revenue.

In 1989, Unisys delivered new models in all of its mainframe families. The new models provide greater functionality in terms of OLTP, database and network management, security, capacity, memory, and storage. Unisys also unveiled the Network Applications Platform (NAP). This is the first time in the industry that a digital telephone switch has been directly integrated with a mainframe system. The NAP runs on a full range of A Series models and enables telephone companies to offer customers advanced "intelligent" services that require mainframe storage capacity.

The 1100/2200 Series family offers a wide performance range of object code-compatible, general-purpose computer systems. The series is broken into three subfamilies: the 2200/200 Series, which consists of entry-level systems; the 2200/400 Series, which consists of medium-scale systems; and the 2200/600 Series, which consists of large-scale systems. The 1100/2200 Series is primarily targeted at the airline, communication, and government markets.

The A Series family of processors are descendants of the B5000 introduced in the early 1960s. The A Series product family is divided into four subfamilies of processors aimed at the needs of desktop, entry-level, midrange, and large-scale commercial data-processing customers. During 1989, Unisys introduced the Micro A, a multiuser desktop system that runs the same operating system as the other members of the A Series. Housed in a Unisys PW personal computer, the Micro A runs the same software as other A series models and can be used to test and develop applications quickly for use on larger systems. The A10x models provide midrange performance with a larger selection of peripheral connectivity. The A12, A15x, and A17 field upgradable models make up the large-scale systems.

InfoImage IIPS/ICPS (Image Item Processing System/Image Check Processing System) is based on Unisys' V Series mainframes and DP 1800 document processors. Through the elimination of many manual steps involved in processing checks, the system allows customers to cut labor expenses while doubling the number of checks they can process each hour. **InfoImage EDMS** (Engineering Document Management System) runs on Unisys' UNIX-based systems and PW workstations. The system captures large documents, such as engineering drawings and facilities diagrams, that can then be displayed, edited, and distributed electronically, reducing paperwork during design review cycles. In April 1990, Unisys unveiled **InfoImage Folder**, an electronic file folder management system that automates and expedites the movement of paper-based information. Electronic files are handled in the same manner as paper files: Files are organized into folders that can hold many documents, each of which can have many pages. **InfoImage Folder** has menu-driven programs that enable the user to define form displays, map data to and from files on mainframes and other computers in the network, develop indexing routines, and automate document distribution.

Unisys **BTOS/CTOS** workstations are multitasking, allowing users to execute many tasks at the same time. They offer a modular architecture and built-in local area network (LAN) capabilities so that users can build LANs of workstations quickly and without incurring costs for additional equipment. These LANs can be connected to users' central mainframes without sacrificing the processing power available to individual users. There are over 700,000 **BTOS/CTOS** systems installed.

The Unisys **U Series** are business-oriented UNIX computers that run under an implementation of AT&T's UNIX system V. These systems act as "servers" in LANs, coordinating the flow of information between large-scale mainframe systems and smaller desktop systems. Unisys provides the **U 5000**, **6000**, and **7000 Series** and adds value in software, development tools, and database products. The **U 5000 Series**, based on the Motorola 68020 processor, comes from NCR Corporation and Aris Corporation. The **U 7000** is based on Computer Consoles, Inc.'s (CCT's) **Power 6/32** supermini. The **U 6000/30**, **50**, and **55** are Intel 80386-based systems manufactured by Network Computer Group, a wholly owned subsidiary. The high-end **U 6000/70** and **80** are from Sequent Computer Systems.

Early in 1990, Unisys announced a series of broadband networking systems, which include the **TX3/SuperHub** and **TIME/LAN** family systems based on Fiber Distributed Data Interface. Through fiber-optic technology, the **TIME/LAN** systems offer increases in working capacity that customers need to consolidate their LANs and to support high-speed, high-bandwidth applications such as imaging and videoconferencing. The **TX3/SuperHub** provides 28 times the capacity of T-1 systems and offers customers platforms to build super transport backbone networks.

Unisys also markets **DCP** and **CP** families of front-end network processors, concentrators, and gateways. These systems consolidate, format, and transmit data among workstations, departmental servers, and mainframes.

Mil/Aero

The Defense Systems Group provides defense electronics through five major lines: shipboard and ground systems, systems development, communication systems, system support, and computer systems. Unisys has many key military and aerospace programs. Revenue generated from federal defense and space contracts and subcontracts accounted for 17 percent of 1989 total revenue and sales of commercial products to the federal government accounted for an additional 6 percent of total revenue.

