Apple Computer, Inc.

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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 IIcx

The Macintosh IIcx personal computer versatile design allows it to be used in either a vertical or horizontal orientation. The Macintosh IIcx has a full 32-bit 68030 microprocessor with a built-in paged memory management unit, a 68882 floating-point coprocessor, 1MB of RAM, one 1.4MB floppy disk drive, and a mouse. It can be expanded incrementally to 8MB of RAM, and virtually any type of Macintosh IIcx configuration can be created because the system includes three internal NuBus expansion slots to add cards as well as seven external ports to accommodate peripherals and LocalTalk network connections. The Macintosh IIcx offers advanced color and gray-scale graphics capabilities and can be used with a range of monitors. For floppy disk storage, it uses the 1.4MB Apple FDHD SuperDrive. An internal hard disk added and a second floppy disk drive can be connected externally. It is compatible with most Macintosh applications and comes standard with Apple's MultiFinder operating system and HyperCard, a tool for custom software solutions.

Macintosh IIx

The Macintosh IIx offers many of the same performance features of the Macintosh IIcx, including the 68030 microprocessor, the 68882 coprocessor, 1MB

of RAM, and the Apple SuperDrive. The Macintosh IIx has six NuBus expansion slots and can accommodate either a 3.5-inch or a 5.25-inch internal hard disk drive as well as a second internal SuperDrive floppy disk drive.

Macintosh IIci

The Macintosh IIci personal computer has a 25-MHz 68030 microprocessor and performs up to 45 percent faster than the Macintosh IIcx and Macintosh IIx computers. To speed the processing of complex mathematical functions, a 68882 math coprocessor comes standard with the Macintosh IIci. Through installing an optional cache memory card, users can upgrade system performance by an additional 20 to 30 percent for an overall performance improvement of up to 75 percent over the Macintosh IIx and IIcx. It comes with built-in video capability that allows the system to display up to 256 colors or shades of gray simultaneously on a variety of Apple color and gray-scale monitors. The Macintosh IIci includes three internal NuBus expansion slots, space for a 3.5-inch internal hard disk drive, seven standard external ports to accommodate peripherals, the capability of expanding RAM to up to 8MB, and uses the 1.4MB Apple FDHD SuperDrive. It is compatible with most Macintosh applications and comes standard with Apple's MultiFinder operating system and HyperCard, a toll for custom software solutions.

Macintosh IIfx

Introduced in March 1990, the Macintosh IIfx runs up to twice as fast as the 25-MHz Macintosh IIci. It incorporates a 40-MHz 68030 microprocessor, a 32K static RAM cache memory subsystem, a 68882 floating-point coprocessor, and input/output (I/O) processors. These custom-designed application-specific integrated circuits (ASICs) boost system efficiency by managing low-level I/O tasks for the Apple Desktop Bus, floppy disk drives, and serial ports that previously were carried out by the 68030 processor. The Macintosh IIfx contains a small computer system interface/direct memory access (SCSI/DMA) controller and possesses a system memory that can be expanded from 4MB to 8MB. It includes six NuBus expansion slots that can accommodate a variety of Apple and third-party expansion cards, such as additional network interface and graphics cards. A new processor direct slot (PDS) offers a direct interface for third-party hardware options; six external interface ports accommodate peripherals such as hard disks and printers, LocalTalk network connections, and Apple Desktop Bus devices. The Macintosh IIfx utilizes the 1.4MB Apple SuperDrive disk drive, can be configured with up to 160MB of internal hard disk storage, and will accommodate a second SuperDrive.

Storage

Apple External Hard Disks

Apple External Hard Disks provide 20, 40, 80, or 160MB of storage capacity. They provide more storage capacity than a floppy disk and transfer data up to six times faster than floppy disk drives. Macintosh computers equipped with an SCSI port and Apple IIe computers equipped with an Apple II SCSI Interface Card can support external hard disk products.

Apple Tape Backup 40SC

The Apple Tape Backup 40SC uses removable tape cartridges, each of which provides 40MB of backup storage, offering virtually unlimited storage capacity. It is designed for use with all SCSI-based Macintosh systems that include a hard disk.

Modems

Apple Data Modem 2400

The Apple Data Modem 2400 is a standard asynchronous 2,400-bps modem that allows users to exchange information with other standard data modems. It can be used to communicate with other personal computers, minicomputers, and mainframes to send reports and graphics between offices, gain access to databases and commercial information, find out the latest stock prices, and shop and bank from home. The Apple Data Modem 2400 comes with a built-in feature called the Microcom Networking Protocol (MNP) Classes 1-4, which automatically corrects errors that occur while exchanging information over the public telephone system.

Scanners

Apple Scanner

The Apple Scanner allows Apple Macintosh personal computer users to import graphics and images into a variety of software applications. It works with other Apple products—the Macintosh computer, the AppleFax Modem, and the LaserWriter family of printers.

The scanner was designed to integrate with Apple products as well as with third-party page layout and graphics programs. The scanner is based on a flatbed design that allows the user to scan a range of document sizes: letter (8.5 by 11 inches), A4, and legal (8.5 by 14 inches). It supports three composition modes: line, halftone, and gray scale. The user can scan images at 75, 100, 150, 200, and 300 dots per inch (dpi). The Apple Scanner comes with HyperScan software and has a full range of enhancing controls that allows the user to adjust the contrast, brightness, gray map, and halftone pattern of the scanned image.

Printers

LaserWriter IIsc

The Apple LaserWriter IIsc is an entry-level, single-user laser printer for the Macintosh personal computer. It offers full-page, high-resolution (300-dpi) text and graphics print capability and allows printing up to 8 pages per minute through its Motorola 68000 processor. The LaserWriter IIsc comes with four font families: Times, Helvetica, Courier, and Symbol.

LaserWriter IInt

The Apple LaserWriter IInt features 11 font families (35 typefaces): Times, Helvetica, Courier, Symbol, ITC Avant Garde Gothic, ITC Bookman, New Century Schoolbook, Helvetica Narrow, Palatino, ITC Zapf Chancery, and ITC Zapf Dingbats. It provides full-page, high-resolution (300 dpi) text and graphics and allows printing up to eight pages per minute through its Motorola 68000 processor. The LaserWriter IInt is Apple's mainstream network laser printer for both individuals and work groups.

LaserWriter IIntx

The Apple LaserWriter IIntx can be used by individuals or work groups. It offers the same characteristics and ll font families as the LaserWriter IInt; however, it prints up to four times faster than LaserWriter IInt and possesses a Motorola 68020 processor and 2MB of RAM (expandable up to 12MB of RAM).

Further Information

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

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

Claris Corporation (United States)
Coral Software Corp. (United States)
Network Innovations Corp. (United States)
Orion Network Systems, Inc. (United States)

Europe

Apple UK Ltd. (United Kingdom)

*130 buildings in North America, Europe, Australia, and the Far East

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

KPMG Peat Marwick
Apple Computers and KPMG Peat Marwick formed a strategic alliance that will provide consulting and systems integration services to companies that implement executive information systems and decision support systems (EIS/DSS) on Macintosh personal computers.

1989

GE Information Services
Apple Computers and GE Information Services (GEIS) signed an agreement for Apple to extend use of GEIS' teleprocessing services as part of AppleLink Version 5.0, Apple's on-line information and communication system for the Apple community.

Falcon Microsystems
Apple Computers and Falcon Microsystems signed a three-year exclusive contract stating that Falcon will continue as exclusive holder of Apple's GSA Schedule C, the official purchasing catalog for personal computing products. The deal is estimated to be worth in excess of $100 million to Apple in its first year and could deliver a total value of $0.5 billion by its expiration date of March 31, 1993.

1988

Digital Equipment Corporation
The companies agreed to provide Mac-to-VAX connectivity by applying common standards for distributed applications, file sharing, printing terminal emulation, electronic mail, conferencing, database access, and networking. They also agreed to jointly develop desktop integration software.

Texas Instruments
TI will be a VAR for Micro Explorer, a LISP-based artificial-intelligence system that incorporates a TI-developed coprocessor board and the Mac II.

1987

Northern Telecom
The companies agreed to jointly develop networking products.

MERGERS AND ACQUISITIONS

1988

Network Innovations Corp.
Apple acquired Network Innovations Corp., a manufacturer of standard connectivity products that connect PC applications with minicomputers and mainframes.

Orion Network Systems, Inc.
Apple acquired Orion, a developer of IBM-compatible Systems Network Architecture software. Both of these acquisitions are consistent with Apple's goal to integrate the Macintosh into industry-standard computing environments.

KEY OFFICERS

John Sculley
Chairman, president, and chief executive officer

Michael H. Spindler
Chief operating officer and executive vice president, temporarily acting president of Apple USA Division

Jean-Louis Gassee
Senior vice president and president of Apple Products Division

Soren Olsson
Senior vice president and president of Apple Europe Division

Ian W. Diery
Senior vice president and president of Apple Pacific Division

Daniel L. Eilers
Vice president, Strategic Investments

PRINCIPAL INVESTORS

A.C. Markkula, Jr.

FOUNDERS

Steven Jobs
Stephen Wozniak

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
Liquidity					
Current (Times)	2.78	3.17	2.73	2.16	2.59
Quick (Times)	2.22	2.84	2.26	1.60	2.03
Fixed Assets/Equity (%)	16.34	16.42	15.46	15.59	22.49
Current Liabilities/Equity (%)	53.66	47.33	57.23	82.43	60.25
Total Liabilities/Equity (%)	70.06	67.14	76.70	107.50	84.67
Profitability (%)					
Return on Assets	7.10	14.69	16.49	22.49	22.49
Return on Equity	12.06	24.75	28.42	43.52	36.48
Profit Margin (%)	3.19	8.10	8.17	9.83	9.83
Other Key Ratios					
R&D Spending % of Revenue	3.78	6.72	7.20	6.69	6.69
Capital Spending % of Revenue	2.82	3.50	3.24	3.54	3.54
Employees	4,182	5,600	7,228	10,828	14,517
Revenue ($K)/Employee	$458.70	$339.62	$368.20	$376.00	$363.99
Capital Spending % of Assets	5.78	5.74	5.83	6.92	6.92

Source: Apple Computer, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

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CORPORATE STRATEGIC DIRECTION

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Apple's operating results for 1988 marked a high point in its history. Spurred by its first $1 billion* quarter, annual net sales increased 53 percent, from $2.7 billion in 1987 to $4.1 billion in 1988.

Sales continued to generate revenue in both the domestic and the international markets. International sales as a percentage of total sales increased over the last three years in response to Apple's efforts in targeting foreign customers and opening foreign facilities. From 1987 to 1988, international revenue grew 81 percent and measured almost one-third of total sales.

Net income rose from $217.5 million in 1987 to $400.3 million in 1988, reflecting an 84 percent growth rate. The after-tax profit margins for 1987 and 1988 were 8.2 and 9.8 percent, respectively. Because Apple repurchased 7.4 million shares of common stock in 1988 and because of its record sales performance, earnings per share increased dramatically from $1.65 in 1987 to $3.08 in 1988.

Apple's goal is to create a personal computer that is not only indispensable but also understandable. The Company has sustained a high rate of investment in new product research and development. Fiscal 1988 R&D expenditures of $272.5 million represented 6.7 percent of 1988 revenue, compared with 7.2 percent of revenue in 1987.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

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

BUSINESS SEGMENT STRATEGIC DIRECTION

Personal Computers

Apple is a leading manufacturer of Motorola MC68030, 68000, and 68020 microprocessor-based personal computers, related software, and other peripheral products. The Company ranked second in personal computer worldwide market share with 9.8 percent of the market.

Technical Computers

Apple's market share increased from 1.8 percent in 1987 to 2.8 percent in 1988 in the workstation or technical computer industry. Its revenue also increased from $315,000 to $577,000 over the same period. For both years, the Company ranked seventh in the market.

LANs

Total Macintosh local area network (LAN) revenue was an estimated $220 million in 1988. Apple had less than 1 percent of the data communications industry market share in 1987.

Software

Apple manufactures graphics, word processing, communications, and utility software to run on the Macintosh and Apple computers. Some of the newer software allows the Macintosh to communicate with IBM-compatible computers. In 1988, Apple captured less than 1 percent of the total software market share.

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 U.S. Dollars)

	1984	1985	1986	1987	1988
Five-Year Revenue	$1,515.9	$1,918.3	$1,901.9	$2,661.1	$4,071.4
Percent Change	-	26.55	(0.85)	39.92	53.00
Capital Expenditure	$39.6	$54.1	$66.6	$86.1	$144.0
Percent of Revenue	2.61	2.82	3.50	3.24	3.54
R&D Expenditure	$71.1	$72.5	$127.8	$191.5	$272.5
Percent of Revenue	4.69	3.78	6.72	7.20	6.69
Number of Employees	5,382	4,182	5,600	7,228	10,828
Revenue ($K)/Employee	$281.66	$458.70	$339.62	$368.20	$376.00
Net Income	$64.0	$61.2	$154.0	$217.5	$400.3
Percent Change	-	(4.37)	151.63	41.23	84.05

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$1,247.00	$1,248.21	N/A	N/A
Quarterly Profit	$56.00	$96.13	N/A	N/A

N/A = Not Available

Source: Apple Computer, Inc. Annual Reports and Forms 10-K
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1984	1985	1986	1987	1988
North America	78.36	77.69	74.23	72.92	67.94
International	21.64	22.31	25.77	27.09	32.06
Europe	12.67	12.90	15.71	17.55	21.08
All Other	8.98	9.40	10.06	9.54	10.98

Source: Apple Computer, Inc. Annual Reports and Forms 10-K
Dataquest
January 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1987	1988
Direct Sales	20.00	20.00
Indirect Sales	80.00	80.00
VARs	20.00	20.00
Dealers	60.00	60.00

Source: Dataquest
January 1990

1988 SALES OFFICE LOCATIONS

North America—Not available
Japan—Not available
Europe—Not available
Asia/Pacific—Not available
ROW—Not available

MANUFACTURING LOCATIONS

North America

Cambridge, Massachusetts
Programming and advanced development environment
Columbia, Maryland
Advanced development environment
Fremont, California
Macintosh production and peripherals sold outside Europe

Europe

Cork (Ireland)
Macintosh and Apple II products for Europe

Asia/Pacific

Singapore
Apple II, Mac Plus, and Mac SE products for the United States and Asia/Pacific

SUBSIDIARIES

North America

Claris Corporation (United States)
Coral Software Corp. (United States)
Network Innovations Corp. (United States)
Orion Network Systems, Inc. (United States)

ALLIANCES, JOINT VENTURES, LICENSING AGREEMENTS

1988

DEC
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

Jean-Louis Gassee
Senior vice president and president of Apple Products Division

Allan Z. Loren
Senior vice president and president of Apple USA Division

Michael H. Spindler
Senior vice president and president of Apple Europe Division

Ian W. Diery
Senior vice president and president of Apple Pacific Division

Deborah A. Coleman
Treasurer, Finance, and chief financial officer

PRINCIPAL INVESTORS

A.C. Markkula, Jr.

FOUNDERS

Steven Jobs
Stephen Wozniak

Table 4
Apple Computer, Inc.
Fiscal Year Ending September 27
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	$687.5	$822.1	$1,040.9	$1,307.4	$1,783.0
Cash	114.9	337.0	576.2	565.1	545.7
Receivables	258.2	220.2	263.1	405.6	638.8
Marketable Securities	0	0	0	0	0
Inventory	264.6	167.0	108.7	225.8	461.5
Other Current Assets	49.8	97.9	92.9	110.9	137.0
Net Property, Plants	$75.9	$90.4	$107.3	$130.4	$207.4
Other Assets	$25.4	$23.7	$11.9	$40.1	$91.1
Total Assets	$788.8	$936.2	$1,160.1	$1,477.9	$2,082.1
Total Current Liabilities	$255.2	$295.4	$328.5	$478.7	$827.1
Long-Term Debt	0	0	0	0	0
Other Liabilities	$69.0	$90.3	$137.5	$162.8	$251.6
Total Liabilities	$324.2	$385.7	$466.0	$641.5	$1,078.7
Total Shareholders' Equity	$464.6	$550.5	$694.1	$836.4	$1,003.4
Converted Preferred Stock	0	0	0	0	0
Common Stock	208.9	234.6	227.1	263.9	226.2
Other Equity	(3.4)	(4.4)	(7.3)	(0.6)	0.7
Retained Earnings	259.1	320.3	474.3	573.1	776.5
Total Liabilities and Shareholders' Equity	$788.8	$936.2	$1,160.1	$1,477.9	$2,082.1

Income Statement	1984	1985	1986	1987	1988
Revenue	$1,515.9	$1,918.3	$1,901.9	$2,661.1	$4,071.4
U.S. Revenue	1,187.9	1,490.4	1,411.8	1,940.4	2,766.3
Non-U.S. Revenue	328.0	427.9	490.1	720.7	1,305.1
Cost of Sales	$878.6	$117.9	$891.1	$1,296.2	$1,990.9
R&D Expense	$71.1	$72.5	$127.8	$191.5	$272.5
SG&A Expense	$474.7	$580.7	$609.5	$801.8	$1,187.6
Capital Expense	$39.6	$54.1	$66.6	$86.1	$144.0
Pretax Income	$109.2	$120.0	$309.7	$410.4	$656.2
Pretax Margin (%)	7.20	6.30	16.28	15.42	16.12
Effective Tax Rate (%)	41.00	49.00	50.30	47.00	39.00
Net Income	$64.0	$61.2	$154.0	$217.5	$400.3
Shares Outstanding, Millions	122	124	129	132	130
Per Share Data					
Earnings	$1.05	$0.99	$1.20	$1.65	$3.08
Dividends	0	0	0	$0.12	$0.32
Book Value	$3.83	$4.48	$5.43	$6.35	$7.72

Table 4 (Continued)
Apple Computer, Inc.
Fiscal Year Ending September 27
(Millions of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1984	1985	1986	1987	1988
Liquidity					
Current (Times)	2.69	2.78	3.17	2.73	2.16
Quick (Times)	1.66	2.22	2.84	2.26	1.60
Fixed Assets/Equity (%)	16.34	16.42	15.46	15.59	20.67
Current Liabilities/Equity (%)	54.93	53.66	47.33	57.23	82.43
Total Liabilities/Equity (%)	69.78	70.06	67.14	76.70	107.50
Profitability (%)					
Return on Assets	-	7.10	14.69	16.49	22.49
Return on Equity	-	12.06	24.75	28.42	43.52
Profit Margin (%)	4.22	3.19	8.10	8.17	9.83
Other Key Ratios					
R&D Spending % of Revenue	4.69	3.78	6.72	7.20	6.69
Capital Spending % of Revenue	2.61	2.82	3.50	3.24	3.54
Employees	5,382	4,182	5,600	7,228	10,828
Revenues ($K)/Employee	$281.66	$458.70	$339.62	$368.20	$376.00
Capital Spending % of Assets	5.02	5.78	5.74	5.83	6.92

Source: Apple Computer, Inc. Annual Reports and Forms 10-K
Dataquest
January 1990

Applied Digital Data Systems, Inc.

100 Marcus Boulevard
Hauppauge, New York 11788
Telephone: (516) 231-5400
Fax: (516) 231-7378
Dun's Number: 04-920-5602

Date Founded: 1969

CORPORATE STRATEGIC DIRECTION

Applied Digital Data Systems, Inc. (ADDS), was formed in 1969 as a video display terminal manufacturer. An early entrant into the display terminals industry, ADDS built its business as a supplier of ASCII terminals to a variety of computer manufacturers. In 1981, ADDS became a fully owned subsidiary of NCR Corporation.

In 1980, as part of a diversification strategy, ADDS organized two separate divisions. Its original business line, display terminals, became the Display Products Division, and it added the Systems Division, which manufactures and markets a line of multiuser minicomputer systems based on the PICK operating system.

ADDS has increased its commitment to the display terminals product line during the past few years, moving the bulk of terminals manufacturing back from Asia to the United States. Display terminal products are now manufactured at the Company's headquarters in Hauppauge, New York. The move was made to ensure product quality and provide closer ties between production and customers. ADDS also maintains ties to terminal subassembly manufacturers in Taiwan and Hong Kong.

The Company markets its terminal products primarily through distributors and original equipment manufacturers (OEMs). Dataquest estimates that approximately 20 percent of ADDS' display terminal products are sold to NCR. The balance of sales are split approximately 90 to 10 percent between distributors and OEMs, respectively. ADDS intends to increase its OEM business to 30 percent by 1991.

The ADDS Systems Division has an international network of more than 150 value-added resellers (VARS) and distributors, which it calls Mentor Marketers. These Mentor Marketers sell ADDS systems in over 200 vertical markets.

The Company employed approximately 450 people in the United States as of December 31, 1989. ADDS products are sold by 75 distributors in the United States and about 30 distributors outside the United States. International sales are estimated to be 25 percent of ADDS' total sales.

Because ADDS is a wholly owned subsidiary of NCR, no financial statements are included in this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

Display Terminals

For the year ended December 31, 1989, Dataquest ranks ADDS as the number two supplier of multipurpose ASCII/ANSI terminals (Segment 4) in North America and in the top five vendors worldwide based on unit shipments. The Company derives approximately 45 percent of its revenue from display terminal sales, according to Dataquest estimates.

ADDS display terminal products can be broken down into two main categories, ASCII- and Digital VT-compatible products. The ASCII product line consists of the ADDS 1010 terminal. The ADDS 4000 models are high-end ASCII/ANSI/PC terminals. In November, ADDS is expected to announce a new VT-compatible terminal, the 4320.

The ADDS 4000, introduced in April 1990, represents the first in a new generation of products manufactured at the Company's Hauppauge headquarters. The 4000 has dual-session capability and is claimed to be four times as reliable as the Company's previous generation of terminals. New terminal products being developed include a color flat-panel display, expected to be available in 1992, and new X Window products. In September 1990, NCR moved to consolidate X Window development, merging its Orlando, Florida-based X Window division into the ADDS terminal division. All X Terminal product development is now being handled in Orlando under ADDS management.

As mentioned earlier, ADDS has moved its manufacturing back to the United States. This move is part of the Company's strategy to improve the quality and reliability of its terminal products. ADDS still retains ties to its subassembly manufacturers in the Far East; however, final assembly and quality control functions are now done in the United States.

Systems Products

The ADDS Systems Division markets multiuser minicomputers, based on the PICK operating system, for business applications. The Systems Division's Mentor product offerings can be grouped into two categories: operating system-related software and NCR-supplied hardware.

The Mentor operating system provides the link between the ADDS family of hardware and the software solution provided by ADDS' Mentor Marketers. Based on the PICK operating system, the Mentor system software incorporates business productivity tools and communications support for 3270 protocols and networking with other PICK-based systems.

In 1989, ADDS completed development of a coresident operating environment called Mentor M/ix, which allows the Mentor operating system to run concurrently with NCR UNIX V.3. The M/ix operating system also works with all communications and networking products available on the UNIX-based NCR Tower, such as Ethernet, Token-Ring, X.25, X.400, and SNA. Mentor M/ix provides access to all UNIX applications and languages for the Mentor operating system user.

The Mentor hardware family is based on systems developed by NCR. The smallest multiuser platform from ADDS is the Mentor Model 1, which is based on the NCR PC product line. The Model 1 comes in four configurations offering connectivity for 3 to 32 users.

In 1989, ADDS introduced the Mentor 7000 series, based on the NCR Tower 300, 500, and 700 series. These systems utilize the Motorola 68030 microprocessor. There are three models in the 7000 series—the 3/20, 5/20, and 5/30—designed to connect from 16 to 512 users. ADDS intends to expand the Mentor product family in 1991 with systems built on the new NCR Tower 750 platform, which will incorporate the Motorola 68040 microprocessor.

Further Information

For further information about Applied Digital Data Systems' business segments, please contact the appropriate Dataquest industry service.

1989 SALES OFFICE LOCATIONS

North America—5

MANUFACTURING LOCATIONS

North America

Hauppauge, New York
Display terminals and multiuser computer systems

Asia/Pacific

Taiwan, Hong Kong
Display terminal products

SUBSIDIARIES

Applied Digital Data Systems, Inc., is a subsidiary of NCR and has no subsidiaries.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

Applied Digital Data Systems, Inc., has made no mergers or acquisitions.

KEY OFFICERS

David Laws
President and chief executive officer

Robin White
Vice president and general manager, Systems Division

Edward Schenk
Vice president and general manager, Display Products Division

Tony Novellino
Vice president, Operations

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. 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

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

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 epi 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 Sarl
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. Ditmore
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
Liquidity					
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
Profitability (%)					
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
Other Key Ratios					
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

Applied Micro Circuits Corporation

Applied Micro Circuits Corporation
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San Diego, CA 92121
Telephone: (619) 450–9333
Fax: 619–450–9885

Applied Micro Circuits Corporation is a privately held company; therefore, balance sheet and income statement data are unavailable.

Applied Micro Circuits Corporation

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Applied Micro Circuits Corporation

THE COMPANY

Overview

Applied Micro Circuits Corporation (AMCC) specializes in the design and manufacture of high-speed ECL gate arrays and, most recently, a family of BICMOS gate arrays. The Company has targeted its products at OEMs that make industrial instruments, high-performance computers, electronic warfare systems, test equipment, graphics hardware, and telecommunications equipment.

Long-term Outlook

AMCC's strategic thrust is in high-performance end-use markets. With its ECL family of gate arrays and the recent addition of a CMOS family of gate arrays, the Company has concentrated on end-use markets that are out of the mainstream. In particular, the Company has focused on certain niches within the military and industrial segments, and we believe that 80 percent of AMCC's 1986 revenue came from products aimed at these segments. AMCC fabricates all products, regardless of the end-use application, to standard military screening procedures, thereby providing products that satisfy quality levels required for other segments. The end result is that the Company has aligned its product portfolio to be congruent with its customer base.

The ECL gate array market is dominated by a few large suppliers such as Fairchild, Fujitsu, and Motorola. While most of the large suppliers have concentrated on EDP market segments, they have also devoted resources to the military and industrial segments. The challenge for AMCC will be to position its products so as to erect barriers against these larger suppliers.

Management and Employees

Table 1 lists AMCC's corporate executives.

Table 1

Applied Micro Circuits Corporation
Corporate Executives

Position	Name
Chairman	Roger A. Smullen
President, CEO	Al Martinez
VP Finance/Administration	Joel O. Holliday
VP Marketing/Sales	A.C. D'Augustine
VP Operations	Don Shrock
VP Engineering	Ray Yuen

Source: Dataquest
October 1987

AMCC currently employs 230 people.

Financial Information

The Company has received three rounds of funding totaling $11 million, as shown in Table 2.

Table 2

Applied Micro Circuits Corporation
Sources of Funding as of January 1987
(Millions of Dollars)

Date	Round	Sources	Amount
April 1979	Round 1	Fred Adler & Co.; Ampersand Associates; International Industrial Investments Inc.; Kimball Organ; Timex	$ 5.0
March 1983	Round 2	Accel Capital; Asset Management Associates; Harrison Capital; International Industrial Investments (France); Kemper; Matrix Partners; Oak Investment Partners II; Prime Capital; Fleming Ltd.; Robertson, Colman & Stephens; US Ventures; Venture Growth Associates; Adler & Co.	6.8
Sept. 1987	Round 3	Accel Partners; Adler & Co.; Asset Management Co.; The Crossover Fund; Eberstadt Fleming; Robert Fleming; Matrix Partners; Oak Partners; Paine Webber Venture Capital; Sequoia Capital; U.S. Venture Partners	$12.0

Source: Dataquest
October 1987

Applied Micro Circuits Corporation

PRODUCTS AND MARKETS

Semiconductor Product Markets

AMCC derived 100 percent of its revenue from ECL bipolar gate array activities through June 1985. Last year, however, the Company expanded its product line with CMOS gate arrays, as shown in Table 3.

Table 3

Applied Micro Circuits Corporation
Estimated Revenue
(Millions of Dollars)

	1984	1985	1986
Total ASICs	18.0	21.0	19.0
Bipolar	18.0	21.0	18.0
CMOS	0	0	1.0

Source: Dataquest
October 1987

TECHNOLOGY AND MANUFACTURING

AMCC uses double-level-metal 2.0-, 3.0-, and 5.0-micron bipolar process technology; double-level-metal 1.5-micron CMOS process technology; and 1.5-micron BICMOS process technology.

All of AMCC's gate arrays are manufactured at its San Diego, California, facility. This facility occupies 48,000 square feet of space and includes 43,000 square feet for administration, marketing, development, and manufacturing. The remaining 5,000 square feet are devoted to a class 10 wafer fabrication clean room.

Product List

AMCC offers a broad range of products. Table 4 lists the Company's products.

Applied Micro Circuits Corporation

Table 4

Applied Micro Circuits Corporation
Product List

Family	Process	Line Width (micron)	Delay (ns)	Gates
		ECL Gate Arrays		
Q700	Bipolar	5.0	0.9	250 to 1,000
Q1500	Bipolar	5.0	0.9	1,500 to 1,700
Q3500	Bipolar	3.0	0.6	1,300 to 3,500
Q5000	Bipolar	N/A	N/A	1,300 to 5,000
		CMOS Gate Arrays		
Q6000	Si-Gate	1.8	1.3	1,394 to 6,206
Q9000	Si-Gate	1.5	1.0	2,200 to 3,500
		BICMOS Gate Arrays*		
Q12000	BICMOS	1.5	0.7	2,160 to 9,072
		Cell Libraries and Software Design Kits		
MicroMatrix	Bipolar	5.0	0.9	Custom Macros
MicroMatrix	Bipolar	5.0	0.9	3,200 gates, 18 MSI
MicroMatrix	Bipolar	3.0	0.6	220 gates, 4 MSI
		CMOS Cell Library		
MicroMatrix	Si-Gate	1.8	1.3	80 gates, 40 MSI
MicroMatrix	Si-Gate	1.8	1.3	80 gates, 40 MSI

*Preliminary data
N/A = Not Available

Source: Dataquest
October 1987

Applied Micro Circuits Corporation

Semiconductor Agreements

AMCC has entered into the following agreements and alliances:

- Signetics
  - April 1979—AMCC and Signetics agreed that Signetics would provide alternate sourcing of the Q700 Quick-Chip series. AMCC was licensed to market designs for Signetics' 8A-1200 gate array family.
  - September 1983—AMCC and Signetics signed an extension of the prior agreement covering a technology transfer of future families of gate arrays and junction-isolated and oxide-isolation processes.
- Sorep
  - January 1982—AMCC and Sorep agreed to participate in a joint venture to design, assemble, test, and market gate arrays in France.
- Thomson CSF
  - July 1982—AMCC signed an agreement with Thomson-CSF under which Thomson-CSF would provide alternate sourcing and develop AMCC's high-performance, bipolar Q700 Series of gate arrays. AMCC received $1 million over a period of five years.
- Daisy
  - February 1983—Daisy offered support for AMCC's Q700 Series gate array family on its Gatemaster gate array development system; AMCC provided the design software.
- Honeywell
  - August 1984—Honeywell signed an agreement to second-source AMCC's Q700 Series gate arrays and to be an alternate source for AMCC's bipolar gate arrays.
- Sanders
  - February 1985—Sanders agreed to develop prototype ECL gate arrays by customizing AMCC base wafers for in-house use only.
- Seiko-Epson/S-MOS
  - May 1985—S-MOS signed an agreement to second-source AMCC's Q600 Series of sub-2-micron CMOS logic arrays. Seiko-Epson licensed its SLA 6000 Series of high-performance gate arrays to AMCC.

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Applied Micro Circuits Corporation

THE COMPANY

Background

Applied Micro Circuits Corporation (AMCC), a privately held company, was founded in Cupertino, California, in April 1979. The Company moved to San Diego in June 1982. The co-founders were Howard S. Bobb and Joseph A. Mingione. Mr. Bobb was also a co-founder of American Microsystems, Astrotech, and Western Digital. Mr. Mingione came from American Microsystems. The initial $5 million investment in the Company was made by Timex, Kimball Organ, and Fred Adler & Co.

Additional venture capital amounting to $6.3 million was realized in March 1983 through the sale of subordinated convertible debentures. The 1983 investment participants included: Oak Investment Partners II; Matrix Partners; Harrison Capital; Asset Management Capital Company; U.S. Ventures; Robertson, Colman, & Stephens; International Industrial Interests; F. Eberstadt & Company, Inc.; and Adler & Company.

AMCC, a semicustom IC house, specializes in the design and manufacture of high-speed bipolar gate arrays serving the military and industrial sectors.

Operations

On June 1, 1983, AMCC moved to a new 20,000-square-foot facility in San Diego, California. AMCC has options on additional facilities within the complex.

Marketing

AMCC markets its products directly through Company headquarters as well as though field sales representatives.

AMCC's marketing, sales, and manufacturing headquarters are:

Applied Micro Circuits Corporation
5502 Oberlin Drive
San Diego, California 92121

Telephone: (619) 450-9333
Telex: 3718552
TWX: 182754 HQ LJLA

Applied Micro Circuits Corporation

Customer Interface

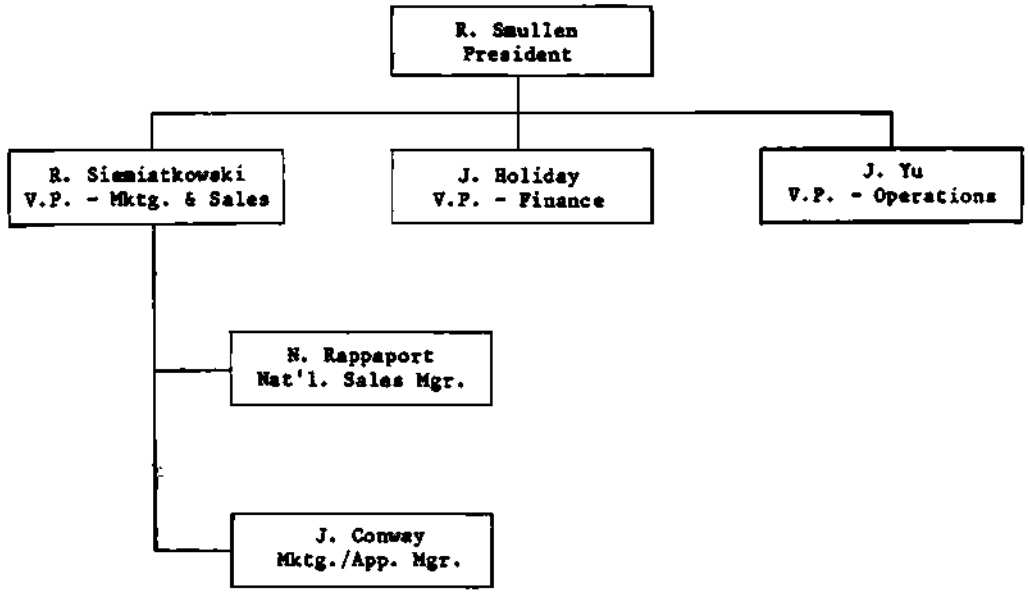
AMCC will either design gate arrays for a customer or work from a customer's own design. The Company is willing to train users to work with its design tools. AMCC uses an Applicon 860 for array design, Tegas 4 for logic simulation, and has proprietary software for layout verification. (Tegas is a trademark of Comsat General Integrated Systems, Inc.)

Employees

In January 1983, AMCC employed 85 people, more than half of whom were engineering, design, and software specialists. Figure 1 shows the Company's organization chart.

Figure 1

Applied Micro Circuits Corporation
ORGANIZATION CHART



Source: Applied Micro Circuits Corporation
DATAQUEST
June 1983

Applied Micro Circuits Corporation

Products

AMCC manufactures a range of high-speed bipolar gate arrays that combine ECL with TTL I/O. The devices are fully compatible with low-power Schottky (LS) and Schottky (S) TTL and ECL 10K devices. Table 1 summarizes AMCC's product family. The devices are second-sourced by Thomson-CSF in Europe. In the United States, Signetics acts as a second source for wafer fabrication only.

AMCC processes its wafers to MIL-STD-883-B and can assemble devices to MIL-STD-45208. Although the Company currently uses subcontract assembly, it will establish a pilot in-house assembly facility by July 1983.

Table 1

Applied Micro Circuits Corporation
BIPOLAR GATE ARRAY FAMILY

Description	Q700	Q710	Q720
Equivalent Gates	1,000	500	250
I/O Pads	76/74	56/54	34
Package (Pin Count)	up to 84	up to 64	up to 40
Number of Gates per I/O Pin	13	8	8
Typical Power Dissipation at 5V, 80 percent usage	1.8W	1.2W	750mW

Note: 1,500-gate array to become available in the second quarter of 1983.

Source: Applied Micro Circuits Corporation
DATAQUEST
June 1983

Applied Micro Circuits Corporation

Financial Information

AMCC has been growing by more than 100 percent per year, and expects to continue on a substantial growth path. DATAQUEST believes that the March 1983 $6.3 million financing will enable the Company to proceed with its growth plans.

Estimates of AMCC's annual sales are shown in Table 2.

Table 2

Applied Micro Circuits Corporation
ESTIMATED SALES
(Millions of Dollars)

Year	Sales
1981	$ 1.5
1982	$ 4.0
1983	$ 6.0
1984	$ 7.0 - $ 8.0

Source: DATAQUEST
June 1983

Applix, Inc.

112 Turnpike Road
Westboro, Massachusetts 01581
Telephone: (508) 870-0300
Fax: (508) 366-9313
Dun's Number: 10-583-8627

Date Founded: 1983

CORPORATE STRATEGIC DIRECTION

Applix, Inc., is the developer and marketer of Alis office automation software. The Company is privately owned, with estimated 1989 sales of over $8 million.* Dataquest estimates that in 1989, Applix sold some 3,200 licenses for its Alis software and has a cumulative installed base of more than 13,000 units. According to Dataquest, Applix ranks in the top five licensers of UNIX-based integrated office systems (IOS) software worldwide with a market share of 7.7 percent in 1989.

Founded in 1983, the Company focused on solutions to what it believed to be the barriers to growth of the office automation industry, i.e., the wide variety of computer hardware and operating systems in offices that had limited use because of the design of existing office automation software. The founders developed Alis to provide transportability between various computer hardware products, allowing users to create a unified office system across multiple vendors' hardware.

Applix sells its product through a combination of systems integrators, original equipment manufacturers (OEMs), value-added resellers (VARs), and a direct sales force. OEM contracts include vendors such as Digital Equipment Corporation (DEC), Hewlett Packard, IBM, and Sun. Applix also has distributors in Europe and Australia, with unit sales accounting for approximately 30 percent of Applix's total market.

As of 1988, Applix had raised over $10 million in three rounds of venture capital funding. Its investors include Alex Brown & Sons; Chatham Venture Corporation; Cigna Venture Capital, Inc.; Hambrecht & Quist Investment Partners; Matrix Partners, L.P.; New Enterprise Associates II, L.P.; and New Venture Partners II.

*All dollar amounts are in US dollars.

No financial statements are included because Applix is a privately held company.

BUSINESS SEGMENT STRATEGIC DIRECTION

Applix's Alis software product combines a graphics-based system with integrated business office applications and the information sharing benefits of network-based office systems. Alis combines communications capabilities in a single package with multifont word processing, drawings, business graphics, spreadsheets, data management, and calendar functions. It is designed to take full advantage of 32-bit technology used by many computer systems vendors, and it supports numerous operating systems, including UNIX, DEC, VMS, and MS-DOS.

Written in the C language, Alis supports a wide variety of computer hardware, including technical workstations, minicomputers, and personal computers. Its open system design provides interoperability across numerous operating systems, presenting an identical interface to each user. It also offers OEMs and VARs the ability to customize the software to incorporate technological advancements in their systems.

What Applix describes as Active Integration enables Alis users to combine text, graphics, spreadsheets, and other information into one compound document. This is made possible through an "object orientation" that defines the separate elements of the document as individual "objects," thus allowing them to be combined, in their original form, as one document to be edited as a whole.

In addition to its open architecture and active integration design, Alis has the following features:

- Document Composer—This feature includes multifont, multisized, proportional or monospaced type in a what-you-see-is-what-you-get (WYSIWYG) display. Alis provides format assistance through the use of style guides, for use in creating and editing documents.
- User Interface—Alis employs an icon-based user interface. Icons provide the user with complete menu, window, application, and document control. Users can access Alis' functions using either a mouse or keyboard.
- Universal Graphics Editor—This feature combines freestyle drawing with the ability to create standard business graphics automatically. The graphics editor also enables the user to incorporate and edit scanned images for any document.
- Electronic Mail and Information Sharing—Alis' networking applications provide work group communications to improve office productivity. They include electronic mail, calendar management, meeting scheduling, and shared filing.
- Intelligent Spreadsheet—The Alis spreadsheet includes built-in equation-solving capabilities, business graphics, and automatic inter-spreadsheet references. The spreadsheet also supports the concept of views, allowing subsets of spreadsheets to be incorporated into text documents.
- Personal Database—Alis users can create, edit, merge, and manage up to 8,000 database records. Database information can be used in conjunction with other Alis functions such as E-mail, scheduling, and mailmerge.
- Extension Language Facility (ELF)—This facility enables Alis users to automate tasks and customize the Alis' environment. ELF is a programming language that supports automatic command recording and window creation and manipulation.
- PC-Alis—This feature gives users of MS-DOS-based personal computers access to the full range of Alis' office automation features. Users are linked via Ethernet to the host computer, which acts as an Alis server. PCs must be equipped with a graphics board and mouse to achieve full Alis functionality.

In February 1990, Applix introduced Alis version 2.1 with enhanced word processing, E-mail, graphics, and simpler installation scripts.

Further Information

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

1990 SALES OFFICE LOCATIONS

North America—3
Europe—1
Asia/Pacific—1

MANUFACTURING LOCATIONS

North America

Westboro, Massachusetts
Manufacturing of Alis software

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

MBP Software & Systems GmbH (Germany)
Distribution of Applix in Europe

BKS (Australia)
Distribution of Applix in Australia

DEC, Hewlett-Packard, IBM, and Sun
Applix also maintains marketing agreements with DEC, Hewlett-Packard, and IBM, and participates in the Sun Microsystems Catalyst program.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Jitendra Saxena
President

Richard J. Davis
Executive vice president

PRINCIPAL INVESTORS

Alex Brown & Sons
Chatham Venture Corporation
Cigna Venture Capital, Inc.
Hambrecht & Quist Investment Partners
Matrix Partners, L.P.
New Enterprise Associates II, L.P.
New Venture Partners II

FOUNDERS

Information is not available.

Archive Corporation

1650 Sunflower Avenue
Costa Mesa, California 92626
Telephone: (714) 641-0279
Fax: (714) 966-7347
Dun's Number: 02-122-6683

Date Founded: 1980

CORPORATE STRATEGIC DIRECTION

Archive Corporation designs, manufactures, and markets a broad line of removable tape drives and tape drive subsystems as secondary mass storage in workstations, minicomputers, multiuser microcomputers, and personal computers. The Company's products are used in conjunction with Winchester disk drives as backup storage to protect against loss of data in the event of a disk malfunction or user error. They are also used for archival storage, data interchange, and software loading. Archive also develops and sells controllers and utility software for use in conjunction with its tape drive products.

In March 1989, the Company acquired Maynard Electronics by purchasing 100 percent of Maynard's common stock. Maynard assembles and sells a line of tape drive subsystems with capacities from 20 megabytes to 2.2 gigabytes that employ either 1/4-inch, cartridge, or helical scan recording tape drives.

The Company traditionally markets its products through original equipment manufacturers (OEMs). However, in 1988, marketing efforts were expanded to include retail distribution channels.

Archive's net sales increased 48 percent to $181.4 million* in fiscal 1989 from $122.7 million in fiscal 1988. The increase was partially offset by declines in average unit selling prices that reflected volume discounts to OEMs. The Company anticipates further unit selling price declines as a result of improved production efficiencies and volume cost reductions. This factor is evident, with the gross margin percentage increasing to 34.5 percent in fiscal 1989 from 30.7 percent in fiscal 1988. Net income remained stable with respect to net sales, at approximately 8.5 percent. However, as a final figure, net income increased 45.4 percent to $15.3 million in fiscal 1989 from $10.5 million in fiscal 1988.

R&D expenses increased 63 percent to $12.4 million in fiscal 1989 from $7.6 million in fiscal 1988. As a percent of sales, R&D expenditure increased to 6.8 percent in fiscal 1989 from 6.2 percent in fiscal 1988. The increase was attributable to the development of tape drives for use with Apple Macintosh computers as well as IBM and compatible computers.