The navy accounts for a major percentage of Unisys' defense revenue. Unisys is an alternate supplier for the **Aegis** combat system that will be used aboard more than 50 guided-missile cruisers and destroyers. Unisys, a leading supplier of shipborne computers, is replacing the navy's old small, general-purpose computers with the embedded computer system family—**UYK43** and **UYK44**. Unisys also has won a \$280 million contract to supply microcomputers throughout the US Department of Defense. Unisys recently began selling and planning to increase its concentration on avionic modules, including 32-bit airborne computers.

Late in 1989, Unisys was awarded the **DeskTop III** contract that was led by the United States Air Force. The contract was for up to 250,000 **Personal Workstation (PW)** desktop computers, based on Intel's microprocessor technology. The order is one of the largest in Unisys' history. The **PW** systems will run both a **POSIX**-compliant version of the UNIX operating systems and the **MS-DOS** operating system. If all

options are exercised, the contract, currently having an initial two-year value of \$233 million, could be worth up to \$700 million over the next five years.

UNIX

UNIX systems offer users a powerful platform to perform standalone tasks as well as connect into broader cooperative networks. More than 1,000 commercial UNIX applications run on Unisys' U Series systems.

Software

Unisys offers a wide range of software packages tailored for specific industries including banking, health care, manufacturing, and airlines. By supporting standard operating systems on its platforms and maintaining relationships with third-party software developers, the Company also gives its customers access to off-the-shelf applications available on the general market. Unisys' computer-aided software engineering (CASE)/fourth-generation language (4GL) tools—the Logic and Information Network

Compiler (LINC), Maintaining, Preparing, Producing Executive Reports (MAPPER), and Ally systems—automate the software development process, decreasing development time and freeing organizations to concentrate on designing new systems that solve business problems. The LINC and MAPPER are available on all major Unisys product platforms. In 1989, Unisys extended the MAPPER system to its A Series and UNIX-based systems customers, with the V Series and System 80 scheduled for portation in 1990. The Company is also making its CASE/4GL tools available on major UNIX-based systems from other vendors. Unisys added "upper-CASE" systems design capabilities to the LINC system as well, and extended the use of its software tools to outside developers whose upper-CASE technologies are widely used throughout the industry.

Further Information

For further information about Unisys' business segments, please contact the appropriate Dataquest industry services.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$5,038	\$7,432	\$9,713	\$9,902	\$10,097
Percent Change	-	-	30.69	1.95	1.97
Capital Expenditure	\$450	\$550	\$719	\$673	\$615
Percent of Revenue	8.93	7.40	7.40	6.80	6.09
R&D Expenditure	\$285	\$441	\$597	\$713	\$782
Percent of Revenue	5.66	5.93	6.15	7.20	7.74
Number of Employees	60,500	98,300	92,500	93,000	82,300
Revenue (\$K)/Employee	\$83.27	\$75.60	\$105.00	\$106.47	\$120.32
Net Income	\$248	(\$43)	\$578	\$681	(\$639)
Percent Change	-	(117.32)	1,444.19	17.82	(193.88)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$2,201.0	\$2,575.0	\$2,351.0	\$2,969.0	
Quarterly Profit	(\$79.0)	\$54.0	(\$648.0)	\$34.0	

Source: Unisys Corporation
Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	56.00	57.00	56.00	54.00	51.00
International	44.00	43.00	44.00	46.00	49.00

Source: Unisys Corporation
Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988*	1989*
Direct Sales	79.08	80.30
Indirect Sales	20.92	19.70
VARs	10.75	10.50
OEMs	0.03	0.50
Distributors	10.14	8.70

*Business and technical computers only

Source: Dataquest (1990)

1990 SALES OFFICE LOCATIONS

North America—200
Europe—1 (sales subsidiary only)
Asia/Pacific—7 (sales subsidiary only)
ROW—10 (sales subsidiary only)

MANUFACTURING LOCATIONS

North America

Camarillo, California
Air traffic control systems, custom systems,
development of Thailand's centralized air defense
system
Clear Lake, Iowa
2200 Series systems, high-end A Series
Dorval, Quebec
Terminals, power supplies and terminals
Eagan, Minnesota
Standard militarized computer products and
displays, information-processing systems,
Submarine Standard Operating Systems (SSOS)
Flemington, New Jersey
Personal computers
Great Neck, New York
Electronic warfare, military systems, and support
systems
Mission Viejo, California
Low-end A Series
Plymouth, Michigan
Imaging, check reader/sorters
Rancho Bernardo, California
Low-end A Series
Rochester, New York
Office supplies
Salt Lake City, Utah
UNIX
Twin Cities, Minnesota
2200 Series systems, military computers
Woodcliff Lake, New Jersey
TI switchers