Other significant events consist of an acquisition and a reorganization. In December 1989, Archive commenced a tender offer for Cipher Data Products, Inc. The acquisition began as a hostile takeover with Archive offering $7.50 per share for all of Cipher's common stock. However, after Archive raised its offer to $8.25 per share, the merger assumed a friendlier tone. The acquisition was announced as final in late April 1990. Archive also gained control of Cipher's two storage subsidiaries, Irwin Magnetics and Optimem. Summit Partners of Newport Beach, California, contributed $7.5 million to help finance the acquisition. The merger with Cipher has given Archive control of 50 percent of the OEM 1/4-inch tape drive market and 43 percent of the reseller sales.

Following the merger, Archive reorganized its corporate structure into six divisions with Archive Corporation as the parent/holding company. The six divisions are Archive Technology (OEM), Maynard Electronics (retail and distribution), Irwin Magnetics (retail and distribution), AR-DAT (digital audiotape manufacturing), Optimem (write-once optical disk development and production), and Cipher Data Products (1/2-inch reel-to-reel and 1/2-inch cartridge development and production).

*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 backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

According to Dataquest, the worldwide tape drive market increased 17 percent in 1989, surpassing the $2.5 billion mark. The 1/2-inch tape products claimed nearly 75 percent of the market. Although Dataquest expects the overall tape drive market to decline over time, the 1/2-inch reel-to-reel products are expected to remain as an interchange standard for years to come. Archive ranked fourth in factory revenue with a 6 percent share of the worldwide tape drive market. In the 1/4-inch drive market, Archive achieved the number one ranking with a 26.8 percent market share. The Company's main competition in the 1/4-inch tape drive market comes from Mountain, Tandberg, and Wangtek.

Prior to its acquisition of Cipher, the Company's products included 1/4-inch cartridge and DAT tape drives, as well as controllers and software that support the tape drives. The tape drives are available in various physical form factors, configurations, and storage capacities ranging from 40 megabytes to 1.3 gigabytes. They are available in both basic (without controller) and intelligent (with controller) configurations. With the Cipher acquisition, Archive's product line includes 1/2-inch reel-to-reel, 1/2-inch cartridge, write-once/read-many (WORM) optical drives, and 3.5-inch minicartridges and drives. The Company's main products and significant introductions are described in the sections that follow.

Tape Drives and Subsystems

Archive's OEM division accounted for 63 percent of its consolidated revenue. The Company experienced a slight decline in margins in fiscal 1989 as a result of discounts to OEMs. The Company's main products in this division are the following:

- SCORPION—The SCORPION product line is made up of 5 1/4-inch form-factor tape drives that have 45 and 60 megabytes of capacity using nine tracks. The basic SCORPION is designed to be integrated with a half-height Winchester disk drive. Total unit shipments of the SCORPION product line increased 29 percent in fiscal 1989.
- VIPER—The VIPER product line consists of half-height, 5 1/4-inch form-factor tape drives with 60, 150, 320, and, if used with an extended-tape cartridge, 525 megabytes of capacity with complete controller electronics built into each drive. The VIPER features very large-scale integration (VLSI) circuitry design and the use of surface-mount technology (SMT). The VIPER offers many of the same features as the SCORPION tape drive and is available in a standalone enclosure. The VIPER is sold as a subsystem under the ArchiveVP label. Total unit shipments of the VIPER product line increased 205 percent in fiscal 1989. This increase in demand was principally attributable to OEMs converting to VIPER products.

Maynard's product line, which now includes Archive's DSD, accounted for 37 percent of the Company's consolidated revenue. An overall goal for this division is to differentiate itself from the OEM division, since the Company believes that the two divisions are significantly different. On its own, Archive's DSD grew approximately 30 percent in 1989, and with the acquisition of Maynard, the combined efforts resulted in annual revenue approaching $100 million. Because of this growth, the Company is striving to evenly balance OEM and distribution sales. The Company's main products in this division are the following:

- MAYNSTREAM—The MAYNSTREAM tape backup subsystem line, made and sold by Maynard Electronics, is intended for use with the IBM and compatible personal computers, Apple Macintosh, and Digital Equipment's VAX computers. These subsystems are available for desktop use or internal mounting in storage capacities of 20, 60, 150, and 2,200 megabytes. Depending on the capacity of the device, MAYNSTREAM products use either a 1/4-inch cartridge, an 8mm helical scan recording, or a 4mm digital tape drive.
- MaxStream—The Company recently introduced a 2.2-gigabyte tape backup subsystem, MaxStream MS2200e, for the Apple Macintosh, and enhanced MaxStream software. All of the tape backup products for the Apple Macintosh have been consolidated under the MaxStream name.

Digital Audiotape Drives

Shortly after the close of the 1989 fiscal year, Archive introduced its first tape backup drive

employing digital audiotape (DAT) technology, the Python DAT drive. The Python family of computer-grade DAT products was codeveloped with Matsushita Kotobuki Electronics Industries, Ltd. The DAT product is an internally mounted 5 1/4-inch, half-height, form-factor tape drive employing helical scan recording techniques and a digital data storage recording format with a 4mm-wide tape. It is designed with custom LSI components, and its mechanical transport employs four separate drive motors. Up to 1.3 gigabytes of data can be backed up on a single tape in a maximum of 120 minutes. The Python is compatible with Novell NetWare 286 and NetWare 386, Token-Ring, 3Com 3Net, and MS-DOS.

Controllers

In addition to its tape drives and subsystems, the Company also manufactures and sells a full line of controllers, which are designed to direct data storage and retrieval operations and control the flow of data between the tape drive and a variety of host computers. The controllers were introduced to broaden the market for tape drives by effectively reducing the customer's effort and cost to interface between the tape drive and the host computer.

Software

The Company develops and sells utility software for use in conjunction with its tape drive products. The Company's FasTape, QICStream, and MaxStream software are used by the computer to which the tape drive is connected to perform a variety of data recording and retrieval functions. The software products are typically sold in conjunction with the Company's other products.

In 1990, the Company introduced QICStream Version 2.0, an enhanced version of Archive's networking software for the ArchiveVP series of tape backup systems. Version 2.0 supports the AppleTalk File Protocol in NetWare Version 2.15. Other features include an event logger for unattended backup operation, wild card capabilities for file selection, and automatic retry of busy files on a network.

Further Information

For further information on 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	$57,845	$78,824	$88,806	$122,669	$181,409
Percent Change	-	36.27	12.66	38.13	47.88
Capital Expenditure	$3,318	$5,254	$4,687	$5,935	$12,609
Percent of Revenue	5.74	6.67	5.28	4.84	6.95
R&D Expenditure	$2,933	$5,381	$5,752	$7,626	$12,410
Percent of Revenue	5.07	6.83	6.48	6.22	6.84
Number of Employees	NA	NA	NA	NA	2,851
Revenue ($K)/Employee	NA	NA	NA	NA	$63,630
Net Income	$1,034	$2,024	$6,085	$10,535	$15,320
Percent Change	-	95.74	200.64	73.13	45.42

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$35,970	$45,248	$50,500	$49,691
Quarterly Profit	$3,219	$3,667	$4,213	$4,221

NA = Not available

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

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	77.00	81.00	77.00	75.00	72.00
International	23.00	19.00	23.00	25.00	28.00

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

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
OEMs	NA	63.00
Resellers, VARS, and Systems Integrators	NA	37.00

NA = Not available

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

1989 SALES OFFICE LOCATIONS

North America—6
Europe—1

MANUFACTURING LOCATIONS

North America

Orlando, Florida
Manufactures, assembles, and performs repairs of Maynard products

Asia/Pacific

Singapore
Manufactures and assembles all high-volume products

SUBSIDIARIES

North America

AR-DAT (United States)
CAC Corp. (United States)
Cipher Data Products, Inc. (1990 acquisition) (United States)
Irwin Magnetics (1990 acquisition) (United States)
Maynard Electronics (United States)
Optimem (1990 acquisition) (United States)

Europe

Archive U.K. Ltd. (United Kingdom)

Asia/Pacific

Archive (Singapore) Pte. Ltd. (Singapore)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Digital Equipment Corporation (DEC)
Cipher and DEC agreed to an OEM agreement where Cipher will supply nine-track tape drives for use in DEC's MicroVAX and PDP-11 systems.

1989

Hewlett-Packard (HP)
Archive negotiated a licensing agreement with HP for DAT technology to be used in mass data storage.

Sony
Archive negotiated a licensing agreement with Sony for DAT technology to be used in mass data storage.

1988

Matsushita Kotobuki Electronics Industries, Ltd.
The companies made a joint development agreement to develop DAT tape drives to be used in mass data storage.

MERGERS AND ACQUISITIONS

1990

Cipher Data Products, Inc.
Archive acquired Cipher Data Products, which manufactures 1/2-inch reel-to-reel, 1/2-inch cartridge, WORM, and optical drives.

1989

Maynard Electronics
Archive purchased 100 percent of the common stock of Maynard, which assembles and sells tape drive subsystems.

KEY OFFICERS

D. Howard Lewis
Chairman and president

B. C. Ang
Vice president, Far East Operations

Jess Parker
Senior vice president, Operations

Henry Caplan
President, Maynard Electronics

J. V. Howell
Vice president, Research and Development

Ronald W. Kenwisher
Vice president, OEM Sales

PRINCIPAL INVESTORS

Willoughby and Associates—5 percent
Perot Group—7 percent

FOUNDERS

Information is not available.

Table 4
Comprehensive Financial Statement
Fiscal Year Ending September 29
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$36,189	$35,519	$69,999	$74,977	$84,186
Cash	7,049	5,345	26,315	12,021	5,284
Receivables	13,743	16,700	16,434	23,771	32,543
Marketable Securities	0	0	0	16,796	19,397
Inventory	15,023	12,715	25,956	20,760	22,111
Other Current Assets	374	759	1,294	1,629	4,851
Net Property, Plants	$7,019	$9,536	$10,824	$14,587	$24,178
Other Assets	$602	$633	$838	$1,084	$22,220
Total Assets	$43,810	$45,688	$81,661	$90,648	$130,584
Total Current Liabilities	$11,036	$10,381	$15,865	$15,093	$35,068
Long-Term Debt	0	0	0	$76	$65
Other Liabilities	$1,173	$1,554	$1,423	$3,503	$11,135
Total Liabilities	$12,209	$11,935	$17,288	$18,672	$46,268
Total Shareholders' Equity	$31,601	$33,753	$64,373	$71,976	$84,316
Converted Preferred Stock	-	-	-	-	-
Common Stock	29,213	29,341	53,876	50,944	49,361
Other Equity	0	0	0	0	(1,397)
Retained Earnings	2,388	4,412	10,497	21,032	36,352
Total Liabilities and Shareholders' Equity	$43,810	$45,688	$81,661	$90,648	$130,584

Income Statement	1985	1986	1987	1988	1989
Revenue	$57,845	$78,824	$88,806	$122,669	$181,409
US Revenue	44,541	63,847	68,381	92,002	130,614
Non-US Revenue	13,304	14,977	20,425	30,667	50,795
Cost of Sales	$46,058	$58,592	$62,796	$85,040	$118,805
R&D Expense	$2,933	$5,381	$5,752	$7,626	$12,410
SG&A Expense	$7,939	$11,959	$13,426	$18,199	$29,422
Capital Expense	$3,318	$5,254	$4,687	$5,935	$12,609
Pretax Income	$1,138	$2,723	$7,049	$13,605	$22,053
Pretax Margin (%)	1.97	3.45	7.94	11.09	12.16
Effective Tax Rate (%)	9.10	25.70	17.10	28.80	30.50
Net Income	$1,034	$2,024	$6,085	$10,535	$15,320
Shares Outstanding, Millions	10,594	10,915	11,120	13,146	13,342
Per Share Data					
Earnings	$0.10	$0.19	$0.55	$0.80	$1.15
Dividend	0	0	0	0	0
Book Value	$2.98	$3.09	$5.79	$5.48	$6.32

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending September 29
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	3.28	3.42	4.41	4.97	2.40
Quick (Times)	1.92	2.20	2.78	3.59	1.77
Fixed Assets/Equity (%)	22.21	28.25	16.81	20.27	28.68
Current Liabilities/Equity (%)	34.92	30.76	24.65	20.97	41.59
Total Liabilities/Equity (%)	38.63	35.36	26.86	25.94	54.87
Profitability (%)					
Return on Assets	-	4.52	9.56	12.23	13.85
Return on Equity	-	6.19	12.40	15.45	19.60
Profit Margin	1.79	2.57	6.85	8.59	8.45
Other Key Ratios					
R&D Spending % of Revenue	5.07	6.83	6.48	6.22	6.84
Capital Spending % of Revenue	5.74	6.67	5.28	4.84	6.95
Employees	NA	NA	NA	NA	2,851
Revenue ($K)/Employee	NA	NA	NA	NA	$63,630
Capital Spending % of Assets	7.57	11.50	5.74	6.55	9.66

NA = Not available

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

Arix Corporation

821 Fox Lane
San Jose, California 95131
Telephone: (408) 432-1200
Fax: (408) 432-0263
Dun's Number: 06-648-3868

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Arete Systems Corporation was founded in 1982. In March 1988, it became a publicly held firm and changed its name to Arix Corporation. Arix designs, manufactures, and markets high-performance UNIX-based multiprocessor computer systems that have the ability to accommodate over 500 users in certain configurations. The systems are used principally for interactive commercial computing applications that require high reliability and user availability, including on-line transaction processing (OLTP); management, office, and manufacturing information processing; and departmental computing.

Total revenue increased 41 percent to $85.0 million* in fiscal year 1989, up from $60.3 million in fiscal 1988. Arix attributes the substantial increase to the growth in demand for products based on the Arix 800 Series. Net income increased to $5.2 million in fiscal 1989, resulting in a 24.6 percent increase over fiscal year 1988. Arix employs 382 people.

Arix distributes its products primarily through reseller channels. These indirect sales channels include original equipment manufacturers (OEMs), value-added resellers (VARs), and systems integrators. Due to increased acceptance of the UNIX operating system in the international market, Arix is concentrating on strategically positioning itself internationally. Arix has been establishing agreements with international OEMs such as Mannesmann Data Systems (United Kingdom, France, and Spain), Marubeni (Japan), Orion Trading (Europe and the Far East), and Sagem (France). These efforts have resulted in an increase in international sales from representing 8 percent of total revenue in fiscal 1987 to 18 percent in fiscal 1989.

*All dollar amounts are in US dollars.

Over the past three years, R&D expenditure has steadily increased, from $4.9 million in fiscal 1987 to $10.4 million in fiscal 1989. Arix spends approximately 12 percent of its revenue on R&D activities. These activities generally are focused on both enhancing its existing product offerings and developing new systems based on advanced technologies. During fiscal 1989, Arix aimed its efforts toward increasing system transaction processing speed, improving system reliability, increasing system capability, and reducing system cost.

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

800 Series Hardware

Arix's 800 Series of computer systems is based on the Motorola 68020 microprocessor. The 800 Series includes Models 800, 825, 850, and 875, which are offered in a variety of packaged systems. System component modules are also available that allow the user complete flexibility to configure the system for its intended installation. Model 800 can support up to 48 users, up to five intelligent communications processors, and up to two database processors. It possesses 16MB of shared memory, 6.6GB of magnetic disk storage, 6GB of optional optical disk storage, a 150MB 1/4-inch streaming cartridge tape drive, an optional 9-track tape drive, and one or two

32-bit processors running at 12.5 MHz. Model 825 has nearly twice the capability of Model 800. It possesses the same characteristics as Model 800, but it can support up to 80 users and provides 64MB of shared memory. Models 850 and 875 support 128 users, with 64MB of shared memory and three 32-bit processors running at 25 MHz. Both have up to 11 intelligent communications processors, up to four database processors, 10.5GB of magnetic disk storage, and 28GB of optional optical storage. Model 850 comes with a 150MB 1/4-inch streaming cartridge tape drive, whereas Model 875 comes with a 1,600/3,200-bits-per-inch (bpi) 9-track tape drive.

System 90 Hardware

Arix's System 90 Series of systems is for use in intensive applications that require more memory capacity, higher throughput, and access by a greater number of users. The System 90 design is based on the Motorola 68020 and 68030 microprocessors and is characterized by symmetric multiprocessing and a broader system bus, allowing for the products to support up to eight application processors while maintaining a near linear increase in performance for each added processor.

In January 1990, Arix introduced three new models to its System 90 Series product line: Models 90/25, 90/45, and 90/85. Model 90/25 supports 16 to 128 users, offers up to 160MB of memory, and can supply over 5GB of disk storage. Model 90/45 supports from 128 to 256 users, offers up to 416MB of memory, and can supply over 63GB of disk storage. Model 90/85 supports from 256 to 512 users, offers up to 416MB of memory, and provides over 82GB of disk storage. Models 90/25, 90/45, and 90/85 are binary-compatible with the existing System 90 platform. Thus, each can use any application software or communications products currently available to System 90 users.

The previously released System 90 Series models consist of the 90/40 and the 90/80. Model 90/40 has 160MB of shared memory, 43GB of magnetic disk storage, up to 16 intelligent communications processors, up to eight database processors, one to four high-performance 25-MHz applications processors, and can support up to 256 users. The Model 90/80 has 416MB of shared memory, 86GB of magnetic disk storage, up to 32 intelligent communications processors, up to 16 database processors, one to eight high-performance 25-MHz applications processors, and can support up to 512 concurrent users.

Release 3

In January 1990, Arix unveiled Release 3 of the OS/90 operating system. Based on the AT&T UNIX System V Release 3.2, it will be one of the industry's first systems that is fully compliant with POSIX 1003.1 and meets level C2 computer system security requirements. Arix has contracted with Mindcraft Inc. to perform the independent certification.

Peripherals

In January 1990, Arix introduced a variety of high-capacity, high-performance on-line storage peripherals. These include two 5.25-inch SCSI Winchester disk drives with capacities of 380 and 760MB; a 650MB, 5.25-inch rewritable optical disk drive; a 780MB, 5.25-inch write-once, read-many (WORM) disk drive; and a 635MB, 5.25-inch CD-ROM.

Software

Arix supplies a variety of internally developed and third-party software for use on its systems. It provides operating system software, database management products, networking software, and third-party applications software. Through its Imix Corporation subsidiary, Arix provides development toolkits for systems integrators and VARs that permit creation of image-management applications on Arix's platforms using either Macintosh or PC workstations.

Further Information

For more information on Arix's business segments, please contact Dataquest's Business Computer Systems Industry Service.

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$11,946	$30,128	$41,536	$60,284	$84,973
Percent Change	-	152.20	37.87	45.14	40.95
Capital Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
R&D Expenditure	$1,619	$2,969	$4,865	$7,538	$10,378
Percent of Revenue	13.55	9.85	11.71	12.50	12.21
Number of Employees	130	138	211	317	382
Revenue ($K)/Employee	$91.89	$218.32	$196.85	$190.17	$222.44
Net Income	($922)	$4,917	$3,299	$4,145	$5,163
Percent Change	-	633.30	(32.91)	25.64	24.56

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$22,449.00	$20,127.00	$20,178.00	$22,219.00
Quarterly Profit	$1,350.00	$1,203.00	$1,041.00	$1,569.00

NA = Not available

Source: Arix Corporation
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	92.00	87.00	82.00
International	NA	NA	8.00	13.00	18.00

NA = Not available

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

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	5.00	5.00
Indirect Sales	95.00	95.00
VARs	NA	15.00
OEM (Unisys)	NA	80.00

NA = Not available

Source: Dataquest (1990)

1990 SALES OFFICE LOCATIONS

North America—14
Europe—2
Asia/Pacific—2
Japan—1

MANUFACTURING LOCATIONS

North America

San Jose, California
Assembling and testing components and subassemblies, which are produced by a third-party supplier, and integrating those components and subassemblies into finished systems

SUBSIDIARIES

North America

Arix Computer Corporation (United States)
Imix Corporation (United States)

Europe

Arix GmbH (Germany)
Arix Ltd. (United Kingdom)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Unicorn Systems Company
Arix and Unicorn Systems, a software consulting and development firm made a strategic alliance under which Unicorn will port its UniKix to Arix's hardware. UniKix is a software product that enables customer information control and virtual system access management compatibility in OLTP under UNIX.

Phitech Inc.
Arix and Phitech have an agreement to sell computers to the telecommunications industry. Phitech will develop certain generic switch interface software for Arix's machines and will develop customer-specific solutions on Arix's platforms.

Hitachi Ltd.
Arix and Hitachi have a strategic alliance for the development of a next-generation complex-instruction-set computing (CISC) symmetric multiprocessing system using the 680X0 instruction set.

1988

Mannesmann Information Systems
The companies have a three-year OEM agreement calling for Mannesmann to purchase Arix's 800 series. Mannesmann will resell the system under its Series 9400 label through its direct sales force and its dealers.

MERGERS AND ACQUISITIONS

1989

Edgcore Technology
Arix has acquired Edgcore Technology, which designs, manufactures, and markets high-performance UNIX-based and PICK multiprocessor computer systems.

KEY OFFICERS

Eugene Manno
President and chief executive officer

Robert G. Bartizal
President and chief operating officer, Arix Computer Corporation

Robert R. Creager
Vice president, Corporate Development; general counsel and secretary

Carter C. McCorkle
Vice president and chief financial officer

Michael J. Terry
Vice president, Customer Support

PRINCIPAL INVESTORS

Bay Management Company—7.41 percent
Meriken Noniness Ltd.—6.59 percent

FOUNDERS

Information is not available.

Table 4
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	NA	NA	$21,225.0	$29,696.0	$44,754.0
Cash	NA	NA	7,898.0	8,633.0	19,916.0
Receivables	NA	NA	4,014.0	4,470.0	6,278.0
Inventory	NA	NA	8,191.0	14,892.0	15,815.0
Other Current Assets	NA	NA	1,122.0	1,701.0	2,745.0
Net Property, Plants	NA	NA	$2,131.0	$3,251.0	$5,656.0
Other Assets	NA	NA	$567.0	$875.0	$2,684.0
Total Assets	$14,748.0	$19,328.0	$23,923.0	$33,822.0	$53,094.0
Total Current Liabilities	NA	NA	$3,386.0	$8,683.0	$9,174.0
Long-Term Debt	NA	NA	NA	NA	NA
Other Liabilities	NA	NA	$1,036.0	$1,294.0	$1,192.0
Total Liabilities	$3,668.0	$3,259.0	$4,422.0	$9,977.0	$10,366.0
Total Shareholders' Equity	$11,080.0	$16,069.0	$19,501.0	$23,845.0	$42,728.0
Converted Preferred Stock	NA	NA	15,183.0	15,183.0	NA
Common Stock	NA	NA	404.0	924.0	29,697.0
Other Equity	NA	NA	(119.0)	(440.0)	(310.0)
Retained Earnings	NA	NA	4,033.0	8,178.0	13,341.0
Total Liabilities and Shareholders' Equity	$14,748.0	$19,328.0	$23,923.0	$33,822.0	$53,094.0
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$11,946.0	$30,128.0	$41,536.0	$60,284.0	$84,973.0
US Revenue	NA	NA	38,213.1	52,447.1	69,677.9
Non-US Revenue	NA	NA	3,322.9	7,836.9	15,295.1
Cost of Sales	$8,082.0	$17,830.0	$22,454.0	$33,921.0	$50,558.0
R&D Expense	$1,619.0	$2,969.0	$4,865.0	$7,538.0	$10,378.0
SG&A Expense	$3,433.0	$4,889.0	$9,082.0	$13,384.0	$18,058.0
Capital Expense	NA	NA	NA	NA	NA
Pretax Income	($922.0)	$3,073.0	$3,299.0	$5,908.0	$7,359.0
Pretax Margin (%)	(7.72)	10.20	7.94	9.80	8.66
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	($922.0)	$4,917.0	$3,299.0	$4,145.0	$5,163.0
Shares Outstanding, Thousands	4,759.0	5,711.0	5,887.0	5,804.0	7,171.0
Per Share Data					
Earnings	($0.19)	$0.86	$0.56	$0.71	$0.72
Dividend	NA	NA	NA	NA	NA
Book Value	$2.33	$2.81	$3.31	$4.11	$5.96

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

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	NA	NA	6.27	3.42	4.88
Quick (Times)	NA	NA	3.85	1.70	3.15
Fixed Assets/Equity (%)	NA	NA	10.93	13.63	13.24
Current Liabilities/Equity (%)	NA	NA	17.36	36.41	21.47
Total Liabilities/Equity (%)	33.10	20.28	22.68	41.84	24.26
Profitability (%)					
Return on Assets	-	28.86	15.26	14.36	11.88
Return on Equity	-	36.22	18.55	19.13	15.51
Profit Margin	(7.72)	16.32	7.94	6.88	6.08
Other Key Ratios					
R&D Spending % of Revenue	13.55	9.85	11.71	12.50	12.21
Capital Spending % of Revenue	NA	NA	NA	NA	NA
Employees	130	138	211	317	382
Revenue ($K)/Employee	$91.89	$218.32	$196.85	$190.17	$222.44
Capital Spending % of Assets	NA	NA	NA	NA	NA

NA = Not available

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

12.00 Arrow Electronics

Arrow Electronics, Inc.
600 Steamboat Drive
Greenwich, Connecticut 06830
(203) 622-9030

(Millions of Dollars Except per Share Data)

Balance Sheet (December 31)

	1978	1979	Percent Change 1978-1979
Working Capital	$ 36.2	$ 85.7	136.6%
Long-Term Debt	$ 10.7	$ 33.1	210.9%
Shareholders' Equity	$ 26.6	$ 30.2	13.8%
Equity as a Percent of Assets	33.8%	20.7%	
After-Tax Return on Average Equity (%)	20.1%	19.6%	

Operating Performance (Fiscal Year Ending December 31)

	1978	1979	Percent Change 1978-1979
Revenue	$155.7	$263.7	69.4%
Cost of Goods	$115.3	$202.4	75.5%
Marketing, SG&A Expense	$ 26.7	$ 41.5	55.3%
Pretax Income	$ 8.9	$ 10.4	17.8%
Pretax Margin (%)	5.7%	4.0%	
Net Income	$ 4.9	$ 5.6	14.2%
Per Share Data			
Earnings*	$ 2.30	$ 2.55	10.9%
Dividends	$ 0.00	$ 0.00	-
Book Value	$ 12.56	$ 13.84	10.2%
Average Shares Outstanding (Millions)	2.12	2.18	3.0%
Capital Expenditures	$ 6.0	5.7	(5.0%)
Sales/Average Assets	2.25	2.34	4.1%
Sales/Average Inventory	5.34	5.02	(6.0%)
Total Employees	1,150	1,710	48.7%

*Fully diluted

Source: Arrow Electronics, Inc. Annual Report
DATAQUEST, Inc.

12.00 Arrow Electronics

Table 12.00-1

Arrow Electronics, Inc.
REVENUES BY LINE OF BUSINESS
(Millions of Dollars)

	1974	1975	1976	1977	1978	1979
Electronics Distribution	$45.0	$43.0	$59.4	$ 72.6	$102.3	$177.3
Electrical Distribution	16.4	13.7	13.8	16.8	21.2	26.3
Refining	22.9	21.6	23.1	31.2	32.2	60.1
Total Revenues	$84.3	$78.3	$96.3	$120.6	$155.7	$263.7

Source: Arrow Electronics, Inc. Annual Reports
DATAQUEST, Inc.

12.00 Arrow Electronics

Table 12.00-2

Arrow Electronics, Inc.
FINANCIAL STATEMENT HISTORY 1972-79
(Millions of Dollars)

		Fiscal Year Ending December 31									
		1972	1973	1974	1975	1976	1977	1978	1979	TREND	CMPD GR
BALANCE SHEET											
1	CASH & LIQUID SECURITIES	0.66	1.36	2.17	1.08	0.68	1.43	2.56	6.61	0.54	23.34
3	RECEIVABLES	5.79	10.06	12.29	11.76	14.58	17.57	24.44	42.35	4.12	26.36
4	INVENTORY	15.32	20.35	23.51	22.42	24.10	25.14	33.20	71.88	5.56	17.49
5	OTHER CURRENT ASSETS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	PREPAID EXPENSES	0.20	0.18	0.20	0.14	0.23	0.52	0.37	0.98	0.09	24.32
7	EXCESS FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	TOTAL CURRENT ASSETS	21.97	31.94	38.17	35.40	39.59	44.66	60.57	121.83	10.31	20.66
9	GROSS P P E	4.25	5.48	6.73	8.07	8.46	12.61	18.51	23.35	2.58	26.80
10	ACCUMULATED DEPRECIATION	1.79	2.23	2.73	3.40	3.68	4.58	5.70	6.87	0.70	20.60
11	NET P P E	2.46	3.25	4.00	4.67	4.79	8.03	12.81	16.48	1.88	30.40
12	MISC ASSETS	0.56	0.61	1.04	0.82	0.79	3.08	1.78	4.38	0.46	31.35
13	GOODWILL	3.47	3.73	4.03	4.01	3.93	3.75	3.56	3.73	0.00	0.04
15	*TOTAL ASSETS*	28.46	39.54	47.23	44.91	49.10	59.52	78.72	146.42	12.65	20.54
16	NOTES PAYABLE	0.00	4.24	8.90	8.90	10.90	0.00	4.00	0.00	(0.31)	(55.92)
17	ACCOUNTS PAYABLE	6.70	9.54	9.87	8.67	10.04	10.04	16.04	25.86	2.01	15.70
18	ACCRUED TAXES	0.24	1.56	2.00	0.72	0.87	3.26	0.14	2.11	0.12	5.98
19	ACCRUED LIABILITIES	1.43	0.89	1.43	1.49	2.14	2.13	3.20	6.54	0.60	24.86
20	CURR MAT LONG TERM DEBT	0.46	0.85	0.63	0.59	0.65	0.80	0.99	1.66	0.11	13.36
22	TOTAL CURR LIABILITIES	8.83	17.07	22.83	20.37	24.60	16.23	24.37	36.17	2.53	13.74
23	LONG TERM DEBT	8.09	8.68	7.98	7.31	6.79	21.32	10.66	33.13	2.67	17.81
24	DEFERRED TAXES	0.10	0.24	0.53	0.51	0.39	0.46	0.78	0.82	0.09	27.05
25	MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	16.34	46.05	4.81	3037.16
27	DEFICIT FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	TOTAL LIABILITIES	17.02	25.99	31.34	28.19	31.77	38.01	52.15	116.17	10.10	23.35
29	PREFERRED STOCK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	COMMON STOCK	1.56	1.61	1.65	1.65	1.65	1.65	2.00	2.21	0.08	4.25
31	CAPITAL SURPLUS	2.04	2.23	2.30	2.30	2.30	2.30	5.52	12.13	1.04	22.48
32	RETAINED EARNINGS	7.83	9.71	11.98	12.92	13.61	17.76	20.56	19.48	1.83	14.48
33	TREASURY STOCK	0.00	0.00	(0.04)	(0.16)	(0.23)	(0.21)	(1.52)	(3.57)	(0.39)	*********
34	TOTAL EQUITY	11.44	13.55	15.90	16.71	17.33	21.51	26.57	30.25	2.55	14.15
35	*TOTAL LIAB & EQUITY*	28.46	39.54	47.23	44.91	49.10	59.52	78.72	146.42	12.65	20.54
36	NET WORKING CAPITAL	13.14	14.87	15.34	15.03	15.00	28.43	36.20	85.65	7.78	26.01
INCOME & EXPENSE											
38	SALES	46.83	60.96	84.26	78.27	96.36	120.63	155.68	263.72	25.23	24.00
40	COST OF GOODS	34.43	46.17	63.38	58.72	72.75	88.39	115.29	202.41	19.17	24.17
41	GROSS PROFIT	12.40	14.79	20.90	19.55	23.61	32.24	40.39	61.30	6.05	23.46
42	S G & A EXPENSE	8.00	8.80	12.86	14.02	16.82	20.26	26.73	41.46	4.15	24.79
43	MISC OPERATING EXPENSE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	OPERATING PROFIT	4.40	5.99	8.04	5.53	6.99	11.99	13.67	19.84	1.90	21.14
46	DEPRECIATION	0.34	0.66	0.83	1.03	1.06	1.21	1.53	3.01	0.29	27.73
47	LEASE PAYMENTS	0.61	0.72	0.84	0.64	0.59	0.65	0.64	0.88	0.01	1.35
48	INTEREST EXPENSE	0.48	1.07	1.66	1.60	1.59	1.67	2.63	5.50	0.51	29.09
49	MISC EXPENSE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	MISC INCOME	0.07	0.01	(0.20)	(0.36)	(1.19)	0.00	0.00	0.00	(0.01)	*********
53	PRETAX PROFIT	3.02	3.54	4.51	1.90	2.55	8.45	8.86	10.44	1.08	20.20
54	INCOME TAXES	1.32	1.64	2.23	0.95	1.85	4.11	3.98	4.86	0.51	21.03
56	NET PROFIT	1.69	1.89	2.29	0.95	0.70	4.33	4.88	5.58	0.57	19.12
57	EPS AFTER PFD DIVIDENDS	0.91	0.99	1.17	0.48	0.36	2.15	2.30	2.56	0.25	16.79
58	COMMON DIV PER SHARE	0.00	0.00	0.00	0.00	0.00	0.08	0.16	0.20	0.03	2799.65

Source: Arrow Electronics, Inc. Annual Reports
DATAQUEST, Inc.

12.00 Arrow Electronics

Table 12.00-3

Arrow Electronics, Inc.
FINANCIAL STATEMENT HISTORY 1972-79
(Percent)

		Fiscal Year Ending December 31									
		1972	1973	1974	1975	1976	1977	1978	1979	TREND	CMPD GR
BALANCE SHEET											
1	*CASH & LIQUID SECURITIES*	2.31	3.43	4.60	2.42	1.38	2.40	3.26	4.52	0.08	2.32
3	*RECEIVABLES*	20.34	25.45	26.01	26.20	29.70	29.52	31.04	28.92	1.21	4.83
4	*INVENTORY*	53.84	51.46	49.77	49.92	49.08	42.24	42.17	49.09	(1.23)	(2.53)
5	*OTHER CURRENT ASSETS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	*PREPAID EXPENSES*	0.70	0.45	0.43	0.31	0.48	0.88	0.48	0.67	0.02	3.14
7	*EXCESS FUNDS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	*TOTAL CURRENT ASSETS*	77.19	80.79	80.81	78.84	80.64	75.04	76.95	83.20	0.09	0.10
9	*GROSS P P E*	14.93	13.86	14.25	17.98	17.24	21.18	23.51	15.95	0.90	5.20
10	*ACCUMULATED DEPRECIATION*	6.29	5.63	5.79	7.57	7.49	7.69	7.24	4.69	0.03	0.05
11	*NET P P E*	8.63	8.22	8.46	10.40	9.75	13.49	16.27	11.26	0.87	8.18
12	*MISC ASSETS*	1.98	1.55	2.20	1.83	1.61	5.18	2.26	2.99	0.23	8.96
13	*GOODWILL*	12.20	9.43	8.53	8.92	8.00	6.29	4.52	2.55	(1.19)	(17.00)
15	**TOTAL ASSETS**	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
16	*NOTES PAYABLE*	0.00	10.71	18.84	19.82	22.20	0.00	5.08	0.00	(0.98)	(58.85)
17	*ACCOUNTS PAYABLE*	23.54	24.13	20.90	19.32	20.45	16.87	20.37	17.66	(0.84)	(4.02)
18	*ACCRUED TAXES*	0.85	3.95	4.23	1.60	1.78	5.48	0.18	1.44	(0.13)	(12.08)
19	*ACCRUED LIABILITIES*	5.01	2.24	3.03	3.32	4.36	3.58	4.07	4.47	0.10	3.58
20	*CURR MAT LONG TERM DEBT*	1.62	2.14	1.33	1.32	1.32	1.35	1.25	1.13	(0.09)	(5.96)
22	*TOTAL CURR LIABILITIES*	31.02	43.17	48.33	45.37	50.09	27.27	30.96	24.70	(1.95)	(5.64)
23	*LONG TERM DEBT*	28.44	21.95	16.89	16.28	13.82	35.82	13.54	22.63	(0.34)	(2.27)
24	*DEFERRED TAXES*	0.34	0.61	1.12	1.13	0.79	0.76	1.00	0.56	0.02	5.40
25	*MISC LIABILITIES*	0.00	0.00	0.00	0.00	0.00	0.00	20.76	31.45	3.86	2982.63
27	*DEFICIT FUNDS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	*TOTAL LIABILITIES*	59.80	65.73	66.34	62.78	64.70	63.85	66.24	79.34	1.59	2.33
29	*PREFERRED STOCK*	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(17.02)
30	*COMMON STOCK*	5.50	4.07	3.50	3.68	3.36	2.78	2.55	1.51	(0.45)	(13.51)
31	*CAPITAL SURPLUS*	7.16	5.63	4.87	5.13	4.69	3.87	7.02	8.28	0.13	1.61
32	*RETAINED EARNINGS*	27.53	24.57	25.37	28.77	27.71	29.84	26.12	13.30	(0.95)	(5.03)
33	*TREASURY STOCK*	0.00	0.00	(0.09)	(0.36)	(0.47)	(0.35)	(1.93)	(2.44)	(0.33)	*********
34	*TOTAL EQUITY*	40.20	34.27	33.66	37.22	35.30	36.15	33.76	20.66	(1.59)	(5.30)
35	**TOTAL LIAB & EQUITY**	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
36	*NET WORKING CAPITAL*	46.17	37.62	32.47	33.47	30.55	47.76	45.99	58.50	2.04	4.54
INCOME & EXPENSE											
38	*SALES*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
40	*COST OF GOODS*	73.52	75.74	75.20	75.02	75.50	73.27	74.05	76.75	0.11	0.14
41	*GROSS PROFIT*	26.48	24.26	24.80	24.98	24.50	26.73	25.95	23.25	(0.11)	(0.44)
42	*S G & A EXPENSE*	17.09	14.44	15.26	17.81	17.24	16.79	17.17	15.72	0.10	0.63
43	*MISC OPERATING EXPENSE*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	*OPERATING PROFIT*	9.39	9.82	9.54	7.07	7.26	9.94	8.78	7.52	(0.20)	(2.31)
46	*DEPRECIATION*	0.73	1.08	0.99	1.32	1.10	1.01	0.99	1.14	0.03	3.01
47	*LEASE PAYMENTS*	1.31	1.18	0.99	0.82	0.62	0.54	0.41	0.34	(0.15)	(18.27)
48	*INTEREST EXPENSE*	1.05	1.76	1.96	2.04	1.65	1.39	1.69	2.09	0.06	4.11
49	*MISC EXPENSE*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	*MISC INCOME*	0.14	0.01	(0.24)	(0.46)	(1.24)	0.00	0.00	0.00	(0.01)	*********
53	*PRETAX PROFIT*	6.44	5.81	5.35	2.43	2.65	7.00	5.69	3.96	(0.15)	(3.06)
54	*INCOME TAXES*	2.83	2.70	2.64	1.22	1.92	3.41	2.56	1.84	(0.05)	(2.40)
56	*NET PROFIT*	3.61	3.11	2.71	1.22	0.73	3.59	3.14	2.11	(0.10)	(3.93)
57	*EPS AFTER PFD DIVIDENDS*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
58	*COMMON DIV PER SHARE*	0.00	0.00	0.00	0.00	0.00	3.72	6.94	7.82	1.20	5549.94

Source: Arrow Electronics, Inc. Annual Reports
DATAQUEST, Inc.

12.00 Arrow Electronics

Table 12.00-4

Arrow Electronics, Inc.
FUNDS FLOW HISTORY 1973-79
(Millions of Dollars)

		Fiscal Year Ending December 31								
		1973	1974	1975	1976	1977	1978	1979	TREND	CMPD GR
SOURCES										
56	*NET PROFIT*	1.89	2.29	0.95	0.70	4.33	4.88	5.58	0.70	25.10
46	*DEPRECIATION*	0.66	0.83	1.03	1.06	1.21	1.53	3.01	0.31	23.62
61	*NEW LONG TERM DEBT*	1.43	0.00	0.00	0.12	15.33	0.00	24.13	2.98	212.80
62	*NEW EQUITY*	0.23	0.12	0.00	0.00	0.00	1.83	0.58	0.16	*********
63	*INCR OTHER LIABILITIES*	0.14	0.29	(0.02)	(0.12)	0.07	16.67	29.75	4.34	*********
66	*TOTAL SOURCES*	4.36	3.52	1.96	1.76	20.95	24.91	63.05	8.49	66.60
USES										
67	*P P E EXPENDITURES*	1.45	1.58	1.70	1.17	4.46	6.31	6.69	1.00	34.54
68	*REPAYMENT LONG TERM DEBT*	0.46	0.92	0.71	0.59	0.65	10.48	0.99	0.74	28.68
69	*PREFERRED DIVIDENDS*	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	(94.83)
70	*COMMON DIVIDENDS*	0.00	0.00	0.00	0.00	0.16	0.34	0.44	0.08	6630.24
72	*INCR WORKING CAPITAL*	2.12	0.25	(0.34)	0.02	13.59	7.96	50.12	6.19	*********
71	*INCR OTHER ASSETS*	0.31	0.72	(0.24)	(0.11)	2.11	(1.49)	2.77	0.19	*********
74	*TOTAL USES*	4.36	3.48	1.84	1.70	20.97	23.60	61.01	8.19	65.89
75	*EXCESS/DEFICIT*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	*CUMULATIVE SUR/DEF*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Arrow Electronics, Inc. Annual Reports
DATAQUEST, Inc.

12.00 Arrow Electronics

Table 12.00-5

Arrow Electronics, Inc.
FINANCIAL RATIO HISTORY 1972-79

		Fiscal Year Ending December 31									
		1972	1973	1974	1975	1976	1977	1978	1979	ST AV	MTD AVG
LIQUIDITY											
1	*CURRENT RATIO*	2.488	1.871	1.672	1.738	1.610	2.751	2.486	3.368	2.248	2.419
2	*QUICK RATIO*	0.730	0.669	0.633	0.631	0.620	1.171	1.108	1.354	0.864	0.978
3	*CASH RATIO*	0.074	0.079	0.095	0.053	0.028	0.088	0.105	0.183	0.088	0.100
4	*WORKING CAPITAL/SALES*	0.281	0.244	0.182	0.192	0.156	0.236	0.233	0.325	0.231	0.236
6	*DAYS RECEIVABLES*	45.121	60.251	53.211	54.864	55.241	53.168	57.293	58.611	54.720	55.830
7	*DAYS INVENTORY*	162.432	160.848	135.392	139.351	120.911	103.819	105.111	129.616	132.185	123.552
LEVERAGE											
8	*LONG TERM DEBT/CAPITALIZ*	0.414	0.390	0.334	0.304	0.281	0.498	0.286	0.523	0.379	0.389
11	*LONG TERM DEBT/EQUITY*	0.707	0.640	0.502	0.437	0.392	0.991	0.401	1.095	0.646	0.687
12	*TOTAL DEBT/EQUITY*	0.748	1.015	1.101	1.005	1.058	1.028	0.589	1.150	0.962	0.969
COVERAGE											
13	*EBIT/INTEREST*	7.155	4.298	3.724	2.192	2.599	6.047	4.367	2.897	4.160	3.853
14	*FIXED CHARGE COVERAGE*	3.643	2.926	2.774	1.824	2.110	4.575	3.711	2.634	3.025	3.060
16	*REPAY LTD+FIX CHARGE COV*	**********	2.334	2.078	1.430	1.670	3.590	2.981	2.282	2.338	2.474
OPER PERFORMANCE											
17	*GROSS PROFIT/SALES*	0.265	0.243	0.248	0.250	0.245	0.267	0.259	0.232	0.251	0.250
18	*OPER PROFIT/SALES*	0.094	0.098	0.095	0.071	0.073	0.099	0.088	0.075	0.087	0.084
21	*PRETAX PROFIT/SALES*	0.064	0.058	0.054	0.024	0.026	0.070	0.057	0.040	0.049	0.047
22	*NET PROFIT/SALES*	0.036	0.031	0.027	0.012	0.007	0.036	0.031	0.021	0.025	0.024
23	*NET PROFIT/AVG EQUITY*	**********	0.152	0.155	0.059	0.041	0.223	0.203	0.196	0.147	0.161
24	*NET PROFIT/AVG CAPITALIZ*	**********	0.091	0.099	0.040	0.029	0.129	0.122	0.111	0.089	0.096
26	*NET PROFIT/AVG TOT ASSETS*	**********	0.056	0.053	0.021	0.015	0.080	0.071	0.050	0.049	0.052
27	*E P S GROWTH RATE*	**********	0.092	0.179	(0.591)	(0.255)	5.060	0.071	0.110	0.666	0.862
28	*SALES GROWTH RATE*	**********	0.302	0.383	(0.071)	0.231	0.252	0.291	0.694	0.297	0.344
TURNOVER											
31	*SALES/AVG EQUITY*	**********	4.879	5.724	4.800	5.661	6.211	6.475	9.283	6.147	6.723
32	*SALES/AVG CAPITALIZ*	**********	2.920	3.656	3.268	4.003	3.604	3.889	5.243	3.797	4.075
33	*SALES/AVG TOT DEBT + EQTY*	**********	2.578	2.776	2.339	2.786	3.042	3.627	4.918	3.152	3.489
34	*SALES/AVG TOTAL ASSETS*	**********	1.793	1.943	1.699	2.050	2.221	2.252	2.343	2.043	2.143
35	*SALES/AVG OPER ASSETS*	**********	2.045	2.179	1.903	2.282	2.485	2.470	2.492	2.265	2.355
36	*SALES/AVG GROSS P P E*	**********	12.536	13.805	10.573	11.655	11.450	10.006	12.600	11.804	11.570
BALANCE SHEET											
37	*CASH/SALES*	0.014	0.022	0.026	0.014	0.007	0.012	0.016	0.025	0.017	0.017
38	*RECEIVABLES/SALES*	0.124	0.165	0.146	0.150	0.151	0.146	0.157	0.161	0.150	0.153
41	*INVENTORY/SALES*	0.327	0.334	0.279	0.286	0.250	0.208	0.213	0.273	0.271	0.254
42	*OTH CURR ASSETS/SALES*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
43	*LINE 6/SALES*	0.004	0.003	0.002	0.002	0.002	0.004	0.002	0.004	0.003	0.003
44	*GROSS P P E/SALES*	0.091	0.090	0.080	0.103	0.088	0.105	0.119	0.089	0.095	0.098
45	*LINE 13/SALES*	0.074	0.061	0.048	0.051	0.041	0.031	0.023	0.014	0.043	0.034
46	*MISC ASSETS/SALES*	0.012	0.010	0.012	0.011	0.008	0.026	0.011	0.017	0.013	0.014
47	*ACCOUNTS PAYABLE/SALES*	0.143	0.156	0.117	0.111	0.104	0.083	0.103	0.098	0.114	0.105
48	*ACCRUED TAXES/SALES*	0.005	0.026	0.024	0.009	0.009	0.027	0.001	0.008	0.014	0.012
51	*ACCRUED LIABILITY/SALES*	0.030	0.015	0.017	0.019	0.022	0.018	0.021	0.025	0.021	0.021
53	*DEFERRED TAXES/SALES*	0.002	0.004	0.006	0.007	0.004	0.004	0.005	0.003	0.004	0.004
54	*MISC LIABILITIES/SALES*	0.000	0.000	0.000	0.000	0.000	0.000	0.105	0.175	0.035	0.059
MISCELLANEOUS											
57	*EQUITY PER COMMON SHARE*	6.184	7.131	8.166	8.492	8.958	10.724	12.542	13.867	9.508	10.744
58	*RETIRE/PREV GROSS P P E*	**********	(0.053)	(0.060)	(0.054)	(0.097)	(0.037)	(0.033)	(0.100)	(0.062)	(0.064)
61	*DEPREC/PREV GROSS P P E*	**********	0.156	0.152	0.153	0.131	0.143	0.122	0.163	0.146	0.144
62	*COM DIVS/ERN-PFD DIVS*	0.000	0.000	0.000	0.000	0.000	0.037	0.069	0.078	0.023	0.037
63	*TAX RATE*	0.439	0.465	0.493	0.499	0.724	0.487	0.449	0.466	0.503	0.507
64	*COST OF GOODS/SALES*	0.735	0.757	0.752	0.750	0.755	0.733	0.741	0.758	0.749	0.750
65	*S G & A/SALES*	0.171	0.144	0.159	0.179	0.172	0.168	0.172	0.157	0.165	0.166

Source: Arrow Electronics, Inc. Annual Reports
DATAQUEST, Inc.

ASEA Brown Boveri

Table 1

Estimated Worldwide Semiconductor Revenue by Calendar Year
(Millions of Dollars)

	1983	1984	1985	1986	1987	1988
Total Semiconductor	14	22	28	64	103	113
Total Integrated Circuit	7	13	18	22	26	28
Bipolar Digital (Function)						
Bipolar Digital Memory						
Bipolar Digital Logic						
MOS (Function)	7	13	18	22	26	28
MOS Memory						
MOS Microdevices						
MOS Logic	7	13	18	22	26	28
Analog						
Total Discrete	4	5	5	36	69	76
Total Optoelectronic	3	4	5	6	8	9

Table 2

ASEA Brown Boveri
1988 Worldwide Ranking by Semiconductor Markets
(Revenue in Millions of Dollars)

	1988 Rank	1987 Rank	1988 Revenue	Sales % Change 1987-1988	Industry % Change 1987-1988
Total Semiconductor	52	49	$113	9.7%	33.0%
Total Integrated Circuit	84	76	$ 28	7.7%	37.4%
MOS (Function)	62	55	$ 28	7.7%	54.5%
MOS Logic	44	38	28	7.7%	29.2%
Total Discrete	24	25	$ 76	10.1%	14.4%
Total Optoelectronic	26	25	$ 9	12.5%	27.5%

Source: Dataquest
December 1989

ASEA Brown Boveri

Table 3

ASEA Brown Boveri
Estimated 1988 Semiconductor Revenue by Geographic Region
(Millions of Dollars)

	U.S.	Japan	Europe	ROW
Total Semiconductor	$10	$3	$100	
Total Integrated Circuit	$ 2	$1	$ 25	
Bipolar Digital (Function)				
Bipolar Digital Memory				
Bipolar Digital Logic				
MOS (Function)	$ 2	$1	$ 25	
MOS Memory				
MOS Microdevices				
MOS Logic	2	1	25	
Analog				
Total Discrete	$ 7		$ 69	
Total Optoelectronic	$ 1	$2	$ 6	

Source: Dataquest
December 1989

ASEA-Hafo AB

BACKGROUND AND OVERVIEW

ASEA-Hafo AB is a Swedish company dedicated to the design and fabrication of high-quality semiconductor products. ASEA is one of the world's major electrical engineering groups, manufacturing a highly diversified range of products that includes electrical machines and industrial robots and apparatus, as well as supplying complete systems and turnkey plants to power utilities, industries, and public transport operations. Hafo was established as a semiconductor institute in the 1940s. In 1970, it became a fully owned subsidiary of ASEA, called ASEA-Hafo.

In 1970, ASEA-Hafo entered into a licensing agreement with RCA, of the United States, to transfer CMOS process technology. This agreement is still in force. In 1971, ASEA-Hafo started the development of a design system optimized for LSI custom circuits.

Early in 1981, ASEA-Hafo moved into new facilities in Järfälla, near Stockholm, Sweden. These facilities contain two production areas--one for wafer fabrication and one for assembly.

In April 1983, ASEA-Hafo announced plans to expand its facilities for custom integrated circuits. The first stage of the expansion was a design center in San Diego, California, opened in March 1984. Expansion is also planned for the production facilities at Järfälla, where a new process line is to be set up.

In late 1984, ASEA-Hafo was put under investigation by U.S. trade authorities for suspected circumvention of U.S. high-technology export restrictions; this resulted in a $440,000 fine being imposed in May 1986. The Company was fined for participating in the reexport of nine computers of U.S. origin to the Soviet Bloc.

In March 1985, ASEA-Hafo bought a controlling 51 percent interest in Tolley Holdings, the leading New Zealand manufacturer and wholesaler of electrical equipment. This is intended to further consolidate ASEA-Hafo's position both in Australasia and in Southeast Asia.

As shown in Table 1, Dataquest estimates that ASEA-Hafo's European semiconducter revenue was $32 million in 1986, representing an increase of 28 percent over 1985 revenue. Table 2 shows Dataquest's estimates of the Company's worldwide semiconductor revenue.

ASEA-Hafo AB

Table 1

ASEA-Hafo AB
ESTIMATED EUROPEAN SEMICONDUCTOR REVENUE BY PRODUCT LINE
(Millions of U.S. Dollars)

	1982	1983	1984	1985	1986
Total Semiconductor	$13	$14	$21	$25	$32
Total Integrated Circuit	$ 7	$ 7	$12	$15	$19
Bipolar Digital	0	0	0	0	0
MOS	7	7	$12	15	19
Linear	0	0	0	0	0
Total Discrete	$ 5	$ 4	$ 5	$ 5	$ 7
Transistor	0	0	0	0	0
Diode	0	0	0	0	0
Thyristor	3	2	2	2	4
Other	2	2	3	3	3
Total Optoelectronic	$ 1	$ 3	$ 4	$ 5	$ 6

Table 2

ASEA-Hafo AB
ESTIMATED WORLDWIDE SEMICONDUCTOR REVENUE BY PRODUCT LINE
(Millions of U.S. Dollars)

	1982	1983	1984	1985	1986
Total Semiconductor	$13	$14	$22	$28	$35
Total Integrated Circuit	$ 7	$ 7	$13	$18	$22
Bipolar Digital	0	0	0	0	0
MOS	7	7	13	18	22
Linear	0	0	0	0	0
Total Discrete	$ 5	$ 4	$ 5	$ 5	$ 7
Transistor	0	0	0	0	0
Diode	0	0	0	0	0
Thyristor	3	2	2	2	4
Other	2	2	3	3	3
Total Optoelectronic	$ 1	$ 3	$ 4	$ 5	$ 6

Source: Dataquest
February 1987
Ref. 0187-05

ASEA-Hafo AB

PRODUCTS AND MARKETS SERVED

ASEA-Hafo specializes in CMOS custom LSI circuits, optoelectronic devices, and transient-surge suppressors. The Company's products are aimed at high-reliability telecommunications, industrial, military, and medical applications.

ASEA-Hafo has two families of IC processors: CMOS metal gate on silicon and CMOS silicon gate on sapphire. Both of these technologies are based on the licensing agreement with RCA.

ASEA-Hafo manufactures two types of optoelectronic devices: high-frequency and low-frequency. The high-frequency device applications include infrared-emitting diodes and photodetectors for fiber-optic applications. The low-frequency device application area is broader and includes optoelectronic couplers.

The most notable product in ASEA-Hafo's transient-surge suppressors group is a self-triggering thyristor diode, suitable for many applications, to protect integrated circuits and other electronic components.

In October 1983, the Swedish government announced plans for a five-year development program for advanced electronic microprocessors. ASEA-Hafo will be one of the two companies to which the government initiative will be directed.

In 1986, ASEA-Hafo opened a new U.S. facility in San Diego, California specifically to address the growing North American marketplace for custom IC LSI circuits. In this plant, a CMOS silicon-on-sapphire process is used by ASEA-Hafo under license from RCA. This process is more rugged than the standard CMOS silicon gate process, making it popular in military/aerospace applications.

OUTLOOK

ASEA-Hafo is increasing its resources for the development and production of transient-surge suppressors and components for fiber-optic communication, in parallel with increased investments in integrated circuits.

ASEA-Hafo started to market custom integrated circuits in the United States in 1982. Dataquest believes that ASEA-Hafo's export marketing will continue to focus on the United States, because of the large market potential there for the Company's products.

AST Research, Inc.

16215 Alton Parkway
P.O. Box 19658
Irvine, California 92713-9658
Telephone: (714) 727-4141
Fax: (714) 863-9478
Dun's Number: 01-876-8648

Date Founded: 1980

CORPORATE STRATEGIC DIRECTION

AST Research, Inc., is a leading manufacturer of board-level enhancement products that expand the capabilities and performance of personal computers. The Company's broad line of integrated hardware and software products is designed primarily to address the needs of business users for memory expansion, data communications, local area networking, and graphics.

AST targets the three largest computer markets served by Apple, Digital Equipment Corporation, and IBM: personal, business, and technical. The Company's organizational structure reflects this market orientation; it is divided into task groups that design products exclusively for each of the three markets served.

The Company's total revenue increased 11 percent to $456.5 million* in fiscal 1989 from $412.7 million in fiscal 1988. From its net income of $15.1 million in fiscal 1988, AST plummeted 150 percent to a negative net income loss of $7.5 million in fiscal 1989. AST Research employs more than 2,000 people worldwide.

The U.S. sales contribution to AST's total revenue grew to $340 million in 1989. U.S. sales accounted for 74 percent of the total, down from 79 percent the previous year. Sixty-six percent of the Company's sales offices are in U.S. locations.

Research and development expenditures totaled $16.9 million in fiscal 1989, representing 3.7 percent of revenue. Capital expenditures totaled $11.8 million, or 2.6 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

AST Research's market positions are as varied as its diversified product line. In fact, both its strength and weakness lie in its product diversity. When a product area is either satiated or depressed, another product line can make up for lost revenue. On the other hand, it is difficult for any firm to cover such broad markets sufficiently.

Multifunction Circuit Boards

Multifunction circuit boards have been AST's principal product line. Sales were affected dramatically by a decline in the Six Pak Plus product family but were being offset by newer-generation, board-level products. Within one year, Six Pak Plus dropped from nearly 52 percent of AST's revenue to less than 13 percent. Products in this area have been built predominantly for use with the IBM PC AT and compatibles. Part of AST's marketing strategy is to steer away from relying solely on the IBM marketplace by developing more products for use with Apple's MacIntosh computer.

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

Data Communication Products

AST has taken the leadership in 5250 and 5257 emulator boards for IBM's System/3X in 1988. Dataquest ranks AST as number five for the 3270 emulator board, holding 3 percent of the market share. In comparison, Digital Communication Associates with 54 percent and IBM with 16 percent hold first and second place in the 3270 emulator board market segment for the same year.

LAN Products

AST has announced that it wants to be a competitor in the Ethernet market. It has a few products on the market that will work on high-end 286 and 386 computer systems, but the Company is not a major player in the local area network (LAN) industry.

Graphics

In the past year, graphics has been a relatively slow area for AST. Dataquest estimates that AST had 2 percent of the 1988 market share for PC add-on boards, in comparison with the top four vendors, who held 48 percent of the market share. Because AST has been emphasizing its systems business, it appears that it has not been pushing graphics boards for other vendors' computer systems. But since it was selling low-margin commodity graphics products, this may be a part of the Company's plan to build its systems business.

Business and Personal Computers

In late 1986, AST announced its plan to leverage its expertise in the computer peripheral and enhancement products business by introducing five of its own IBM PC AT-compatible personal computers called the Premium/286 and Premium/386 series. These machines are designed for applications such as desktop publishing, data processing, spreadsheet analysis, computer graphics, and CAD/CAE. Dataquest estimates that AST had 1.24 percent of the 1989 personal computer worldwide market share.

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 U.S. Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	$138.6	$172.3	$206.0	$412.7	$456.5
Percent Change	-	24.31	19.56	100.34	10.61
Capital Expenditure	$2.7	$6.5	$6.3	$14.6	$11.8
Percent of Revenue	1.95	3.77	3.06	3.54	2.58
R&D Expenditure	$5.0	$8.4	$11.1	$15.7	$16.9
Percent of Revenue	3.61	4.88	5.39	3.80	3.70
Number of Employees	532	800	1,358	N/A	2,281
Revenue ($K)/Employee	$260.53	$215.38	$151.69	N/A	$200.13
Net Income	$19.0	$27.2	$13.0	$15.1	($7.5)
Percent Change	-	42.85	(52.21)	16.15	(149.67)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$113.84	$123.45	$114.50	N/A
Quarterly Profit	($1.31)	$2.48	$2.85	N/A

N/A = Not Available

Source: AST Research, Inc. Annual Reports and Forms 10-K
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	88.02	85.20	80.39	79.06	74.48
International	12.00	14.80	19.61	20.94	25.52
Europe	N/A	13.55	17.85	18.10	18.76
ROW	N/A	1.25	1.76	2.84	6.76

N/A = Not Available

Source: AST Research, Inc. Annual Reports and Forms 10-K
Dataquest
January 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	0	0
Indirect Sales	100.00	100.00
VARs	65.00	62.00
Distributor	27.00	32.00
OEMs	8.00	6.00

Source: Dataquest
January 1990

1989 SALES OFFICE LOCATIONS

North America—18
Japan—1
Europe—6
Asia/Pacific—2
ROW—3

MANUFACTURING LOCATIONS

North America

Irvine, California
Systems and board-level production

Asia/Pacific

Hong Kong
High-volume, board-level product production using surface-mount technology
Taiwan
Computer systems products

SUBSIDIARIES

North America

AST Sales Inc. (Canada)

Japan

AST Research (Japan) K.K.

Europe

AST Europe Limited (England)
AST Research France SARL (France)
AST Research Germany GmbH (West Germany)
AST Research Italia S.p.A. (Italy)
AST Research (Switzerland) S.A. (Switzerland)

Asia/Pacific

AST Research Australia (Australia)
AST Research (Far East) Ltd. (Hong Kong)
AST Research, Inc. (China)
AST Taiwan Ltd. (Taiwan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Microsoft
Licensing agreement

1988

ComputerLand
AST microcomputer systems offered to ComputerLand franchises

KEY OFFICERS

Safi U. Qureshey
Cochairman of the board, president and chief executive officer

Thomas C. K. Yuen
Cochairman of the board and chief operating officer

James W. Ashbrook
Senior vice president, Product Marketing

Bruce D. Cassell
Senior vice president, North American Sales and Marketing

Bruce C. Edwards
Senior vice president, Finance, and chief financial officer

Wesley F. Nelson
Vice president, International Sales

John C. Olson
Vice president, Worldwide Manufacturing

PRINCIPAL INVESTORS AND FOUNDERS

Albert Wong—15.58 percent
Safi Qureshey—16.94 percent
Thomas Yuen—16.85 percent

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

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	$70.0	$95.8	$128.6	$234.8	$200.0
Cash	36.1	47.9	39.8	20.4	18.5
Receivables	16.5	19.2	30.7	79.5	64.8
Marketable Securities	0	0	0	0	0
Inventory	14.5	23.3	52.0	125.2	91.6
Other Current Assets	2.9	5.4	6.1	9.7	25.1
Net Property, Plants	$4.1	$8.7	$11.8	$32.7	$46.6
Other Assets	$1.8	$4.3	$3.9	$4.3	$14.5
Total Assets	$75.9	$108.8	$144.3	$271.8	$261.1
Total Current Liabilities	$18.1	$19.4	$39.3	$86.9	$58.2
Long-Term Debt	$0.03	$0.01	0	$61.3	$81.0
Other Liabilities	$0.9	$2.8	$5.9	$8.7	$13.1
Total Liabilities	$19.0	$22.2	$45.2	$156.9	$152.3
Total Shareholders' Equity	$56.9	$86.6	$99.1	$114.9	$108.8
Converted Preferred Stock	0	0	0	0	0
Common Stock	30.6	33.1	32.6	0.1	0.1
Other Equity	0.0	0.0	0.0	33.2	34.5
Retained Earnings	26.3	53.5	66.5	81.6	74.2
Total Liabilities and Shareholders' Equity	$75.9	$108.8	$144.3	$271.8	$261.1
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$138.6	$172.3	$206.0	$412.7	$456.5
U.S. Revenue	122.0	146.8	165.6	326.3	340.0
Non-U.S. Revenue	16.6	25.5	40.4	86.4	116.5
Cost of Sales	$71.6	$76.5	$120.4	$295.8	$344.3
R&D Expense	$5.0	$8.4	$11.1	$15.7	$16.9
SG&A Expense	$24.1	$41.1	$55.3	$78.2	$99.2
Capital Expense	$2.7	$6.5	$6.3	$14.6	$11.8
Pretax Income	$38.0	$49.3	$21.7	$20.9	($11.6)
Pretax Margin (%)	27.42	28.61	10.53	5.06	(2.54)
Effective Tax Rate (%)	46.00	46.00	N/A	28.00	N/A
Net Income	$19.0	$27.2	$13.0	$15.1	($7.5)
Shares Outstanding, Millions	9.6	11.6	11.5	11.7	11.6
Per Share Data					
Earnings	$1.98	$2.34	$1.13	$1.28	($0.64)
Dividends	0	0	0	0	0
Book Value	$5.93	$7.47	$8.62	$9.82	$9.38

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

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	3.87	4.94	3.27	2.70	3.44
Quick (Times)	3.07	3.74	1.95	1.26	1.86
Fixed Assets/Equity (%)	7.21	10.05	11.91	28.46	42.83
Current Liabilities/Equity (%)	31.81	22.40	39.66	75.63	53.49
Total Liabilities/Equity (%)	33.44	25.65	45.61	136.55	139.98
Profitability (%)					
Return on Assets	-	29.45	10.27	7.26	(2.81)
Return on Equity	-	37.91	14.00	14.11	(6.71)
Profit Margin	13.74	15.79	6.31	3.66	(1.64)
Other Key Ratios					
R&D Spending % of Revenue	3.61	4.88	5.39	3.80	3.70
Capital Spending % of Revenue	1.95	3.77	3.06	3.54	2.58
Employees	532	800	1,358	N/A	2,281
Revenue ($K)/Employee	$260.53	$215.38	$151.69	N/A	$200.13
Capital Spending % of Assets	3.56	5.97	4.37	5.37	4.52

N/A = Not Available

Source: AST Research, Inc. Annual Reports and Forms 10-K
Dataquest
January 1990

Ashton-Tate Corporation

20101 Hamilton Avenue
Torrance, California 90502-1319
Telephone: (213) 329-8000
Fax: (213) 538-6191
Dun's Number: 03-438-7464

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Ashton-Tate Corporation, formed in 1980, is one of the largest software companies in the world, developing and marketing leading microcomputer software products including database management systems (DBMS), word processing, business graphics, spreadsheets, and integrated software. Although such products as Framework and MultiMate are successful, dBASE is the Company's key product. Dataquest estimates that Ashton-Tate ranked fourth in worldwide PC software revenue.

At the beginning of 1989, Ashton-Tate changed from a fiscal year ending on January 31 to a year ending on December 31. Fiscal 1989 extended from January 1, 1988 to January 1, 1989; calendar 1989 from January 1, 1989 to December 31, 1989.

The Company's total revenue decreased 13.7 percent to $265.3 million* in calendar 1989 from $307.3 million in fiscal 1989. Ashton-Tate reported a net loss of $28.6 million in calendar 1989 after reporting a profit of $47.8 million in fiscal 1989. The Company employed 1,430 people worldwide during calendar year 1989.

Worldwide, Ashton-Tate has over 500 marketing, sales, and support personnel, including a regional network in the United States of approximately 115 field sales representatives and support personnel in 9 metropolitan areas. The field sales group provides product training, technical assistance, and sales support to its dealers and distributors. The Company's US sales force also markets its products to original equipment manufacturers (OEMs), value-added resellers (VARs), and major resellers, and works with key dealers who sell to corporate accounts.

According to Ashton-Tate, distributors accounted for 88 percent and OEMs accounted for 1 percent of sales. Direct sales accounted for 11 percent of revenue in calendar 1989. The Company sells directly to major retail accounts including Businessland, ComputerLand, Corporate Software, Egghead Discount Software, and Government Technology Services, Inc. Authorized dealers are targeted by the Company's five US distributors, including two that sell to the educational market.

Over the past five years, international sales have gradually increased from 24 percent of total revenue in fiscal 1986 to 57 percent in calendar 1989.

The Company divides the international world into two territories—Europe and International. Europe consists of all the Company's subsidiaries and master distributors on the European continent, Northern Africa, and the Middle East. Europe is Ashton-Tate's strongest international market. Ashton-Tate Europe's mission is focused on sales and marketing resource expansion in the Nordic countries, Italy and Spain, and other areas that present major opportunities. The International territories are the countries of the Pacific Rim, including those in Asia, Australia, New Zealand, and Latin America.

Research and development expenditure totaled $68.7 million in calendar 1989, representing 26.0 percent of Ashton-Tate's revenue. R&D expenses increased because of the expansion of the Company's internal development activities, a significant portion of which related to the development of dBASE IV. Capital expenditure totaled $22.3 million in calendar 1989, representing 8.4 percent of the Company's 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

Software

Ashton-Tate's principal software products operate on the IBM PC, PC XT, PC AT, PS/2, and fully IBM-compatible computers, and are available in foreign-language versions. FullWrite, FullPaint, and Full Impact are designed to operate on the Macintosh. The Company has announced its intention to offer database products that operate on UNIX and VMS operating systems.

Database Management Products

Ashton-Tate's dBASE products accounted for 74, 70, and 64 percent of the Company's total revenue during calendar 1989, fiscal 1989, and fiscal 1988, respectively. The Company's principal products are dBASE IV and its predecessor dBASE III PLUS, which allow users to create, save, retrieve, and manipulate databases and create standard and customized reports. The dBASE IV product features an enhanced dBASE programming language, including SQL programming commands, is faster than its predecessor, and is designed for use in local area networks (LANs).

The Company announced its intention to ship two enhanced versions of dBASE IV: dBASE IV version 1.1 Standard Edition for individual and LAN users and dBASE IV version 1.1 Server Edition for users who require connectivity with database servers. Ashton-Tate shipped dBASE IV version 1.1 Standard Edition in August 1990. Expanding the capabilities of dBASE IV is dBASE IV LAN Pack, which enables five workstations to access dBASE IV. The Company also markets dBASE IV Developer's Edition, for use principally by applications developers, which includes a run-time version of dBASE IV and additional documentation. The dBASE III PLUS is available in a single-user version and a LAN version.

Word Processing Products

Ashton-Tate's DOS-based word processor, MultiMate version 4.0, began shipment in December 1989. MultiMate contains over 150 text editing and document handling functions, electronic mail, document compression, and grammar check, and utilizes the features of laser printers. It also has a legal and conventional dictionary for spell-checking. The Company has announced its intention to release a LAN version of MultiMate.

FullWrite Professional operates on the Macintosh and combines the functionality of a full-featured word processor with the features of desktop publishing and graphics products. It provides automatic footnoting, pagination, a spell-checker, and a thesaurus. FullWrite Professional also allows the user to wrap text around graphics or illustrations randomly placed in the text and to select different fonts within text.

Graphics Products

APPLAUSE II operates on DOS systems and allows users to create 37 types of charts as well as graphic arts-quality visuals through special effects including color selection, color blending, and drawing and editing capabilities. APPLAUSE II operates on DOS personal computers with low memory configurations and supports a variety of output devices. It currently is being translated into nine languages.

Multifunction Product

Framework III is the DOS-based successor to Framework and Framework II. It uses hierarchically arranged "frames" to manage words, numbers, graphs, data, and ideas. This fully integrated product combines spreadsheet and word processing capabilities with database, graphics, outlining, and communication modules, including a built-in electronic mail component. Framework III also contains its own applications development language, FRED, which may be used to develop applications software or to customize the product for the specific needs of the users. FrameWork III LAN was introduced during December 1988. It allows five additional workstations on a LAN to access Framework III.

Spreadsheets

Full Impact is a presentation spreadsheet product for the Macintosh. It incorporates full spreadsheet functionality with graphics and presentation capabilities, word processing, and other features associated with spreadsheet products.

Further Information

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

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

	1986	1987	1988	1989	1989*
Five-Year Revenue	$121,571	$210,799	$267,328	$307,283	$265,319
Percent Change	-	73.40	26.82	14.95	(13.66)
Capital Expenditure	$4,803	$5,962	$6,507	$36,399	$22,323
Percent of Revenue	3.95	2.83	2.43	11.85	8.41
R&D Expenditure	$14,832	$25,670	$35,463	$52,863	$68,652
Percent of Revenue	12.20	12.18	13.27	17.20	25.88
Number of Employees	822	1,100	1,250	1,460	1,430
Revenue ($K)/Employee	$147.90	$191.64	$213.86	$210.47	$185.54
Net Income	$16,567	$30,100	$43,076	$47,755	($28,642)
Percent Change	-	81.69	43.11	10.86	(159.98)

1989 Calendar Year*	Q1	Q2	Q3	Q4
Quarterly Revenue	$89.8	$59.5	$53.9	$62.1

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

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1989*
North America	74.74	71.80	69.69	60.50	43.34
International	24.26	28.20	30.31	39.50	56.66

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

Table 3
Revenue by Distribution Channel (Percent)

Channel	1989	1989*
Direct Sales	8.00	11.00
Indirect Sales	92.00	89.00
Distributors	89.00	88.00
OEMs	3.00	1.00

*During the year ended December 31, 1989, the Company changed its financial reporting year-end from January 31 to December 31.

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—15
Europe—6
Asia/Pacific—6
  Japan—1
ROW—1

MANUFACTURING LOCATIONS

North America

Gurabo, Puerto Rico
  Duplication of diskettes/printing of manuals
Torrance, California
  Duplication of diskettes/printing of manuals

Europe

Dublin, Ireland
  Duplication of diskettes/printing of manuals

Asia/Pacific

Singapore
  Duplication of diskettes/printing of manuals

SUBSIDIARIES

North America

Ashton-Tate Canada, Ltd. (Canada)
Ashton-Tate Puerto Rico, Ltd. (Puerto Rico)
Interbase Software Corp. (United States)

Europe

Ashton-Tate GmbH (West Germany)
Ashton-Tate Nederland B.V. (Ireland)
Ashton-Tate Northern Europe B.V. (Netherlands)
Ashton-Tate S.A. (Spain)
Ashton-Tate Srl (Italy)
Ashton-Tate (U.K.) Ltd. (United Kingdom)

Asia/Pacific

Ashton-Tate (H.K.) Limited (Hong Kong)
Ashton-Tate (Malaysia) Sdn. Bhd. (Malaysia)
Ashton-Tate New Zealand Limited (New Zealand)
Ashton-Tate Pty. Ltd. (Australia)
Ashton-Tate Singapore Pte. Ltd. (Singapore)
Ashton-Tate Trading Co. (Hong Kong)
Nippon Ashton-Tate K.K. (Japan)

ROW

Ashton-Tate C.A. (Venezuela)

ALLIANCES, JOINT VENTURES, LICENSING AGREEMENTS

1990

Hunter Systems
Ashton-Tate and Hunter Systems have formed an agreement under which the MultiMate Advantage II word processing program that has been available for the IBM PC will now also be available for most UNIX-based microcomputer systems.

Thaisoft Co. Ltd.
Ashton-Tate has appointed Thaisoft Co. Ltd. as its sole distributor in Thailand.

General Parametrics
A cooperative agreement has been announced by Ashton-Tate and General Parametrics under which Ashton-Tate's new Applause II graphics software now supports General Parametric's line of VideoShow electronic presentation products.

SoftKat Inc.
SoftKat Inc. and Ashton-Tate established an agreement that allows SoftKat to distribute some of Ashton-Tate's Macintosh programs designed specifically for faculty and students of nonprofit educational institutions.

Sun Microsystems Inc.
Sun Microsystems Inc. and Ashton-Tate signed a joint development and marketing agreement to make dBASE IV available for Sun computer systems.

Technology Works
Technology Works has entered into a joint promotion with Ashton-Tate. Through this promotion, a free copy of Ashton-Tate's word processing software, FullWrite Professional for the Macintosh 1.0, will be included with every purchase of Technology Works' 4MB memory upgrade kit.

1989

Macamerica
Macamerica became a new distributor of Ashton-Tate's software products for the Apple Macintosh personal computer.

1988

Interbase Software Corp.
Ashton-Tate announced a database technology agreement with Interbase Software Corporation of Massachusetts. The two companies will jointly develop an advanced technology for Ashton-Tate's next-generation workstation DBMS products. Ashton-Tate has also acquired an equity position in Interbase.

MERGERS AND ACQUISITIONS

1989

Interbase Software Corp.
Interbase develops and markets the database management system for minicomputers from Apollo, Digital Equipment, Sun, and others running under VMS, Ultrix, and UNIX operating systems.

1988

Ann Arbor Softworks
After acquiring Macintosh software from Ann Arbor Softworks, Ashton-Tate has merged the company into Ashton-Tate's Macintosh division located in Campbell, California.

KEY OFFICERS

Dr. Carmelo Santoro
Chairman of the board

Bill Lyons
President and chief operating officer

Donald Dempsey
Vice president, US Division

David Proctor
Vice president, Database Division

George Farinsky
Executive vice president and chief financial officer

Floyd H. Bradley III
Vice president, Europe

Peter Boot
Vice president, International

PRINCIPAL INVESTORS

J.P. Morgan & Co., Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending January 31
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1986	1987	1988	1989	1989*
Total Current Assets	$53,684	$129,729	$189,185	$214,495	$185,211
Cash	15,959	77,844	117,640	109,381	96,292
Receivables	30,417	40,003	58,417	70,695	42,417
Inventory	5,149	8,666	8,171	25,092	16,471
Other Current Assets	2,159	3,216	4,957	9,327	30,031
Net Property, Plants	$12,611	$15,802	$18,053	$44,570	$49,897
Other Assets	$22,103	$29,200	$42,505	$46,426	$30,929
Total Assets	$88,398	$174,731	$249,743	$305,491	$266,037
Total Current Liabilities	$29,481	$44,740	$63,043	$63,858	$61,780.0
Long-Term Debt	$4,704	$2,158	$2,113	$4,606	$4,531.0
Other Liabilities	$685	$5,387	$5,502	$3,569	$2,670.0
Total Liabilities	$34,870	$52,285	$70,658	$72,033	$68,981
Total Shareholders' Equity	$53,528	$122,446	$179,085	$233,458	$197,056
Converted Preferred Stock	0	0	0	0	0
Common Stock	24,308	239	248	257	264
Other Equity	(1,016)	61,871	75,425	82,034	94,954
Retained Earnings	30,236	60,336	103,412	151,167	101,838
Total Liabilities and Shareholders' Equity	$88,398	$174,731	$249,743	$305,491	$266,037

Income Statement	1986	1987	1988	1989	1989*
Revenue	$121,571	$210,799	$267,328	$307,283	$265,319
US Revenue	92,074	151,346	186,290	185,909	114,998
Non-US Revenue	29,497	59,453	81,038	121,374	150,321
Cost of Sales	$17,842	$33,362	$39,684	$47,839	$65,571
R&D Expense	$14,832	$25,670	$35,463	$52,863	$68,652
SG&A Expense	$59,006	$95,339	$119,244	$138,651	$157,810
Capital Expense	$4,803	$5,962	$6,507	$36,399	$22,323
Pretax Income	$30,679	$58,161	$76,976	$73,455	($31,642)
Pretax Margin (%)	25.24	27.59	28.79	23.90	0
Effective Tax Rate (%)	46.00	48.00	44.00	35.00	(9.50)
Net Income	$16,567	$30,100	$43,076	$47,755	($28,642)
Shares Outstanding, Thousands	19,434	23,902	25,338	26,158	26,306
Per Share Data					
Earnings	$0.85	$1.26	$1.70	$1.83	($1.09)
Dividend	0	0	0	0	0
Book Value	$2.75	$5.12	$7.07	$8.92	$7.49

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending January 31
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1986	1987	1988	1989	1989*
Liquidity					
Current (Times)	1.82	2.90	3.00	3.36	3.00
Quick (Times)	1.65	2.71	2.87	2.97	2.73
Fixed Assets/Equity (%)	23.56	12.91	10.08	19.09	25.32
Current Liabilities/Equity (%)	55.08	36.54	35.20	27.35	31.35
Total Liabilities/Equity (%)	65.14	42.70	39.46	30.85	35.01
Profitability (%)					
Return on Assets	24.60	22.88	20.30	17.20	(10.02)
Return on Equity	39.69	34.21	28.57	23.15	(13.31)
Profit Margin	13.63	14.28	16.11	15.54	(10.80)
Other Key Ratios					
R&D Spending % of Revenue	12.20	12.18	13.27	17.20	25.88
Capital Spending % of Revenue	3.95	2.83	2.43	11.85	8.41
Employees	822	1,100	1,250	1,460	1,430
Revenue ($K)/Employee	$148	$192	$214	$210	$186
Capital Spending % of Assets	5.43	3.41	2.61	11.91	8.39

*During the year ended December 31, 1989, the Company changed its financial reporting year-end from January 31 to December 31.

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

Ashton-Tate Corporation

20101 Hamilton Avenue
Torrance, California 90502-1319
Telephone: (213) 329-8000
Fax: (213) 538-6191
Dun's Number: 03-438-7464

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Ashton-Tate Corporation, formed in 1980, is now one of the largest software companies in the world, developing and marketing leading microcomputer software products including database management systems (DBMSs), word processing, business graphics, desktop publishing, spreadsheets, and integrated software. Although such products as Framework, Chart Master, and MultiMate are fairly successful, dBase is the Company's key product. In 1988, Ashton-Tate ranked third in the software industry by revenue earnings. Dataquest does not expect Ashton-Tate to hold this ranking position in 1989 because of the lack of acceptance of dBase IV.

The five-year trend of the profitability ratios indicate that Ashton-Tate is very profitable. During the last five years, the Company has always earned more per dollar on its profits than the industry average. In fact, its average profit margin from 1985 through 1989 was $7.22*more per dollar than the industry average.

The Company's total revenue increased 15 percent to $307.3 million in fiscal 1989 from $267.3 million in fiscal 1988. Its net income increased 11 percent to $47.8 million in fiscal 1989 from $43.1 million in 1988. Ashton-Tate employs 1,460 people worldwide.

U.S. revenue decreased to $185.9 million in 1989. U.S. sales accounted for 61 percent of the total, down from 70 percent in fiscal 1988.

Research and development expenditures totaled $52.9 million in fiscal 1989, representing 17 percent of Ashton-Tate's revenue. R&D expenses increased because of the expansion of the Company's internal development activities, a significant portion of which related to the development of dBASE IV, and increased product rights amortization. Capital expenditures totaled $36.4 million in 1989, representing 12 percent of the Company's 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

Software

Ashton-Tate's software operates primarily on IBM, fully IBM-compatible, and certain other 8-, 16-, and 32-bit microcomputers. dBASE Mac, FullWrite, FullPaint, and Full Impact are designed to operate on the Macintosh. The Company has announced its intention to offer products that operate on UNIX operating systems.

Although dBASE accounts for the bulk of Ashton-Tate's revenue, a significant 35 to 40 percent of its income currently is generated by products other than dBASE III Plus and IV, such as word processing, multifunction, and business graphics software. Ashton-Tate has plans to diversify from its traditional personal computer software base toward larger hardware platforms in the workstation and minicomputer environments.

Further Information

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

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$82,281	$121,571	$210,799	$267,328	$307,283
Percent Change	-	47.75	73.40	26.82	14.95
Capital Expenditure	N/A	$4,803	$5,962	$6,507	$36,399
Percent of Revenue	-	3.95	2.83	2.43	11.85
R&D Expenditure	$8,331	$14,832	$25,670	$35,463	$52,863
Percent of Revenue	10.13	12.20	12.18	13.27	17.20
Number of Employees	459	822	1,100	1,250	1,460
Revenue ($K)/Employee	$179.26	$147.90	$191.64	$213.86	$210.47
Net Income	$7,463	$16,567	$30,100	$43,076	$47,755
Percent Change	-	121.99	81.69	43.11	10.86

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$89.80	$59.49	N/A	N/A
Quarterly Profit	$11.50	($19.78)	N/A	N/A

N/A = Not Available

Source: Ashton-Tate Corporation
Annual Reports and Forms 10-K
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	78.17	74.74	71.80	69.69	60.50
International	21.83	24.26	28.20	30.31	39.50

Source: Ashton-Tate Corporation
Annual Reports and Forms 10-K
Dataquest
January 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	8.00	5.00
Indirect Sales	92.00	95.00
Resellers	25.00	30.00
Distributors	35.00	27.00
OEMs	4.00	8.00
International Operations	28.00	30.00

Source: Ashton-Tate Corporation
Annual Reports and Forms 10-K
Dataquest
January 1990

1989 SALES OFFICE LOCATIONS

North America—8
Japan—Not available
Europe—Not available
Asia/Pacific—Not available
ROW—Not available

MANUFACTURING LOCATIONS

North America

Gurabo, Puerto Rico
Duplication of diskettes/printing of manuals
Torrance, California
Duplication of diskettes/printing of manuals

Europe

Dublin, Ireland
Duplication of diskettes/printing of manuals

Asia/Pacific

Singapore
Duplication of diskettes/printing of manuals

SUBSIDIARIES

North America

Ashton-Tate Canada, Ltd. (Canada)
Ashton-Tate Puerto Rico, Ltd. (Puerto Rico)

Japan

Nippon Ashton-Tate

Europe

Ashton-Tate B.V. (Netherlands)
Ashton-Tate GmbH (West Germany)
Ashton-Tate Nederland B.V. (Netherlands)
Ashton-Tate Northern Europe B.V. (Ireland)
Ashton-Tate S.A. (Spain)
Ashton-Tate Srl (Italy)
Ashton-Tate (U.K.) Ltd. (United Kingdom)

Asia/Pacific

Ashton-Tate (H.K.) Limited (Hong Kong)
Ashton-Tate (Malaysia) SDN, BHD. (Malaysia)
Ashton-Tate New Zealand Limited (New Zealand)
Ashton-Tate Pty. Ltd. (Australia)
Ashton-Tate Singapore Pte. Ltd. (Singapore)

ALLIANCES, JOINT VENTURES, LICENSING AGREEMENTS

1988

Microsoft Corporation
Ashton-Tate announced a strategic alliance with Microsoft to produce and market the Ashton-Tate/Microsoft SQL Server in 1988. The product is an advanced OS/2 database server based on successful minicomputer technology developed by Sybase, Inc., of Berkeley, California.

Interbase Software Corp.
Ashton-Tate announced a database technology agreement with Interbase Software Corporation of Massachusetts. The two companies will jointly develop an advanced technology for Ashton-Tate's next-generation workstation DBMS products. Ashton-Tate has also acquired an equity position in Interbase.

MERGERS AND ACQUISITIONS

1989

Interbase Software Corp.
Interbase develops and markets the database management system for minicomputers from Apollo, Digital Equipment, Sun, and others running under VMS, Ultrix, and UNIX operating systems.

1988

Ann Arbor Softworks
After acquiring Macintosh software from Ann Arbor Softworks, Ashton-Tate has merged the company into Ashton-Tate's Macintosh division located in Campbell, California.

KEY OFFICERS

Edward M. Esber
Chairman of the board, president and chief executive officer

George L. Farinksy
Executive vice president and chief financial officer

Floyd H. Bradley III
Vice president, Europe

Peter Boot
Vice president, International

Joseph F. Brilando
Vice president, Corporate Marketing and Strategy

PRINCIPAL INVESTORS

J.P. Morgan & Co., Incorporated

Table 4
Comprehensive Financial Statement
Fiscal Year Ending January 31
(Thousands of U.S. Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$38,227	$53,684	$129,729	$189,185	$214,495
Cash	18,618	15,959	77,844	117,640	109,381
Receivables	16,412	30,417	40,003	58,417	70,695
Inventory	2,457	5,149	8,666	8,171	25,092
Other Current Assets	740	2,159	3,216	4,957	9,327
Net Property, Plants	$4,409	$12,611	$15,802	$18,053	$44,570
Other Assets	$3,659	$22,103	$29,200	$42,505	$46,426
Total Assets	$46,295	$88,398	$174,731	$249,743	$305,491
Total Current Liabilities	$16,202	$29,481	$44,740	$63,043	$63,858
Long-Term Debt	$143	$4,704	$2,158	$2,113	$4,606
Other Liabilities	0	$685	$5,387	$5,502	$3,569
Total Liabilities	$16,345	$34,870	$52,285	$70,658	$72,033
Total Shareholders' Equity	$29,950	$53,528	$122,446	$179,085	$233,458
Converted Preferred Stock	0	0	0	0	0
Common Stock	16,464	24,308	239	248	257
Other Equity	(183)	(1,016)	61,871	75,425	82,034
Retained Earnings	13,669	30,236	60,336	103,412	151,167
Total Liabilities and Shareholders' Equity	$46,295	$88,398	$174,731	$249,743	$305,491

Income Statement	1985	1986	1987	1988	1989
Revenue	$82,281	$121,571	$210,799	$267,328	$307,283
U.S. Revenue	64,321	92,074	151,346	186,290	185,909
Non-U.S. Revenue	17,960	29,497	59,453	81,038	121,374
Cost of Sales	$14,978	$17,842	$33,362	$39,684	$47,839
R&D Expense	$8,331	$14,832	$25,670	$35,463	$52,863
SG&A Expense	$42,201	$59,006	$95,339	$119,244	$138,651
Capital Expense	N/A	$4,803	$5,962	$6,507	$36,399
Pretax Income	$12,427	$30,679	$58,161	$76,976	$73,455
Pretax Margin (%)	15.10	25.24	27.59	28.79	23.90
Effective Tax Rate (%)	48.00	46.00	48.00	44.00	35.00
Net Income	$7,463	$16,567	$30,100	$43,076	$47,755
Shares Outstanding, Thousands	18,580	19,434	23,902	25,338	26,158
Per Share Data					
Earnings	$0.40	$0.85	$1.26	$1.70	$1.83
Dividends	0	0	0	0	0
Book Value	$62.04	$36.31	$19.52	$14.15	$11.20

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending January 31
(Thousands of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	2.36	1.82	2.90	3.00	3.36
Quick (Times)	2.21	1.65	2.71	2.87	2.97
Fixed Assets/Equity (%)	14.72	23.56	12.91	10.08	19.09
Current Liabilities/Equity (%)	54.10	55.08	36.54	35.20	27.35
Total Liabilities/Equity (%)	54.57	65.14	42.70	39.46	30.85
Profitability (%)					
Return on Assets	19.20	24.60	22.88	20.30	17.20
Return on Equity	28.60	39.69	34.21	28.57	23.15
Profit Margin	9.07	13.63	14.28	16.11	15.54
Other Key Ratios					
R&D Spending % of Revenue	10.13	12.20	12.18	13.27	17.20
Capital Spending % of Revenues	0	3.95	2.83	2.43	11.85
Employees	459	822	1,100	1,250	1,460
Revenue ($K)/Employee	$179	$148	$192	$214	$210
Capital Spending % of Assets	N/A	5.43	3.41	2.61	11.91

N/A = Not Available

Source: Ashton-Tate Corporation
Annual Reports and Forms 10-K
Dataquest
January 1990

AST Research, Inc.