Europe

Barcelona, Spain
AI equipment
Livingston, Scotland
S Series coding machines
Villers-Ecalles, France
Financial terminals

Asia/Pacific

Jurong, Singapore
Terminals
Milson's Point, Australia
Software

ROW

Nogales, Mexico
Cables
Veleiros, Brazil
Low-end A Series systems

SUBSIDIARIES

North America

Burroughs Europe Inc. (United States)
Burroughs Export Corporation (United States)
Burroughs Information Systems Ltd. (United States)
Burroughs International Government Sales Inc.
(United States)
Burroughs International Holding Co. (United States)
Burroughs Systems Inc. (United States)
Burroughs Transport Corporation (United States)
Convergent Inc. (United States)
Foundation Computer Systems Inc. (United States)
Harrison Credit Group Inc. (United States)
Joseph & Cogan Associates Inc. (United States)
New Holland Machine Co. (Canada) Ltd. (Canada)
Ramac Services Corp. (United States)
Sperry C.A. (United States)
Sperry Dalmo Victor Inc. (United States)
Sperry Holding Co. Inc. (United States)
Sperry International Services Co. Inc. (United States)
Sperry Lease Finance Corp. (United States)
Sperry Leasing Corp. (United States)
Sperry Mapper Services Inc. (United States)
Sperry Overseas Services Corp. (United States)
Sperry Rand Corp. (United States)
Unisys CAD/CAM Inc. (United States)
Unisys China Investment Inc. (United States)
Unisys China Services Inc. (United States)
Unisys Japan Ltd. (United States)
Unisys Services Corp. (United States)
Unisys World Trade Inc. (United States)

Europe

Burroughs International Finance N.V. (Netherlands
Antilles)
Burroughs International S.A. (Switzerland)
Burroughs Machines Ltd. (United Kingdom)

Sperry Curacao N.V. (Netherlands)
 Sperry International Finance Corp. B.V. (Netherlands)
 Unisys AB (Sweden)
 Unisys Ab, Oy (Finland)
 Unisys A/S (Denmark)

Asia/Pacific

New Holland Ltd. (New Zealand)
 Nihon Unisys Ltd. (Japan)
 Nippon Univac Kaisha Ltd. (Japan)
 Oki Univac Kaisha Ltd. (Japan)
 Remington Rand Ltd. (New Zealand)
 Sperry Computer Systems Ltd. (New Zealand)
 Sperry Transportation Systems Pty. Ltd. (Australia)
 Synercom Australia Pty. Ltd. (Australia)

ROW

Burroughs Overseas Sales Co. Ltd. (Jamaica)
 Galactic Insurance Group Ltd. (Bermuda)
 Remington Peruana Equipos de Oficina S.A. (Peru)
 Remington Rand de Mexico S.A. (Mexico)
 Remington Venezuela C.A. (Venezuela)
 Sperry C.A. (Venezuela)
 Sperry Cayman Islands Ltd. (Cayman Islands)
 Sperry Colombiana S.A. (Colombia)
 Sperry Foreign Sales Corp. (Barbados)
 Sperry S.A. de C.V. (Mexico)
 Univac de Mexico S.A. (Mexico)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

September 1989

FileNet

FileNet signed an agreement under which FileNet will provide Unisys with its Image Access Facility software and jukeboxes.

Touche Ross

Unisys and Touche Ross have agreed to a strategic alliance to provide large-scale commercial systems integration services.

Mercedes Information Technologies (Pty) Ltd.

Unisys sold its South African marketing and sales subsidiary to Mercedes Information Technologies.

Lodgistix Inc.

The two companies have a marketing alliance that makes Lodgistix a value-added reseller (VAR) of the Unisys PW2 line of products in conjunction with its MS-DOS-based property management system and sales and catering system.

July 1989

Microamerica

Unisys signed a value-added distributor (VAD) agreement with Microamerica. The agreement is expected to increase Unisys sales of UNIX-based multiuser systems and PCs through the third party channel over the next five years significantly.

June 1989

Tech Data Corp.

Unisys signed a VAD arrangement with Tech Data. Under the agreement, Tech Data will resell Unisys' Intel 80386-based U 6000 Series of UNIX processors and the PW2 line to its customers.

March 1989

SPSS Inc.

Unisys and SPSS agreed to a strategic alliance to provide statistical and graphics software solutions on Unisys hardware.

1988

Mitsui & Co.

The two companies entered into a joint venture to form Nihon Unisys Ltd.

MERGERS AND ACQUISITIONS

December 1988

Convergent, Inc.