16215 Alton Parkway
P.O. Box 19658
Irvine, California 92713-9658
Telephone: (714) 727-4141
Fax: (714) 863-9478
Dun's Number: 01-876-8648

Date Founded: 1980

CORPORATE STRATEGIC DIRECTION

AST Research, Inc., is a leading manufacturer of personal computer systems and board-level enhancement products that expand the capabilities and performance of personal computers. The Company's broad line of integrated hardware products is designed primarily to address the needs of business users for memory expansion, data communications, local area networking, and graphics.

The Company's total revenue increased 17 percent to $533.8 million* in fiscal 1990 from $456.5 million in fiscal 1989. AST attributed the increase to the Company's key marketing, product, and international expansion strategies adopted during the year as well as improved operating costs. Net income totaled $35 million in fiscal year 1990. The Company employs more than 2,300 people worldwide.

AST sells its products primarily through value-added resellers (VARs), distributors, and original equipment manufacturers (OEMs). The Company estimates that VARs accounted for 57 percent of its domestic revenue during 1990, while distributors accounted for 35 percent and OEMs, 8 percent. In June 1990, the Company introduced the Professional Solution VAR (PSV) program focused on strengthening its position with VARs. Criteria to qualify for the program are to have at least one year's experience as a VAR; to sell a total solution including hardware, software, installation, training, service, and support; and to meet defined service criteria. The PSV program provides sales, marketing, training, service, and support to qualified dealers. Through this program, PSVs become licensed to sell AST's full systems and enhancement product lines.

*All dollar amounts are US dollars.

AST has ten sales offices throughout North America, and domestic sales accounted for 70 percent of its total revenue in fiscal 1990. Internationally, the Company has offices in Europe, Hong Kong, Taiwan, Japan, Australia, Canada, and China. Each subsidiary or sales office sells directly to retail dealers and/or distributors located in over 89 countries. During fiscal years 1990, 1989, and 1988, international sales represented 30.0, 25.5, and 20.9 percent, respectively, of total revenue. The majority of international sales is generated from the European marketplace.

R&D expenditure totaled $18.4, $16.9, and $15.7 million during fiscal years 1990, 1989, and 1988, respectively. These amounts represented 3.5, 3.7, and 3.8 percent of total revenue for the respective fiscal years. In 1989, the Advanced Products Group was formed in order to centralize the Company's R&D efforts. The group focuses on technology assessment and marketing strategies for new products. AST also allocates specific engineering resources to each of its major product groups, allowing engineers to work closely with a related product marketing group.

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

AST has three major product groups: the Systems Products Group, which includes personal computers and computer peripheral products; the Enhancement

Products Group, which includes multifunctional and graphics enhancement products; and the Data Communications Product Group, which includes data communications and local area network (LAN) products. The Company estimates that in fiscal 1990, systems accounted for 88 percent of sales, enhancements 7 percent, and data communications 5 percent.

Systems Products

In 1986, AST announced its plan to leverage its expertise in the computer peripheral and enhancement products business by introducing five of its own Industry Standard Architecture (ISA) personal computers, called the Premium/286 and Premium/386 series. These machines are designed for applications such as desktop publishing, data processing, spreadsheet analysis, computer graphics, and computer-aided design/computer-aided engineering (CAD/CAE).

The AST Premium/286 is an 80286-microprocessor-based computer that includes two AST-designed FASTslots, which allow the user to operate at speeds of up to 10 MHz with zero-wait states. The FASTslot also provides for an upgrade to an 80386-based system through the addition of AST's FASTboard/386. The result is an upgradable 80286 computer that offers IBM PC AT software and hardware compatibility. Introduced in 1988, the AST Premium Workstation/286 is a highly integrated 80286-based computer that uses a number of custom-designed integrated circuits. It may also be preconfigured for LAN, 5250, and 3270 connectivity.

Both the AST Premium 386/25 system introduced in 1988 and AST Premium 386/33 system introduced in 1989 use the Company's Cupid-32 architecture, a modular design consisting of a motherboard and a plug-in CPU card. Both systems have 2MB RAM in base systems that can be configured with a range of fixed disks, diskette drives with a maximum capacity of 34MB of memory, and peripheral equipment offered by the Company.

The AST Bravo/286 began shipping in February 1989. It offers 80286 8-MHz zero-wait state performance, has four full-length expansion slots, one serial and one parallel port. Various options are provided for the end user to customize a system with fixed disks, 3.5- or 5.25-inch floppy diskette drives, and graphic adapters. The 640 RAM can be expanded to 4MB on the system board.

AST's Premium i486 desktop systems have seven-slot expansion capacity, a 220-watt power supply, five disk drive bays, and support for the Weitek 3167 numeric coprocessor. The standard configuration includes 4MB of RAM expandable to 48MB of total system memory. The Premium 486/25 tower computer features ten expansion slots, a 300-watt power supply, six drive bays, and a Weitek 4167 coprocessor support, and is expandable to 48MB of RAM. AST's Premium i486 line features AST's proprietary Cupid-32 architecture. This design separates the processor and memory from the input/output and BIOS, providing an upgrade path for the next level of processing power as well as future microprocessor technology. A motherboard upgrade to convert ISA (industry standard architecture)-based systems to extended ISA (EISA) architecture is available.

In early 1990, AST announced the availability of the first dual-compatible personal computer for the Japanese marketplace. The AST Dual SX/16 is software-compatible with personal computers operating under the NEC 9801 standard that was developed in 1981 exclusively for Japanese users. It can also run thousands of software application and utility programs written for ISA or AT-class computers operating under MS-DOS. The technology offers Japanese computer users the capability to conduct business using both standards with a single desktop computer. Currently, AST is exploring strategic Japanese OEM relationships to market and distribute the Dual SX/16 personal computer in Japan. AST's Dual SX/16 will run software compatible with NEC 9801 standard computers and will accept ISA add-on enhancement boards. The system has eight ISA-compatible enhancement board slots.

Enhancement Products

AST's line of multifunctional products offers various combinations of increased memory, additional input/output ports, and other features. These products basically consist of a single printed circuit board and a utility software program library. The Company's enhancement products are designed both for new PCs that require performance enhancements and for existing PCs that require upgrades to run newer applications.

Data Communications Products

AST believes connectivity is a key element of current and future computing environments. AST data communications products allow PCs to function as terminals for minicomputers or mainframes, while at the same time retaining the PC's ability to act as a standalone desktop computer. AST is a leader in the 5250 Series emulator boards for IBM's midrange system AS/400. AST is also a participant in the 3270 emulator board market.

AST's LAN products provide connectivity between PCs to allow for sharing of information and peripheral devices. AST Ethernet is a LAN based on the Ethernet industry standard. The Company also offers the Novell Advanced NetWare Operating system as an option with certain LAN products. AST's Cluster and Gateway products allow any PC connected on a network to communicate with a minicomputer or mainframe computer.

Further Information

For further information about the Company's business segments, please contact Dataquest's Microcomputer Systems Service.

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

	1986	1987	1988	1989	1990
Five-Year Revenue	$172.3	$206.0	$412.7	$456.5	$533.8
Percent Change	-	19.56	100.34	10.61	16.93
Capital Expenditure	$6.5	$6.3	$14.6	$11.8	NA
Percent of Revenue	3.77	3.06	3.54	2.58	NA
R&D Expenditure	$8.4	$11.1	$15.7	$16.9	$18.4
Percent of Revenue	4.88	5.39	3.80	3.70	3.45
Number of Employees	800	1,358	NA	2,281	2,300
Revenue ($K)/Employee	$215.38	$151.69	NA	$200.13	$232.09
Net Income	$27.2	$13.0	$15.1	($7.5)	$35.1
Percent Change	-	(52.21)	16.15	(149.67)	568.00

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$114.5	$130.2	$137.3	$151.8
Quarterly Profit	$2.9	$7.4	$9.6	$15.2

NA = Not available

Source: AST Research, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	85.20	80.39	79.06	74.48	70.00
International	14.80	19.61	20.94	25.52	30.00
Europe	13.55	17.85	18.10	18.76	NA
ROW	1.25	1.76	2.84	6.76	NA

NA = Not available

Source: AST Research, Inc.
Annual Reports and Forms 10-K,
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1989	1990
Direct Sales	0	0
Indirect Sales	100.00	100.00
VARs	55.00	57.00
Distributors	37.00	35.00
OEMs	8.00	8.00

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—10
Europe—7
Asia/Pacific—7
Japan—1

MANUFACTURING LOCATIONS

North America

Fountain Valley, California
Systems and board-level production

Asia/Pacific

Hong Kong
High-volume, board-level product production using surface-mount technology
Taiwan
Computer systems products

SUBSIDIARIES

North America

AST Sales Inc. (Canada)

Europe

AST Europe Limited (England)
AST Research France SARL (France)
AST Research Germany GmbH (Germany)
AST Research Italia S.p.A. (Italy)
AST Research (Switzerland) S.A. (Switzerland)

Asia/Pacific

AST Research Australia (Australia)
AST Research (Far East) Ltd. (Hong Kong)
AST Research, Inc. (China)
AST Research K.K. (Japan)
AST Taiwan Ltd. (Taiwan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Texas Instruments (TI)
AST Research and the Information Technology Group of TI formed a worldwide alliance that includes an agreement for TI to provide service to users of AST's computer systems. TI will service AST systems in domestic as well as key international markets.

Mitek Systems
AST Research and Mitek Systems announced an agreement under which Mitek will purchase AST Cupid-32 architecture-based computers for TEMPEST modification and resale.

IBM
AST Research and IBM entered into a reciprocal personal computer technology licensing deal. It grants each company a nonexclusive license covering patents filed prior to January 1, 1995, relating to computers, peripherals, communications and connectivity products, enhancements, and other advanced computer technologies.

Siga Corporativo S.A.
Siga Corporativo S.A. of Mexico City has become an authorized distributor in Mexico for AST's line of personal computers and board-level enhancement products.

Helix Software
AST Research formed an agreement with Helix Software under which AST will bundle Helix's Headroom with AST's EMS memory enhancement boards, the RampagePlus 286, Rampage PC, Rampage Plus/MC, and SixPak286.

TECHS International
AST Research signed an agreement with TECHS International to provide multiple-source technical support to its customers and resellers.

1989

Microsoft
The companies have a licensing agreement.

Sears Business System
Sears Business System will offer AST Research's 286- and 386-based computers under a franchise agreement. Sears also will offer computer service centers for AST offerings and AST's enhancement boards and data communications offering for LANs and PC-to-mainframe links.

Todays Computer Business Centers
AST Research made Todays Computer Business Centers a reseller of its products.

Tandem Computers
Tandem Computers will market AST Research desktop computers under a $30 million worldwide OEM deal. Under the terms of the agreement, Tandem will sell the AST machines under its own label as part of its systems or networks.

1988

ComputerLand
AST microcomputer systems are being offered to ComputerLand franchises

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Safi U. Qureshey
Cochairman of the board, president and chief executive officer

Thomas C. K. Yuen
Cochairman of the board and chief operating officer

James W. Ashbrook
Senior vice president, Product Marketing

Bruce C. Edwards
Senior vice president, Finance, and chief financial officer

John C. Olson
Vice president, Worldwide Manufacturing

PRINCIPAL INVESTORS AND FOUNDERS

Albert Wong—15.58 percent
Safi Qureshey—16.94 percent
Thomas Yuen—16.85 percent

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

Balance Sheet	1986	1987	1988	1989	1990
Total Current Assets	$95.8	$128.6	$234.8	$200.0	$262.0
Cash	47.9	39.8	20.4	18.5	92.2
Receivables	19.2	30.7	79.5	64.8	72.3
Marketable Securities	0	0	0	0	0
Inventory	23.3	52.0	125.2	91.6	73.5
Other Current Assets	5.4	6.1	9.7	25.1	24.0
Net Property, Plants	$8.7	$11.8	$32.7	$46.6	$60.0
Other Assets	$4.3	$3.9	$4.3	$14.5	$2.2
Total Assets	$108.8	$144.3	$271.8	$261.1	$324.2
Total Current Liabilities	$19.4	$39.3	$86.9	$58.2	$76.8
Long-Term Debt	$0.01	0	$61.3	$81.0	$30.1
Other Liabilities	$2.8	$5.9	$8.7	$13.1	$24.0
Total Liabilities	$22.2	$45.2	$156.9	$152.3	$130.9
Total Shareholders' Equity	$86.6	$99.1	$114.9	$108.8	$193.3
Converted Preferred Stock	0	0	0	0	0
Common Stock	33.1	32.6	33.2	34.5	84.1
Other Equity	0	0	0.1	0.1	0
Retained Earnings	53.5	66.5	81.6	74.2	109.2
Total Liabilities and Shareholders' Equity	$108.8	$144.3	$271.8	$261.1	$324.2

Income Statement	1986	1987	1988	1989	1990
Revenue	$172.3	$206.0	$412.7	$456.5	$533.8
US Revenue	146.8	165.6	326.3	340.0	373.7
Non-US Revenue	25.5	40.4	86.4	116.5	160.1
Cost of Sales	$76.5	$120.4	$295.8	$344.3	$360.4
R&D Expense	$8.4	$11.1	$15.7	$16.9	$18.4
SG&A Expense	$41.1	$55.3	$78.2	$99.2	$100.5
Capital Expense	$6.5	$6.3	$14.6	$11.8	NA
Pretax Income	$49.3	$21.7	$20.9	($11.6)	$51.6
Pretax Margin (%)	28.61	10.53	5.06	(2.54)	9.67
Effective Tax Rate (%)	46.00	NA	28.00	NA	NA
Net Income	$27.2	$13.0	$15.1	($7.5)	$35.1
Shares Outstanding, Millions	11.6	11.5	11.7	11.6	12.3
Per Share Data					
Earnings	$2.34	$1.13	$1.28	($0.64)	$2.86
Dividend	0	0	0	0	0
Book Value	$7.47	$8.62	$9.82	$9.38	$15.72

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

Key Financial Ratios	1986	1987	1988	1989	1990
Liquidity					
Current (Times)	4.94	3.27	2.70	3.44	3.41
Quick (Times)	3.74	1.95	1.26	1.86	2.45
Fixed Assets/Equity (%)	10.05	11.91	28.46	42.83	31.04
Current Liabilities/Equity (%)	22.40	39.66	75.63	53.49	39.73
Total Liabilities/Equity (%)	25.65	45.61	136.55	139.98	67.72
Profitability (%)					
Return on Assets	-	10.27	7.26	(2.81)	11.99
Return on Equity	-	14.00	14.11	(6.71)	23.24
Profit Margin	15.79	6.31	3.66	(1.64)	6.58
Other Key Ratios					
R&D Spending % of Revenue	4.88	5.39	3.80	3.70	3.45
Capital Spending % of Revenue	3.77	3.06	3.54	2.58	NA
Employees	800	1,358	N/A	2,281	2,300
Revenue ($K)/Employee	$215.38	$151.69	N/A	$200.13	$232.09
Capital Spending % of Assets	5.97	4.37	5.37	4.52	NA

NA = Not available

Source: AST Research, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

Atari Corporation

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Sunnyvale, California 94086
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Fax: (408) 745-4306
(408) 745-5179
Dun's Number: 11-816-6040

Date Founded: 1972

CORPORATE STRATEGIC DIRECTION

Atari, Inc., was founded in the United States in 1972 and was dedicated to the video game market, where it became one of the market leaders. At the height of its success in 1976, it was bought by Warner Communications. Its first entrants into the computer market were home computers, which did not achieve much success in Europe, although the computers were market leaders in the United States. When Commodore introduced its home personal computer, Atari had some difficulty competing successfully. This competition, combined with the decline of the video games market, marked a downturn and severe financial problems for Atari.

In May 1984, Jack Tramiel, founder of Commodore, purchased the microcomputer and video games division of Atari Inc., a subsidiary of Warner Communications Inc. These two divisions merged to form Atari Corporation.

As one of the early entrants in the microcomputer market, Atari was dedicated originally to the home computer-video game markets. In recent years, Atari has tried to break away from its strict hobbyist image and promote strategies in two markets: the high end of the traditional game market and the professional-business market. Atari has found its initial hobbyist image difficult to shed in its drive for the business market.

Atari's total revenue decreased 6.3 percent to $424 million* in fiscal 1989 from $452 million in fiscal 1988. Net income totaled $4 million in fiscal 1989, representing a 104.7 percent increase over fiscal 1988. The exchange rates are responsible for a 7 percent reduction in overall international sales dollars for fiscal 1989. Atari employed 1,420 people worldwide during fiscal 1989.

*All dollar amounts are in US dollars.

Although the Company now has a manufacturing plant in Taiwan, it is expected to begin assembly of its home and personal computers in West Germany. The Company has purchased a 92,000-square-foot parcel of land near Frankfurt, West Germany, on which office and warehouse accommodations are being constructed. Atari hopes these accommodations will help alleviate some of the supply shortages in the Nordic countries and reinforce Atari's dedication to the European market.

International sales contribution to Atari's total revenue grew to $330.1 million in fiscal 1989, compared with $304.1 million in fiscal 1988. These sales accounted for 78 percent of total revenue, up from 67 percent for fiscal 1988. A majority of the Company's sales are concentrated in the European countries.

Research and development (R&D) expenditure totaled $25 million, $21 million, and $18 million for fiscal years 1989, 1988, and 1987, respectively. These figures represented 5.8 percent, 4.7 percent, and 3.7 percent of revenue, respectively. In fiscal 1989, the increase in R&D expenditure was focused principally on the TT, ST, and Mega family of computers. These products were developed primarily internally; however, Atari entered into R&D agreements for the hardware and software technology of the hand-held game Lynx and the hand-held computer Portfolio. Capital expenditure totaled $6 million, $3 million, and $4 million, representing 1.3 percent, 0.6 percent, and 0.8 percent of total revenue, respectively, for the fiscal years of 1989, 1988, and 1987. The current increase in capital expenditure has been affected by the purchase and development of the land in West Germany.

Atari's principal market is the European market, serving primarily West Germany, France, and the United Kingdom. These countries represent 76 percent of Atari's total European revenue. Dataquest estimates that the home PC market will experience a 108.2 percent growth rate (measured in revenue generated in US dollars) over the next three years for the 386 microprocessor market. The 286 market is estimated to grow at a rate of 38.9 percent. The business market is forecast to grow at a 48.3 percent rate for the 386 microprocessors, and revenue generated for the 286 microprocessors will experience a negative 27.8 percent growth rate in the same time period.

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

Personal Computers

Dataquest estimates that Atari had 4.1 percent of the 1989 personal computer worldwide market share as measured in units shipped. This share is expected to increase to 4.9 percent in 1990. Dataquest estimates Atari's US personal computer market share increase in 1990 to be 4.2 percent, up from 3.4 percent in 1989.

The Company's principal products are its ST and Mega series of personal computer systems, which also are being marketed as high-powered business tools. The ST currently uses a UNIX-like proprietary operating system called Idris and the Mega operates on the TOS proprietary operating system. Atari also introduced the STE, which is an enhanced version of the older ST. The ST and Mega series computers use the Motorola 68000 microprocessor, which simultaneously processes 32 bits of information internally and communicates over a 16-bit channel. The 520ST, 1040ST, MEGA1, MEGA2, and MEGA4 contain 524,288 bytes, one megabyte, one megabyte, two megabytes, and four megabytes of internal random access memory, respectively.

The Company has upgraded its computer line and entered into the PC market by demonstrating its TT computer system, which is based on the Motorola 68030 microprocessor. This machine will be capable of running three distinct operating systems including TOS (providing continued upward compatibility with current ST and Mega systems), MS DOS (in emulation mode), and UNIX 5.3 standard. Atari also has started shipping its Stacy ST laptop models, which are available with a 40MB hard disk that operates on Atari's latest Rainbow TOS proprietary operating system.

Atari started shipping a range of PC compatibles in fiscal 1989, notably the PC4 and PC5 (enhanced versions of earlier PC models 1, 2, and 3). These compatibles are powered by the 80286 microprocessor. In the spring of 1990, Atari began shipment of the enhanced ABC386SX, which is powered by the 386 microprocessor.

Atari has entered the motion picture industry, which uses the ST systems to edit the audio portion of pictures. This system has become the standard for sound engineers in this field as well as in the music industry.

Other new products include the Stacy laptop computer, the Portfolio hand-held computer, and a hand-held game unit called the Lynx. The Lynx is Atari's reentry into the video game market. The success of the Lynx depends chiefly on the software, of which Atari plans to release 25 new games by December 1990. The Stacy portable computer has an integrated Trak-Ball controller and features Atari's latest Rainbow operating system driven by the Motorola 68000 microprocessor. The Portfolio is Atari's entrant into the hand-held market. Its success depends on the available software and portable computer technology; however, Dataquest expects the hand-held computer market to do well overall in 1990.

Further Information

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

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

	1985[1]	1986[2]	1987	1988	1989
Five-Year Revenue	$142	$258	$493	$452	$424
Percent Change	-	81.76	91.05	(8.29)	(6.32)
Capital Expenditure	$2	$1	$4	$3	$6
Percent of Revenue	1.34	0.33	0.81	0.55	1.30
R&D Expenditure	$9	$15	$18	$21	$25
Percent of Revenue	6.62	5.62	3.65	4.71	5.81
Number of Employees	NA	1,400	4,000	1,760	1,420
Revenue ($K)/Employee	-	$184.36	$123.28	$256.93	$298.31
Net Income	($14)	$45	$57	($85)	$4
Percent Change	-	421.43	28.99	(247.74)	104.72

1989 Calendar Year	Q1	Q2	Q3
Quarterly Revenue	$88.78	$82.74	$81.44
Quarterly Profit	$3.29	$0.33	($5.39)

[1]1985 numbers are from 1986 Annual Report.
[2]1986 was the first Annual Report.
NA = Not available

Source: Atari Corporation Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	39.86	46.84	54.15	32.75	22.07
International	60.14	53.16	45.85	67.25	77.93
Europe	33.25	39.79	41.32	64.49	72.57
ROW	26.39	13.37	4.53	2.76	5.36

Source: Atari Corporation Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	4.00	4.00
Indirect Sales	96.00	96.00
Dealers*	6.50	6.50
Mass Merchandisers*	89.50	89.50
Manufacturing Representatives*	-	-

*Dataquest estimate

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—1
Europe—13
Asia/Pacific—1
ROW—1

MANUFACTURING LOCATIONS

Asia/Pacific

Tam-Shui, Taiwan
Principal computer products

SUBSIDIARIES

North America

Atari Corp. (Canada)
Atari Computer Corp. (United States)
Atari Explorer Publications Corp. (United States)
Atari Technology Corp. (United States)
Styra Semiconductor Corp. (United States)
The Federated Group Inc. (Discontinued operation) (United States)
The Federated Group (South Central) Inc. (Discontinued operation) (United States)
Tramel Trading Ltd. (United States)

Europe

Atari AG (Switzerland)
Atari B.V. (Benelux, Netherlands)
Atari Computers GmbH (West Germany)
Atari Corp. Ltd. (United Kingdom)
Atari Corp. Sverige AB (Sweden)
Atari France S.A. (France)
Atari Italia S.p.A. (Italy)
Ordenadores Atari S.A. (Spain)

Asia/Pacific

Atari Computers Pty. Ltd. (Australia)
Atari Corp. (Japan)
Atari Taiwan Manufacturing Corp. (Taiwan)
Tambercombe Ltd. (Hong Kong)

ROW

Atari, Israel Ltd. (Israel)
Atari Fabricante S.A. de C.V. (Mexico)
Atari S.A. de C.V. (Mexico)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Distributed Information Processing Ltd.
Distributed Information Processing designed Atari's Portfolio pocket MS-DOS computer.

Timeworks Inc.
Timeworks provided the software that comes with the Atari Mega ST 2 and the Mega ST 4 microcomputers.

MERGERS AND ACQUISITIONS

1987

Federated Group, Inc.
Acquired Federated, a retailer of consumer electronic and home entertainment products

KEY OFFICERS

Jack Tramiel
Chairman of the board

Sam Tramiel
President, chief executive officer

Samuel W.L. Chin
Vice president

Steven M. Kawalick
Vice president, treasurer

August J. Liguori
Vice president

Richard Miller
Vice president, Technology

Gregory A. Pratt
Vice president, Finance; chief financial officer

Elton Southard
Vice president, Semiconductor Operations

Taro Tokai
Vice president

Garry Tramiel
Vice president, Administration; secretary

Leonard Tramiel
Vice president, Software Development

PRINCIPAL INVESTORS

Jack Tramiel—43.8 percent
Warner Communications, Inc.—24.6 percent

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

Balance Sheet	1985[1]	1986[2]	1987	1988	1989
Total Current Assets	$126.4	$175.2	$405.7	$324.1	306.8
Cash	16.4	70.8	103.5	91.9	54.9
Receivables	22.2	37.1	101.6	100.5	107.0
Marketable Securities	0	0	0	0	0
Inventory	77.1	64.8	196.9	117.9	129.9
Other Current Assets	10.7	2.5	3.7	13.8	15.0
Net Property, Plants	$6.8	$5.8	$66.5	$8.5	$13.9
Other Assets	$5.8	$3.1	$46.1	$5.8	$9.9
Total Assets	$139.0	$184.1	$518.3	$338.4	$330.7
Total Current Liabilities	$114.8	$78.8	$217.2	$180.1	$167.3
Long-Term Debt	$43.7	0	$133.5	$75.0	$77.4
Other Liabilities	0	0	0	0	0
Total Liabilities	$158.5	$78.8	$350.7	$255.1	$244.7
Total Shareholders' Equity	($19.5)	$105.3	$167.6	$83.3	$86.1
Converted Preferred Stock	0	0	0	0	-
Common Stock	0.1	0.3	0.6	0.6	0.6
Other Equity	(19.6)	105.0	142.2	142.6	141.4
Retained Earnings	0	0	24.8	(59.9)	(55.9)
Total Liabilities and Shareholders' Equity	$139.0	$184.1	$518.3	$338.4	$330.8

Income Statement	1985[1]	1986[2]	1987	1988	1989
Revenue	$142.0	$258.1	$493.1	$452.2	$423.6
US Revenue	56.6	120.9	267.0	148.1	93.5
Non-US Revenue	85.4	137.2	226.1	304.1	330.1
Cost of Sales	$133.7	$149.2	$304.0	$280.5	$309.4
R&D Expense	$9.4	$14.5	$18.0	$21.3	$24.6
SG&A Expense	$24.5	$46.1	$105.5	$90.8	$85.9
Capital Expense	$1.9	$0.9	$4.0	$2.5	$5.5
Pretax Income	($14.3)	$47.2	$74.8	$58.5	$2.5
Pretax Margin (%)	(10.07)	18.29	15.17	12.94	0.59
Effective Tax Rate (%)	NA	47.00	41.00	33.00	(63.00)
Net Income	($14.3)	$44.5	$57.4	($84.8)	$4.0
Shares Outstanding, Millions	16.3	28.8	57.7	58.0	58.1
Per Share Data					
Earnings	($0.62)	$0.53	$0.76	($1.31)	$0.07
Dividends	0	0	0	0	-
Book Value	($1.20)	$3.66	$2.90	$1.44	$1.48

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

Key Financial Ratios	1985[1]	1986[2]	1987	1988	1989
Liquidity					
Current (Times)	1.10	2.22	1.87	1.80	1.83
Quick (Times)	0.43	1.40	0.96	1.14	1.06
Fixed Assets/Equity (%)	(34.87)	5.51	39.68	10.21	16.14
Current Liabilities/Equity (%)	(588.72)	74.84	129.61	216.27	194.31
Total Liabilities/Equity (%)	(812.82)	74.84	209.28	306.33	284.20
Profitability (%)					
Return on Assets	-	27.55	16.34	(19.80)	1.20
Return on Equity	-	103.74	42.07	(67.61)	4.72
Profit Margin	(10.07)	17.24	11.64	(18.75)	0.94
Other Key Ratios					
R&D Spending % of Revenue	6.62	5.62	3.65	4.71	5.81
Capital Spending % of Revenue	1.34	0.33	0.81	0.55	1.30
Employees	NA	1,400	4,000	1,760	1,420
Revenue ($K)/Employee	NA	$184.36	$123.28	$256.93	$298.31
Capital Spending % of Assets	1.37	0.47	0.77	0.74	1.66

[1]1985 numbers are from 1986 Annual Report.
[2]1986 was the first Annual Report.
NA = Not available

Source: Atari Corporation Annual Reports
Dataquest (1990)

Atari Corporation

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Date Founded: 1972

CORPORATE STRATEGIC DIRECTION

Atari Corporation was founded in the United States in 1972 and was dedicated to the video game market, where it became one of the market leaders. At the height of its success in 1976, it was bought by Warner Communications. Its first entries into the computer market were home computers, which did not achieve much success in Europe, although the computers were market leaders in the United States. When Commodore introduced its home personal computer, Atari had some difficulty competing successfully. This, combined with the decline of the video games market, marked a downturn and severe financial problems for Atari.

Atari was bought by Jack Tramiel, the founder of Commodore, in 1984. Soon afterward, Atari introduced the first model of the ST line, the 520, followed by the 1040 ST in 1986 and the Mega ST in 1987. These models have been reasonably successful in the European home personal computer market, and Atari is now attempting to branch out into the business PC market.

As one of the early entrants in the microcomputer market, Atari was dedicated originally to the home computer-video game markets. In recent years, Atari has tried to break away from its strict hobbyist image and promote strategies in two markets: the high end of the traditional game market and the professional-business market. Atari has found its initial hobbyist image more difficult to shed in its drive for the business market.

Atari's total revenue decreased 8 percent to $452 million* in fiscal 1988 from $493 million in fiscal 1987. Its net income decreased 248 percent to a loss of $85 million in fiscal 1988. The loss is attributable to the discontinuation of Federated operations as of December 1988. Atari employs approximately 1,700 people worldwide.

Although the Company now has a manufacturing plant in Taiwan, in the future, it is expected to begin assembly of its home and personal computers in West Germany. This will help to alleviate some of the supply shortages in the Nordic countries and to reinforce Atari's dedication to the European market.

The non-U.S. sales contribution to Atari's total revenue grew to $304.1 million in 1988. Non-U.S. sales accounted for 67 percent of the total, up from 46 percent in fiscal 1987. A majority of the Company's sales are concentrated in the European countries. Eighty-one percent of the Company's sales offices are in Europe.

Research and development expenditures totaled $21 million in fiscal 1988, representing 4.7 percent of Atari's revenue. Capital expenditures totaled $3 million in fiscal 1988, representing less than 1 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

Personal Computers

Dataquest estimates that Atari had 4.5 percent of the 1988 personal computer worldwide market share.

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

This was expected to drop slightly in 1989, to 4.3 percent market share. Dataquest estimates Atari's U.S. personal computer market share to be slightly less than its worldwide market share at 4.0 percent in 1988 and 3.7 percent in 1989.

Atari's current product range includes its XL home computers and its noncompatible personal computers, the ST models based on the Motorola 68000 processor. The ST line was introduced to counter the Commodore Amiga and to react to the falling demand in the low end of the home computer market. It allowed Atari to move upmarket with higher-performance, higher-priced machines. Atari's compatible PCs, called the PC1 (8088 processor), PC2 (80286 processor), and PC3, PC4, and PC5 (all based on the 80386 processor) were introduced in early 1987. The PC4 and PC5 were unveiled at Comdex in 1989. The PC1 met with problems competing with other vendors' more powerful low-end compatibles, and it seems likely that it will soon be dropped completely from the line. The PC2 had a somewhat better reception, but Atari's dedication remains with the ST machines, which are also being projected as high-powered business tools. The ST line currently uses a UNIX-like operating system called Idris. However, the future generation of STs most likely will be based on Motorola's 68030 processor or the new Inmos parallel processing transputer processor that Atari is researching now. Atari also is likely to switch from Idris to the true UNIX V operating system for its next generation of STs.

Outside the traditional markets, Atari has become dominant in the niche market of computer-aided music composition. As the only known manufacturer active in the market, popular among musicians, this market has been easy for Atari to develop, since the Company's game market image does not have the negative impact here that it has in the business market.

Further Information

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

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

	1985*	1986**	1987	1988
Four-Year Revenue	$142	$258	$493	$452
Percent Change	-	81.76	91.05	(8.29)
Capital Expenditure	$2	$1	$4	$3
Percent of Revenue	1.34	0.33	0.81	0.55
R&D Expenditure	$9	$15	$18	$21
Percent of Revenue	6.62	5.62	3.65	4.71
Number of Employees	N/A	1,400	4,000	1,760
Revenue ($K)/Employee	-	$184.36	$123.28	$256.93
Net Income	($14)	$45	$57	($85)
Percent Change	-	421.43	28.99	(247.74)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$88.78	$82.74	$81.44	N/A
Quarterly Profit	$3.29	$0.33	($5.39)	N/A

*1985 numbers are from 1986 Annual Report.
**1986 was the first Annual Report.
N/A = Not Available

Source: Atari Corporation Annual Reports
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988
North America	39.86	46.84	54.15	32.75
International	60.14	53.16	45.85	67.25
Europe	33.25	39.79	41.32	64.49
ROW	26.39	13.37	4.53	2.76

Source: Atari Corporation Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1987	1988
Direct Sales	1.00	4.00
Indirect Sales	99.00	96.00
Dealers	4.50	6.50
Mass Merchandisers	94.50	89.50
Manufacturing Representatives	-	-

Source: Dataquest
January 1990

1988 SALES OFFICE LOCATIONS

North America—1
Europe—13
Asia/Pacific—1
ROW—1

MANUFACTURING LOCATIONS

Asia/Pacific

Tam-Shui, Taiwan
Principal computer products

SUBSIDIARIES

North America

Atari Corp. (Canada)
Atari Explorer Publications Corp. (United States)
Atari Technology Corp. (United States)
Styra Semiconductor Corp. (United States)
The Federated Group Inc. (Discontinued operation) (United States)
The Federated Group (South Central) Inc. (Discontinued operation) (United States)
Tramel Trading Ltd. (United States)

Japan

Atari Corp.

Europe

Atari AG (Switzerland)
Atari B.V. (Benelux, Netherlands)
Atari Computers GmbH (West Germany)
Atari Corp. Ltd. (United Kingdom)
Atari Corp. Sverige AB (Sweden)
Atari France S.A. (France)
Atari Italia S.p.A. (Italy)
Ordenadores Atari S.A. (Spain)

Asia/Pacific

Atari Computers Pty. Ltd. (Australia)
Atari Taiwan Manufacturing Corp. (Taiwan)

ROW

Atari Fabricante S.A. de C.V. (Mexico)
Atari S.A. de C.V. (Mexico)

MERGERS AND ACQUISITIONS

1987

Federated Group, Inc.
Acquired Federated, a retailer of consumer electronic and home entertainment products

KEY OFFICERS

Jack Tramiel
Chairman of the board

Sam Tramiel
President, chief executive officer

Samuel W. L. Chin
Vice president

Steven M. Kawalick
Vice president, treasurer

Gregory A. Pratt
Vice president, Finance, chief financial officer

Elton Southard
Vice president, Semiconductor Operations

Taro Tokai
Vice president

Garry Tramiel
Vice president, Administration, secretary

Leonard Tramiel
Vice president, Software Development

PRINCIPAL INVESTORS

Jack Tramiel—43.8 percent
Warner Communications, Inc.—24.6 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
Total Current Assets	$126.4	$175.2	$405.7	$324.1
Cash	16.4	70.8	103.5	91.9
Receivables	22.2	37.1	101.6	100.5
Marketable Securities	0	0	0	0
Inventory	77.1	64.8	196.9	117.9
Other Current Assets	10.7	2.5	3.7	13.8
Net Property, Plants	$6.8	$5.8	$66.5	$8.5
Other Assets	$5.8	$3.1	$46.1	$5.8
Total Assets	$139.0	$184.1	$518.3	$338.4
Total Current Liabilities	$114.8	$78.8	$217.2	$180.1
Long-Term Debt	$43.7	0	$133.5	$75.0
Other Liabilities	0	0	0	0
Total Liabilities	$158.5	$78.8	$350.7	$255.1
Total Shareholders' Equity	($19.5)	$105.3	$167.6	$83.3
Converted Preferred Stock	0	0	0	0
Common Stock	0.1	0.3	0.6	0.6
Other Equity	(19.6)	105.0	142.2	142.6
Retained Earnings	0	0	24.8	(59.9)
Total Liabilities and Shareholders' Equity	$139.0	$184.1	$518.3	$338.4

Income Statement	1985*	1986**	1987	1988
Revenue	$142.0	$258.1	$493.1	$452.2
U.S. Revenue	56.6	120.9	267.0	148.1
Non-U.S. Revenue	85.4	137.2	226.1	304.1
Cost of Sales	$133.7	$149.2	$304.0	$280.5
R&D Expense	$9.4	$14.5	$18.0	$21.3
SG&A Expense	$24.5	$46.1	$105.5	$90.8
Capital Expense	$1.9	$0.9	$4.0	$2.5
Pretax Income	($14.3)	$47.2	$74.8	$58.5
Pretax Margin (%)	(10.07)	18.29	15.17	12.94
Effective Tax Rate (%)	N/A	47.00	41.00	33.00
Net Income	($14.3)	$44.5	$57.4	($84.8)
Shares Outstanding, Millions	16.3	28.8	57.7	58.0
Per Share Data				
Earnings	($0.62)	$0.53	$0.76	($1.31)
Dividends	0	0	0	0
Book Value	($1.20)	$3.66	$2.90	$1.44

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
Liquidity				
Current (Times)	1.10	2.22	1.87	1.80
Quick (Times)	0.43	1.40	0.96	1.14
Fixed Assets/Equity (%)	(34.87)	5.51	39.68	10.21
Current Liabilities/Equity (%)	(588.72)	74.84	129.61	216.27
Total Liabilities/Equity (%)	(812.82)	74.84	209.28	306.33
Profitability (%)				
Return on Assets	-	27.55	16.34	(19.80)
Return on Equity	-	103.74	42.07	(67.61)
Profit Margin	(10.07)	17.24	11.64	(18.75)
Other Key Ratios				
R&D Spending % of Revenue	6.62	5.62	3.65	4.71
Capital Spending % of Revenue	1.34	0.33	0.81	0.55
Employees	N/A	1,400	4,000	1,760
Revenue ($K)/Employee	N/A	$184.36	$123.28	$256.93
Capital Spending % of Assets	1.37	0.47	0.77	0.74

*1985 numbers are from 1986 Annual Report.
**1986 was the first Annual Report.
N/A = Not Available

Source: Atari Corporation Annual Reports
Dataquest
January 1990

Atex Publishing Systems

32 Wiggins Avenue
Bedford, Massachusetts 01730
Telehone: (617) 275-8300
Fax: (617) 276-7931
Dun's Number: Not Available

Date Founded: June 1973

CORPORATE STRATEGIC DIRECTION

Atex Publishing Systems originated in a Lexington, Massachusetts, loft when founders Richard and Charles Ying and Douglas Drane developed their first computer-aided electronic prepress system. In July 1974, Atex completed delivery of its first system to *U.S. News and World Report.*

In 1981, the Eastman Kodak Company acquired Atex as part of its strategy to enter the publishing market. Atex operates as a business unit of Kodak's Electronic Pre-Press Systems (EPPS) subsidiary. In September 1989, Kodak formed the Integration and Systems Product Division (ISPD), which is responsible for marketing and development of electronic imaging systems with EPPS at its core. As a division of EPPS, Atex comprises two separate groups: Atex Publishing Systems (newspaper systems) and Atex Commercial Publishing Systems (magazine and commercial systems).

Atex is a leading supplier of electronic prepress systems to the newspaper and magazine industries, with over 750 customers worldwide. Atex's products are designed to meet the total prepress needs of newspaper publishers: text entry and editing, composition, ad creation, news layout, classified pagination, publication design and ad placement, display advertising management, black-and-white and color imaging, and systems for remote news and advertising bureau locations.

Recently, Atex embraced the open systems concept, providing publishing systems that operate on Apple, IBM, and Sun PCs in addition to its proprietary Advanced Display Terminal (ADT) and Application Server. In June 1990, Kodak announced an alliance with IBM to develop publishing systems based on open industry standards. The alliance will combine IBM's Media Industry Marketing technical and marketing resources with Atex Publishing's applications software and publishing industry expertise.

The Company's Bedford, Massachusetts, headquarters contain laboratories and training facilities in addition to administrative offices. Atex employs approximately 900 people at its headquarters and at 25 sales and service offices worldwide.

No financial statements are included because Atex Publishing Systems is a business unit of Kodak's EPPS subsidiary.

BUSINESS SEGMENT STRATEGIC DIRECTION

Electronic Publishing

Atex entered the electronic prepress system marketplace with an editorial front-end system designed to meet the publishing industry's need for automated editorial systems. The Company's products have evolved to provide text processing and a more flexible system architecture—echoing the computer industry's trend toward open systems.

Atex provides the electronic publishing market with a turnkey system solution based on Digital Equipment's DEC J11 and proprietary Multi-Processor Bus (MPB). The Atex MPB provides a local area network (LAN) to link multiple central processing units (CPUs), allowing them to share a common database. The MPB allows users to access the database from any CPU on the system and provides rapid transfer of information among processors. In addition, the MPB system provides file locking and file backup redundancy.

Atex's Publication Production Node (PPN) serves the page layout needs of the publishing industry. The PPN incorporates the Atex Publication Database, which integrates Atex pagination products on Atex Application Servers. This system allows image integration and full-page output of text, images, and graphics. The Atex Publication Database, based on the Ingres relational database management system, allows integration of pagination products, centralization of configuration management, and production tracking.

Atex's software tools for its pagination product line include Atex News Layout R2+, which integrates page design, composition, and page assembly functions; Atex Classified Pagination Software, an interactive system running on Sun workstations using the Integrated Advertising System (IAS) as its database; and Atex Architect Software, which manages design and layout of retail advertising for newspaper publishing. Operating on a Sun workstation, Architect automatically extracts ads from the Atex advertising database, designs the ad for publication, and assigns the ad location in the publication.

Atex Editorial Software and ATEX IAS are the Company's traditional products. The Editorial Software package provides copy-handling functions to assist with composition format and editing. Atex IAS software is designed to meet the needs of newspaper advertising departments. IAS assists in processing ads, rating, and adding new products (including zoned sections).

The balance of Atex's product line consists of several PC-based publishing systems software packages. Atex Writer Software is a PC MS/DOS-compatible text-processing package. Writer provides word processing functions and composition capabilities with windowing, communications functions, and integration to Atex PC networks. PC Page Makeup is a page layout package providing font support and various text capabilities integrated with Design Software and PC Writer. Design Software is a Macintosh II-compatible design package that provides design tool capabilities with page building and color functions.

Using the Atex PC-based software, writers can work off-line, then integrate their work through the Atex Application Server network. Atex also offers the PC Preference package, which enables users of IBM PS/2 models to emulate an Atex terminal. PC Preference provides access to Atex Editorial Software and IAS software in addition to PC-based programs.

Further Information

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

1989 SALES OFFICE LOCATIONS

North America—8
Europe—10
Asia/Pacific—1

MANUFACTURING LOCATIONS

North America

Bedford, Massachusetts
Electronic publishing systems and software

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

IBM
IBM and Kodak signed a joint development and comarketing agreement for electronic publishing systems based on IBM computer systems.

1989

Motorola
Atex signed an agreement with Motorola making Motorola's Computer Group an authorized service provider for Atex publishing systems based on Sun Microsystems workstation products.

Media Solutions
Media Solutions signed an agreement with Atex giving exclusive licensing rights to Atex to sell and support Design Software for the Apple Macintosh II.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Harland LaVigne
President

Agnes Imregh
Vice president, Marketing and Business Development

Ben B. Smylie
Vice president, Product Marketing

Joseph A. Nicholls
Vice president, Research and Development

Gary J. Moore
Vice president, Newspaper Color Imaging Systems

Max Coebergh
Vice president, International Field Operations

Alec Hollingworth
Vice president, North American Field Operations

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Richard Ying
Charles Ying
Douglas Drane

AT&T Microelectronics

Table 1

Estimated Worldwide Semiconductor Revenue by Calendar Year (Millions of Dollars)

	1986	1987	1988
Total Semiconductor	983	802	859
Total Integrated Circuit	730	595	688
Bipolar Digital (Function)	123	79	61
Bipolar Digital Memory	1	1	0
Bipolar Digital Logic	122	78	61
MOS (Function)	325	300	380
MOS Memory	55	25	24
MOS Microdevices	45	50	39
MOS Logic	225	225	317
Analog	282	216	247
Total Discrete	247	200	161
Total Optoelectronic	6	7	10

Table 2

AT&T Microelectronics 1988 Worldwide Ranking by Semiconductor Markets (Revenue in Millions of Dollars)

	1988 Rank	1987 Rank	1988 Revenue	Sales % Change 1987-1988	Industry % Change 1987-1988
Total Semiconductor	19	15	$859	7.1%	33.0%
Total Integrated Circuit	18	15	$688	15.6%	37.4%
Bipolar Digital (Function)	13	11	$ 61	(22.8%)	9.2%
Bipolar Digital Memory	11	13	0		11.0%
Bipolar Digital Logic	12	11	61	(21.8%)	9.0%
MOS (Function)	17	16	$380	26.7%	54.5%
MOS Memory	37	30	24	(4.0%)	93.1%
MOS Microdevices	26	19	39	(22.0%)	39.9%
MOS Logic	8	8	317	40.9%	29.2%
Analog	15	15	$247	14.4%	16.0%
Total Discrete	16	12	$161	(19.5%)	14.4%
Total Optoelectronic	25	26	$ 10	42.9%	27.5%

Source: Dataquest
December 1989

AT&T Microelectronics

Table 3

AT&T Microelectronics
Estimated 1988 Semiconductor Revenue by Geographic Region
(Millions of Dollars)

	U.S.	Japan	Europe	ROW
Total Semiconductor	$834		$18	$7
Total Integrated Circuit	$668		$17	$3
Bipolar Digital (Function)	$ 61			
Bipolar Digital Memory				
Bipolar Digital Logic	61			
MOS (Function)	$365		$15	
MOS Memory	24			
MOS Microdevices	38		1	
MOS Logic	303		14	
Analog	$242		$ 2	$3
Total Discrete	$156		$ 1	$4
Total Optoelectronic	$ 10			

Source: Dataquest
December 1989

Autodesk, Inc.

2320 Marinship Way
Sausalito, California 94965
Telephone: (415) 332-2344
Fax: (415) 331-8093
Dun's Number: 06-970-1282

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Autodesk, Inc., designs, develops, markets, and supports computer-aided design (CAD) software for use on leading desktop computers and workstations. Autodesk believes that AutoCAD, the Company's principal product, is the most widely used general-purpose CAD program, with more than 250,000 packages sold through fiscal 1989.

The Company's total revenue increased 48 percent to $117.3 million* in fiscal 1989 from $79.3 million in fiscal 1988. Net income increased 59 percent to $32.7 million in fiscal 1989 from $20.5 million in fiscal 1988. Autodesk employs 576 people worldwide.

Non-U.S. revenue accounted for $47.6 million in fiscal 1989, which accounts for 41 percent of the total, up from 37 percent in fiscal 1988.

Research and development expenditures totaled $10.9 million in fiscal 1989, representing 9 percent of revenue. Autodesk is committed to maintaining an aggressive program for new product development. In 1989, the Company began shipping Animator, a software animation package. It also dramatically reduced the price of the AutoSolid package. In 1988, the Company formed the Autodesk Research Lab, where Autodesk is using technology tracking, research, prototype development, and testing to identify new markets and develop new technology for future products. Also, Autodesk is investing significantly in software applications other than CAD.

Autodesk also is positioning itself for the future through relationships with key strategic partners. During fiscal 1989, Autodesk developed associations to work on new products and market channels with such industry leaders as Apollo Computer, Apple Computer, Compaq, Digital Equipment, IBM, and Sun Microsystems. Autodesk also has teamed up with Aldus, Ashton-Tate, Lotus Development, Microsoft, and WordPerfect to form the Business Software Association (BSA). The BSA, along with Autodesk's own in-house Special Projects Department, promotes antipiracy awareness, education, and legislation.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Application Software

Autodesk's products generally are designed for broad market distribution to users without specialized CAD training. Typical users include mechanical, structural, and electrical engineers, architects, facilities planners, technical illustrators, interior designers, surveyors, electronic systems designers, and educators. The Company's software is available across leading personal computer and workstation environments: Apollo AEGIS, Apple Macintosh, DEC VMS, IBM MS-DOS, and Sun UNIX. Autodesk's CAD software packages are AutoCAD, AutoShade, AutoSketch, and AutoSolid. Dataquest ranked Autodesk among the top 10 CAD/CAM vendors worldwide in 1988.

AutoCAD is Autodesk's major product. It was released in 1982 as a general-purpose design and drafting tool that operates on many different models of desktop computers and workstations and supports

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

hundreds of peripheral devices. AutoCAD is currently available in Czech, Danish, English, Finnish, French, German, Italian, Japanese, Norwegian, Polish, Russian, Spanish, and Swedish editions. AutoCAD sales accounted for more than 93 percent of the Company's net revenue in fiscal 1989.

AutoShade is a full-color rendering package for use with AutoCAD that transforms AutoCAD wire frame drawings into three-dimensional shaded images showing perspective, lighting, and specular reflection. AutoShade was released in 1987.

AutoSketch is a low-cost, precision drawing program for personal computers. It is designed for a wide range of drawing applications, including business graphics, architectural drawings, line art for desktop publishing, and technical illustrations. AutoSketch is currently available in Danish, English, Finnish, French, German, Italian, Norwegian, Spanish, and Swedish. More than 90,000 units have been shipped to date.

AutoSolid is a conceptual design package that uses solid modeling technology to create analytical models of three-dimensional components and assemblies. Design information can be used by engineers to perform analysis and determine the acceptability of the design without having to create physical prototypes.

Further Information

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$9,874.0	$29,531.0	$52,382.0	$79,257.0	$117,302.0
Percent Change	-	199.08	77.38	51.31	48.00
Capital Expenditure	0	0	0	0	0
Percent of Revenue	0	0	0	0	0
R&D Expenditure	$1,249.0	$1,665.0	$3,366.0	$7,206.0	$10,921.0
Percent of Revenue	12.65	5.64	6.43	9.09	9.31
Number of Employees	145	214	300	414	576
Revenue ($K)/Employee	$68.10	$138.00	$174.61	$191.44	$203.65
Net Income	$1,626.0	$6,521.0	$11,620.0	$20,541.0	$32,695.0
Percent Change	-	301.05	78.19	76.77	59.17

1989 Calendar Year (US$M)	Q1	Q2	Q3	Q4
Quarterly Revenue	$25.75	$27.25	$30.29	$34.00
Quarterly Profit	$7.24	$7.59	$8.50	$9.34

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

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	88.30	78.06	69.37	63.05	59.40
International	11.70	21.94	30.63	36.95	40.60
Japan	-	1.94	4.63	7.95	11.60
Europe	-	20.00	26.00	29.00	29.00

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

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	58.00	61.00
Indirect Sales	42.00	39.00
VARs	8.00	9.00
Dealers	34.00	30.00

Source: Dataquest
1990

1989 SALES OFFICES

North America—8
Europe—9
Japan—1
Asia/Pacific—1

MANUFACTURING LOCATIONS

Sausalito, California

Autodesk's production involves duplicating master disks and printing user manuals for the Company's software products. The purchase of blank disks and transfer of the software programs onto these disks for distribution to customers is performed by Autodesk and subcontractors. The Company's user manuals and the packaging materials are produced by outside sources to the Company's specifications. Media for the Company's products, primarily 5 1/4-inch floppy disks and 3 1/2-inch microdiskettes, are available from multiple sources.

SUBSIDIARIES

North America

American Information Exchange (United States)
Generic Software Inc. (United States)
Xanadu Operating Company (United States)

Japan

Autodesk Ltd.

Europe

Autodesk AB (Sweden)
Autodesk AG (Switzerland)
Autodesk Ltd. (England)
Autodesk Softrade AG (Switzerland)

Asia/Pacific

Autodesk Australia Pty. Ltd. (Australia)
Autodesk Ltd. (Australia)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

D-Cubed Ltd., Applied Geometry Corp., Spatial Technology Inc.

Autodesk signed licensing agreements with three software developers. It licensed the DCM dimensional constraint manager for model definition from D-Cubed. Nonexclusive rights to the AGLib library of nonuniform rational B-spline (NURBS) geometry software were obtained from Applied Geometry. Also, Autodesk agreed to license ACIS, a geometric modeler developed by Spatial Technology.

1989

Microsoft Corporation

Autodesk and Microsoft, with two other software companies (Tesseract Corporation and 3Com Corporation), entered into a joint marketing agreement. Under the agreement, the companies will jointly promote their products with Microsoft Excel. The marketing activities will include joint customer presentations, seminars, sales cross-training, and other market development activities. The companies will exchange technical information to assist in the development of stronger customer solutions.

Pixar

Autodesk and Pixar entered into an agreement under which Autodesk acquired nonexclusive rights to integrate Pixar's proprietary photorealistic imaging software into Autodesk's family of CAD and engineering software products. With the agreement, Autodesk becomes the first company to license the technology based on Pixar's RenderMan interface. Initially, Autodesk plans to offer photorealism as a complement to its CAD and rendering products, AutoCAD and AutoShade.

1988

Summagraphics Corporation

Autodesk and Summagraphics entered into an agreement under which Autodesk will bundle AutoSketch with Summagraphics' SummaSketch Plus tablet. This will be a special product offering in North America.

Bridgeport Machines, Inc.
Autodesk and Bridgeport Machines entered into a marketing agreement under which Autodesk will market its AutoCAD software package (version 9) with Bridgeport's EZ-CAM IV software package. EZ-CAM, compatible with almost all computer numerical control (CNC) machine tools, allows for visual verification of parts before they are actually produced.

Sun Microsystems, Inc.
Autodesk and Sun Microsystems entered into an OEM agreement under which AutoShade, AutoCAD, and AutoCAD AEC architectural design module will be available on the Sun-4 and the Sun386i families of workstations. Sun workstations combined with Autodesk's AutoCAD will enable design professionals to run multiple AutoCAD sessions concurrently.

MSC Technologies, Inc.
Autodesk and MSC Technologies entered into an OEM agreement under which MSC's PC Mouse and PC Mouse Bus Plus will be offered with Autodesk's AutoSketch software package.

1987

Timberline Software Corporation
Autodesk and Timberline Software entered into a joint development agreement under which Timberline's Precision Estimating software will be fully interfaced with Autodesk's AutoCAD software package. The interface, which will allow designs created within AutoCAD to be automatically fed into Timberline's Precision Estimating System, will be promoted by both companies.

ACA Pacific, Inc.
Autodesk and ACA Pacific entered into a distribution agreement under which ACA Pacific will distribute Autodesk's products in Southeast Asia, including Singapore, Malaysia, Thailand, Indonesia, Brunei, and the Philippines.

Micro D and Gates Distributing
Autodesk, Micro D, and Gates Distributing entered into a licensing agreement under which Micro D and Gates Distributing will sell Autodesk's AutoSketch entry-level CAD package.

MERGERS AND ACQUISITIONS

1989

Generic Software, Inc.
Autodesk acquired Generic Software, developer of Generic CADD. Generic Software, a low-cost CAD software vendor, will operate as a wholly owned subsidiary of Autodesk.

Xanadu Operating Company
Autodesk acquired an 80 percent equity in Xanadu Operating Company. The Xanadu group is developing new tools for information processing in the work group environment.

American Information Exchange Corporation (AMIX)
Autodesk acquired an 80 percent equity interest in AMIX, a developer of network-management software.

1987

Cadetron
Autodesk acquired Cadetron, providing Autodesk entry into the solid modeling market.

KEY OFFICERS

Alvar Green
Chairman, president, chief executive officer

Daniel Drake
Executive vice president

Malcom Davies
Senior vice president, Marketing and Sales

Volker Kleinn
Vice president, European Operations

Ronald McElhaney
Vice president, Engineering

PRINCIPAL INVESTORS

Equitable Life Assurance Society of the U.S.—9.3 percent
John Walker—8.4 percent

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

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$4,218.0	$22,841.0	$35,819.0	$113,576.0	$133,055.0
Cash	1,192.0	3,202.0	7,458.0	47,780.0	49,633.0
Receivables	2,588.0	4,910.0	8,130.0	11,353.0	16,354.0
Marketable Securities	-	12,948.0	16,843.0	48,851.0	58,178.0
Inventory	217.0	657.0	1,123.0	1,712.0	2,371.0
Other Current Assets	221.0	1,124.0	1,918.0	3,880.0	6,519.0
Net Property, Plants	$637.0	$1,590.0	$3,498.0	$7,546.0	$13,412.0
Other Assets	$75.0	$253.0	$1,377.0	$4,329.0	$23,426.0
Total Assets	$4,933.0	$24,684.0	$40,347.0	$125,451.0	$169,893.0
Total Current Liabilities	$2,839.0	$3,031.0	$5,555.0	$8,858.0	$18,608.0
Long-Term Debt	-	$362.0	$310.0	-	-
Other Liabilities	$57.0	$120.0	$500.0	$1,828.0	$3,551.0
Total Liabilities	$2,896.0	$3,513.0	$6,365.0	$10,686.0	$22,159.0
Total Shareholders' Equity	$2,007.0	$21,170.0	$33,982.0	$114,765.0	$147,734.0
Converted Preferred Stock	2.0	-	-	-	-
Common Stock	297.0	12,747.0	13,355.0	72,897.0	74,364.0
Other Equity	-	-	-	-	-
Retained Earnings	1,708.0	8,423.0	20,627.0	41,868.0	73,370.0
Total Liabilities and Shareholders' Equity	$4,903.0	$24,683.0	$40,347.0	$125,451.0	$169,893.0

Income Statement	1985	1986	1987	1988	1989
Revenue	$9,874.0	$29,531.0	$52,382.0	$79,257.0	$117,302.0
U.S. Revenue	8,719.0	23,052.0	36,335.0	49,968.0	69,673.0
Non-U.S. Revenue	1,155.0	6,479.0	16,047.0	29,289.0	47,629.0
Cost of Sales	$1,514.0	$4,582.0	$7,864.0	$10,552.0	$14,507.0
R&D Expense	$1,249.0	$1,665.0	$3,366.0	$7,206.0	$10,921.0
SG&A Expense	$4,293.0	$10,891.0	$19,514.0	$30,290.0	$44,957.0
Capital Expense	0	0	0	0	0
Pretax Income	$2,881.0	$13,011.0	$22,925.0	$35,047.0	$54,165.0
Pretax Margin (%)	29.18	44.06	43.77	44.22	46.18
Effective Tax Rate (%)	13.00	22.00	22.00	18.00	18.00
Net Income	$1,626.0	$6,521.0	$11,620.0	$20,541.0	$32,695.0
Shares Outstanding, Millions	16.5	19.0	21.0	23.2	24.1
Per Share Data					
Earnings	$0.10	$0.34	$0.55	$0.89	$1.35
Dividends	-	-	-	-	-
Book Value	$0.12	$1.11	$1.62	$4.95	$6.13

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

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	1.49	7.54	6.45	12.82	7.15
Quick (Times)	1.41	7.32	6.25	12.63	7.02
Fixed Assets/Equity (%)	31.89	7.51	10.29	6.58	9.08
Current Liabilities/Equity (%)	141.45	14.32	16.35	7.72	12.60
Total Liabilities/Equity (%)	2,964.37	16.59	18.73	9.31	15.00
Profitability (%)					
Return on Assets	-	44.04	35.55	24.73	22.14
Return on Equity	-	56.27	42.14	27.62	24.91
Profit Margin	16.47	22.08	22.18	25.92	27.87
Other Key Ratios					
R&D Spending % of Revenue	12.65	5.64	6.43	9.09	9.31
Capital Spending % of Revenue	0	0	0	0	0
Employees	145	214	300	414	576
Revenue ($K)/Employee	$68.10	$138.00	$174.61	$191.44	$203.65
Capital Spending % of Assets	0	0	0	0	0

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

Avantek, Inc.

Avantek, Inc.
3175 Bowers Avenue
Santa Clara, CA 95054
(408)727-0700

Established 1965
No. of Employees: 2,600

BACKGROUND

Avantek, Inc., is a vertically integrated company engaged in the design, manufacture, and marketing of solid-state components, subsystems, and systems operating at the frequency range of microwave and below, for the defense, space, communications, test, and instrumentation markets. The Company serves more than 3,000 customers in 35 countries. It manufactures more than 600 proprietary product types, most of which use internally produced semiconductors. Its microwave transistors sell for approximately $4 to $500 each.

The Company's "core" strategy is to maximize the competitive advantage provided by vertical integration. The Company's success is keyed to the application of superior microwave semiconductor technology. More than 60 percent of Avantek's 1986 revenue was based on GaAs. The Company's sales in 1987 and 1988 were $161.5 million and $123.5 million, respectively.

COMPANY EXECUTIVES

- President/CEO—Dr. E. Oran Brigham
- Executive Vice President—Robert E. Goff
- Senior Vice President, Administration/Services—Robert W. Busch
- Vice President, Finance/CFO—Steven Allan
- Senior Vice President, Amplifiers and Assemblies Division—Richard J. Clark
- Senior Vice President, Microwave Semiconductor Division—Lionel A. Kirton
- Vice President/General Manager, GaAs FET and MMIC Operations —R. M. Malbon
- Vice President, Sales—Peter Manno
- Vice President, Modules and Oscillator Components—Ed Winn

Avantek, Inc.

ALLIANCES

None

SERVICES

- Avantek provides custom assemblies based on the largest pretested die bank in the microwave industry.

PROCESS TECHNOLOGY

- Submicron GaAs MESFET allowing structures operable above 60 GHz
- Microwave silicon processing

PRODUCTS

- Silicon and GaAs microwave transistors, MMICs, hybrids, and other
- Microwave subsystems and systems

Applications

- Communications
- Military electronics systems

FACILITIES

Avantek leases 430,000 square feet in Santa Clara and Milpitas, California, and owns 88,000 square feet and 25 acres of land in Folsom, California. The Company also owns nine acres in Newark, California, on which it has built a 150,000-square-foot semiconductor plant that includes 17,000 square feet of Class 10 wafer fab area. The Newark facility started operations in 1987.

Avantek, Inc.

Avantek, Inc.
4401 Great America Parkway, Fifth Floor
Santa Clara, CA 95054
(408) 970–3084

Established 1965
No. of Employees: 3,200

BACKGROUND

Avantek, Inc., is a vertically integrated company engaged in the design, manufacture, and marketing of solid state components, subsystems, and systems operating at the frequency range of microwave and below, for the defense, space, communications, test, and instrumentation markets. The Company serves more than 3,000 customers in 35 countries. It manufactures more than 600 proprietary product types, most of which use internally produced semiconductors. Its microwave transistors sell for approximately $4 to $500 each.

The Company's "core" strategy is to maximize the competitive advantage provided by vertical integration. The Company's success is keyed to the application of superior microwave semiconductor technology. More than $130 million of Avantek's 1986 revenue was based on GaAs.

Sales ($M)	1986	1985	1984	1983	1982
Total (1984 Annual Report)			159.2	119.4	100.4
Total (1986 Annual Report)	208.1	168.2	131.7*	91.2*	83.8*

*Restated to reflect discontinued operations

COMPANY EXECUTIVES

- President/CEO—Dr. E. Oran Brigham
- Vice President Administration/Services—Robert W. Busch
- Senior Vice President, Microwave Products Group—Robert E. Goff
- Senior Vice President/CFO–Gary G. Harmon
- Senior Vice President, Microwave Semiconductor Group—Lionel A. Kirton
- Marketing Director—Peter Manno

Avantek, Inc.

ALLIANCES

None

SERVICES

Avantek provides custom assemblies based on the largest pretested die bank in the industry.

PROCESS TECHNOLOGY

- Submicron GaAs MESFET allowing structures operable above 60 GHz
- Microwave silicon processing

PRODUCTS

- Silicon and GaAs microwave components
- Microwave subsystems and systems

Applications

- Communications
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FACILITIES

Avantek leases 430,000 square feet in Santa Clara and Milpitas, California, and owns 88,000 square feet and 25 acres of land in Folsom, California. The Company owns nine acres in Newark, California, on which it has constructed a 90,000-square-foot semiconductor manufacturing plant.

Avantek, Inc.

THE COMPANY

Background

Avantek, Inc., founded in 1965, manufactures and markets microwave components and equipment for use in defense electronics, commercial telecommunications, and CATV applications.

The Company consists of three divisions: Microwave Integrated Circuits (MIC), producing thin-film hybrid amplifiers, oscillators, modules, and subsystems; Telecommunications, producing CATV test equipment, digital microwave radios, high-performance amplifiers and integrated subsystems; and Semiconductors, which produces transistors for both in-house use and for sale to other original equipment manufacturers.

Operations

Avantek's headquarters are in Santa Clara, California in a complex that also houses the Company's microwave semiconductor fabrication facility. In 1980, the Company purchased a fully equipped, printed circuit board plant, and in 1981 the Telecommunications group moved into a new building, also in Santa Clara.

Marketing

Avantek's products are sold through a network of independent sales representatives throughout the United States. International sales are handled by independent sales representatives.

Avantek's marketing and sales headquarters are:

Avantek
3175 Bowers Avenue
Santa Clara, CA 95051
Telephone: (408) 249-0700
Telex: 346337

Research and Development

Historically, Avantek has been a technological leader in the field of microwave semiconductors. The Company has a continuing policy of emphasizing research and development. In the first three quarters of 1981, it increased R&D expenditure by 54 percent over the same period of 1980. Approximately 15 percent of Avantek's total workforce is employed in engineering and R&D.

Avantek, Inc.

SEMICONDUCTOR DIVISION PRODUCTS

Avantek's in-house transistor manufacturing facility was established in 1968. Subsequently the Company offered its range of microwave semiconductor components on the open market. Avantek's Semiconductor Division produces a range of discrete devices for microwave applications. The Company's product line includes both silicon bipolar microwave transistors and gallium arsenide field effect microwave transistors (GaAsFet). Avantek's current GaAsFets operate up to 26GHz, and 40GHz products are under development. Monolithic microwave integrated circuits (MMICs) for high-speed digital applications are also under development.

OTHER ACTIVITIES

The Company's other divisions are MIC (Microwave Integrated Circuits), which produces hybrid thin-film devices for amplifiers, oscillators, modules, and subsystems; and the Telecommunications Division, which produces CATV test equipment, digital microwave radios, high-performance amplifiers, and integrated subsystems.

Avantek, Inc.

Avantek, Inc.
3175 Bowers Avenue
Santa Clara, California 95051
Telephone: (408) 727-0700
(Millions of Dollars Except Per Share Data)

Balance Sheet (January 2, 1982)

	1979	1980	1981
Working Capital	$11.9	$24.6	$51.7
Long-Term Debt	$ 0.1	$ 0.1	$ 1.2
Shareholders' Equity	$16.5	$32.7	$64.7
After-Tax Return on Average Equity (%)	29.8	28.6	19.5

Operating Performance (Fiscal Years Ending 12/29/79, 1/3/81, 1/2/82)

	1979	1980	1981
Revenue	$39.8	$58.3	$81.9
U.S. Revenue*	$33.8	$49.6	$69.6
Non-U.S. Revenue*	$ 6.0	$ 8.7	$12.3
Cost of Revenue	$20.6	$29.8	$42.1
R&D Expense	$ 3.3	$ 4.4	$ 7.2
SG&A Expense	$ 7.4	$10.3	$14.5
Pretax Income	$ 7.8	$13.0	$17.0
Pretax Margin (%)	20.0	22.0	21.0
Effective Tax Rate (%)	46.0	46.0	44.0
Net Income	$ 4.3	$ 7.0	$ 9.5
Average Shares Outstanding (Millions)*	15.0	16.4	17.4
Per Share*			
Earnings	$ 0.28	$ 0.43	$ 0.55
Dividend			
Book Value	$ 1.14	$ 2.00	$ 3.57
Price Range	$ 2- 5 7/8	$ 4 5/8- 16 7/8	$12 5/8- 24 3/4
Total Employees	1,030	1,335	1,533

*Adjusted to reflect 2-for-1 stock splits in March 1979, January 1981, and June 1981

Source: Avantek, Inc. Annual Reports
DATAQUEST, Inc.
February 1982

12.01 Avnet, Inc.

Avnet, Inc.
767 Fifth Avenue
New York, New York 10022
(212) 644-1050

(Millions of Dollars Except per Share Data)

Balance Sheet (June 30)

	1979	1980	Percent Change 1979-1980
Working Capital	$ 274.8	$ 349.4	27.1%
Long Term Debt	$ 43.7	$ 55.7	27.5%
Shareholders' Equity	$ 307.3	$ 371.1	20.8%
Equity as a Percent of Assets (%)	57.0%	60.0%	
After-Tax Return on Average Equity (%)	19.1%	21.1%	

Operating Performance (Fiscal Year Ending June 30)

	1979	1980	Percent Change 1979-1980
Revenue	$ 1,029.7	$ 1,266.8	23.1%
Cost of Goods	$ 724.4	$ 892.8	23.2%
Marketing, Shipping, SG&A Expense	$ 174.4	$ 210.2	20.5%
Pretax Income	$ 107.2	$ 137.1	27.9%
Pretax Margin (%)	10.4%	10.8%	
Net Income	$ 54.5	$ 71.7	31.6%
Per Share Data[1]			
Earnings	$ 3.50	$ 4.57	30.6%
Dividends	$ 0.75	$ 0.85	13.3%
Book Value	$ 20.02	$ 23.76	18.7%
Average Shares Outstanding (Millions)	15.56	15.68	18.7%
Capital Expenditures	$ 11.3	$ 9.2	(17.9%)
Sales/Average Assets	2.14	2.19	2.2%
Sales/Average Inventory	4.47	4.55	1.8%
Total Employees	12,400	12,000	(3.2%)

[1]Fully diluted

Source: Avnet, Inc. Annual Reports
DATAQUEST, Inc.

12.01 Avnet, Inc.

Table 12.01-1

Avnet, Inc.
REVENUES BY LINE OF BUSINESS
(Millions of Dollars)

	Fiscal Year Ending June 30				
	1976	1977	1978	1979	1980
Electronic Marketing	$230.8	$286.6	$359.3	$ 512.4	$ 699.5
Consumer Products	112.5	131.3	118.0	122.8	133.7
Wire and Cable	141.7	168.3	185.0	222.8	247.3
Automotive	79.0	62.8	61.8	70.7	67.9
Electrical & Engineering	57.5	70.6	82.5	99.4	118.4
Total	$621.5	$719.6	$806.6	$ 1,028.1	$ 1,266.8

Source: Avnet, Inc. Annual Reports
DATAQUEST, Inc.

12.01 Avnet, Inc.

Table 12.01-2

Avent, Inc.
FINANCIAL STATEMENT HISTORY 1973-1980
(Millions of Dollars)

		Fiscal Year Ending June 30									
		1973	1974	1975	1976	1977	1978	1979	1980	TREND	CMPD GR
BALANCE SHEET											
1	CASH & LIQUID SECURITIES	11.08	14.10	12.01	10.08	12.48	11.40	15.70	14.89	0.42	3.23
3	RECEIVABLES	75.91	99.86	81.65	103.61	121.37	143.61	185.07	221.48	19.63	15.95
4	INVENTORY	118.49	152.85	129.80	157.49	171.61	200.75	259.31	297.55	23.96	13.29
5	OTHER CURRENT ASSETS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	PREPAID EXPENSES	1.92	1.59	2.01	2.54	2.59	2.70	3.18	7.73	0.60	18.31
7	EXCESS FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	TOTAL CURRENT ASSETS	207.38	268.39	225.48	273.72	308.05	358.46	463.26	541.63	44.61	13.94
9	GROSS P P E	55.47	66.24	73.57	80.66	82.22	90.57	100.64	106.28	6.91	9.06
10	ACCUMULATED DEPRECIATION	24.59	27.93	30.33	33.97	36.38	40.88	46.98	51.43	3.78	10.95
11	NET P P E	30.88	38.30	43.24	46.69	45.84	49.69	53.66	54.85	3.13	7.54
12	MISC ASSETS	17.71	16.24	14.46	15.00	16.43	15.14	22.57	22.56	0.82	4.34
15	*TOTAL ASSETS*	255.97	322.93	283.18	335.41	370.32	423.29	539.49	619.04	48.57	12.71
16	COMMERCIAL PAPER	0.00	0.00	0.00	9.00	15.00	33.90	58.70	47.09	8.70	8011.61
17	ACCOUNTS PAYABLE	31.41	32.49	20.41	41.02	45.37	51.44	60.79	67.27	5.83	14.45
18	ACCRUED TAXES	8.54	10.41	4.57	15.22	8.66	7.44	19.77	18.93	1.61	14.74
19	ACCRUED LIABILITIES	15.45	22.89	23.12	27.47	28.02	30.10	43.27	52.05	4.52	16.04
20	CURR MAT LONG TERM DEBT	2.93	3.22	3.28	3.15	3.03	2.95	2.97	3.04	(0.02)	(0.58)
21	DIVIDEND PAYABLE	0.00	0.00	0.00	1.85	2.49	2.59	3.00	3.85	0.60	4919.69
22	TOTAL CURR LIABILITIES	56.33	69.01	51.38	97.71	102.58	128.42	188.50	192.23	21.25	21.58
23	LONG TERM DEBT	70.80	101.69	58.99	37.30	34.32	31.66	43.69	55.67	(5.72)	(8.93)
24	DEFERRED TAXES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	MINORITY INT IN SUBS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	DEFICIT FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	TOTAL LIABILITIES	127.13	170.70	110.37	135.01	136.89	160.09	232.19	247.90	15.52	9.13
29	PREFERRED STOCK	0.79	0.73	0.71	0.65	0.24	0.15	0.12	0.09	(0.12)	(30.04)
30	COMMON STOCK	11.47	11.59	11.71	12.39	14.33	14.91	15.05	15.42	0.67	5.18
31	CAPITAL SURPLUS	28.16	28.10	28.05	27.59	27.27	28.01	28.24	33.04	0.41	1.34
32	RETAINED EARNINGS	88.65	111.95	132.85	160.55	192.20	221.22	264.28	322.96	32.13	19.63
33	TREASURY STOCK	(0.25)	(0.15)	(0.32)	(0.68)	(0.61)	(1.08)	(0.40)	(0.36)	(0.05)	14.19
34	TOTAL EQUITY	128.84	152.23	172.80	200.40	233.43	263.20	307.29	371.14	33.04	15.81
35	*TOTAL LIAB & EQUITY*	255.97	322.93	283.18	335.41	370.32	423.29	539.49	619.04	48.57	12.71
36	NET WORKING CAPITAL	151.05	199.38	174.10	176.01	205.47	230.04	274.76	349.40	23.37	10.60
INCOME & EXPENSE											
38	SALES	440.72	571.04	541.46	621.50	719.85	806.65	1028.13	1266.80	106.69	14.91
40	COST OF GOODS	302.71	395.02	365.68	418.10	497.98	563.02	724.38	892.76	76.77	15.46
41	GROSS PROFIT	138.01	176.02	175.79	203.40	221.87	243.63	303.75	374.04	29.91	13.68
42	S G & A EXPENSE	82.86	103.11	105.12	116.57	132.10	148.58	174.36	210.24	16.59	13.05
43	MISC OPERATING EXPENSE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	OPERATING PROFIT	55.13	72.91	70.67	86.82	89.57	95.04	129.40	163.80	13.32	14.55
46	DEPRECIATION	4.13	4.32	4.95	5.39	5.58	6.14	7.43	8.26	0.57	10.31
47	LEASE PAYMENTS	3.42	4.28	5.26	5.37	4.99	5.96	6.70	7.64	0.52	10.20
48	INTEREST EXPENSE	5.20	7.64	8.59	4.34	4.49	4.45	9.15	14.54	0.72	7.61
49	MISC EXPENSE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	MISC INCOME	1.66	1.18	1.17	0.80	5.28	1.25	1.14	3.77	0.23	9.53
53	PRETAX PROFIT	44.04	57.84	53.03	72.52	79.79	79.75	107.25	137.13	11.74	15.85
54	INCOME TAXES	22.32	29.32	26.73	37.11	39.61	40.17	52.79	65.43	5.50	15.02
56	NET PROFIT	21.72	28.52	26.30	35.42	40.18	39.58	54.46	71.70	6.24	16.66
57	EPS AFTER PFD DIVIDENDS	1.43	1.87	1.72	2.31	2.60	2.55	3.50	4.57	0.39	16.15
58	COMMON DIV PER SHARE	0.30	0.30	0.34	0.50	0.63	0.70	0.75	0.85	0.09	18.57

Source: Avnet, Inc. Annual Reports
DATAQUEST, Inc.

12.01 Avnet, Inc.

Table 12.01-3

Avnet, Inc.
FINANCIAL STATEMENT HISTORY 1973-80
(Percent)

		Fiscal Year Ending June 30									
		1973	1974	1975	1976	1977	1978	1979	1980	TREND	CMPD GR
	BALANCE SHEET										
1	*CASH & LIQUID SECURITIES*	4.32	4.37	4.24	3.01	3.37	2.69	2.91	2.40	(0.30)	(6.41)
3	*RECEIVABLES*	29.66	30.92	28.63	30.89	32.77	33.93	34.31	35.78	0.92	2.87
4	*INVENTORY*	46.29	47.33	45.84	46.95	46.34	47.43	48.07	48.07	0.24	0.51
5	*OTHER CURRENT ASSETS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	*PREPAID EXPENSES*	0.75	0.49	0.71	0.78	0.70	0.64	0.59	1.25	0.04	4.96
7	*EXCESS FUNDS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	*TOTAL CURRENT ASSETS*	81.02	83.11	79.63	81.61	83.18	84.69	85.87	87.50	0.90	1.08
9	*GROSS P P E*	21.67	20.51	25.98	24.05	22.20	21.40	18.66	17.17	(0.67)	(3.24)
10	*ACCUMULATED DEPRECIATION*	9.61	8.65	10.71	10.13	9.82	9.66	8.71	8.31	(0.15)	(1.56)
11	*NET P P E*	12.06	11.86	15.27	13.92	12.38	11.74	9.95	8.86	(0.53)	(4.59)
12	*MISC ASSETS*	6.92	5.03	5.10	4.47	4.44	3.58	4.18	3.64	(0.38)	(7.43)
15	**TOTAL ASSETS**	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
16	*COMMERCIAL PAPER*	0.00	0.00	0.00	2.68	4.05	8.01	10.88	7.61	1.58	$879.69
17	*ACCOUNTS PAYABLE*	12.27	10.06	7.21	12.23	12.25	12.15	11.27	10.87	0.13	1.54
18	*ACCRUED TAXES*	2.55	3.22	1.61	4.54	2.34	1.76	3.66	3.06	0.05	1.80
19	*ACCRUED LIABILITIES*	6.04	7.09	8.17	8.19	7.57	7.11	8.02	8.41	0.21	2.95
20	*CURR MAT LONG TERM DEBT*	1.14	1.00	1.16	0.94	0.82	0.70	0.55	0.49	(0.10)	(11.80)
21	*DIVIDEND PAYABLE*	0.00	0.00	0.00	0.55	0.67	0.61	0.56	0.62	0.11	3600.31
22	*TOTAL CURR LIABILITIES*	22.01	21.37	18.14	29.13	27.70	30.34	34.94	31.05	1.98	7.87
23	*LONG TERM DEBT*	27.66	31.49	20.63	11.12	9.27	7.48	8.10	8.99	(3.45)	(19.20)
24	*DEFERRED TAXES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	*MISC LIABILITIES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	*MINORITY INT IN SUBS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	*DEFICIT FUNDS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	*TOTAL LIABILITIES*	49.66	52.86	38.98	40.25	36.97	37.82	43.04	40.05	(1.47)	(3.17)
29	*PREFERRED STOCK*	0.31	0.23	0.25	0.16	0.06	0.04	0.02	0.01	(0.05)	(37.93)
30	*COMMON STOCK*	4.48	3.59	4.14	3.69	3.87	3.52	2.79	2.49	(0.23)	(6.68)
31	*CAPITAL SURPLUS*	11.01	6.70	9.90	8.23	7.36	6.62	5.23	5.34	(0.61)	(10.09)
32	*RETAINED EARNINGS*	34.63	34.67	46.85	47.87	51.90	52.26	48.99	52.17	2.56	8.14
33	*TREASURY STOCK*	(0.10)	(0.05)	(0.11)	(0.20)	(0.16)	(0.26)	(0.07)	(0.06)	0.00	1.31
34	*TOTAL EQUITY*	50.34	47.14	61.02	59.75	63.03	62.18	56.96	59.95	1.47	2.75
35	**TOTAL LIAB & EQUITY**	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
36	*NET WORKING CAPITAL*	59.01	61.74	61.48	52.48	55.48	54.35	50.93	56.44	(1.08)	(1.87)
	INCOME & EXPENSE										
38	*SALES*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
40	*COST OF GOODS*	68.69	69.18	67.54	67.27	69.20	69.80	70.46	70.47	0.33	0.48
41	*GROSS PROFIT*	31.31	30.82	32.46	32.73	30.80	30.20	29.54	29.53	(0.33)	(1.07)
42	*S G & A EXPENSE*	18.80	18.06	19.41	18.75	18.38	18.42	16.96	16.60	(0.29)	(1.61)
43	*MISC OPERATING EXPENSE*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	*OPERATING PROFIT*	12.51	12.77	13.05	13.97	12.45	11.78	12.59	12.93	(0.04)	(0.31)
46	*DEPRECIATION*	0.94	0.78	0.91	0.87	0.78	0.76	0.72	0.65	(0.03)	(4.00)
47	*LEASE PAYMENTS*	0.78	0.75	0.97	0.86	0.69	0.74	0.65	0.60	(0.03)	(4.10)
48	*INTEREST EXPENSE*	1.18	1.34	1.59	0.70	0.62	0.55	0.89	1.15	(0.07)	(8.35)
49	*MISC EXPENSE*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	*MISC INCOME*	0.38	0.21	0.22	0.13	0.73	0.16	0.11	0.30	(0.01)	(4.68)
53	*PRETAX PROFIT*	9.99	10.13	9.79	11.67	11.09	9.89	10.43	10.83	0.08	0.82
54	*INCOME TAXES*	5.06	5.13	4.94	5.97	5.50	4.98	5.13	5.17	0.00	0.10
56	*NET PROFIT*	4.93	4.99	4.85	5.70	5.58	4.91	5.30	5.66	0.08	1.53
57	*EPS AFTER PFD DIVIDENDS*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
58	*COMMON DIV PER SHARE*	21.01	16.06	19.43	21.68	24.09	27.46	21.43	18.59	0.43	2.08

Source: Avnet, Inc. Annual Reports
DATAQUEST, Inc.

12.01 Avnet, Inc.

Table 12.01-4

Avnet, Inc.
FUNDS FLOW HISTORY 1974-80
(Millions of Dollars)

	Fiscal Year Ending June 30								
	1974	1975	1976	1977	1978	1979	1980	TREND	CMPD GR
SOURCES									
56 *NET PROFIT*	28.52	26.30	35.42	40.18	39.58	54.46	71.70	6.79	15.73
46 *DEPRECIATION*	4.32	4.95	5.39	5.58	6.14	7.43	8.26	0.63	10.87
61 *NEW LONG TERM DEBT*	34.12	0.00	0.00	0.05	0.30	15.00	15.02	(0.96)	880.37
62 *NEW EQUITY*	(0.65)	(0.45)	0.22	2.45	1.53	0.62	5.44	0.78	*********
63 *INCR OTHER LIABILITIES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
66 *TOTAL SOURCES*	66.31	30.80	41.02	48.27	47.55	77.50	100.42	7.22	12.26
USES									
67 *P P E EXPENDITURES*	11.74	9.99	8.84	4.74	9.98	11.40	9.45	(0.10)	(0.87)
68 *REPAIMENT LONG TERM DEBT*	2.93	42.64	21.83	3.15	3.03	2.95	2.97	(3.50)	(22.67)
69 *PREFERRED DIVIDENDS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70 *COMMON DIVIDENDS*	4.58	5.11	7.68	9.67	10.87	11.67	13.33	1.52	20.42
72 *INCR WORKING CAPITAL*	48.62	(25.22)	1.78	29.35	24.49	44.74	74.72	8.80	*********
71 *INCR OTHER ASSETS*	(1.47)	(1.79)	0.54	1.43	(1.29)	7.43	(0.01)	0.75	*********
74 *TOTAL USES*	66.41	30.63	40.67	48.34	47.08	78.19	100.46	7.27	12.36
75 *EXCESS/DEFICIT*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76 *CUMULATIVE SUR/DEF*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Avnet, Inc. Annual Reports
DATAQUEST, Inc.