Convergent, acquired by Unisys, was a leader in distributed and networking solutions.

January 1988

Timeplex, Inc.

Timeplex, acquired by Unisys, was a leading worldwide supplier of wide area voice/data communication networks.

KEY OFFICERS

Michael W. Blumenthal
Chairman of the board

James A. Unruh
President and chief executive officer

Curtis A. Hessler
Vice chairman

John J. Holton
Vice president; president, Corporate Marketing

PRINCIPAL INVESTORS

Information is not available

FOUNDERS

Information is not available

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	\$2,878	\$4,537	\$5,334	\$5,816	\$5,083
Cash	43	56	55	26	9
Receivables	1,239	1,807	2,915	2,785	2,698
Marketable Securities	0	0	0	0	0
Inventory	1,475	1,952	1,856	2,484	1,761
Other Current Assets	122	722	508	521	615
Net Property, Plants	\$1,007	\$2,192	\$1,858	\$2,003	\$1,855
Other Assets	\$671	\$2,680	\$3,399	\$3,716	\$3,815
Total Assets	\$4,556	\$9,409	\$10,591	\$11,535	\$10,751
Total Current Liabilities	\$1,240	\$3,342	\$3,666	\$3,432	\$3,537
Long-Term Debt	\$802	\$2,226	\$2,377	\$3,078	\$3,248
Other Liabilities	\$23	\$13	\$3	\$70	\$84
Total Liabilities	\$2,064	\$5,581	\$6,046	\$6,580	\$6,869
Total Shareholders' Equity	\$2,492	\$3,828	\$4,545	\$4,955	\$3,882
Converted Preferred Stock	-	1,432	1,426	1,429	1,429
Common Stock	228	231	747	797	797
Other Equity	392	486	355	294	126
Retained Earnings	1,872	1,679	2,017	2,435	1,530
Total Liabilities and Shareholders' Equity	\$4,556	\$9,409	\$10,591	\$11,535	\$10,751
Income Statement	1985	1986	1987	1988	1989
Revenue	\$5,038	\$7,432	\$9,713	\$9,902	\$10,097
US Revenue	2,835	4,244	5,476	5,368	5,136
Non-US Revenue	2,203	3,188	4,237	4,534	4,961
Cost of Sales	\$3,084	\$5,118	\$5,639	\$5,589	\$6,816
R&D Expense	\$285	\$441	\$597	\$713	\$782
SG&A Expense	\$1,242	\$1,905	\$2,378	\$2,527	\$2,710
Capital Expense	\$450	\$550	\$719	\$673	\$615
Pretax Income	\$360	(\$89)	\$951	\$959	(\$554)
Pretax Margin (%)	7.14	(1.20)	9.79	9.68	(5.49)
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	\$248	(\$43)	\$578	\$681	(\$639)
Shares Outstanding, Millions	137	138	149	158	158
Per Share Data					
Earnings	\$5.46	(\$0.54)	\$2.93	\$3.27	(\$4.71)
Dividend	\$2.60	\$0.87	\$0.91	\$0.98	\$1.00
Book Value	\$18.23	\$27.74	\$30.50	\$31.16	\$24.57

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
<i>Liquidity</i>					
Current (Times)	2.32	1.36	1.45	1.69	1.44
Quick (Times)	1.13	0.77	0.95	0.97	0.94
Fixed Assets/Equity (%)	40.41	57.26	40.88	40.42	47.78
Current Liabilities/Equity (%)	49.75	87.30	80.66	69.26	91.11
Total Liabilities/Equity (%)	82.83	145.79	133.03	132.80	176.93
<i>Profitability (%)</i>					
Return on Assets	-	(0.62)	5.78	6.16	(5.74)
Return on Equity	-	(1.36)	13.81	14.34	(14.47)
Profit Margin	4.93	(0.58)	5.95	6.88	(6.33)
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	5.66	5.93	6.15	7.20	7.74
Capital Spending % of Revenue	8.93	7.40	7.40	6.80	6.09
Employees	60,500	98,300	92,500	93,000	82,300
Revenue (\$K)/Employee	\$83.27	\$75.60	\$105.00	\$106.47	\$122.69
Capital Spending % of Assets	9.88	5.85	6.79	5.83	5.72

NA = Not available

Source: Unisys Corporation
 Annual Reports and Forms 10-K
 Dataquest 1990

Xerox Corporation

P.O. Box 1600
800 Long Ridge Road
Stamford, Connecticut 06904
Telephone: (203) 968-3000
Fax: (203) 968-4312
Dun's Number: 04-959-1852

Date Founded: 1906

CORPORATE STRATEGIC DIRECTION

Xerox Corporation, founded in 1906 as The Haloid Company, started out as a manufacturer and seller of photographic paper and photocopying equipment. In 1961, the Company changed its name to Xerox Corporation. Xerox is now a multinational company constituting two separate enterprises, business products and systems (BP&S) and financial services.

BP&S activities include developing, manufacturing, marketing, and servicing a broad range of document processing products, including Xerox copiers, duplicators, electronic printers and typewriters, workstations, networks and other related products, scanners, facsimile machines, software, and supplies. These products are marketed in more than 130 countries by a direct sales force and a network of dealers and distributors. The focus of this analysis is on the BP&S sector.

The Company's financial services business provides financial products and services primarily on a whole-sale basis, through Xerox Financial Services. Xerox's financial services include such names as Crum and Forster, Xerox Credit Corporation, Van Kampen Merritt, Furman Selz Holding Corporation, and Xerox Financial Services Life Insurance Company.

In the BP&S segment, Xerox has refocused its efforts. Because certain resources were not producing adequate returns, businesses were either scaled down (e.g., the electronic typing business) or eliminated (e.g., Xerox Medical Systems). The Company organized document systems into one worldwide organization, Integrated Systems Operations. With the development of this new unit, Xerox hopes to achieve

substantial increases in profits by having a narrower focus on specific customer and market segments and specific applications. Overhead was reduced by eliminating 2,000 jobs during fiscal 1988.

During 1989, the Company underwent a major reorganization, affecting marketing, product development, and manufacturing. Wanting to become a more market-driven company and recognizing that its marketing efforts must be coordinated on a worldwide basis, Xerox formed a worldwide marketing and sales organization, Marketing and Customer Operations.

For product development, the new Development and Manufacturing Organization was formed, responsible for design and manufacturing of virtually all Xerox products, including systems software. Additionally, this unit will focus its efforts on developing a corporate-wide architecture based on industry-standard platforms for Xerox products and systems and maximization of Xerox's software assets.

During 1989, Xerox expanded and renamed its Xerox Business Services (formerly Xerox Reproduction Centers), which provides facility management services and operates a nationwide network of Xerox facilities, all of which provide high-volume reprographics, electronic publishing, and special-event support services both off and on-site.

The Company's goals include achieving a 15 percent return on assets in the 1990s and providing solid shareholder value. As a step to achieve these goals, the BP&S restructuring, eliminating underused assets, resulted in a \$275 million* write-off against 1988 earnings.

*All dollar amounts are in US dollars.

Total revenue increased by 7.3 percent to \$17.6 billion in fiscal 1989 from \$16.4 billion in fiscal 1988. Net income increased 81.4 percent to \$704 million in fiscal 1989 from \$388 million in fiscal 1988. Xerox employs 111,400 worldwide.

Research and development (R&D) expenditure totaled \$809 million in fiscal 1989, representing 5.0 percent of revenue. Capital spending expenditure totaled \$1.3 billion in fiscal 1989, representing 7.4 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. Information on distribution channels is not available. Table 3 a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Xerox anticipates that documents will be increasingly handled in digital electronic form but that customers will demand the capability to move easily between the digital electronic and the paper forms of a document in the process of meeting their business documentation needs. Xerox believes that the use of paper in the office will continue to increase. Accordingly, Xerox's document processing strategy is focused on providing products, service, and supplies that integrate into its customers' office environments and that both simplify and enhance the customers' document-related business processes and communications.

In support of this strategy, Xerox offers a wide range of copiers and duplicators, which principally serve the office equipment market. Products range from small personal and desktop models to large, high-speed duplicator models and are designed to provide customers with monthly copy volumes ranging from under 1,000 copies per month to more than 250,000 copies per month. Xerox markets these products on an outright sale and rental basis as well as offering various equipment purchase financing options, although not all of these options are offered for every product.

In 1988, Xerox began the introduction of its latest "50 Series" of copiers and duplicators based on advanced technology in order to further enhance the features and performance and reduce the costs of its product line. Six new copier/duplicator products were introduced in 1988. During 1989, the 50 Series of copiers and duplicators was expanded to a total of nine models, extending from an 8 copies-per-minute personal copier to a 15-copies-per-minute fully featured duplicator.

In further support of this strategy, Xerox offers a wide range of other document processing products. These products include electronic nonimpact printers based on laser and ion deposition technology, ink jet and electrostatic printers, electronic typewriters, workstations, local area networks (LANs) such as Ethernet and network products, facsimile products, scanners, programming products, CAD/CAM systems, and integrated systems solutions.