12.01 Avnet, Inc.

Table 12.01-5

Avnet, Inc.
FINANCIAL RATIO HISTORY 1973-80

		Fiscal Year Ending June 30									
		1973	1974	1975	1976	1977	1978	1979	1980	5Y AV	5YR AVG
LIQUIDITY											
1	*CURRENT RATIO*	3.681	3.889	4.388	2.801	3.003	2.791	2.458	2.818	3.229	2.982
2	*QUICK RATIO*	1.544	1.651	1.823	1.164	1.305	1.207	1.065	1.230	1.374	1.279
3	*CASH RATIO*	0.196	0.204	0.234	0.103	0.122	0.089	0.083	0.077	0.139	0.113
4	*WORKING CAPITAL/SALES*	0.343	0.349	0.322	0.283	0.286	0.285	0.267	0.276	0.301	0.288
6	*DAYS RECEIVABLES*	62.865	63.826	55.042	60.850	61.556	64.982	65.703	63.813	62.330	62.976
7	*DAYS INVENTORY*	142.865	141.232	129.563	137.488	125.781	130.144	130.661	121.650	132.423	129.488
LEVERAGE											
8	*LONG TERM DEBT/CAPITALIZ*	0.355	0.400	0.255	0.157	0.128	0.107	0.124	0.130	0.207	0.160
11	*LONG TERM DEBT/EQUITY*	0.549	0.668	0.341	0.186	0.147	0.120	0.142	0.150	0.288	0.203
12	*TOTAL DEBT/EQUITY*	0.572	0.689	0.360	0.247	0.224	0.260	0.343	0.285	0.373	0.316
COVERAGE											
13	*EBIT/INTEREST*	9.469	8.568	7.170	17.699	16.783	18.909	12.718	10.429	12.968	13.654
14	*FIXED CHARGE COVERAGE*	6.109	5.849	4.828	8.468	9.424	8.662	7.766	7.182	7.286	7.697
16	*REPAY LTD+FIX CHARGE COV*	**********	4.696	3.917	6.331	7.073	6.708	6.547	6.333	5.944	6.320
OPER PERFORMANCE											
17	*GROSS PROFIT/SALES*	0.313	0.308	0.325	0.327	0.308	0.302	0.295	0.295	0.309	0.305
18	*OPER PROFIT/SALES*	0.125	0.128	0.131	0.140	0.124	0.118	0.126	0.129	0.128	0.127
21	*PRETAX PROFIT/SALES*	0.100	0.101	0.098	0.117	0.111	0.099	0.104	0.108	0.105	0.106
22	*NET PROFIT/SALES*	0.049	0.050	0.049	0.057	0.056	0.049	0.053	0.057	0.052	0.053
23	*NET PROFIT/AVG EQUITY*	**********	0.203	0.162	0.190	0.185	0.159	0.191	0.211	0.186	0.188
24	*NET PROFIT/AVG CAPITALIZ*	**********	0.126	0.108	0.151	0.159	0.141	0.169	0.184	0.148	0.156
26	*NET PROFIT/AVG TOT ASSETS*	**********	0.099	0.087	0.115	0.114	0.100	0.113	0.124	0.107	0.111
27	*E P S GROWTH RATE*	**********	0.306	(0.077)	0.337	0.126	(0.018)	0.372	0.307	0.194	0.213
28	*SALES GROWTH RATE*	**********	0.296	(0.052)	0.148	0.158	0.121	0.275	0.232	0.168	0.184
TURNOVER											
31	*SALES/AVG EQUITY*	**********	4.063	3.332	3.331	3.318	3.248	3.604	3.734	3.519	3.500
32	*SALES/AVG CAPITALIZ*	**********	2.518	2.230	2.648	2.848	2.868	3.184	3.257	2.793	2.948
33	*SALES/AVG TOT DEBT + EQTY*	**********	2.484	2.200	2.563	2.687	2.613	2.762	2.848	2.594	2.675
34	*SALES/AVG TOTAL ASSETS*	**********	1.973	1.787	2.009	2.039	2.033	2.136	2.187	2.023	2.072
35	*SALES/AVG OPER ASSETS*	**********	2.096	1.882	2.110	2.134	2.117	2.223	2.276	2.120	2.164
36	*SALES/AVG GROSS P P E*	**********	9.384	7.746	8.059	8.836	9.337	10.754	12.244	9.480	10.047
BALANCE SHEET											
37	*CASH/SALES*	0.025	0.025	0.022	0.016	0.017	0.014	0.015	0.012	0.018	0.016
38	*RECEIVABLES/SALES*	0.172	0.175	0.151	0.167	0.169	0.178	0.180	0.175	0.171	0.173
41	*INVENTORY/SALES*	0.269	0.268	0.240	0.253	0.238	0.249	0.252	0.235	0.251	0.246
42	*OTH CURR ASSETS/SALES*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
43	*LINE 6/SALES*	0.004	0.003	0.004	0.004	0.004	0.003	0.003	0.008	0.004	0.004
44	*GROSS P P E/SALES*	0.126	0.116	0.136	0.130	0.114	0.112	0.098	0.084	0.114	0.108
46	*MISC ASSETS/SALES*	0.040	0.028	0.027	0.024	0.023	0.019	0.022	0.018	0.025	0.022
47	*ACCOUNTS PAYABLE/SALES*	0.071	0.057	0.038	0.066	0.063	0.064	0.059	0.053	0.059	0.058
48	*ACCRUED TAXES/SALES*	0.015	0.018	0.008	0.024	0.012	0.009	0.019	0.015	0.015	0.015
51	*ACCRUED LIABILITY/SALES*	0.035	0.040	0.043	0.044	0.039	0.037	0.042	0.041	0.040	0.041
52	*LINE 21/SALES*	0.000	0.000	0.000	0.003	0.003	0.003	0.003	0.003	0.002	0.003
53	*DEFERRED TAXES/SALES*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
54	*MISC LIABILITIES/SALES*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
56	*LINE 26/SALES*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MISCELLANEOUS											
57	*EQUITY PER COMMON SHARE*	8.419	9.922	11.281	13.013	15.065	16.945	19.735	23.663	14.756	17.184
58	*RETIRE/PREV GROSS P P E*	**********	(0.018)	(0.038)	(0.024)	(0.039)	(0.020)	(0.015)	(0.038)	(0.027)	(0.028)
61	*DEPREC/PREV GROSS P P E*	**********	0.078	0.075	0.073	0.069	0.075	0.082	0.082	0.076	0.077
62	*COM DIVS/EBN-PFD DIVS*	0.210	0.161	0.194	0.217	0.241	0.275	0.214	0.186	0.212	0.217
63	*TAX RATE*	0.507	0.507	0.504	0.512	0.496	0.504	0.492	0.477	0.500	0.496
64	*COST OF GOODS/SALES*	0.687	0.692	0.675	0.673	0.692	0.698	0.705	0.705	0.691	0.695
65	*S G & A/SALES*	0.188	0.181	0.194	0.188	0.184	0.184	0.170	0.166	0.182	0.178

Source: Avnet, Inc. Annual Reports
DATAQUEST, Inc.

Bell & Howell Company

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Skokie, Illinois 60077-1076
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Fax: (708) 470-9530
Dun's Number: 00-506-9141

Date Founded: 1907

CORPORATE STRATEGIC DIRECTION

The Bell & Howell Group's predecessor was founded in 1907 in Illinois as a manufacturer of professional motion picture equipment. During 1977, the Bell & Howell Group was incorporated in Delaware and shifted its focus toward being a document processing and information services company. In December 1987, Bell & Howell Group and BHW Acquisition Corporation merged to form Bell & Howell Company, which became privately held in June 1988.

Bell & Howell Company is a parent/holding company with high-tech operating units involved in the computer hardware, high-tech service, and software industries. According to Dataquest, Bell & Howell held a 5.9 percent market share of the low-end worldwide installed base of document imaging systems (1,655 systems) and a 5.4 percent market share of the low-end worldwide image systems shipments during 1989. According to Dataquest estimates, total revenue increased 6.6 percent to $627.4 million* in fiscal year 1989, up from $588.7 million in fiscal 1988. Net loss was estimated at $49.6 million in fiscal year 1989, representing a 47.7 percent decrease from fiscal 1988.

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. No comprehensive financial statement is included because Bell & Howell is a privately held company.

*All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

Document Processing Systems

Image Search Plus System

The Image Search Plus System is a PC-based document storage and retrieval system. It consists of a high-resolution monitor, Copiscan II scanner, a 5.25- or 12-inch optical disk drive, a personal computer, a laser printer, an image server and record server, PC workstations, Image Search software, and the optional capability to fax documents stored on the system to facsimile equipment at remote locations. The Image Search Plus is available in a standalone or local area network (LAN) configuration through Bell & Howell's direct sales force and dealer network. On June 20, 1989, Bell & Howell's Image Search Plus System won the Computer Smithsonian award honoring the innovative use of information technology.

Data Search 8000 Computer-Assisted Retrieval System

The Data Search 8000 System is aimed at midrange to large-scale computer-assisted retrieval (CAR) users. It is designed for high-volume document management applications and can support as many as 120 terminals and four parallel printers. Peripherals connected to the system by cable can operate up to 3,000 feet (1 kilometer) away from the central processing unit through a LAN. The Data Search 8000 system consists of a minicomputer, system

software, a Bell & Howell microfilm recorder, and a Bell & Howell reader/printer. Documents can be filmed with a variety of Bell & Howell cameras, from integrated data entry recorders to high-end bar code readers. Key information is stored by the system, creating an index. Index data can be shared with the user's mainframe computer system directly or via tape. When a document or file must be located, the Data Search 8000's software conducts a rapid search for the information. The document is then retrieved, viewed, and printed. Information stored by the system can be accessed by any of the workstations. Based on a custom 16-bit parallel microprocessor, 6400/6600 minicomputers are at the heart of the system. These minicomputers hold up to 4MB of RAM in main memory. The minicomputers support up to three 140MB 5.25-inch hard disk drives and two 500MB 8-inch drives. A 1/4-inch cartridge tape drive and up to two 1/2-inch streaming tape drives provide high-speed data backup and transfer. Modems provide remote-site storage and retrieval capability. All operations are controlled by a menu-driven relational database management system (RDBMS) that uses a series of easy-to-use English commands.

Image Search Plus COM System

The Image Search Plus COM System, provided to Bell & Howell by Image Communication Systems Corporation, allows storage of computer data directly on optical disk without using a laser printer or fax machine. It takes advantage of the large storage capacity of an optical disk combined with the speed of a PC to eliminate the need to output computer data to microfilm or paper for storage. Files are stored directly to the optical disk from magnetic tape, host computer download, floppy diskette, or 1/4-inch cartridge tape. With the Image Search Plus COM system, an index is created automatically to allow retrieval of data through a variety of search functions such as primary search fields, secondary search fields, cross references, or range searches. Its software runs on a PC AT or compatible or on a PS/2 personal computer. The Image Search Plus COM system offers the possibility of working with 5.25-inch, 12-inch, or jukebox optical disk drives and to be set up in single-user or network configurations.

ABR-425 Jacket Indexing System

Bell & Howell introduced its ABR-425 Jacket Indexing System in April 1990. The ABR-425 consists of a jacket indexing printer and software that runs on IBM PCs and compatibles. The systems software utilizes pulldown menus. The ABR-425 automatically titles and sequences jackets at high speed and with cost savings.

Image Search Plus LAN

The Image Search Plus LAN supports up to seven 12-inch optical disk drives and 16 workstations for a total on-line storage capacity of 160,000 pages. Network communications, an image server, and a record server enable users to share document images and index information between the PC workstations. With this system, the user can scan 8-1/2 x 11-inch documents in under 3 seconds and store the images on optical disks as the user creates a computerized document index. It also has electronic mail capability that allows messages to be sent to specific users on the network. Users also can broadcast messages to all workstations for immediate display.

Optical Disk Jukebox

In April 1990, Bell & Howell presented a multiple disk jukebox for its Image Search Plus LAN document management system. Up to 25 optical disks (5.25-inch) can be loaded into the jukebox's storage bay, putting 20 gigabytes of data—approximately 500,000 pages of scanned documents—at the user's fingertips. It features a rotating robotic arm that enables access to both sides of an optical disk. Disk exchange is completed in less than 4 seconds. A jukebox can be added to existing Image Search Plus LAN systems or included as an option on a new system. A second jukebox can be added for applications that require additional storage.

ImageTrak Plus Recorder/Scanner

The ImageTrak Plus concept combines microfilm and electronic imaging technologies into one product. It consists of the ImageTrak rotary microfilm recorder and an electronic imaging document scanner in one package. The microfilm recorder can film both sides of a document as it is fed through the system. Based on the Copiscan II Document Scanner, the scanner will scan the document at the same time it is being filmed. An optional built-in bar code reader automatically and simultaneously indexes the microfilm and optical disk files as they are fed into the unit. The ImageTrak Plus offers the same features as the ImageTrak recorder—ink jet imprinting of documents, film numbering, film image marking, a two-in-one automatic/manual feeder, and a choice of camera reduction ratios.

Software

Data Search 9000 Computer-Assisted Retrieval Software

Data Search 9000 CAR Software requires very little user computer literacy and is designed for use with a wide range of mainframe computers including Burroughs, Digital Equipment Corporation (DEC), and IBM. It allows organizations to start with a simple, single-user base system and grow to virtually an unlimited number of terminals. Indexes are stored in structures known as file folders that may be labeled with up to 30 characters. Users can browse through file folders or access a folder directly using the file folder name. Individual file folders can be assigned restricted access if security is necessary. Documents can be filmed with a variety of Bell & Howell cameras, from integrated data entry recorders to high-end bar code readers. Key information is stored by the software, creating an index that can be entered on-line or obtained directly from the mainframe computer system. Data Search 9000 has the ability to generate reports on such data as keystroke and error counts, index removal, rejected data, or data not verified. The software also can be used to automatically generate labels for document requests.

Loan Search Software

The Loan Search Software is a custom-designed consumer software to be used with a CAR system. It is also available on the Data Search 8000 system. The software allows lenders to track missing documents in loan files electronically and alerts them to past-due items.

Readers/Printers

7000 Reader/Printer

Bell & Howell unveiled the 7000 Reader/Printer with a 16mm-roll film capacity in April 1990. The 7000 Reader/Printer features a dry-print process that prints images on plain bond paper and a wide selection of lenses, including zoom capability. The units fit on a desktop and can automatically load 16mm-roll film housed in M-style or ANSI cartridges. When used with an optional controller, the 7000 Reader/Printer is capable of multilevel image mark searching, browsing, or odometer searching. The controller also enables the 7000 Reader/Printer to be used with CAR systems.

7100 Reader/Printer

Introduced in April 1990, the 7100 Reader/Printer is focused at the midrange of the information management marketplace. A variety of film carrier options allows the 7100 Reader/Printer to retrieve information from microfiche, aperture cards, 16mm- or 35mm-roll film on open spools, or 16mm-roll film on both M-style or ANSI cartridges. The 7100 Reader/Printer has a modular print control panel and print features such as automatic masking. The print mechanism utilizes the latest bond paper copier technology. The high-speed system can print up to 20 standard-sized (8-1/2-inch x 11-inch) pages per minute.

7700 Reader/Printer

The 7700 Reader/Printer is a roll film system capable of retrieving information from M-style or ANSI 16mm-roll film. Through its ability to interface with an organization's computer system, the 7700 Reader/Printer is suited for applications such as check and credit card processing in the financial marketplace and claims processing in the insurance industry. The 7700 Reader/Printer has an easy-to-use controller with memory for automatic retrieval of roll film, a modular print control panel, and a variety of search modes, including several that operators can set to modify the reader/printer to a particular application. The 7700 Reader/Printer can search on single, dual, or trilevel image-marked film and read the widely used image management code to automatically set up such retrieval information as roll numbers. It can also search programs and present values for initial image marks. The 7700 Reader/Printer offers an automatic odometer reading for nonimage-marked film.

7500 Reader/Printer

The 7500 Reader/Printer accepts 16 and 35mm-roll film and 35mm fiche and aperture cards. Both the 7500 and the 7700 Reader/Printers incorporate the latest bond paper copier technology, featuring two-sided prints, automatic and pinpoint masking, and automatic printing of groups of images.

8000 Series Reader/Printer

The 8000 Series Reader/Printer features a digital image print mechanism and automatic or manual focusing. Digital image processing and a built-in RS-232-D interface enable the Digital Image Reader/Printer to bridge the technology between microfilm and electronic optical imaging. The universal film

format feature allows it to convert virtually any microfilmed image to a magnetic or optical image. The 8000 Series Reader/Printer enables electronic reduction or enlargement of an image from 50 percent to 200 percent of normal print size. A digital image editor enables a variety of trimming, masking, and image-positioning functions. The 8000 Series Reader/Printer retrieves images from microfiche, aperture cards, 16mm- or 35mm-roll film on open spools, or 16mm-roll film in ANSI or M-style cartridges. An optional controller allows the reader/printer to search on single, dual, or trilevel image-marked film. For nonimage-marked film, it offers an automatic odometer reading. Electronic imaging enables the 8000 Series Reader/Printer the capability of networking with other printers and interfacing with CAR systems.

Reader/Printer Controller

On April 10, 1990, Bell & Howell unveiled a low-cost, hand-held, compact controller that works with a wide variety of reader/printers, including Bell & Howell's 4000R, 7100, and 7500 Reader/Printers. The controller's features include multilevel image-mark retrieval, RS-232-C capability, variable speed control, a print memory function, and the ability to print entire files. A browsing feature enables the user to view each image for a fixed period of time before the controller automatically advances the film to the next image.

ImageTrak Rotary Recorder

The ImageTrak Rotary Recorder is focused at the high end of the information management marketplace. The ImageTrak Rotary Recorder's special software enables the user to control the system easily. All filming and indexing requirements for up to seven different applications can be preprogrammed by the user. Switching from one preset job to another is accomplished easily through selecting the job name from the system's application menu. It features a two-in-one feeding system that allows the user to switch between manual and automatic feeding of documents, an optional 20-character alphanumeric ink jet imprinter, film numbering, multilevel image marks with image management code, a large display and keyboard, an optional bar code scanner for automatic filming and computer indexing in a single step, RS-232 communications, and a custom workstation. The ImageTrak system will also download index data to a user's computer via a communications link or floppy disk accommodating CAR systems. It is designed to interface with Bell & Howell Computer Assisted Retrieval Systems, including the Data Search 8000 System.

Scanners

Copiscan Document Scanner

The Copiscan Document Scanner is the input device used in image management systems. Bell & Howell provides 300-dpi Copiscan scanners on an OEM basis for the image systems offered by Alpharel, IBM, and others.

Copiscan II Document Scanner

In April 1990, Bell & Howell introduced its second-generation Copiscan scanner, the Copiscan II. The Copiscan II handles a range of paper sizes from a minimum of 2-1/2 by 2 inches to a maximum of 11 by 17 inches. It handles any weight paper from 0.0018 inch (onionskin or telephone book page weight) to 80-pound card stock. Document feeding and stacking is accomplished easily because documents are fed face-up and away from the user, the output tray is positioned for convenient access, and document feed order is maintained in stacking. The Copiscan II features a compact new style that complements PC-based workstations. It is compatible with a variety of host systems and is plug compatible with original Copiscan scanners. The Copiscan II models offer higher speeds, selectable resolution, and halftone output for scanning photographs. All models include extra space and power supply capacity for adding a PC-AT-size or smaller circuit cards. Built-in diagnostics and easily accessible parts simplify servicing. Functional tests can be performed from the control panel to facilitate troubleshooting and minimize downtime. The Copiscan II is mostly sold on an OEM basis to systems companies and systems integrators.

Further Information

For more information about Bell & Howell's business segments, please contact Dataquest's Document Image Management Systems service.

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

	1985	1986	1987	1988[1]	1989[2]
Five-Year Revenue	$548,430.0	$602,324.0	$584,210.0	$588,669.0	$627,448.0
Percent Change	-	9.83	(3.01)	0.76	6.59
Capital Expenditure	$32,984.0	$44,080.0	$32,230.0	$25,241.0	$25,098.0
Percent of Revenue	6.01	7.32	5.52	4.29	2.09
R&D Expenditure	$24,664.0	$22,700.0	$20,600.0	$24,200.0	$28,235.0
Percent of Revenue	4.50	3.77	3.53	4.11	4.50
Number of Employees	7,853	7,373	7,158	6,733	6,733
Revenue ($K)/Employee	$69.84	$81.69	$81.62	$87.43	$93.19
Net Income	$32,186.0	$32,895.0	$61,365.0	($33,601.0)	($49,642.0)
Percent Change	-	2.20	86.55	(154.76)	(47.74)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	NA	NA	NA	NA
Quarterly Profit	NA	NA	NA	NA

[1]Bell & Howell Company became privately owned in June 1988.
[2]Dataquest estimates
NA = Not available

Source: Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	NA	80.60	77.82	77.45	NA
International	NA	19.40	22.18	22.55	NA
Europe	NA	11.75	14.77	15.21	NA
Other	NA	7.65	7.41	7.34	NA

NA = Not available

Source: Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	90.00	NA
Indirect Sales	10.00	NA
Dealers	10.00	NA

NA = Not available

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

Bell & Howell Company has distribution and/or sales facilities in most major cities in the United States. Detailed information is not available.

MANUFACTURING LOCATIONS

North America

Allentown, Pennsylvania
Ann Arbor, Michigan
Caguas, Puerto Rico
Chicago, Illinois
Cleveland, Ohio
Columbus, Ohio
Irvine, California
Lehigh Valley, Pennsylvania
Phillipsburg, New Jersey
Wooster, Ohio
Zealand, Michigan

SUBSIDIARIES

North America

Bell & Howell Acceptance Corp. (United States)
Bell & Howell Document Management Products Company (United States)
Bell & Howell Foreign Sales, Inc. (Virgin Islands)
Bell & Howell International Finance Company (United States)
Bell & Howell Ltd. (Canada)
Bell & Howell Mailmobile Company (United States)
Bell & Howell Phillipsburg Co. (United States)
Bell & Howell Publication Systems Co. (United States)
N.B. Jackets De Puerto Rico, Inc. (United States)
University Microfilms, Inc. (United States)

Europe

Bell & Howell Benelux S.A. (Belgium)
Bell & Howell France S.A. (France)
Bell & Howell GmbH (Germany)
Bell & Howell Italia S.p.A. (Italy)
Bell & Howell Limited (United Kingdom)
Bell & Howell Mfg. S.A. (Switzerland)
Bell & Howell Netherlands B.V. (Netherlands)
Bell & Howell S.A. (Switzerland)
Micromedia Limited (United Kingdom)

Asia/Pacific

Bell & Howell Japan Co., Ltd. (Japan)
Edworth Pty. Limited (Australia)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

US Bureau of the Census

Bell & Howell Document Management Products Company won a $4.5 million contract with the US Bureau of the Census. Under the terms of the contract, Bell & Howell was to deliver 202 of its 7700 microfilm Reader/Printers during the first quarter of 1990. Bell & Howell will provide complete service coverage and maintenance of the equipment.

1987

Daifuku Co., Ltd.

The companies made an agreement for Daifuku to sell Bell & Howell's unmanned mail and document delivery vehicle on an OEM basis. Daifuku will produce the vehicle at its main factory in Aichi Prefecture, Japan. Daifuku obtained the exclusive rights to market the vehicle under the Bell & Howell brand name in Japan and nine other Asian countries.

Reynolds & Reynolds

A licensing agreement calls for Reynolds & Reynolds to sell Bell & Howell's electronic parts catalog system to auto dealers.

EasTek Corporation

Bell & Howell has signed an OEM agreement with EasTek Corporation to sell EasTek's department image scanner.

McDonnell Douglas

The companies made a joint venture to market a computer-assisted microfilm and microfiche retrieval system. Under the agreement, Bell & Howell will provide micrographics equipment and McDonnell Douglas will provide a minicomputer for storing microfilm file data and software that will allow the computer to initiate a search for the microfilmed document.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

William J. White
President, chief executive officer, chief operating officer

Nils Johnson
Executive vice president, chief financial officer

Jerry Herb
Vice president, Administration

Eugene F. Sikorovsky
Senior vice president

PRINCIPAL INVESTORS

Robert M. Bass—34 percent
Robert M. Bass Group Inc.—33 percent
Acadia Partners—28 percent
David Banderman—5 percent

FOUNDERS

Information is not available.

Bell Atlantic Corporation

1600 Market Street
Philadelphia, Pennsylvania 19103
Telephone: (215) 963-6000
Fax: (215) 963-6038
Dun's Number: 10-721-2169

Date Founded: January 1, 1984

CORPORATE STRATEGIC DIRECTION

Bell Atlantic Corporation is one of seven regional Bell operating companies (RBOCs) created as a result of the US District Court's decision to restructure the Bell System and American Telephone & Telegraph (AT&T). The historic AT&T antitrust settlement ordered AT&T to divest its 22 Bell operating companies (BOCs) and its control of the local exchange services. The 22 BOCs were reorganized into seven RBOCs, one of which was the Bell Atlantic Corporation. In January 1, 1984, Bell Atlantic and the six RBOCs began life as independent corporations, separate from their former parent, AT&T.

The AT&T divestiture and Federal Communications Commission rules required Bell Atlantic to operate in two distinct organizations. One is the Network Services Group, consisting of the seven local telephone companies servicing 19 Local Access and Transport Areas (LATAs) in the mid-Atlantic region. The other group is the Bell Atlantic Enterprises Corporation that umbrellas the new Bell Atlantic Companies, including Bell Atlantic Mobile Systems for cellular telephone service and Bell Atlanticom for competitive equipment sales. The enterprises group is also responsible for all expansion activities of the nonregulated branch of Bell Atlantic.

Bell Atlantic is the holding company that represents an entire family of companies offering business and residential consumers a variety of public network services and a wide variety of premises communications products and services. The companies that make up Bell Atlantic fall into the following three distinct divisions: corporate headquarters, network services group, and Bell Atlantic Enterprises Corporation.

Corporate headquarters is the parent facility of Bell Atlantic, located in Philadelphia, Pennsylvania. The headquarters facility provides the overall financial, strategic, and public policy direction to the total family of Bell Atlantic companies, whereas a separate unit, Bell Atlantic Corporate Services, Inc., provides general administrative and corporate oversight services required by the Bell Atlantic companies.

The network services group is composed of the seven Bell Atlantic BOCs: Bell of Pennsylvania; Diamond State Telephone; New Jersey Bell; and the Chesapeake and Potomac Telephone Companies of Maryland, Virginia, West Virginia, and Washington, D.C. These operating companies provide local exchange and exchange access services under each state's respective regulatory franchise. The group also includes Bell Atlantic Management Services, Inc., which provides staff support services in common for the telephone companies and assists in their efforts to procure communications equipment and services.

Bell Atlantic Enterprises Corporation comprises nine subsidiaries that operate separately from the BOCs. These subsidiaries fall into the following three categories: information products and services, personal communications, and financing. Bell Atlantic Enterprises Corporation owns the stock of the enterprises group companies and provides them with common services such as data processing, accounting, and administration.

Bell Atlantic's total revenue increased 5.2 percent to $11.4 billion* in fiscal 1989 from $10.9 billion in fiscal 1988. Net income decreased 18.4 percent to $1.1 billion in fiscal 1989 from $1.3 billion in fiscal 1988. Bell Atlantic employs approximately 79,100 people worldwide.

*All dollar amounts are in US dollars.

Bell Atlantic does not report international versus domestic sales. According to the Modified Final Judgment (MFJ), which is the final set of instructions for the restructuring of the Bell System, the RBOCs are not allowed to manufacture telecommunications products after the divestiture. Currently, this restriction is under study by Congress.

Bell Atlantic Corporation also does not report R&D expenditures separately. Its research and development is performed by Bell Communications Research, of which the Bell Atlantic Corporation is one-seventh owner, with the remaining RBOCs each having an equal share. Capital expenditures totaled $2.6 billion in fiscal 1989, representing 23.0 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 distribution channel. Information on revenue by region is not available. Table 3, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Telecommunications

Bell Atlantic's Network Services Group serves more than 14.6 million customer lines in the mid-Atlantic region. The Bell Atlantic operating companies provide regulated, primary local telephone service (dial tone) to residential and business subscribers through their respective central office switching centers. Through these central offices, the BOCs currently supply their customers with a variety of network services, including network consulting services, Centrex, the Guardian Plan and Residential Service Variety Package (RSVP), and public data network.

The Bell Atlantic operating companies each offer the Network Consulting Services program that provides business customers with access to skilled network specialists who can assist in all stages of communications network design and configuration, and implementation of communication systems for medium-size and large businesses.

Services

The Central Office local area network (LAN) allows the simultaneous transmission of voice and data over existing Centrex wiring, thereby eliminating the need to invest in duplicate cables and obsolescence-prone hardware.

The public data network is a data communications service that allows cost-effective transmission over existing telephone lines for the interactive, two-way exchange of information.

The Guardian Plan and RSVP are two services that meet the needs of residential customers. The Guardian Plan is a maintenance contract that covers the diagnosis and repair of faulty telephones and lines. Under the Guardian Plan, a subscriber receives a "loaner" phone while the broken phone is being fixed or replaced. RSVP provides services that once were available only for businesses. Features include distinctive ringing for priority calls, call transfer, and intercom.

During 1989, several of the Network Services Companies began offering three new services: Bell Atlantic I.Q Services, Gateway Services, and Information Services. Bell Atlantic I.Q Services offers a family of calling features that include Caller ID, which displays the number of the calling party; Identa Ring, which enables a single line to have multiple telephone numbers, each with a distinctive ring; Ultra Forward, which customers can use to program call-forwarding instructions; and Home Intercom, which allows for phone-to-phone dialing within the home. Bell of Pennsylvania and the C & P telephone companies of Washington, D.C., Maryland, and Virginia are continuing trials of Gateway Services in the Philadelphia and Washington, D.C., LATAs. Gateway Services provides a single point of entry that allows users of personal computers to gain access to multiple databases. Information Services consists of message storage services, voice mail, electronic mail, and call delivery service.

Bell Atlantic continues to expand the major lines of business that it has developed during the past four years, primarily in the servicing and financing of information and communications equipment through the following subsidiaries:

- Bell Atlantic Capital Corporation manages the financial services companies, which include TriContinental Leasing.

- Bell Atlantic Systems Leasing International's position in the distribution and financing of computer mainframes and other high-technology equipment complements TriContinental Leasing's experience in financing office and industrial equipment.
- Bell Atlantic Capital Corporation manages the real estate investments of Bell Atlantic Properties (BAP).
- Sorbus is the leading computer maintenance company in the country, with 200 offices across the United States.
- Bell Atlantic Mobile Systems, a cellular mobile communications company, is the second largest cellular wire-line carrier in the country, with 106 cell sites.
- Bell Atlantic Investment Development manages Bell Atlantic's nonregulated businesses.
- Telecommunications Specialists, Inc., provides leasing, installations, and maintenance of business communications systems for small to medium-size businesses from five offices throughout Texas.

Further Information

For more information about the Company's business segments, please contact Dataquest's Telecommunications Industry Service.

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$9,084.2	$9,920.8	$10,298.4	$10,880.1	$11,448.6
Percent Change	-	9.21	3.81	5.65	5.23
Capital Expenditure	$2,163.2	$2,290.9	$2,364.3	$2,619.5	$2,628.1
Percent of Revenue	23.81	23.09	22.96	24.08	22.96
R&D Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
Number of Employees	79,285	80,185	80,950	81,000	79,100
Revenue ($K)/Employee	$114.58	$123.72	$127.22	$134.32	$144.74
Net Income	$1,092.9	$1,167.1	$1,240.4	$1,316.8	$1,074.5
Percent Change	-	6.79	6.28	6.16	(18.40)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$2,768.3	$2,882.2	$2,909.4	$2,888.7
Quarterly Profit	$330.8	$341.7	$344.1	$57.9

NA = Not available

Source: Bell Atlantic Corporation Annual Reports
Dataquest (1990)

Table 2
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

North America—Not available
Japan—Not available
Europe—Not available
Asia/Pacific—Not available
ROW—Not available

MANUFACTURING LOCATIONS

According to the Modified Final Judgment (MFJ), which is the final set of instructions for the restructuring of the Bell System, the RBOCs are not allowed to manufacture telecommunications products after the divestiture.

SUBSIDIARIES

North America

BAP-1310 North Courthouse Road, Inc. (United States)
BAP-1760 Market, Inc. (United States)
BAP-Durham, Inc. (United States)
BAP-Tustin, Inc. (United States)
BATCL-1987-I, Inc. (United States)
BATCL-1987-II, Inc. (United States)
BATCL-1987-III, Inc. (United States)
Bell Atlantic Business Supplies Corporation (United States)
Bell Atlantic Capital Corporation (United States)
Bell Atlantic Cellular Consulting Group, Inc. (United States)
Bell Atlantic Customer Services, Inc. (United States)
Bell Atlantic Customer Services International, Inc. (United States)
Bell Atlantic Directory Graphics, Inc. (United States)
Bell Atlantic Education Services, Inc. (United States)
Bell Atlantic Enterprises Corporation (United States)
Bell Atlantic Financial Overseas Corporation (United States)
Bell Atlantic Financial Services, Inc. (United States)
Bell Atlantic Foreign Sales Corporation (United States)
Bell Atlantic Information Systems, Inc. (United States)
Bell Atlantic International Inc. (United States)
Bell Atlantic Investment Development Corporation (United States)
Bell Atlantic Investments, Inc. (United States)
Bell Atlantic Knowledge Systems, Inc. (United States)
Bell Atlantic Mobile Systems, Inc. (United States)
Bell Atlantic Mobile Systems of Allentown, Inc. (United States)
Bell Atlantic Mobile Systems of Atlantic City, Inc. (United States)
Bell Atlantic Mobile Systems of Baltimore, Inc. (United States)
Bell Atlantic Mobile Systems of Norfolk, Inc. (United States)
Bell Atlantic Mobile Systems of Northern New Jersey, Inc. (United States)
Bell Atlantic Mobile Systems of Pittsburgh, Inc. (United States)
Bell Atlantic Mobile Systems of Reading, Inc. (United States)
Bell Atlantic Mobile Systems of Richmond, Inc. (United States)
Bell Atlantic Mobile Systems of Washington, Inc. (United States)
Bell Atlantic Network Funding Corporation (United States)
Bell Atlantic Network Services, Inc. (United States)
Bell Atlantic Paging, Inc. (United States)
Bell Atlantic Properties, Inc. (United States)
Bell Atlantic Rental Properties, Inc. (United States)
Bell Atlantic Services Management, Inc. (United States)
Bell Atlantic Systems Leasing International (United States)
Bell Atlantic Technical Ventures, Inc. (United States)
Bell Atlantic Tricon Leasing Corporation (United States)
Bell Atlantic Tricon Leasing International (United States)
Bell Atlantic Tricon Medical Finance Company (United States)
Bell Atlantic Vehicles Management, Inc. (United States)
Bell Atlantic Ventures, Inc. (United States)
Bell Atlantic Ventures II, Inc. (United States)
Bell Atlantic Ventures XI, Inc. (United States)
Bell Atlantic Ventures XII, Inc. (United States)
Bell Atlanticom Systems, Inc. (United States)
Bell Telephone Company of Pennsylvania (United States)
Camex-CPX, Inc. (United States)
Chesapeake and Potomac Telephone Co. (United States)
Chesapeake and Potomac Telephone Company of Maryland (United States)
Chesapeake and Potomac Telephone of Virginia (United States)
Chesapeake and Potomac Telephone of West Virginia (United States)
Compushop Inc. (United States)
D.S., Inc. (United States)
Data 3 Computer Corporation (United States)
Diamond State Telephone Company (United States)

Electronic Service Specialists Ltd. (United States)
New CII Computer, Inc. (United States)
New Jersey Bell Telephone Company (United States)
Shorrock Inc. (United States)
Sorbus 1 Ltd. (United States)
Sorbus Canada Ltd. (Canada)
Sorbus Computer Services Ltd. (United States)
Sorbus Inc. (United States)
Technology Concepts Inc. (United States)
Telecommunications Specialists, Inc. (United States)
Time-Tronics, Inc. (United States)
TriContinental Leasing Corporation (United States)

Europe

BAC Financial B.V. (Netherlands)
BAC International-Netherlands B.V. (Netherlands)
Bell Atlantic Financial France S.A. (France)
Bell Atlantic Financial (U.K.) Ltd. (United Kingdom)
Bell Financial GmbH (West Germany)
Bell (U.K.) Communications Limited (United Kingdom)
Bell (U.K.) Services Ltd. (United Kingdom)
Dataway Computer AG (Austria)
Dataway Computer GmbH (West Germany)
Eurotech GmbH (West Germany)
Eurotech Italia SpA (Italy)
Eurotechnica S.A. (France)
Sorbus B.V. (Netherlands)
Sorbus Europe Ltd. (United Kingdom)
Sorbus (U.K.) Ltd. (United Kingdom)

ROW

TriContinental Leasing of Puerto Rico, Inc. (Puerto Rico)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Northern Telecom
Bell Atlantic will distribute Northern Telecom's Maestro set, the first residential telephone with an integrated display panel that supports Caller ID services.

Eagle Telephonics Inc.
Bell Atlantic and Eagle Telephonics Inc. executed a three-year agreement for Bell Atlantic to distribute Eagle CLASS (Customer Local Area Signaling System) equipment.

1989

Avanti Communications
Bell Atlantic and Avanti Communications have a joint development agreement to develop the Open Network Management System to manage the intelligent processor ONX nodal networking product line and other networking products.

Fujitsu America
Contract to supply Sonet products

Northern Telecom
Will market Meridian Norstar digital key telephone systems, Meridian Digital Centrex, and Unity lines of business telephone sets

1988

Telefonica de Espana
Agreement for a broad range of cooperative agreements

IBM
Joint product development

Siemens AG
Joint product development

IBM New Zealand
Integration agreement for a computerized directory assistance system for the Telecom Corporation of New Zealand

MERGERS AND ACQUISITIONS

1990

Northern Telecom
Bell Atlantic acquired the mid-Atlantic operations of Northern Telecom's Meridian Business Systems group for an undisclosed sum.

Control Data Corporation
Bell Atlantic purchased Control Data Corporation's third-party computer maintenance business. Bell Atlantic will merge the newly acquired unit into Sorbus, the BOC's previously acquired maintenance subsidiary.

1988

Data 3 Computer Corporation
Buys and sells midrange computer products manufactured by leading companies

KEY OFFICERS

Raymond W. Smith
President and chief executive officer

Anton J. Campanella
President

William M. Newport
Vice president, Strategic Planning

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	$2,683.7	$2,755.6	$2,796.6	$3,206.4	$3,768.9
Cash	239.3	213.3	228.7	47.9	164.2
Receivables	1,732.7	1,795.3	1,677.5	2,122.5	2,401.3
Marketable Securities	0	0	0	253.7	278.9
Inventory	242.3	270.9	298.6	316.5	278.7
Other Current Assets	441.2	469.4	476.1	591.8	645.8
Net Property, Plants	$16,536.7	$16,931.6	$17,245.4	$18,173.9	$18,874.1
Other Assets	$568.0	$1,403.7	$1,203.1	$3,348.9	$3,576.7
Total Assets	$19,788.4	$21,090.9	$21,245.1	$24,729.2	$26,219.7
Total Current Liabilities	$2,831.9	$3,593.8	$3,183.8	$4,265.2	$5,053.0
Long-Term Debt	$4,890.5	$4,957.3	$5,199.2	$6,557.2	$7,720.6
Other Liabilities	$4,144.7	$4,219.1	$4,120.2	$4,730.1	$4,855.5
Total Liabilities	$11,867.1	$12,770.2	$12,503.2	$15,552.5	$17,629.1
Total Shareholders' Equity	$7,921.3	$8,320.7	$8,741.9	$9,176.7	$8,590.6
Common Stock	99.9	199.7	199.7	199.7	199.7
Other Equity	5,568.9	5,469.1	5,469.1	5,469.1	5,545.7
Retained Earnings	2,252.5	2,701.9	3,179.3	3,688.8	3,889.7
Treasury Stock, Cost	0	(50.0)	(106.2)	(180.9)	(1,044.5)
Total Liabilities and Shareholders' Equity	$19,788.4	$21,090.9	$21,245.1	$24,729.2	$26,219.7

Income Statement	1985	1986	1987	1988	1989
Revenue	$9,084.2	$9,920.8	$10,298.4	$10,880.1	$11,488.6
Operating Expenses	$6,759.7	$7,456.9	$7,952.3	$8,635.6	$9,435.8
R&D Expense	N/A	N/A	N/A	N/A	N/A
SG&A Expense	N/A	N/A	N/A	N/A	N/A
Capital Expense	$2,163.2	$2,290.9	$2,364.3	$2,619.5	$2,628.1
Pretax Income	$1,903.3	$2,071.6	$1,954.4	$1,846.8	$1,545.5
Pretax Margin (%)	20.95	20.88	18.98	16.97	13.50
Effective Tax Rate (%)	42.60	43.70	36.50	28.70	30.50
Net Income	$1,092.9	$1,167.1	$1,240.4	$1,316.8	$1,074.5
Shares Outstanding, Millions	199.8	199.6	198.9	198.1	198.0
Per Share Data					
Earnings	$5.47	$5.85	$6.24	$6.65	$5.43
Dividend	$3.20	$3.40	$3.60	$3.84	$4.40
Book Value	$39.65	$41.69	$43.95	$46.32	$43.39

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
Liquidity					
Current (Times)	0.95	0.77	0.88	0.75	0.75
Quick (Times)	0.86	0.69	0.78	0.68	0.69
Fixed Assets/Equity (%)	208.76	203.49	197.27	198.04	219.71
Current Liabilities/Equity (%)	35.75	43.19	36.42	46.48	58.82
Total Liabilities/Equity (%)	149.81	153.48	143.03	169.48	205.21
Profitability (%)					
Return on Assets	-	5.71	5.86	5.73	4.22
Return on Equity	-	14.37	14.54	14.70	12.10
Profit Margin	12.03	11.76	12.04	12.10	9.39
Other Key Ratios					
R&D Spending % of Revenue	NA	NA	NA	NA	NA
Capital Spending % of Revenue	23.81	23.09	22.96	24.08	22.96
Employees	79,285	80,185	80,950	81,000	79,100
Revenue ($K)/Employee	$114.58	$123.72	$127.22	$134.32	$144.74
Capital Spending % of Assets	10.93	10.86	11.13	10.59	10.02

NA = Not available
Note: 1985 share and per share adjusted to reflect a two-for-one stock split declared in March 1986.

Source: Bell Atlantic Corporation Annual Reports
Dataquest (1990)

Bell Atlantic Corporation

1600 Market Street
Philadelphia, Pennsylvania 19103
Telephone: (215) 963-6000
Fax: (215) 963-6038
Dun's Number: 10-721-2169

Date Founded: January 1, 1984

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Bell Atlantic's total revenue increased 6 percent to $10.9 billion* in fiscal 1988 from $10.3 billion in fiscal 1987. Net income increased 6 percent to $1.3 billion in fiscal 1988 from $1.2 billion in fiscal 1987. Bell Atlantic employs approximately 81,000 people worldwide.

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

for the restructuring of the Bell System, the RBOCs are not allowed to manufacture telecommunications products after the divestiture.

Bell Atlantic Corporation also does not report R&D expenditures separately. Its research and development is performed by Bell Communications Research, of which the Bell Atlantic Corporation is one-seventh owner, with the remaining RBOCs each having an equal share. Capital expenditures totaled $2.6 billion in fiscal 1988, representing 24 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

Telecommunications

Bell Atlantic's Network Services Group serves more than 14.6 million customer lines in the mid-Atlantic region. The Bell Atlantic operating companies provide regulated, primary local telephone service (dial tone) to residential and business subscribers through their respective central office switching centers. Through these central offices, the BOCs currently supply their customers with a variety of network services, including network consulting services, Centrex, the Guardian Plan and Residential Service Variety Package (RSVP), and public data network.

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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)

	1984	1985	1986	1987	1988
Five-Year Revenue	$8,090.1	$9,084.2	$9,920.8	$10,298.4	$10,880.1
Percent Change	-	12.29	9.21	3.81	5.65
Capital Expenditure	$1,912.6	$2,163.2	$2,290.9	$2,364.3	$2,619.5
Percent of Revenue	23.64	23.81	23.09	22.96	24.08
R&D Expenditure	N/A	N/A	N/A	N/A	N/A
Percent of Revenue	N/A	N/A	N/A	N/A	N/A
Number of Employees	79,500	79,285	80,185	80,950	81,000
Revenue ($K)/Employee	$101.76	$114.58	$123.72	$127.22	$134.32
Net Income	$973.1	$1,092.9	$1,167.1	$1,240.4	$1,316.8
Percent Change	-	12.31	6.79	6.28	6.16

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$2,766.7	$2,882.2	N/A	N/A
Quarterly Profit	$348.8	$360.8	N/A	N/A

N/A = Not Available

Source: Bell Atlantic Corporation Annual Reports
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1984	1985	1986	1987	1988
North America	N/A	N/A	N/A	N/A	N/A
International	N/A	N/A	N/A	N/A	N/A

N/A = Not Available

Source: Dataquest
January 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1987	1988
Direct Sales	100.00	100.00
Indirect Sales	0	0

Source: Dataquest
January 1990

1988 SALES OFFICE LOCATIONS

North America—Not available
Japan—Not available
Europe—Not available
Asia/Pacific—Not available
ROW—Not available

MANUFACTURING LOCATIONS

According to the Modified Final Judgment (MFJ), which is the final set of instructions for the restructuring of the Bell System, the RBOCs are not allowed to manufacture telecommunications products after the divesture.