Xerox also has implemented certain arrangements in support of its strategy. These arrangements include an agreement with Sun Microsystems to use their SPARC microprocessor in certain Xerox products and the development of workstation and server products for Xerox, and arrangements to market Ventura and other desktop publishing software products, which led to the acquisition of Ventura in early 1990.

Xerox also manufactures and markets products for use by engineering reproduction departments, including reproduction devices, some of which reproduce on ordinary paper from microfilm or engineering drawings.

Xerox is one of the world's largest suppliers of cut-sheet paper in the world, distributing approximately 600,000 tons of paper yearly. Xerox also sells and manufactures a broad line of consumables, primarily developer and toner, and a broad range of general office supplies.

Further Information

For further information about the Company's business segments, please contact the appropriate industry service.

Table 1
Five-Year Corporate Highlights (Millions of US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$11,761.0	\$13,046.0	\$15,125.0	\$16,441.0	\$17,635.0
Percent Change	4.62	10.93	15.94	8.70	7.26
Capital Expenditure	\$1,017.0	\$1,075.0	\$1,100.0	\$1,399.0	\$1,298.0
Percent of Revenue	8.65	8.24	7.27	8.51	7.36
R&D Expenditure	\$597.0	\$650.0	\$722.0	\$794.0	\$809.0
Percent of Revenue	5.08	4.98	4.77	4.83	4.59
Number of Employees	112,591	112,337	112,287	113,245	111,400
Revenue (\$K)/Employee	\$104.46	\$116.13	\$134.70	\$145.18	\$158.30
Net Income	\$475.0	\$465.0	\$578.0	\$388.0	\$704.0
Percent Change	63.23	(2.11)	24.30	(32.87)	81.44
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$4,139.00	\$4,380.00	\$4,447.00	\$4,669.00	
Quarterly Profit	\$158.00	\$179.00	\$155.00	\$212.00	

Source: Xerox Corporation
Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	75.00	72.00	70.00	65.00	36.38
International	25.00	28.00	30.00	35.00	63.62

Source: Xerox Corporation
Annual Reports
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—182
Japan—Not available
Europe—Not available
Asia/Pacific—Not available
ROW—Not available

MANUFACTURING LOCATIONS

North America

California (6)
Function not available
Canada
Function not available
New York (3)
Function not available
Oklahoma
Function not available
Texas
Function not available

Japan

Japan
Function not available

Europe

Bulgaria
Function not available
England
Function not available
France
Function not available
Gloucester, United Kingdom
Plain paper printers
Madrid, Spain
Plain paper printers
Netherlands
Function not available

Asia/Pacific

China
Function not available
India
Function not available

South Korea
Function not available
Taiwan
Function not available

ROW

Brazil
Function not available
Mexico
Function not available

SUBSIDIARIES

North America

Lyell Holdings Limited (United States)
Versatec Inc. (United States)
Xerox Business Equipment Inc. (United States)
Xerox Canada Inc. (Canada)
Xerox Financial Services Inc. (United States)
Xerox Imaging Systems Inc. (United States)
Xerox Realty Corporation (United States)

Europe

Bessemer Trust Ltd. (United Kingdom)
Rank Xerox A.B. (Sweden)
Rank Xerox Espanola S.A. (Spain)
Rank Xerox Exports Ltd. (United Kingdom)
Rank Xerox Finance (Nederland) B.V. (Netherlands)
Rank Xerox Greece S.A. (Greece)
Rank Xerox Holding B.V. (Netherlands)
Rank Xerox Leasing International Ltd. (United Kingdom)
Rank Xerox Ltd. (Europe)
Rank Xerox Ltd. (United Kingdom)
Rank Xerox (Management) Ltd. (United Kingdom)
Rank Xerox (Nederland) B.V. (Netherlands)
Rank Xerox S.A. (France)
Rank Xerox (U.K.) Ltd. (United Kingdom)
Triton Business Finance Ltd. (United Kingdom)
Xerox Research (U.K.) Ltd. (United Kingdom)

Japan

Fuji Xerox Co., Ltd.

ROW

Astoria Participacoes Ltda. (Brazil)
Xerox Argentina I.C.S.A.

Xerox de Chile
 Xerox de Colombia S.A. (Colombia)
 Xerox de Ecuador S.A. (Ecuador)
 Xerox de Venezuela (Venezuela)
 Xerox del Peru (Peru)
 Xerox Mexicana S.A. (Mexico)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Digital Research

Xerox Desktop Software Inc. and Digital Research entered into a licensing agreement. Under the agreement, Digital will license its Graphical Environment Manager (GEM) systems software to Xerox. GEM was the first systems software that supported mice; windows; and bit-mapped graphical images such as icons, drop-down menus, and raster fonts for IBM PCs and compatibles.

Advanced Technology

Xerox and Robert E. LaRose, founder of Advanced Technology, entered into a joint venture. The new venture, known as Universal Systems Inc. (USI), will pursue systems integration solutions on a worldwide basis. The two parties, independently and together, will market systems that integrate equipment, software, and services to automate large-scale production and processing of documents for business and governments.

Agile Inc.

Xerox and Agile Inc. entered into an agreement to market a new printer-plotter interface controller, expanding the capability of Xerox low-volume electronic printers by working with IBM main-frame systems in a distributed processing environment.

Adobe Systems Incorporated

Xerox and Adobe Systems Incorporated entered into a licensing agreement, providing Xerox the licensing rights to Adobe's PostScript language interpreter. PostScript is an industry-standard language that supports computer systems and electronic printing and publishing products.

1989

Novell Inc.

Xerox entered into an alliance with Novell Inc. to pursue the development of work group publishing by integrating Xerox Ventura Publisher with Novell's NetWare product.

Metaphor

Xerox and Metaphor entered into a licensing agreement, resulting from a settlement of a suit between the two companies relating to intellectual property rights. Under the agreement, Metaphor, a supplier of data interpretations systems, will be allowed to use all features of Xerox's graphical user interface computer software.

AT&T Microelectronics

The two companies signed an agreement to cooperate in the design and production of application-specific ICs (ASICs) for use in Xerox business systems.

Open Software Foundation (OSF)

Xerox joined OSF to promote open systems and industry standards.

Sun Microsystems

Sun and Fuji Xerox are teaming up to form Unisol, a Tokyo-based software developing and marketing firm. Unisol will develop and sell Unix Stem V and Open Look-based software for Japan's workstation market.

UNIX International

Xerox joined UNIX International to promote open systems and industry standards.

1988

Cricket Software, Inc.

Xerox and Cricket entered into a marketing relationship where Xerox is to have exclusive worldwide marketing rights to certain software products that Cricket develops for the MS-DOS and OS/2 operating systems.

Storage Technology

Storage Tek announced the signing of a multiyear, multimillion dollar OEM agreement with Xerox. Storage Tek is to supply Xerox with Storage Tek's 4980 18-track cartridge tape drive and continued requirements for the 2925 9-track open reel tape transport for use with Xerox electronic printing systems.

Wang Laboratories

Xerox and Wang announced a cooperative marketing agreement under which Wang is to recommend Xerox high-speed, high-volume printing systems to selected and prospective Wang customers.

MERGERS AND ACQUISITIONS

1989

Ventura Software Inc.

Xerox's independent Xerox Desktop Software (XDS) subsidiary acquired Ventura Software Inc., which manufactures the Ventura Publisher desktop package. Prior to the purchase, XDS held exclusive marketing rights to Ventura Publisher, which had estimated annual sales of \$40 million. Ventura's original development team will continue to work on upcoming products through July 1, 1990, and then will participate in a six-month technology transfer program.

1988

Datacopy Corporation

Xerox acquired Datacopy, a leading supplier of desktop scanners and image processing systems.

KEY OFFICERS

David T. Kearns

Chairman and chief executive officer

Paul A. Allaire

President

Wayland R. Hicks

Executive vice president, Marketing and Customer Operations

William C. Lowe

Executive vice president, Development and Manufacturing

A. Barry Rand

Group vice president; president, US Marketing Group

Julius L. Marcus

Senior vice president and assistant group executive, Development and Manufacturing