SUBSIDIARIES

North America

BAP-1310 North Courthouse Road, Inc. (United States)
BAP-1760 Market, Inc. (United States)
BAP-Durham, Inc. (United States)
BAP-Tustin, Inc. (United States)
BATCL-1987-I, Inc. (United States)
BATCL-1987-II, Inc. (United States)
BATCL-1987-III, Inc. (United States)
Bell Atlantic Business Supplies Corporation (United States)
Bell Atlantic Capital Corporation (United States)
Bell Atlantic Cellular Consulting Group, Inc. (United States)
Bell Atlantic Customer Services, Inc. (United States)
Bell Atlantic Customer Services International, Inc. (United States)
Bell Atlantic Directory Graphics, Inc. (United States)
Bell Atlantic Education Services, Inc. (United States)
Bell Atlantic Enterprises Corporation (United States)
Bell Atlantic Financial Overseas Corporation (United States)
Bell Atlantic Financial Services, Inc. (United States)
Bell Atlantic Foreign Sales Corporation (United States)
Bell Atlantic Information Systems, Inc. (United States)
Bell Atlantic International, Inc. (United States)
Bell Atlantic Investment Development Corporation (United States)
Bell Atlantic Investments, Inc. (United States)
Bell Atlantic Knowledge Systems, Inc. (United States)
Bell Atlantic Mobile Systems, Inc. (United States)
Bell Atlantic Mobile Systems of Allentown, Inc. (United States)
Bell Atlantic Mobile Systems of Atlantic City, Inc. (United States)
Bell Atlantic Mobile Systems of Baltimore, Inc. (United States)
Bell Atlantic Mobile Systems of Norfolk, Inc. (United States)
Bell Atlantic Mobile Systems of Northern New Jersey, Inc. (United States)
Bell Atlantic Mobile Systems of Pittsburgh, Inc. (United States)
Bell Atlantic Mobile Systems of Reading, Inc. (United States)
Bell Atlantic Mobile Systems of Richmond, Inc. (United States)
Bell Atlantic Mobile Systems of Washington, Inc. (United States)
Bell Atlantic Network Funding Corporation (United States)
Bell Atlantic Network Services, Inc. (United States)
Bell Atlantic Paging, Inc. (United States)
Bell Atlantic Properties, Inc. (United States)
Bell Atlantic Rental Properties, Inc. (United States)
Bell Atlantic Services Management, Inc. (United States)
Bell Atlantic Systems Leasing International (United States)
Bell Atlantic Technical Ventures, Inc. (United States)
Bell Atlantic Tricon Leasing Corporation (United States)
Bell Atlantic Tricon Leasing International (United States)
Bell Atlantic Tricon Medical Finance Company (United States)
Bell Atlantic Vehicles Management, Inc. (United States)
Bell Atlantic Ventures, Inc. (United States)
Bell Atlantic Ventures II, Inc. (United States)
Bell Atlantic Ventures XI, Inc. (United States)

Bell Atlantic Ventures XII, Inc. (United States)
Bell Atlanticom Systems, Inc. (United States)
Bell Telephone Company of Pennsylvania (United States)
Camex-CPX, Inc. (United States)
Chesapeake and Potomac Telephone Co. (United States)
Chesapeake and Potomac Telephone Company of Maryland (United States)
Chesapeake and Potomac Telephone of Virginia (United States)
Chesapeake and Potomac Telephone of West Virginia (United States)
Compushop, Inc. (United States)
D.S., Inc. (United States)
Data 3 Computer Corporation (United States)
Diamond State Telephone Company (United States)
Electronic Service Specialists Ltd. (United States)
New CII Computer, Inc. (United States)
New Jersey Bell Telephone Company (United States)
Shorrock, Inc. (United States)
Sorbus 1 Ltd. (United States)
Sorbus Canada Ltd. (Canada)
Sorbus Computer Services Ltd. (United States)
Sorbus, Inc. (United States)
Technology Concepts, Inc. (United States)
Telecommunications Specialists, Inc. (United States)
Time-Tronics, Inc. (United States)
TriContinental Leasing Corporation (United States)

Europe

BAC Financial B.V. (Netherlands)
BAC International-Netherlands B.V. (Netherlands)
Bell Atlantic Financial France S.A. (France)
Bell Atlantic Financial (U.K.) Ltd. (United Kingdom)
Bell Financial GmbH (West Germany)
Bell (U.K.) Communications Limited (United Kingdom)
Bell (U.K.) Services Ltd. (United Kingdom)
Dataway Computer AG (Austria)
Dataway Computer GmbH (West Germany)
Eurotech GmbH (West Germany)
Eurotech Italia SpA (Italy)
Eurotechnica S.A. (France)
Sorbus B.V. (Netherlands)
Sorbus Europe Ltd. (United Kingdom)
Sorbus (U.K.) Ltd. (United Kingdom)

ROW

TriContinental Leasing of Puerto Rico, Inc. (Puerto Rico)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Fujitsu America
Contract to supply Sonet products

Northern Telecom
Will market Meridian Norstar digital key telephone systems, Meridian Digital Centrex, and Unity lines of business telephone sets

1988

Telefonica de Espana
Agreement for a broad range of cooperative agreements

IBM
Joint product development

Siemens AG
Joint product development

IBM New Zealand
Integration agreement for a computerized directory assistance system for the Telecom Corporation of New Zealand

MERGERS AND ACQUISITIONS

1988

Data 3 Computer Corporation
Buys and sells midrange computer products manufactured by leading companies

KEY OFFICERS

Raymond W. Smith
President and chief executive officer

Philip A. Campbell
Vice chairman and chief financial officer

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

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	$2,600.4	$2,683.7	$2,755.6	$2,796.6	$3,206.4
Cash	267.2	239.3	213.3	228.7	47.9
Receivables	1,770.2	1,732.7	1,795.3	1,677.5	2,122.5
Marketable Securities	0	0	0	0	253.7
Inventory	121.8	242.3	270.9	298.6	316.5
Other Current Assets	441.2	469.4	476.1	591.8	465.8
Net Property, Plants	$15,788.8	$16,536.7	$16,931.6	$17,245.4	$18,173.9
Other Assets	$295.1	$568.0	$1,403.7	$1,203.1	$3,348.9
Total Assets	$18,684.3	$19,788.4	$21,090.9	$21,245.1	$24,729.2
Total Current Liabilities	$2,741.2	$2,831.9	$3,593.8	$3,183.8	$4,265.2
Long-Term Debt	$4,745.0	$4,890.5	$4,957.3	$5,199.2	$6,557.2
Other Liabilities	$3,689.6	$4,144.7	$4,219.1	$4,120.2	$4,730.1
Total Liabilities	$11,175.8	$11,867.1	$12,770.2	$12,503.2	$15,552.5
Total Shareholders' Equity	$7,508.5	$7,921.3	$8,320.7	$8,741.9	$9,176.7
Common Stock	99.6	99.9	199.7	199.7	199.7
Other Equity	5,562.0	5,568.9	5,469.1	5,469.1	5,469.1
Retained Earnings	1,846.9	2,252.5	2,701.9	3,179.3	3,688.8
Treasury Stock, Cost	0	0	(50.0)	(106.2)	(180.9)
Total Liabilities and Shareholders' Equity	$18,684.3	$19,788.4	$21,090.9	$21,245.1	$24,729.2

Income Statement	1984	1985	1986	1987	1988
Revenue	$8,090.1	$9,084.2	$9,920.8	$10,298.4	$10,880.1
Operating Expenses	$5,982.1	$6,759.7	$7,456.9	$7,952.3	$8,635.6
R&D Expense	N/A	N/A	N/A	N/A	N/A
SG&A Expense	N/A	N/A	N/A	N/A	N/A
Capital Expense	$1,912.6	$2,163.2	$2,290.9	$2,364.3	$2,619.5
Pretax Income	$1,705.1	$1,903.3	$2,071.6	$1,954.4	$1,846.8
Pretax Margin (%)	21.08	20.95	20.88	18.98	16.97
Effective Tax Rate (%)	42.90	42.60	43.70	36.50	28.70
Net Income	$973.1	$1,092.9	$1,167.1	$1,240.4	$1,316.8
Shares Outstanding, Millions	195.8	199.8	199.6	198.9	198.1
Per Share Data					
Earnings	$4.97	$5.47	$5.85	$6.24	$6.65
Dividends	$3.20	$3.40	$3.60	$3.84	$4.08
Book Value	$38.35	$39.65	$41.69	$43.95	$46.32

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

Key Financial Ratios	1984	1985	1986	1987	1988
Liquidity					
Current (Times)	0.95	0.95	0.77	0.88	0.75
Quick (Times)	0.90	0.86	0.69	0.78	0.68
Fixed Assets/Equity (%)	210.28	208.76	203.49	197.27	198.04
Current Liabilities/Equity (%)	36.51	35.75	43.19	36.42	46.48
Total Liabilities/Equity (%)	148.84	149.81	153.48	143.03	169.48
Profitability (%)					
Return on Assets	-	5.68	5.71	5.86	5.73
Return on Equity	-	14.17	14.37	14.54	14.70
Profit Margin	12.03	12.03	11.76	12.04	12.10
Other Key Ratios					
R&D Spending % of Revenue	N/A	N/A	N/A	N/A	N/A
Capital Spending % of Revenue	23.64	23.81	23.09	22.96	24.08
Employees	79,500	79,285	80,185	80,950	81,000
Revenue ($K)/Employee	$101.76	$114.58	$123.72	$127.22	$134.32
Capital Spending % of Assets	10.24	10.93	10.86	11.13	10.59

N/A = Not Available
Note: 1984 and 1985 share and per share adjusted to reflect a two-for-one stock split declared in March 1986.

Source: Bell Atlantic Corporation
Annual Reports
Dataquest
January 1990

BellSouth Corporation

1155 Peachtree Street, N.E.
Atlanta, Georgia 30367-6000
Telephone: (404) 249-2000
Fax: (404) 249-5599
Dun's Number: 10-667-8006

Date Founded: 1984

CORPORATE STRATEGIC DIRECTION

BellSouth Corporation is a holding company that provides telecommunications services through four principal subsidiaries: South Central Bell, Southern Bell, BellSouth Services, and BellSouth Enterprises. South Central Bell and Southern Bell are operating telephone companies that provide predominantly tariffed telecommunications services to Alabama, Kentucky, Louisiana, Mississippi, Tennessee, Florida, Georgia, North Carolina, and South Carolina. Approximately 92 percent of net income in fiscal 1989 was provided by these two companies.

On January 1, 1984, BellSouth and six other regional holding companies (RHCs) began operations as independent corporations, separated from their former parent, AT&T.

BellSouth, along with the six other RHCs, operate under a Consent Decree as ordered by the Federal Court. This Consent Decree restricts the RHCs from engaging in certain business activities, including manufacturing customer premises equipment (CPE), manufacturing or providing telecommunications equipment, and long distance telephone service. The Consent Decree defines CPE as equipment used on a customer's premises to originate, route, or terminate telecommunication. The Consent Decree defines telecommunications equipment as including equipment used by carriers to provide telecommunications services. Currently, BellSouth is engaged in efforts to persuade key legislators to remove these restrictions on all RHCs.

As a jointly owned subsidiary of South Central Bell and Southern Bell, BellSouth Services, Inc., performs selected staff, planning, and other functions and services with respect to marketing, network strategic planning, development and maintenance of financial and information systems, training, regulatory matters, and centralized purchasing for its owners. BellSouth's other business, primarily mobile communication, advertising, and publishing and communications systems, is conducted through BellSouth Enterprises, Inc., a wholly owned subsidiary.

Internationally, BellSouth has made several inroads to the European market. In 1985, BellSouth International (BSI) was established as part of the Mobile Systems/International Group under BellSouth Enterprises. BSI provides telecommunications services and products to international customers. Products and services offered by BSI include public and private network design, CPE, mobile communication, and other telecommunications-related products. BSI has offices in Atlanta, Georgia; Hong Kong; London, England; Metz, France; and Bonn, Germany. Marketing efforts are focused upon three primary geographical areas: Asia/Pacific, Europe, and Latin America.

In November 1986, BellSouth acquired 40 percent of Air Call, a UK mobile communications company, for $8.82 million.* In March 1989, BellSouth paid $35.09 million for the remaining 60 percent of Air Call. Through activities with Air Call, BellSouth has entered the paging markets in Switzerland, Spain, and Ireland. Also, BellSouth owns Dataserve, a UK leasing company, through acquisition of Dataserve's US parent. In addition, BellSouth acquired a minority stake in Cofira, a French cellular mobile radio operator.

In January 1990, BellSouth agreed to buy a minority interest in Communications-Development (Com-Dev), a leading cable television company in France. BellSouth will be involved in the operation of the cable systems and will provide direct marketing and

*All dollar amounts are in US dollars.

customer service assistance through its French subsidiary, Datech. In June 1990, Southwestern Bell Corp. was cleared by the New Zealand Commerce Commission to submit a bid to purchase an interest in Telecom Corp., a New Zealand state-owned telecommunications operation.

Total revenue in fiscal 1989 increased by 3 percent to $13.99 billion from $13.59 billion in fiscal 1988. BellSouth does not disclose its international revenue. Net income increased 4.5 percent to $1.74 billion in fiscal 1989 from $1.66 billion in fiscal 1988. BellSouth employs 101,230 worldwide.

R&D expenditure totaled $52.0 million in fiscal 1988, representing less than 1 percent of revenue. Each of the seven RHCs owns an equal share in Bell Communications Research Inc. (Bellcore), which coordinates federal government telecommunications requirements and conducts R&D activities for its owners. Capital spending totaled $3.2 billion in fiscal 1989, representing 23 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 distribution channel. Information on revenue by region is not available. Table 3, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Telecommunications Services

Approximately 76 percent of BellSouth's consolidated revenue in fiscal 1989 was from telecommunications services (local, toll, access, billing and collection, and operator services). The remainder of consolidated revenue was primarily from directory advertising and publishing operations, cellular and paging operations, billing and collection services, CPE sales, computer leasing and maintenance, and rental facilities. In the aggregate, access revenue, revenue from billing and collection activities, and rental of facilities were approximately 28 percent in 1989. The majority of such revenue was from services provided to AT&T, BellSouth's largest customer.

Telephone Company Operations

South Central Bell and Southern Bell provide telecommunications services, which include local, toll, and access services within each of the 38 calling zones in their combined nine-state operating area.

Local and Toll Services

Dataquest ranked BellSouth as the number one provider of local and toll services by revenue in 1989. Charges for local services in fiscal 1989 accounted for 39 percent of BellSouth's consolidated revenue. Local services include the provision of lines from telephone exchange offices to subscribers' premises for the origination and termination of telecommunication. The usage of the local network through which these local services are provided includes the following: basic local telephone service provided through the regular switching network; dedicated private line facilities for voice and special services such as transport of data, radio and video, and foreign exchange services; switching services for customers' internal communication through facilities owned by South Central Bell and Southern Bell; services for data transport that include managing and configuring special service networks; and dedicated low- or high-capacity public or private digital networks. Other local services revenue is derived from intercept and directory assistance, coin telephones, and various special and custom calling services.

Charges for toll services in fiscal 1989 accounted for 12 percent of BellSouth's consolidated revenue. South Central Bell and Southern Bell provide toll services within, but not between, their 38 calling zones. These services include intra-calling zone service beyond the local calling area; Wide Area Toll Service (WATS or 800 services) for customers with highly concentrated demand; and special services such as transport of data, radio, and video.

South Central Bell and Southern Bell are subject to state regulatory authorities in each state in which they provide telecommunications services. These authorities have powers within their respective jurisdictions with regard to intrastate rates, services, and other issues.

Traditionally, South Central Bell and Southern Bell rates were set in each state in their respective service areas. These rates were set at levels that were anticipated to generate revenue sufficient to cover allowed expenses. Also, these levels were established to

provide an opportunity to earn a stated return on capital investment. BellSouth's major regulatory focus is now directed toward modification of the traditional oversight process for regulated services. The alternate forms of regulation pursued by BellSouth are generally referred to as "incentive regulation." Under one form of incentive regulation, South Central Bell and Southern Bell are provided economic incentives in the form of shared earnings over a benchmark rate of return to improve cost control and general efficiency.

Access Service

South Central Bell and Southern Bell provide access services by connecting the communications networks of interexchange carriers with the equipment and facilities of end users. These connections are provided by linking these carriers and end users through the public switched networks of South Central Bell and Southern Bell, or through dedicated private lines furnished by South Central Bell or Southern Bell.

Access charges, which are payable both by interexchange carriers and subscribers, provided 26 percent of BellSouth's consolidated revenue. In 1989, Dataquest ranked BellSouth second in the access services market.

Other Business Operations

BellSouth's other business operations include mobile communications; selling, leasing, and maintaining equipment; enhanced telecommunications equipment; and advertising and publishing.

Mobile Communication

BellSouth participates in the construction and/or operation of cellular systems through wholly owned subsidiaries, partnerships, and joint ventures with other entities in 39 markets in 15 states and in certain foreign countries. In 1989, BellSouth acquired Mobile Communications Corporation of America (MCCA).

In 1988, the Argentine government awarded South America's first private cellular mobile communications network franchise to a six-company consortium headed by BellSouth. In 1989, the consortium, Compania de Radiocommunicationes Moviles (CRM), inaugurated cellular mobile services in Buenos Aires. CRM expects to serve 320,000 customers as Argentina's cellular infrastructure grows in the 1990s.

Also, BellSouth provides monitoring services to other cellular systems, specialized mobile radio service, improved mobile telephone service, and domestic and international paging services.

As of December 31, 1989, BellSouth had approximately 746,000 paging units in service. Approximately 573,00 paging units were in service in the United States in 63 markets in 17 states, while approximately 173,000 paging units were in service in two foreign countries. Of the paging units in service in the United States, approximately 534,000 units in 41 markets were added by the acquisition of MCCA.

Selling, Leasing, and Maintaining Equipment

BellSouth sells, leases, and maintains CPE, computers, and related office equipment. The RHCs, AT&T, and other substantial enterprises compete with respect to the provision of CPE and other services and products.

Enhanced Telecommunications Services

South Central Bell and Southern Bell have the ability to offer certain enhanced telecommunications services through their networks. Such offerings include various forms of data and voice transmission, voice messaging, and storage services and gateway communication between customers and information services providers. The extent to which these offerings can be profitably provided will depend on the degree of market acceptance and the resolution of various regulatory issues still pending before the FCC regarding the companies' offering of both enhanced and basic network services on an integrated basis. The Consent Decree continues to prohibit the Operating Telephone Companies from generating information content in connection with the provision of enhanced telecommunications 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	$10,712.9	$11,501.7	$12,229.9	$13,596.9	$13,996.3
Percent Change	-	7.36	6.33	11.18	2.94
Capital Expenditure	$2,624.1	$2,835.1	$3,007.9	$3,046.5	$3,222.6
Percent of Revenue	24.49	24.65	24.59	22.41	23.02
R&D Expenditure	$86.0	$86.0	$84.0	$45.0	$52.0
Percent of Revenue	0.80	0.75	0.69	0.33	0.37
Number of Employees	92,300	96,900	98,700	100,280	101,230
Revenue ($K)/Employee	$116.07	$118.70	$123.91	$135.59	$138.26
Net Income	$1,417.8	$1,588.7	$1,664.8	$1,665.5	$1,741.1
Percent Change	-	12.05	4.79	0.04	4.54

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$3,367.6	$3,468.5	$3,545.0	$3,615.2
Quarterly Profit	$449.6	$418.1	$404.4	$469.0

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

Table 2
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

According to the Modified Final Judgment (MFJ), which is the final set of instructions for the Bell System restructuring, the RBOCs are not allowed to manufacture telecommunications products following the divestiture.

SUBSIDIARIES

North America

BellSouth Enterprises, Inc. (United States)
BellSouth Services, Inc. (United States)
South Central Bell Telephone Company (United States)
Southern Bell Telephone and Telegraph Company (United States)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

1989

Mobile Communications Corporation of America (MCCA)
BellSouth acquired MCCA, a national cellular telephone paging company, for approximately $710 million.

KEY OFFICERS

John L. Clendenin
Chairman of the board, president and chief executive officer

F. Duane Ackerman
Vice chairman of the board, Finance and Administration

Walter H. Alford
Executive vice president and general counsel

Harvey R. Holding
Executive vice president and chief financial officer

Raymond L. McGuire
Executive vice president

Richard J. Sharp
Executive vice president, Governmental Affairs

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	$3,346.5	$3,397.6	$3,676.7	$3,449.8	$3,713.8
Cash	1,008.1	950.3	237.1	282.9	292.7
Receivables	1,801.4	1,798.7	1,768.5	2,021.4	2,410.4
Marketable Securities	0	0	658.1	209.0	207.7
Inventory	299.4	332.3	387.2	451.9	489.1
Other Current Assets	237.6	316.3	625.8	484.6	313.9
Net Property, Plants	$21,233.9	$22,168.5	$22,677.6	$23,454.5	$23,741.6
Other Assets	$427.9	$652.0	$1,062.2	$1,568.1	$2,594.4
Total Assets	$25,008.3	$26,218.1	$27,416.5	$28,472.4	$30,049.8
Total Current Liabilities	$3,412.0	$3,345.0	$3,595.8	$4,056.8	$4,266.6
Long-Term Debt	$6,470.7	$6,254.8	$6,320.2	$7,031.0	$7,054.6
Other Liabilities	$4,927.5	$5,356.4	$5,521.9	$5,545.2	$5,626.0
Total Liabilities	$14,810.2	$14,956.2	$15,437.9	$16,633.0	$16,947.2
Total Shareholders' Equity	$10,198.1	$11,261.9	$11,978.6	$11,839.4	$13,102.6
Common Stock	309.8	481.5	485.9	486.0	486.2
Other Equity	6,720.6	6,878.2	6,969.4	6,278.0	7,008.9
Retained Earnings	3,167.7	3,902.2	4,523.3	5,075.4	5,607.5
Total Liabilities and Shareholders' Equity	$25,008.3	$26,218.1	$27,416.5	$28,472.4	$30,049.8

Income Statement	1985	1986	1987	1988	1989
Revenue[1]	$10,712.9	$11,501.7	$12,229.9	$13,596.9	$13,996.3
Cost of Sales	$3,767.7	$3,777.1	$4,035.3	$5,114.1	$5,200.9
R&D Expense	$86.0	$86.0	$84.0	$45.0	$52.0
SG&A Expense	$1,032.1	$1,727.1	$2,039.3	$3,207.3	$2,245.9
Capital Expense	$2,624.1	$2,835.1	$3,007.9	$3,046.5	$3,222.6
Pretax Income	$2,481.5	$2,891.6	$2,700.9	$2,431.0	$2,452.7
Pretax Margin (%)	23.16	25.14	22.08	17.88	17.52
Effective Tax Rate (%)	42.90	45.00	38.40	31.50	30.90
Net Income	$1,417.8	$1,588.7	$1,664.8	$1,665.5	$1,741.1
Shares Outstanding, Millions[2]	481.2	469.5	481.2	474.4	477.7
Per Share Data					
Earnings	$3.13	$3.38	$3.46	$3.51	$3.64
Dividend	$1.88	$2.04	$2.20	$2.36	$2.52
Book Value	$21.19	$23.99	$24.89	$24.96	$27.43

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
Liquidity					
Current (Times)	0.98	1.02	1.02	0.85	0.87
Quick (Times)	0.91	0.92	0.91	0.74	0.76
Fixed Assets/Equity (%)	208.21	196.85	189.32	198.11	181.20
Current Liabilities/Equity (%)	33.46	29.70	30.02	34.27	32.56
Total Liabilities/Equity (%)	145.23	132.80	128.88	140.49	129.34
Profitability (%)					
Return on Assets	-	6.20	6.21	5.96	5.95
Return on Equity	-	14.81	14.33	13.99	13.96
Profit Margin	13.23	13.81	13.61	12.25	12.44
Other Key Ratios					
R&D Spending % of Revenue	NA	0.75	0.69	0.33	0.37
Capital Spending % of Revenue	24.49	24.65	24.59	22.41	23.02
Employees	92,300	96,900	98,700	100,280	101,230
Revenue ($K)/Employee	$116.07	$118.70	$123.91	$135.59	$138.26
Capital Spending % of Assets	10.49	10.81	10.97	10.70	10.72

[1]Certain amounts in prior periods have been reclassified to conform with the current year's presentation.
[2]Reflects a three-for-one split on May 7, 1984, and a three-for-one split on February 5, 1987.
NA = Not available

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

BellSouth Corporation

1155 Peachtree Street, N.E.
Atlanta, Georgia 30367-6000
Telephone: (404) 249-2000
Fax: (404) 249-5599
Dun's Number: 10-667-8006

Date Founded: 1984

CORPORATE STRATEGIC DIRECTION

BellSouth Corporation (BellSouth) is one of seven Regional Bell holding companies (RHCs) created as a result of the U.S. District Court's decision to restructure the Bell System and American Telephone & Telegraph (AT&T). The historic AT&T antitrust settlement ordered AT&T to divest its 22 regional Bell operating companies (RBOCs) and its control of the local exchange services. The 22 BOCs have been reorganized into the aforementioned seven RHCs.

On January 1, 1984, BellSouth and the other six RHCs began operations as independent corporations, separated from their former parent, AT&T.

BellSouth's local telephone operations are conducted via its two telephone subsidiaries: South Central Bell Telephone Company (South Central Bell) and Southern Bell Telephone and Telegraph Company (Southern Bell). These telephone operating companies provide local exchange services and long distance services within calling regions termed Local Access and Transport Areas (LATAs) and provide local exchange access to interexchange carriers. In terms of revenue, BellSouth is the largest of the RBOCs.

BellSouth's net revenue increased from $12.3 billion* in 1987 to $13.7 billion in 1988, a growth rate of 11.0 percent. Since its creation in 1984, BellSouth has maintained yearly revenue advances in each of the four categories of revenue inflow (local service, access revenue, toll revenue, and other). Despite the 11.0 percent increase in net revenue for 1988, BellSouth's net income remained fairly constant between 1987 and 1988, increasing approximately $1.0 million to $1.7 billion.

According to BellSouth, the flat net income growth is the result of increased expenditures for network enhancements and the development of acquired businesses, as well as an increase in costs associated with a mandated accounting change. Expenditures for the construction of facilities increased from $3,008 million in 1987 to $3,047 million in 1988; BellSouth also changed its accounting methodology from capitalizing certain indirect plant costs to expensing these costs, thereby affecting the bottom line during the period in which these costs are incurred.

BellSouth Services is jointly owned by South Central Bell and Southern Bell and performs network strategic planning, training, marketing, and other planning functions for its parent companies. BellSouth Enterprises was formed in 1986. The majority of BellSouth's subsidiaries, joint ventures, and relationships are conducted through BellSouth Enterprises, which consists of four groups—Mobile Systems/International Group, Communications Systems Group, Advertising and Publishing Group, and Other BellSouth Enterprises Entities. As of December 31, 1988, the total number of employees for BellSouth Enterprises and BellSouth Services were 13,308 and 11,247, respectively.

South Central Bell, which provides telecommunications products and services, is headquartered in Birmingham, Alabama, and operates within Alabama, Kentucky, Louisiana, Mississippi, and Tennessee. As of December 1988, South Central Bell operated approximately 7.0 million network access lines and had 30,633 employees.

Southern Bell, which provides local exchange, information access, exchange access, and long distance telecommunications, is headquartered in Atlanta,

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

Georgia, and operates within Florida, Georgia, North Carolina, and South Carolina. As of December 1988, Southern Bell operated approximately 9.4 million network access lines and had 44,381 employees. BellSouth increased the number of network access lines from 15.7 million in 1987 to 16.4 in 1988, an increase of 4.5 percent. In addition to its local telephone operations, BellSouth has advertising and publishing, mobile communications, and telecommunications equipment operations.

BellSouth International (BSI), part of the Mobile Systems/International Group under BellSouth Enterprises, provides telecommunications services and products to international customers. Products and services offered by BSI include public and private network design, customer premises equipment, mobile communications, and other telecommunications-related products. Operations are headquartered in Atlanta, Georgia, with offices in Hong Kong; London, England; Metz, France; and Bonn, Germany. Marketing efforts are focused upon three primary geographical areas: Asia/Pacific, Europe, and Latin America.

Each of the seven RBOCs owns an equal share in Bell Communications Research, Inc. (Bellcore), which coordinates federal government telecommunications requirements and conducts research and development activities for its owners. In addition to the operations of Bellcore, BellSouth incurred research and development expenditures amounting to $86 million, $84 million, and $45 million during 1986, 1987, and 1988, respectively.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Revenue generated from telecommunications services provided by South Central Bell and Southern Bell represented approximately 77 percent of BellSouth's 1988 consolidated revenue. Telecommunications services include local exchange, exchange access, and toll services within BellSouth's nine-state region. Also, South Central Bell offers central office local area network (CO LAN). The CO LAN allows the simultaneous transmission of voice and data over existing Centrex wires. Dataquest estimates that BellSouth ranked sixth in the Centrex market for 1988 with a 9.6 percent market share.

Local Exchange

Despite decreases in local service rates, revenue attributed to local services rose 2.4 percent between 1987 and 1988 to a level of $5.2 billion. This increase resulted from an increase in the number of access lines in service. Included in local revenue are basic local telephone services, dedicated private line services, switching services for international communications, and dedicated public or private digital networks.

Exchange Access

Total access revenue grew from $3.6 billion in 1987 to $3.7 billion in 1988, or an increase of 2.7 percent. Access revenue results from connecting interexchange carriers (long distance telephone companies) and end users via the public switched network or dedicated private lines owned by South Central Bell and Southern Bell. Revenue is identified as either interstate access revenue or intrastate access revenue.

During 1988, interstate access revenue totaled $2.8 billion, an increase of 2.2 percent over the previous year. Interstate access minutes attributed to interexchange carriers increased from 3.5 billion in 1987 to 3.8 million in 1988. In addition, intrastate access revenue grew 4.2 percent between 1987 and 1988 to a level of $880.0 million; intrastate access minutes to the local network amounted to 1,040.1 million in 1987 and 1,008.8 million in 1988.

Toll Services

Toll revenue increased from $1.6 billion in 1987 to $1.7 billion in 1988, a growth rate of 6.2 percent.

Other Services

The remaining 23 percent of BellSouth's consolidated revenue is generated from directory advertising and publishing operations, computer leasing and

maintenance, billing and collecting services, mobile telecommunications services, and customer premises equipment sales and rentals.

Other revenue grew from $2.1 billion in 1987 to $3.2 billion in 1988. This dramatic increase in revenue inflow during 1988 is the direct result of a change in accounting methodology applicable to a subsidiary within BellSouth Enterprises. Other revenue also includes interest income on temporary cash investments.

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 U.S. Dollars)

	1984	1985	1986	1987	1988
Five-Year Revenue	$9,672.9	$10,712.9	$11,501.7	$12,333.1	$13,687.3
Percent Change	-	10.75	7.36	7.23	10.98
Capital Expenditure	$2,274.0	$2,624.1	$2,835.1	$3,007.9	$3,046.5
Percent of Revenue	23.51	24.49	24.65	24.39	22.26
R&D Expenditure	N/A	N/A	$86.0	$84.0	$45.0
Percent of Revenue	N/A	N/A	0.75	0.68	0.33
Number of Employees	96,000	92,300	96,900	98,700	100,280
Revenue ($K)/Employee	$100.76	$116.07	$118.70	$124.96	$136.49
Net Income	$1,257.2	$1,417.8	$1,588.7	$1,664.8	$1,665.5
Percent Change	-	12.77	12.05	4.79	0.04

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$3,367.6	$3,468.5	N/A	N/A
Quarterly Profit	N/A	N/A	N/A	N/A

N/A = Not Available

Source: BellSouth Corporation Annual Reports
Dataquest
1990

Table 2
Revenue by Geographic Region (Percent)

Region	1984	1985	1986	1987	1988
North America	100.00	100.00	100.00	100.00	100.00
International	0	0	0	0	0

Source: Dataquest
1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1987	1988
Direct Sales	100.00	100.00
Indirect Sales	0	0

Source: Dataquest
1990

MANUFACTURING LOCATIONS

According to the Modified Final Judgment (MFJ), which is the final set of instructions for the Bell System restructuring, the RBOCs are not allowed to manufacture telecommunications products following the divestiture.

SUBSIDIARIES

United States

South Central Bell
Southern Bell
BellSouth Enterprises
BellSouth Services

MERGERS AND ACQUISITIONS

1988

Mobile Communications Corporation of America
National cellular telephone paging company

KEY OFFICERS

John L. Clendenin
Chairman of the board, president and chief executive officer

F. Duane Ackerman
Vice chairman

Walter H. Alford
Executive vice president

Harvey R. Holding
Executive vice president

Raymond L. McGuire
Executive vice president

Richard J. Sharp
Executive vice president

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

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	$2,876.5	$3,346.5	$3,397.6	$3,676.7	$3,449.8
Cash	491.2	1,008.1	950.3	237.1	282.9
Receivables	1,861.0	1,801.4	1,798.7	1,768.5	2,021.4
Marketable Securities	0	0	0	658.1	209.0
Inventory	292.0	299.4	332.3	387.2	451.9
Other Current Assets	232.3	237.6	316.3	625.8	484.6
Net Property, Plants	$20,396.2	$21,233.9	$22,168.5	$22,677.6	$23,454.5
Other Assets	$400.5	$427.9	$652.0	$1,062.2	$1,568.1
Total Assets	$23,673.2	$25,008.3	$26,218.1	$27,416.5	$28,472.4
Total Current Liabilities	$3,195.5	$3,412.0	$3,345.0	$3,595.8	$4,056.8
Long-Term Debt	$6,440.5	$6,470.7	$6,254.8	$6,320.2	$7,031.0
Other Liabilities	$4,622.7	$4,927.5	$5,356.4	$5,521.9	$5,545.2
Total Liabilities	$14,258.7	$14,810.2	$14,956.2	$15,437.9	$16,633.0
Total Shareholders' Equity	$9,414.5	$10,198.1	$11,261.9	$11,978.6	$11,839.4
Converted Preferred Stock	0	0	0	0	0
Common Stock	299.1	309.8	481.5	485.9	486.0
Other Equity	6,518.4	6,720.6	6,878.2	6,969.4	6,278.0
Retained Earnings	2,597.0	3,167.7	3,902.2	4,523.3	5,075.4
Total Liabilities and Shareholders' Equity	$23,673.2	$25,008.3	$26,218.1	$27,416.5	$28,472.4

Income Statement	1984	1985	1986	1987	1988
Revenue[1]	$9,672.9	$10,712.9	$11,501.7	$12,333.1	$13,687.3
Cost of Sales	N/A	N/A	$3,777.1	$4,035.3	$5,114.1
R&D Expense[2]	N/A	N/A	$86.0	$84.0	$45.0
SG&A Expense	$1,658.8	$1,981.7	$1,622.1	$1,722.1	$2,039.3
Capital Expense	$2,274.0	$2,624.1	$2,835.1	$3,007.9	$3,046.5
Pretax Income	$2,205.3	$2,481.5	$2,891.6	$2,700.9	$2,431.0
Pretax Margin (%)	22.80	23.16	25.14	21.90	17.76
Effective Tax Rate (%)	43.00	42.90	45.00	38.40	31.50
Net Income	$1,257.2	$1,417.8	$1,588.7	$1,664.8	$1,665.5
Shares Outstanding, Millions[3]	474.4	481.2	469.5	481.2	474.4
Per Share Data					
Earnings	$2.85	$3.13	$3.38	$3.46	$3.51
Dividends	$1.72	$1.88	$2.04	$2.20	$2.36
Book Value	$19.85	$21.19	$23.99	$24.89	$24.96

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

Key Financial Ratios	1984	1985	1986	1987	1988
Liquidity					
Current (Times)	0.90	0.98	1.02	1.02	0.85
Quick (Times)	0.81	0.91	0.92	0.91	0.74
Fixed Assets/Equity (%)	216.65	208.21	196.85	189.32	198.11
Current Liabilities/Equity (%)	33.94	33.46	29.70	30.02	34.27
Total Liabilities/Equity (%)	151.45	145.23	132.80	128.88	140.49
Profitability (%)					
Return on Assets	-	5.82	6.20	6.21	5.96
Return on Equity	-	14.46	14.81	14.33	13.99
Profit Margin	13.00	13.23	13.81	13.50	12.17
Other Key Ratios					
R&D Spending % of Revenue	N/A	N/A	0.75	0.68	0.33
Capital Spending % of Revenue	23.51	24.49	24.65	24.39	22.26
Employees	96,000	92,300	96,900	98,700	100,280
Revenue ($K)/Employee	$100.76	$116.07	$118.70	$124.96	$136.49
Capital Spending % of Assets	9.61	10.49	10.81	10.97	10.70

[1]Certain amounts in prior periods have been reclassified to conform to the current year's presentation.
[2]The R&D amounts for 1986 and 1987 are estimated amounts.
[3]Reflects a three-for-one split on May 7, 1984, and a three-for-one split on February 5, 1987.
N/A = Not Available

Source: BellSouth Corporation Annual Reports
Dataquest
1990

Bitstream, Inc.

215 First Street
Cambridge, Massachusetts 02142
Telephone: (617) 497-6222
Fax: (617) 868-4732
Dun's Number: 02-354-0214

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Bitstream, Inc., has traditionally supplied digitized fonts in outline and bit map form to equipment manufacturers and software developers. As digital type has become a key element in a wider range of products, Bitstream has sought to maintain its position in the industry by offering a range of scaling technologies for original equipment manufacturers (OEMs), software developers, and end users. Bitstream has also developed a new font scaling technology called Speedo for on-the-fly font scaling.

In order to support the expanding market for digital type, Bitstream supplies high-quality type in multiple formats to support a wide range of technologies. Bitstream offers products that work with all major page description languages (PDLs), output devices, and applications, and provides compatibility across the PC and Macintosh platforms.

Bitstream currently offers a library of over 1,400 typefaces for OEM customers. These products are used to generate type for screens, printers, and image setters. Bitstream type is employed in a variety of industries including graphic arts, office automation, desktop publishing, television broadcasting, slide generation, technical publishing, and computer-aided design (CAD).

In September 1989, Bitstream opened a European subsidiary in Cheltenham, England. This office handles all aspects of marketing, sales, distribution, and technical support for the Bitstream Typeface Library for the Macintosh in the United Kingdom and Europe.

Bitstream currently employs approximately 200 people. It licenses fonts and enabling software to more than 370 OEMs and software developers worldwide. Its line of retail font products for the IBM and Macintosh environments is distributed by an extensive network of dealers in the United States and 18 foreign countries. In fiscal 1989, Bitstream had revenue of approximately $17 million.*

No financial statements are included because Bitstream is a privately held company and, as such, is not obligated to disclose comprehensive financial data.

BUSINESS SEGMENT STRATEGIC DIRECTION

Bitstream Speedo

Speedo technology provides on-the-fly font-generation capabilities, allowing users to build fonts in the desired type style and point size immediately without exiting from the software application. It is a compact program for scaling outline fonts and creating high-quality bit map fonts in any software application needing scalable type for screen displays. Speedo offers numerous character transformations, including rotations at any angle, obliquing, and mirror imaging. The Speedo code size is small (12 to 16KB) and uses no floating-point math, so an 80x87 math coprocessor is not required to achieve this performance.

Bitstream FaceLift

FaceLift, a new font utility developed jointly with GCA of Germany and using Bitstream Speedo as its font-generating engine, will produce any size fonts

*All dollar amounts are in US dollars.

for screen displays and dot matrix printers, on-the-fly, for the Microsoft Windows 3.0 environment and earlier versions of Windows. It includes a collection of 13 typefaces (4 display, 8 text, and 1 monospaced typeface). Fonts can also be created for the Hewlett-Packard (HP) LaserJet family of printers and for PostScript devices. FaceLift also offers a wide selection of add-on fonts that are available from the Bitstream Typeface Library. The code size for FaceLift is approximately 80KB; the character generation speed averages 300 characters per second for a 72-dots per inch (dpi) Swiss font at 12 points on a 20-MHz 386.

Bitstream licenses its font-scaling technology to OEMs in many forms, including the Fontware Quality Enhancement Module, an intelligent font-scaling algorithm that enhances the typographic quality in alternative PostScript PDL interpreters, and the Fontware Developer's Kit, which allows OEMs to customize a Fontware Installation Kit to include with their product. The Installation Kit is an application-specific utility that works with Fontware typeface packages to scale type to any size from 2 to 144 points, adapt the fonts to the user's devices, and install them for use with the application.

Bitstream Starter Kits containing the Installation Kit and several sample typefaces are available directly from Aldus Pagemaker, Lotus Manuscript, Microsoft Word 5.0, WordPerfect 5.0/5.1, Wordstar 5.5, Xerox Ventura Publisher, and others. Bitstream also offers its Typeface Library for use with Macintosh-driven typesetters and laser printers using the PostScript PDL. The Bitstream Typeface Library for the Macintosh offers approximately 950 typefaces and the same functionality as Adobe fonts on PostScript typesetters and printers.

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
Europe—1

MANUFACTURING LOCATIONS

North America

Cambridge, Massachusetts
Custom manufactures orders for the Bitstream Typeface Library for the Macintosh
Clinton, Massachusetts
Bitstream Fontware and MacFontware

SUBSIDIARIES

Europe

Bitstream International Ltd. (Cheltenham, England)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Isogon Corporation
Isogon and Bitstream are comarketing the Isogon FontSpace utility. FontSpace is a memory-resident utility that provides transparent and automatic data compression of bit map font files for the HP LaserJet series of printers.

Ashton-Tate Corporation
Ashton-Tate has licensed Bitstream Speedo font-scaling technology for use in future graphics products.

Abaton Technology
Abaton Technology, a subsidiary of Everex Systems, Inc., has licensed Bitstream font-scaling technology and fonts for use in its new LaserScript printer. Abaton will also license 24 bit-mapped fonts for HP LaserJet Series II emulation. LaserScript users with a PC front-end system can purchase any of the 207 fonts in Bitstream's Fontware Typeface Packages.

Mannesmann Tally Corporation
Mannesmann Tally is licensing 35 resident fonts on Adobe Postscript widths for use with Post-Mann, Mannesmann Tally's implementation of the Microsoft/Bauer PostScript language interpreter. In addition, users with Macintosh front ends can select add-on type from the Bitstream Typeface library of nearly 1,000 fonts for use with PostScript.

Lotus Development Corporation
Lotus 1-2-3 release 3.1 will include four Bitstream typeface families (Swiss, Dutch, Courier, and Symbols) and will support more than 200 additional Bitstream downloadable fonts.

Apple Computer, Inc.
Apple signed an agreement with Bitstream allowing Bitstream to sublicense Apple's TrueType rasterizer to Bitstream's OEM clients. Bitstream can provide these OEMs with both the rasterizer and a library of fonts in TrueType format. Also, Apple has licensed several Bitstream fonts for inclusion in the future release of Macintosh System Software version 7.0. Bitstream will supply Courier (four styles), Symbol, International Typeface Corporation (ITC) Avant Garde Gothic (four styles), ITC Bookman (four styles), and ITC Zapf Chancery (one style) in the TrueType outline font format.

1989

WordPerfect Corporation
Bitstream and WordPerfect Corporation introduced a new version of Bitstream Fontware 3.0 for WordPerfect 5.1/5.0. Available since January 1990, this new Fontware 3.0 Starter Kit includes nine free typefaces, four styles each of Swiss and Dutch, and one style of the Bitstream Charters typeface.

1988

Graphic Software Systems, Inc. (GSS)
Bitstream and GSS introduced a Fontware Installation Kit for GSS*CGI. A wide range of matching raster fonts for graphics printers and displays can now be generated for any application software package developed with the GSS*CGI-based Graphics Development Toolkit.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Robert Friedman
President

Cherie Cone
Vice president, Production

John Collins
Vice president, Technical Development

Peter Johnson
Vice president, Finance and Administration

Bill Andrews
Vice president, Sales

Kelsey Selander
Vice president, Marketing

Chris Herot
Vice president, Product Development

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

The BOC Group plc

OVERVIEW

Since its founding in 1886, the British Oxygen Company, now known as The BOC Group plc, has expanded into a very large international company. Today it comprises more than 100 companies operating in more than 50 countries.

In each of these countries, the Group manufactures and markets one or more of its four major product lines. These are:

- Industrial gases and cryogenic equipment
- Health care products
- Carbon and carbide products
- Welding equipment and supplies

Recent important developments have been the acquisitions in 1978 of Airco Inc. of the United States, a large supplier of industrial and special gases, and Edwards High Vacuum in the United Kingdom, one of Europe's leading vacuum technology companies. More recently, in 1984, it purchased 48 percent equity interest in Osaka Sanso Kogyo in Japan.

Also in 1984, the Microelectronics Center of North Carolina (MCNC) was opened. This facility is supported by a number of companies, including Airco Industrial and Speciality Gases (members of the BOC Group), with full-time BOC/Airco staff members located on-site.

During the past two years, as part of its rationalization program in industrial gases, BOC has brought on-stream major new or replacement plants at Middlesborough in the United Kingdom and at Los Angeles, California, and Aiken, South Carolina, in the United States. Currently, the company is building a plant at Scunthorpe in the United Kingdom. It recently won a contract to supply gases by pipeline to the Esso complex at Fawley in the United Kingdom and build a new air separation plant to produce nitrogen, oxygen, and argon that will come on-stream in 1986.

In the area of special gases, in 1983 the company commissioned a state-of-the-art Silane plant at Crawley in the United Kingdom. This plant, with a capacity in excess of 10 tonnes pa, is capable of producing very high-quality silane to meet the growing requirements of the electronics industry in Western Europe.

Thus, over the past 20 years or so, BOC has built up an important worldwide presence in the area of bulk and special gases for the semiconductor industry. In addition, the company supplies plant and ancillary equipment as an integral part of an overall gas supply system.