Leonard Vickers

Senior vice president, Marketing

David R. Myerscough

Vice president; president, Xerox Americas Operations

Charles E. Otto

Vice president; senior vice president, Operations, US Marketing Group

Richard C. Palermo

Vice president; senior vice president, Marketing Support, US Marketing Group

Table 3
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988¹	1989
Total Current Assets	\$3,901.0	\$3,973.0	\$4,459.0	\$5,253.0	\$23,937.0
Cash	267.0	402.0	309.0	296.0	142.0
Receivables	1,874.0	1,867.0	2,104.0	3,374.0	11,811.0
Marketable Securities	0	0	0	0	9,394.0
Inventory	1,470.0	1,389.0	1,408.0	1,583.0	1,567.0
Other Current Assets	290.0	315.0	638.0	0	1,023.0
Net Property, Plants	\$1,423.0	\$1,491.0	\$1,639.0	\$2,008.0	\$1,997.0
Other Assets	\$4,493.0	\$5,144.0	\$5,500.0	\$19,180.0	\$4,154.0
Total Assets	\$9,817.0	\$10,608.0	\$11,598.0	\$26,441.0	\$30,088.0
Total Current Liabilities	\$2,215.0	\$2,206.0	\$2,850.0	\$14,589.0	\$16,531.0
Long-Term Debt	\$1,583.0	\$1,730.0	\$1,539.0	\$5,379.0	\$7,441.0
Other Liabilities	\$1,191.0	\$1,543.0	\$1,662.0	\$806.0	0
Total Liabilities	\$4,989.0	\$5,479.0	\$6,051.0	\$20,774.0	\$23,972.0
Total Shareholders' Equity	\$4,828.0	\$5,129.0	\$5,547.0	\$5,667.0	\$6,116.0
Converted Preferred Stock	442.0	442.0	442.0	296.0	1,081.0
Retained Earnings	4,386.0	4,687.0	5,105.0	5,371.0	5,035.0
Total Liabilities and Shareholders' Equity	\$9,817.0	\$10,608.0	\$11,598.0	\$26,441.0	\$30,088.0
Income Statement	1985	1986	1987	1988¹	1989
Revenue	\$11,761.0	\$13,046.0	\$15,125.0	\$16,441.0	\$17,635.0
US Revenue	8,794.0	9,380.0	10,631.0	10,686.7	6,416.0
Non-US Revenue	2,967.0	3,666.0	4,494.0	5,754.3	11,219.0
Cost of Sales	\$4,411.0	\$4,814.0	\$5,382.0	\$5,778.0	\$4,968.0
R&D Expense	\$597.0	\$650.0	\$722.0	\$794.0	\$809.0
SG&A Expense	\$3,019.5	\$3,370.0	\$3,571.0	\$4,150.0	\$345.0
Capital Expense	\$1,017.0	\$1,075.0	\$1,100.0	\$1,399.0	\$1,298.0
Pretax Income ²	-	-	-	\$1,005.0	\$922.0
Pretax Margin (%)	0	0	0	6.11	5.23
Effective Tax Rate (%)	NA	NA	NA	NA	31.00
Net Income	\$475.0	\$465.0	\$578.0	\$388.0	\$704.0
Shares Outstanding, Millions	96.2	97.3	99.0	101.7	78.9
Per Share Data					
Earnings	\$4.44	\$4.28	\$5.35	\$3.50	\$6.56
Dividend	\$3.00	\$3.00	\$3.00	\$3.00	\$3.00
Book Value	\$45.54	\$48.04	\$51.03	\$52.23	\$77.54

Table 3 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988 ¹	1989
<i>Liquidity</i>					
Current (Times)	1.76	1.80	1.56	0.36	1.45
Quick (Times)	1.10	1.17	1.07	0.25	1.35
Fixed Assets/Equity (%)	29.47	29.07	29.55	35.43	32.65
Current Liabilities/Equity (%)	45.88	43.01	51.38	257.44	270.29
Total Liabilities/Equity (%)	103.33	106.82	109.09	366.58	391.96
<i>Profitability (%)</i>					
Return on Assets	-	4.55	5.21	2.04	2.49
Return on Equity	-	9.34	10.83	6.92	11.95
Profit Margin	4.04	3.56	3.82	2.36	3.99
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	5.08	4.98	4.77	4.83	4.59
Capital Spending % of Revenue	8.65	8.24	7.27	8.51	7.36
Employees	112,591	112,337	112,287	113,245	111,400
Revenue (\$K)/Employee	\$104.46	\$116.13	\$134.70	\$145.18	\$158.30
Capital Spending % of Assets	10.36	10.13	9.48	5.29	4.31

¹ As with the Consolidated Statements of Income, the new consolidation rules have resulted in significant modifications to the presentation of the Company's consolidated balance sheets.

Source: Xerox Corporation
Annual Reports
Dataquest (1990)

² Xerox did not report pretax income for 1985 through 1987.
NA = Not available



X

product
for
device
de
int
Al
hi
res
dens

Chua

History
device
via
faster
Des
not
the
pos
sion
thor

per
down

The
cont
soun
are
lies
after
rev
rev
by
with
to
tion
mas

The

Datap
res
the
cant
design

for

C
Al
Abou
Abou
VI

The
com
at
con
have

as
in
the

even
of
the
the

the
the
the
the

the
the
the

the

the
the
the

the
the
the

the
the
the

the
the
the

the
the
the

the
the
the

the
the
the

the
the
the

the
the
the

the
the
the

the
the
the

102