The BOC Group plc

OPERATIONS

The corporate headquarters of The BOC Group is housed at Hammersmith in West London.

In 1984, the Group employed some 38,600 persons worldwide, of which the Americas accounted for 38 percent and Western Europe 30 percent.

To meet the worldwide demands of the semiconductor industry for bulk and special gases, BOC has strategically sited manufacturing facilities serving a network of localized warehousing and distribution centers in each of the four major geographical areas:

- The Americas
- Western Europe
- Africa
- Asia/Pacific

In each of these areas, BOC has many subsidiaries and affiliated companies that are either wholly owned or in which it has a major interest. Worldwide, there are about 100 such companies. The four principal companies covering the worldwide operation are:

- The BOC Group Inc., a 100 percent-owned subsidiary covering the Americas. This is an important subsidiary, which includes Airco, with headquarters at Murray Hill, New Jersey. This company manufactures and markets bulk and special gases throughout the United States.
- In Western Europe, the production and marketing of commodity and special gases is provided by BOC Limited, with headquarters at Morden, London. On the continent of Europe, these activities are provided by BOC Special Gases GmbH, situated at Marburg in West Germany.
- The African interests are principally covered by African Oxygen Ltd., and those of the Asia/Pacific area by The Commonwealth Industrial Gases Ltd. of Australia.

In 1984, the Group acquired a further interest in Osaka Sanso Kogyo (OSK) to bring its effective interest up to 48 percent. By joining The BOC Group, OSK, which is a long-established Japanese gas company, gained access to new technology that it is now introducing to Japan. This joint enterprise operates a new special gases plant in Osaka and employs

state-of-the-art technology in the filling, purification, and manufacture of gases for not only the Japanese semiconductor industry, but also for those in the Peoples' Republic of China, Korea, and other areas of the Far East.

FINANCIAL

A summary of the most recent financial information covering the fiscal years ending September 30, 1983 and 1984 for the BOC Group is given in Table 1.

Table 1

THE BOC GROUP AND SUBSIDIARIES
WORLDWIDE REVENUES
(Millions of U.S. Dollars)

	1983	1984
Turnover by Business		
Gases and Related Products	$1,669	$1,856
Health Care	476	602
Carbon and Carbide Products	205	299
Other Businesses	279	354
Total	$2,629	$3,111
Operating Profit by Business		
Gases and Related Products	$171	$197
Health Care	79	85
Carbon and Carbide Products	(15)	15
Other Businesses	7	13
Corporate	(9)	(23)
Total	$233	$287
Exchange Rate, US$ to £1:	1.41	1.33

Source: BOC
Annual Accounts 1984

The BOC Group plc

In 1984, the company reported considerable benefits from the sustained economic upturn in the United States and improved growth, although more modest, in Europe.

In terms of the U.S. dollar, turnover of continuing business and operating profit in 1984 showed increases over 1983 of 18.3 percent and 23.2 percent respectively. It should be borne in mind, however, that during these two years, the U.S. dollar appreciated by some 13 percent against European currencies. Thus, when the figures are translated into local currencies, turnover is seen to have risen by 25 percent and operating profit by 31 percent.

Table 1 reveals that the largest business sector by turnover and contribution to operating profit is Gases and Related Products. In 1984, turnover for this group of products was 60 percent of total turnover compared with 63 percent in 1983. In terms of operating profit, Gases and Related Products contributed 69 percent of the total against 73 percent in 1983.

The Gases and Related Products business group can be further broken down into geographic region of origin; this analysis is given in Table 2.

Table 2 shows that the Americas market is the largest for Gases and Related Products, accounting for some 38 percent of turnover for this group of products in 1984. The West European market was half that size at 19 percent.

Table 2

THE BOC GROUP AND SUBSIDIARIES
REVENUES OF GASES AND RELATED PRODUCTS
BY GEOGRAPHIC REGION OF ORIGIN
(Millions of Dollars)

	1983		1984	
Region of Origin	Revenue	Percent	Revenue	Percent
Europe	$ 352	21%	$ 350	19%
Africa	209	13	181	10
Americas	540	32	700	38
Asia/Pacific	569	34	624	33
Total	$1,670	100%	$1,855	100%
Exchange Rate, US$ to £1	1.41		1.33	

Source: BOC
Annual Accounts 1984

The BOC Group plc

Overall, the turnover in U.S. dollars grew by 11.1 percent in 1984, with growth in the Americas and Asia Pacific and decline in Europe and Africa. This growth is more significant in local currency.

Table 3 expresses the percentage change in turnover between 1983 and 1984 for Gases and Related Product by region.

Although the growth order is not changed, the figures in Table 3 highlight the currency effect between the regions.

Table 3

THE BOC GROUP AND SUBSIDIARIES
PERCENTAGE CHANGE BETWEEN 1983 AND 1984
REVENUE FOR GASES AND RELATED PRODUCTS BY REGION

Region of Origin	Change in Revenue, 1983 to 1984	
	U.S. Dollars	£ Sterling
Europe	(1%)	6%
Africa	(13%)	(8%)
Americas	30%	38%
Asia/Pacific	10%	16%
Worldwide	11.1%	18%

Source: BOC
Annual Accounts 1984

RESEARCH AND DEVELOPMENT

The BOC Group spent $56 million in 1984 on R&D projects, and as an important supplier of products and services not only to the electronics industry but also in health care products, etc., gives a high priority to internal R&D. The company takes the view that the primary responsibility of R&D within the group is to provide technical support for the Group's various business centers.

R&D falls broadly into the following areas:

- Improvement of manufacturing methods
- Identification of more effective raw materials

- Upgrading the quality of the Group's products
- Creating opportunities for expanding the business through scientific discovery

Because of the diverse nature of the Group's activities in terms of products, manufacturing processes, and geographical spread of its markets, R&D is organized both centrally and locally.

Local R&D groups are maintained and managed by the operating business units, usually located near Group plants, and perform advanced technical work close to the point of application. In the United Kingdom, Process and Product Development is located at Morden headquarters in S.W. London.

Long-term technical developments requiring significant expenditure are carried out at The BOC Group's Technical Center at Murray Hill, New Jersey, U.S.A.

The Technical Center covers 168,000 square feet and comprises not only research laboratories, but such support facilities as computer, information, and drafting services, in addition to a photographic laboratory, a clean-room laboratory with Class 100 hoods, and model shops for building prototypes of new products.

Several notable achievements have emanated from the Technical Center over the past 30 years or so. These include:

- Development of emulsified copolymer water-based coatings and adhesives
- Discovery of special chromium and silicon alloys for improving the quality of stainless steels
- Development of superconducting materials at cryogenic temperatures
- Advances in inhalation anesthetics

Many novel processes have also been developed at the center. Important achievements were:

- Pioneering of highly efficient cryopumps that led the way to thin-film plasma coating of electronic components
- Sputtered chrome coating of plastics
- Development of the world's first ozone tertiary wastewater treatment plant

The BOC Group plc

In addition to the Group's own R&D, it is involved in a number of cooperative research ventures in the microelectronics area.

At the Microelectronics Center in North Carolina (MCNC), BOC/Airco research staff members are undertaking studies related to yield effects of gases used in submicron manufacturing and the development of new gases for future ultralarge-scale integration (ULSI).

This affiliation at MCNC with other companies and universities has formed the basis for the analysis of critical impurities and their effect on device processing, which in turn provides the basis of the BOC ULSI R&D program.

In the United Kingdom, BOC is taking part in a major industrial research program on plasma etching for the production of ULSI circuits, which has been launched under the government's Alvey scheme for the development of advanced information technology.

The aim of this program is to develop the technology for etching lines less than one micron wide onto semiconductors. It involves collaboration with BOC Limited and other companies. The company will produce special gas compositions for evaluation with novel resists supplied from elsewhere, so that their effect on plasma chemistry can be studied. This will enable the design of the next generation of plasma etching machines to be optimized.

Another area of research currently being carried out is with silane/diborane mixtures used in passivation to give low temperature processing.

PRODUCTS

Through the Special Gases Division, BOC supplies electronic gases and equipment to the European electronics industry.

The BOC Group plc

The Electra II (Electra is a trademark of the BOC Group) range of doping, etching, epitaxial, passive structure, and ion implantation gases is constantly developing to meet the exacting requirements of the European semiconductor industry. The special gases currently offered are:

- Ammonia
- Arsine
- Boron trichloride
- Diborane
- Dichlorosilane
- Germane
- Hexafluoroethane
- Hexafluoromethane
- Hydrogen chloride
- Hydrogen selenide
- Hydrogen sulphide
- Nitrous oxide
- Perfluoropropane
- Phosphine
- Silane
- Silicon tetrachloride
- Tetrafluoromethane
- Trichlorosilane
- Trifluoromethane

Diluent gases include argon, helium, hydrogen, nitrogen, and oxygen.

In addition to these gases, BOC Special Gases has introduced a new range of gases and gas mixtures in its Electra III-V range for use in the metal-organic chemical vapor deposition (MOCVD) technique for the growth of high-quality multilayers of semiconductors.

A selection of these gases includes:

- Dimethyl zinc in hydrogen
- Diethyl zinc in hydrogen
- Diethyl telluride in hydrogen
- Dimethyl cadmium in hydrogen

Apart from special gases, BOC Ltd. also offers a complete service for the design, supply, installation, and commission of total gas feed and control systems for industrial gases. These include acetylene, hydrogen, propane, oxygen, nitrogen, and carbon dioxide.

BOC Special Gases also supplies the Spectrol Range (Spectrol is a trademark of the BOC Group) of gas control and delivery equipment. In particular, the Spectrol 450 tied-diaphragm regulator has been developed in conjunction with the electronics industry to overcome the problems associated with the control of electronic gases.

Edwards High Vacuum, also a member of The BOC Group, makes vacuum systems and instrumentation. This company has recently introduced the Coolstar range of cryopumps specifically designed for service in the semiconductor industry. These pumps are available with pumping speeds of 1,500 and 3,5000 Is^{-1}. They require no backing pump and, having no moving parts within the vacuum system, are totally free of contamination. Edwards also supplies the ESM 100 multipurpose sputtering system for the electronic industry, where it can be used for metalization of semicondutors, passivating and insulating films, metallurgical films, dielectric, and resistance films.

FUTURE PROSPECTS

BOC views the future with confidence and sees Japan, through its OSK subsidiary, as being a growing source of income. It is also clear that the Japanese are capable of producing very high-quality product, and that this trend will be followed elsewhere in the world.

OSK has for many years been a leading engineering company in Japan, producing all types of gas purification plant and welding equipment. This strong engineering bias has now been put to work for the Group, and oxygen, nitrogen, and hydrogen purifiers are being exported to the United Kingdom and the United States. By operating in this fast-moving, high-technology market, BOC will keep its European customers supplied with state-of-the-art technology.

BOC expects its equipment sales to grow considerably faster than the market, and there is increasing emphasis on safety and working practices. The trend is for the gas supplier to offer a complete package from the platform to the point of use.

BOC intends to continue to develop new products to meet the changing needs of its customers, particularly in the field of plasma etching techniques. The company anticipates growing applications for its products in the electronics industry, and attaches great importance to working with its customers to push back the boundaries of its technology.

The BOC Group plc

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The Boeing Company

7755 East Marginal Way South
Seattle, Washington 98108
Telephone: (206) 655-2121
Fax: (206) 655-1177
Dun's Number: 17-963-0272

Date Founded: 1916

CORPORATE STRATEGIC DIRECTION

The Boeing Company, together with its subsidiaries, is one of the world's major aerospace firms. The Company operates in four industry segments: commercial transportation products and services, military transportation products and related systems, defense and space, and computer systems. Operations in the commercial transportation segment involve development, production, and marketing of such products (principally commercial jet transports) and providing related support services, primarily to commercial customers. Operations in military transportation products and related systems involve research, development, and production of such products for the US government and foreign governments. Defense and space operations primarily involve research, development, and production of various strategic and tactical missiles and space exploration products, principally for the US government. Dataquest estimates Boeing to be in the top 30 suppliers to the military/aerospace electronics systems market.

Boeing's ability to deliver jet transports on schedule is dependent upon a variety of factors, including availability of raw materials, performance of suppliers and subcontractors, and certifications by the Federal Aviation Administration. The introduction of new commercial jet aircraft programs and new major derivatives involves increased risks associated with meeting development, production, and certification schedules.

Boeing is highly dependent on its suppliers and subcontractors in order to meet commitments to its customers. Many major components and equipment items for the Company's products are procured from or subcontracted to various domestic and foreign companies. In the past, Boeing had periodically experienced problems with suppliers and subcontractors.

Boeing is a major supplier of US government agencies, principally the Department of Defense and the National Aeronautics and Space Administration (NASA). This portion of Boeing's business is sensitive to shifts in the national economy, changing national priorities, and fluctuations in the defense and space budgets.

Total revenue increased 17 percent to $20.3 billion* in fiscal 1989 from $17.3 billion in fiscal 1987. Net income increased 58 percent to $973 million in fiscal 1989 from $614 million in fiscal 1988. Boeing employs 159,200 people worldwide.

R&D expenditure totaled $754 million in fiscal 1989, representing 3.7 percent of revenue. Capital spending totaled $1.4 billion in fiscal 1989, representing 6.7 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.

BUSINESS STRATEGIC DIRECTION

Commercial Transportation Aircraft

Boeing is a leader in jet transport aircraft and offers a family of commercial jetliners designed to meet a wide range of passenger and cargo requirements of domestic and foreign airlines. This family of aircraft currently includes the standard-body Models 737 and 757 and the wide-body Models 747 and 767. Boeing also produces the commercial Chinook 234

*All dollar amounts are in US dollars.

helicopter. Dataquest estimates that Boeing holds 52 percent of the worldwide civil aircraft market.

Military Transportation Products and Related Systems

Boeing produces the E-3 Airborne Warning and Control System (AWACS) aircraft and related support for the US Air Force, NATO, and Saudi Arabia. The Company also engages in the development of a national ground-based defense command, control, and communications system for Saudi Arabia; modernization and support programs for the US government's B-52 and KC-135 jet aircraft and CH-46 and CH-47 helicopters; development, production, and integration of avionics systems for the B1-B bomber; and development of the E-6A airborne submarine communications aircraft for the US Navy. Other activities are the design and developmental efforts for the navy's early warning Airborne Optical Adjunct (AOA) utilizing a modified 767 aircraft; continued development and updating of the E-4 Advanced Airborne Command Post; production of the KE-3A tanker aircraft for Saudi Arabia; depot maintenance of F-4C fighter aircraft; design and production of the replacement wing for the A-6 carrier-based attack aircraft; design and developmental effort for the V-22 Osprey tilt-rotor aircraft and other military helicopter programs; and certain classified activities.

Defense and Space

In the defense and space segment, Boeing's principal activities include design and development of the basing aspects and ground support for the Peacekeeper (MX) Intercontinental Ballistic Missile (ICBM) system; design and development of launch-related systems for the air force's small ICBM; production of the Air Launched Cruise Missile (ALCM); continued modernization and improvement of the Minuteman ICBM system; development of the Antisubmarine Warfare Standoff Weapon (ASW SOW) for the navy; production of the Inertial Upper Stage (IUS) booster for Titan and Space Shuttle payloads; work on the development of an air-launched antisatellite system; design effort for NASA's Space Station and related areas; and certain classified activities.

Other

Boeing conducts various other activities in diversified areas including computer services, base support services, and projects involving energy and the environment. Individually, these diversified activities represent only a small portion of the Company's total activities.

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	$13,636.0	$16,748.0	$15,813.0	$17,340.0	$20,276.0
Percent Change	-	22.82	(5.58)	9.66	16.93
Capital Expenditure	$551.0	$795.0	$738.0	$690.0	$1,362.0
Percent of Revenue	4.04	4.75	4.67	3.98	6.72
R&D Expenditure	$409.0	$757.0	$824.0	$751.0	$754.0
Percent of Revenue	3.00	4.52	5.21	4.33	3.72
Number of Employees	98,700	118,500	136,100	147,300	159,200
Revenue ($K)/Employee	$138.16	$141.33	$116.19	$117.72	$127.36
Net Income	$566.0	$665.0	$480.0	$614.0	$973.0
Percent Change	-	17.49	(27.82)	27.92	58.47

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$4,001.00	$5,072.00	$6,356.00	$4,847.00
Quarterly Profit	$459.00	$195.00	$242.00	$77.00

Source: The Boeing Company
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	57.02	56.23	60.27	54.73	45.65
International	42.98	43.77	39.73	45.27	54.35
Europe	23.00	14.00	15.00	18.00	26.00
Asia/Pacific	13.00	21.00	18.00	14.00	21.00
ROW	6.00	9.00	7.00	13.00	6.00

Source: The Boeing Company
Annual Reports and Forms 10-K
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	85.00	85.00
Indirect Sales	15.00	15.00

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Seattle and Bellevue, Washington; Dallas and Corinth, Texas; and Huntsville, Alabama

Aerospace and Electronics—Activities include design and development involved with the basing aspects and ground support for the Peacekeeper (MX) Intercontinental Ballistic Missile (ICBM) system, including a rail garrison system; design and development of the Hard Mobile Launcher for the small ICBM; production of the Air Launched Cruise Missile (ALCM) AGM-86B; continued modernization and improvement of the Minuteman ICBM system; development of the short-range attach missile (SRAM II) for the air force; development of the Sea Lance antisubmarine standoff weapon for the navy; production of the IUS booster for Titan and Space Shuttle payloads; work on the development of an air-launched antisatellite system; design effort for NASA's Space Station and related areas; design and development of the Pedestral Mounted System (Avenger) for General Dynamics Stinger Missiles for the Army; design and development of an updated avionics suite for the P-3 Orion; production of flight test vehicles for naval air-to-surface weapons systems; building the crew quarters and a laboratory for the Space Station; management services for the H-46 Sea Knight; design and manufacture of power electronics, custom packaging, processors, displays, electronics subsystems, and automated test systems, primarily for internal use; and design and development of the MIL-STD-1750 computer processor.

Wichita, Kansas; Seattle, Washington; Lake Charles, Louisiana; Huntsville, Alabama; and Macon, Georgia

Military Airplanes—Activities include production of the E-3 Airborne Warning and Control System (AWACS) aircraft and related support for the air force and foreign governments; development of a national ground-based air defense command, control, and communications system (Peace Shield) for Saudi Arabia; modernization and support programs for the B-52 and KC-135 jet aircraft; development, production, and integration of avionics systems for the B-1B program support; development and production of the E-6A airborne submarine communications aircraft for the navy; design and development of the early warning Airborne Optical Adjunct utilizing a modified 767 aircraft; continued development and upgrading of the E-4 Advanced Airborne Command Post; modification of two new 747s for use as the president's official airplane, Air Force One; design and production of the replacement wing for the A-6 carrier-based attack aircraft; a teaming arrangement with Lockheed and General Dynamics under which it will participate in the air force's Advanced Tactical Fighter (ATF) design competition, under the designation YF-22A; modifying Boeing 707s to E-8A Joint STARS platforms; production of the Pave Cricket RPV and Brave 3000, an unmanned aircraft; production of the Seek Spinner (Brave 200) unmanned air vehicle (UAV); production of the E-6A Hermes strategic communications aircraft to replace EC-130 TACAMO; upgrading F-4 Phantoms; and modifying navigation and weapons delivery systems.

Ridley Park, Pennsylvania

Helicopters—Activities include upgrading the CH-47 Chinook Army medium-lift helicopter to the CH-47D version; management services for H-46 Sea Knight; and formation of a joint company with Textron, known as Bell-Boeing Tilt Rotor Team, to develop the V-22 Osprey.

Bellevue, Washington

Boeing Computer Services—Activities include data processing, telecommunications, information services support, and communications services for NASA.

Sunnyvale, California

Argosystems—Activities include the study, design, development, and manufacture of advanced electronic systems and related products for military electronics applications, with emphasis on electronic warfare and communications reconnaissance; upgrading Raytheon's SLQ-32 system; and developing the APECS naval countermeasures system, digital signaling processing systems, and an integrated airborne reconnaissance system.

SUBSIDIARIES

North America

757 UA Inc. (United States)
767 ER Inc. (United States)
Argosystems Inc. (United States)
Astro-II Inc. (United States)
BCS Richland Inc. (United States)
BE&C Engineers Inc. (United States)
Boecon Corporation (United States)
Boeing Aerospace & Electronics Co. (United States)
Boeing Aerospace & Electronics-Irving Co. (United States)
Boeing Aerospace & Electronics-Oak Ridge Inc. (United States)
Boeing Aerospace Operations Inc. (United States)
Boeing Agri-Industrial Company (United States)
Boeing Canada Technology (Canada)
Boeing Commercial Space Development Co. (United States)
Boeing Computer Services Canada Ltd. (Canada)
Boeing Computer Support Services Inc. (United States)
Boeing Domestic Sales Corporation (United States)
Boeing Financial Corporation (United States)
Boeing Georgia Inc. (United States)
Boeing International Corporation (United States)
Boeing International Sales Corporation (United States)
Boeing Investment Company Inc. (United States)
Boeing Leasing and Financial Corporation (United States)
Boeing Leasing Company (United States)
Boeing Louisiana Inc. (United States)
Boeing Middle East Ltd. (United States)
Boeing Mississippi Inc. (United States)
Boeing Nevada Inc. (United States)
Boeing of Canada Ltd. (United States)
Boeing Offset Company Inc. (United States)
Boeing Operations International Inc. (United States)
Boeing Petroleum Services Inc. (United States)
Boeing Technology International Inc. (United States)

Asia/Pacific

Boeing China Inc. (China)
Boeing Sales Corporation (Guam)

ROW

Astro Ltd. (Bermuda)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Mitsubishi Trust and Banking and Spectrum Capital (US)

Boeing, Mitsubishi Trust and Banking, and Spectrum Capital (US) jointly formed a financing firm. The new firm, BC Capital Partners, will be the sole marketer of Boeing financing packages. Boeing owns 50 percent, while Mitsubishi and Spectrum own 40 percent and 10 percent, respectively.

1989

Optical Computing

Boeing and Optical Computing (Dunfermline, Scotland) both agreed on establishing an optoelectronics joint venture research center in cooperation with Scottish universities. The center, based at Heriot Watt University, will develop optical storage devices for computers. Five universities are involved in the project, and other commercial companies will support the venture.

1988

Prva Petoletka, Suko Works, and Utva Enterprise

Boeing and Prva Petoletka (Yugoslavia), the Suko Works of Mostar (Yugoslavia), and the Utva Enterprise of Pancevo (Yugoslavia) entered into an industrial cooperation agreement. Under the agreement, Boeing will purchase $20 million worth of airplane parts for the 737 and 757 model aircraft from the three Yugoslavian enterprises.

Japan Air Lines (JAL)

Boeing and JAL entered into an exclusive sales agreement under which Boeing will market used JAL 747s worldwide.

Sikorsky

Boeing and Sikorsky entered into a joint venture to build fiberglass replacement rotor blades for the US Army's Sikorsky UH-60B Black Hawk Helicopters. The partnership is a result of the companies' collaboration on the LHX.

Ciba-Geigy

Boeing and Ciba-Geigy (Hawthorne, New York) entered into a licensing agreement under which Ciba-Geigy will develop and commercialize high-temperature-resistant, high-toughness resins for Boeing.

1987

Japan Aircraft Development
Boeing and several Japanese companies entered into a joint venture to develop the 300-seat Boeing 767 commercial passenger aircraft. Boeing will provide 75 percent of the capital and Japan Aircraft Development the remaining 25 percent. Japan Aircraft Development, including Fuji, Kawasaki, and Mitsubishi, will be a full partner in the project, participating in all areas including development, production, and sales.

Tandem Computers
Boeing and Tandem Computers entered into an agreement to jointly develop comprehensive computer solutions for manufacturing and network applications, such as document handling, shop floor control, and advanced cell control.

MERGERS AND ACQUISITIONS

1987

Argosystems
Boeing acquired Argosystems, a military-electronics company that is a leader in signal intelligence and designs advanced systems that monitor and confuse hostile radar and radio systems for the US military and its allies. Argosystems now operates as a subsidiary of Boeing.

KEY OFFICERS

Frank Shrontz
Chairman of the board and chief executive officer

D. D. Thornton
President and president of Boeing Commercial Airplane Group

D. P. Beighle
Senior vice president and secretary

A. D. Welliver
Senior vice president of Engineering and Technology

D. D. Cruze
Senior vice president of Operations

B. D. Pinick
President of Defense and Space Group

R. B. Clos
Vice president of Planning

L. G. McKean
Vice president of Human Resources

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

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	$6,766.0	$8,478.0	$9,313.0	$8,561.0	$8,660.0
Cash	3,160.0	2,825.0	2,197.0	3,544.0	1,208.0
Receivables	822.0	1,114.0	1,546.0	1,559.0	1,809.0
Marketable Securities	49.0	1,347.0	1,238.0	419.0	655.0
Inventory	2,672.0	3,105.0	3,509.0	2,947.0	4,942.0
Other Current Assets	63.0	87.0	823.0	92.0	46.0
Net Property, Plants	$1,866.0	$2,281.0	$2,554.0	$2,703.0	$3,481.0
Other Assets	$614.0	$309.0	$699.0	$1,344.0	$1,137.0
Total Assets	$9,246.0	$11,068.0	$12,566.0	$12,608.0	$13,278.0
Total Current Liabilities	$4,417.0	$5,659.0	$7,067.0	$6,705.0	$6,673.0
Long-Term Debt	$16.0	$263.0	$256.0	$251.0	$275.0
Other Liabilities	$449.0	$320.0	$256.0	$248.0	$199.0
Total Liabilities	$4,882.0	$6,242.0	$7,579.0	$7,204.0	$7,147.0
Total Shareholders' Equity	$4,364.0	$4,826.0	$4,987.0	$5,404.0	$6,131.0
Common Stock	1,347.0	1,338.0	1,335.0	1,341.0	1,736.0
Other Equity	-	-	-	-	-
Retained Earnings	3,017.0	3,488.0	3,652.0	4,063.0	4,395.0
Total Liabilities and Shareholders' Equity	$9,246.0	$11,068.0	$12,566.0	$12,608.0	$13,278.0
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$13,636.0	$16,748.0	$15,813.0	$17,340.0	$20,276.0
US Revenue	7,775.0	9,418.0	9,531.0	9,491.0	9,255.0
Non-US Revenue	5,861.0	7,330.0	6,282.0	7,849.0	11,021.0
Cost of Sales	$11,616.0	$13,553.0	$12,791.0	$14,193.0	$19,695.0
R&D Expense	$409.0	$757.0	$824.0	$751.0	$754.0
SG&A Expense	$477.0	$606.0	$793.0	$880.0	$1,012.0
Capital Expense	$551.0	$795.0	$738.0	$690.0	$1,362.0
Pretax Income	$863.0	$1,028.0	$658.0	$820.0	$922.0
Pretax Margin (%)	6.33	6.14	4.16	4.73	4.55
Effective Tax Rate (%)	0.34	0.35	0.27	0.25	0.34
Net Income	$566.0	$665.0	$480.0	$614.0	$973.0
Shares Outstanding, Millions	155.2	155.1	152.3	153.2	230.0
Per Share Data					
Earnings	$3.75	$4.28	$3.10	$4.02	$4.23
Dividend	$1.04	$1.20	$1.40	$1.55	$1.16
Book Value	$28.12	$31.12	$32.75	$35.27	$26.66

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	1.53	1.50	1.32	1.28	1.30
Quick (Times)	0.93	0.95	0.82	0.84	0.56
Fixed Assets/Equity (%)	42.76	47.26	51.21	50.02	56.78
Current Liabilities/Equity (%)	101.21	117.26	141.71	124.07	108.84
Total Liabilities/Equity (%)	111.87	129.34	151.98	133.31	116.57
Profitability (%)					
Return on Assets	-	6.55	4.06	4.88	7.52
Return on Equity	-	14.47	9.78	11.82	16.87
Profit Margin	4.15	3.97	3.04	3.54	4.80
Other Key Ratios					
R&D Spending % of Revenue	3.00	4.52	5.21	4.33	3.72
Capital Spending % of Revenue	4.04	4.75	4.67	3.98	6.72
Employees	98,700	118,500	136,100	147,300	159,200
Revenue ($K)/Employee	$138.16	$141.33	$116.19	$117.72	$127.36
Capital Spending % of Assets	5.96	7.18	5.87	5.47	10.26

Source: The Boeing Company
Annual Reports and Forms 10-K
Dataquest (1990)

Borland International, Inc.

1800 Green Hills Road
P.O. Box 660001
Scotts Valley, California 95066-0001
Telephone: (408) 438-8400
Fax: (408) 438-8696
Dun's Number: 10-276-0501

Date Founded: 1983

CORPORATE STRATEGIC DIRECTION

Borland International, Inc., designs, develops, and markets software for operation on personal computers to meet the information management and software-development needs of businesses and professionals. Borland's wide array of general applications software includes database management, electronic spreadsheet, computer programming language, multifunction utility software, and word processing. Since its formation in May 1983, Borland has become one of the top fifteen microcomputer software vendors in the world, ranking eighth in 1989, according to Dataquest.

Total revenue for fiscal year 1989 increased 11 percent to approximately $90.6 million,* up from approximately $81.6 million in fiscal year 1989. Borland believes that this increase was a direct result of introductions of major new products and new versions of existing products. Although total revenue grew, Borland experienced a net loss of $2.8 million in fiscal year 1989, down 262.2 percent from fiscal year 1988's net income of $1.75 million. Borland maintains a staff of 411 employees.

In September 1989, Borland released Quattro Pro—a completely new product from its Quattro. In addition to all the features of Quattro and Lotus 1-2-3 Release 2.01, Quattro Pro possesses multiple open spreadsheets with dynamic links to cells or ranges of cells, "spreadsheet publishing" features, and the use of bitstream fonts in graphs and presentations. Quattro Pro also features presentation-quality graphics and a built-in draw program for customizing graphs and charts. It has none of the memory-capacity problems of its predecessor, Quattro, and can load larger spreadsheets than Lotus 1-2-3 Release 2.01 and 2.2. Because of its implementation of virtual real-time object-oriented memory management (VROOM) technology. Borland's strategy is for the Quattro Pro to be perceived as technically superior to other spreadsheets, and its aim is to capture 10 percent of the worldwide spreadsheet market within a year of its release.

For fiscal years 1989, 1988, and 1987, Borland spent $14.3 million, $9.1 million, and approximately $5.7 million, respectively, on research and development expenditure. These figures calculated to be 15.8 percent, approximately 11.2 percent, and approximately 14.9 percent, respectively, of total revenue. Borland believes that software development is most efficient when conducted through small teams of people; thus, Borland operates discrete development groups consisting of employees and independent programmers with whom it contracts 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 profile.

*All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

Software Products

Paradox

Paradox is a relational database management system that allows the user to create, save, retrieve, and manipulate databases and create standard and customized reports on IBM or IBM-compatible personal

computers. Paradox was the first personal computer database management system to incorporate the data retrieval feature known as Query-By-Example (QBE). Paradox also contains a built-in applications development language, called Paradox Application Language (PAL), that enables end users and software developers to generate applications software to meet their specific information-management needs. Paradox can be used with both single users on standalone personal computers and multiple users on personal computers connected by local area networks (LANs). The Paradox line's newest product, Paradox 3.0, operates under the PC-DOS and MS-DOS operating systems. Paradox 386 is designed specifically for use on computers utilizing the Intel 80386 microprocessor, and Paradox for OS/2 operates under the OS/2 operating system. The Paradox LAN Pack allows customers with LANs to increase by five the number of authorized users of Paradox on their network.

Quattro

Quattro is a spreadsheet program that is compatible with Lotus 1-2-3 worksheet files and macros. Quattro has a "customizable" menu structure, integrated graphics, and database functions, and it runs under MS-DOS or PC-DOS on IBM and IBM-compatible personal computers.

Quattro Pro

Quattro Pro maintains the same features of Quattro and Lotus 1-2-3 Release 2.01; however, it also has multiple open spreadsheets with dynamic links to cells or ranges of cells, "spreadsheet publishing" features, and the use of bitstream fonts in graphs and presentations. Quattro Pro features presentation-quality graphics and a built-in draw program for customizing graphs and charts. It has none of the memory-capacity problems as its predecessor, Quattro, and can load larger spreadsheets than Lotus 1-2-3 Release 2.01 and 2.2 because of its implementation of VROOM technology.

Turbo Pascal

Turbo Pascal is a language development environment that includes a one-pass compiler-linker and editor for the Pascal computer language. Turbo Pascal includes a language compiler, i.e., a program that translates Pascal into machine code or instructions in binary form capable of being read and executed by a computer. Turbo Pascal operates on the Apple Macintosh and on IBM and IBM-compatible personal computers running on MS-DOS or PC-DOS operating systems. The most recent version, Version 5.5, supports object-oriented programming.

Turbo C

Turbo C is a language development environment and a compiler for the C computer language. C is a programming language often used by professional programmers to write operating systems and other systems software and applications programs. Turbo C runs on IBM and IBM-compatible personal computers running the MS-DOS or PC-DOS operating systems.

Turbo Assembler and Turbo Debugger

Turbo Assembler is an assembler program that generates machine-readable instructions for the 8086, 80186, 80286, and 80386 microprocessors. It has assembly speeds of up to 48,000 lines of code per minute and interface capabilities with higher-level languages such as Turbo C and Turbo Pascal. Turbo Debugger is a debugging utility program for Turbo C, Turbo Pascal, and Turbo Assembler. Turbo Assembler and Turbo Debugger are packaged together.

SideKick

SideKick is a multifunction utility and desktop organizing program that enables a user to perform a number of productive tasks on a personal computer, including jotting down notes, making quick calculations, scheduling appointments, finding phone numbers and addresses, and dialing calls automatically. SideKick is a RAM-resident computer program that runs under the MS-DOS or PC-DOS operating systems. A RAM-resident program is one that, once installed, remains in the computer's memory and may be used even when another application program is being used. It can operate as a standalone application and not just as a RAM resident.

SideKick Plus

SideKick Plus includes improvements in the notepad, calendar, calculator, and other capabilities available in the original SideKick program plus the addition of disk file management, data communication, and an outliner.

SideKick for Presentation Manager 2.0

SideKick for Presentation Manager 2.0 is a special version of SideKick that operates under IBM's graphical user interface personal computer operating system called OS/2 Version 1.1, commonly known as OS/2 Presentation Manager. Its features include the notepad, calendar, calculator, phone book, and time planner.

Reflex

Reflex is an analytical database and file management program that enables the user to analyze, cross-reference, and represent data in a variety of ways (e.g., in list, graphical, or summary form). The data may be imported from a variety of other sources, including data files created by Paradox, Quattro, Lotus 1-2-3, and dBASE. Reflex runs under the MS-DOS or PC-DOS operating systems.

Sprint

Sprint is a word processing program for IBM and IBM-compatible personal computers. Sprint features sophisticated document-handling functions, a spell checker and thesaurus, advanced file-management technology, a "customizable" user interface, powerful formatting capabilities, page preview, and a built-in macro language for programmability.

Others

Borland markets a total of 35 products such as Super-Key, Eureka, Reflex Plus for the Apple Macintosh, Turbo Lightning, programming tools and learning aids, and training materials for Paradox and Quattro.

Further Information

For more information on Borland's business segments, please contact Dataquest's Software Industry Service.

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$11,568.0	$29,662.0	$38,121.0	$81,597.0	$90,555.0
Percent Change	-	156.41	28.52	114.05	10.98
Capital Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
R&D Expenditure	$1,242.0	$3.130.0	$5,663.0	$9,102.0	$14,335.0
Percent of Revenue	10.74	10.55	14.86	11.15	15.83
Number of Employees	NA	NA	240	NA	411
Revenue ($K)/Employee	NA	NA	$159	NA	$220
Net Income	$935.0	$9.49.0	$1,284.0	$1,753.0	($2,844.0)
Percent Change	-	1.50	35.30	36.53	(262.24)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$23.03	$25.20	NA	NA
Quarterly Profit	$1.58	$2.82	NA	NA

NA = Not available

Source: Borland International, 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	94.55	80.55	80.39
International	NA	NA	5.45	19.45	19.61
Europe	NA	NA	5.45	19.45	19.61

NA = Not available

Source: Borland International, Inc. Annual Reports and Forms 10-K Dataquest (1990)

1990 SALES OFFICE LOCATIONS

North America—6

MANUFACTURING LOCATIONS

North America

Scotts Valley, California
All products are manufactured here.

SUBSIDIARIES

North America

Borland Analytica Inc. (United States)
Borland California Inc. (United States)
Borland International Sales Corporation (Virgin Islands, United States)

Europe

Borland International Limited (United Kingdom)
Borland International S.A.R.L. (France)
Borland International (Europe) ApS (Denmark)

ROW

Borland International Pty. Ltd.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Hunter Systems Software
Borland will use Hunter's XDOS CAPS to develop XDOS versions of its Quattro spreadsheet and Sprint word processor for UNIX. XDOS enables applications written for it to be used like any other UNIX program while presenting all the features and functions of the original MS-DOS versions.

Tech Data
Borland and Tech Data entered into a distribution agreement under which Tech Data will market Borland's full line of software nationwide. The agreement includes distribution of Borland's Quattro Pro spreadsheet, Paradox 3.0, and Turbo language products.

Borland Japan
Borland Japan has been formed by Borland International to market, translate, and advertise Borland International's software products in Japan.

Samsung Information Systems America
Borland and Samsung entered into a joint marketing agreement to bring together sales of Borland's software to Samsung's PCs. The agreement includes Borland's Quattro, Sprint, SideKick, and Reflex software and the Paradox database software. The agreement will allow Borland to take advantage of Samsung's strong market position as a value-added reseller (VAR) and possibly benefit from Samsung's relationship with Novell.

1988

IBM
Borland and IBM entered into an agreement under which Borland's SideKick for Presentation Manager desktop management software is to be packaged with IBM's OS/2 Standard Edition operating system.

Microamerica
Borland and Microamerica entered into a distribution agreement in which Microamerica will distribute Borland's software in the United States and Canada. Under the agreement, Microamerica will provide new VAR channels to Borland.

Toshiba
An agreement was entered into in which Toshiba will bundle Borland International's Sprint word processing package in a special portable configuration. Borland will supply to Toshiba customers the interfaces and utilities for Sprint.

Micro Software Associates Co., Ltd.
Borland and Micro Software entered into an agreement in which Micro Software will market Borland's Turbo C compiler.

MERGERS AND ACQUISITIONS

1988

Surpass Software Systems
Borland International acquired Surpass Software Systems, a manufacturer and marketer of the Surpass spreadsheet for IBM PCs and IBM compatibles. The acquisition will help sustain Borland's

competitive edge over Lotus Development. The agreement gave Borland the rights to the technology of Surpass, which competes with Borland's Quattro spreadsheet package. Version 2.0 of Surpass was also included in the deal.

1987

Ansa Software
Borland acquired Ansa Software, which is best known for its Paradox MS-DOS database management system. Through the acquisition, Borland will combine its microcomputer software line with Ansa's database management system.

KEY OFFICERS

Philippe Kahn
Chairman, president, and chief executive officer

Alan S. Henricks
Senior vice president, Finance and Operations, and chief financial officer

Spencer Leyton
Senior vice president, Business Development

Richard L. Schwartz
Vice president, Technology, and chief technical officer

Douglas R. Antone
Vice president, Sales

Robert H. Dickerson
General manager for Database Business Unit

Steve Kahn
General manager for Spreadsheet Business Unit

Eugene Wang
General manager for Language Business Unit

PRINCIPAL INVESTORS

Philippe Kahn—30.50%
Niels Jensen—6.47%

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

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	NA	NA	$22,964.0	$35,916.0	$28,514.0
Cash	NA	NA	15,425.0	8,593.0	9,891.0
Receivables	NA	NA	5,963.0	19,734.0	12,505.0
Marketable Securities	NA	NA	NA	NA	NA
Inventory	NA	NA	943.0	4,239.0	3,098.0
Other Current Assets	NA	NA	633.0	3,350.0	3,020.0
Net Property, Plants	NA	NA	$3,482.0	$13,844.0	$20,416.0
Other Assets	NA	NA	$4,643.0	$3,767.0	$4,477.0
Total Assets	$5,444.0	$12,166.0	$31,089.0	$53,527.0	$53,407.0
Total Current Liabilities	NA	NA	$5,995.0	$17,269.0	$12,323.0
Long-Term Debt	NA	NA	NA	$3,455.0	$11,198.0
Other Liabilities	NA	NA	$2,700.0	$726.0	$834.0
Total Liabilities	$2,552.0	$3,572.0	$8,695.0	$21,450.0	$24,355.0
Total Shareholders' Equity	$2,892.0	$8,594.0	$22,394.0	$32,077.0	$29,052.0
Converted Preferred Stock	NA	NA	NA	NA	NA
Common Stock	NA	NA	21,281.0	30,156.0	30,622.0
Other Equity	NA	NA	NA	112.0	(535.0)
Retained Earnings	NA	NA	1,113.0	1,809.0	(1,035.0)
Total Liabilities and Shareholders' Equity	$5,444.0	$12,166.0	$31,089.0	$53,527.0	$53,407.0

Income Statement	1985	1986	1987	1988	1989
Revenue	$11,568.0	$29,662.0	$38,121.0	$81,597.0	$90,555.0
US Revenue	NA	NA	36,045.0	65,723.0	72,799.0
Non-US Revenue	NA	NA	2,076.0	15,874.0	17,756.0
Cost of Sales	$2,349.0	$5.531.0	$6,511.0	$18,787.0	$27,152.0
R&D Expense	$1,242.0	$3,130.0	$5,663.0	$9,102.0	$14,335.0
SG&A Expense	$5,710.0	$16,243.0	$25,558.0	$49,941.0	$51,621.0
Capital Expense	NA	NA	NA	NA	NA
Pretax Income	$2,276.0	$4,889.0	$2,979.0	$3,832.0	($3,598.0)
Pretax Margin (%)	19.67	16.48	7.81	4.70	(3.97)
Effective Tax Rate (%)	NA	NA	57.00	54.00	(21.00)
Net Income	$935.0	$949.0	$1,284.0	$1,753.0	($2,844.0)
Shares Outstanding, Millions	36,532.0	45,627.0	58,266.0	62,338.0	58,574.0
Per Share Data					
Earnings	$0.03	$0.02	$0.02	$0.03	($0.05)
Dividend	NA	NA	NA	NA	NA
Book Value	$0.08	$0.19	$0.38	$0.51	$0.50

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

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	NA	NA	3.83	2.08	2.31
Quick (Times)	NA	NA	3.67	1.83	2.06
Fixed Assets/Equity (%)	NA	NA	15.55	43.16	70.27
Current Liabilities/Equity (%)	NA	NA	26.77	53.84	42.42
Total Liabilities/Equity (%)	88.24	41.56	38.83	66.87	83.83
Profitability (%)					
Return on Assets	-	10.78	5.94	4.14	(5.32)
Return on Equity	-	16.52	8.29	6.44	(9.30)
Profit Margin	8.08	3.20	3.37	2.15	(3.14)
Other Key Ratios					
R&D Spending % of Revenue	10.74	10.55	14.86	11.55	15.83
Capital Spending % of Revenue	NA	NA	NA	NA	NA
Employees	NA	NA	240	NA	411
Revenue ($K)/Employee	NA	NA	$159	NA	$220
Capital Spending % of Assets	NA	NA	NA	NA	NA

NA = Not available

Source: Borland International, Inc. Annual Reports and Forms 10-K Dataquest (1990)

British Telecom Plc

81 Newgate Street
London EC1A 7AJ, England
Telephone: 01-356-5000
Fax: 01-356-5522
Duns Number: 22-701-5716

Founded: 1880

CORPORATE STRATEGIC DIRECTION

British Telecom Plc (BT) is the major supplier of telecommunications services in the United Kingdom. Originally a government-owned monopoly, the Company was privatized in 1984, and the markets it served opened to competition. British Telecom currently provides telephone equipment, local and long-distance service, cellular communications, and worldwide network services.

British Telecom is focused on expanding into global telecommunications markets based on new technologies, such as cellular communications and fiber optics. In support of this global strategy, BT has made several acquisitions overseas, including the purchase of Tymnet and Dialcom services (now BT Tymnet) from McDonnell Douglas and a 20 percent investment in McCaw Cellular Communications, both of the United States. BT also has improved existing domestic telecommunications systems by investing in new equipment and expanding call-handling capabilities.

In 1986, British Telecom acquired Mitel (Canada), a maker of private branch exchanges (PBXs). Financial constraints, coupled with intense competition in the PBX market from large vendors such as GPT, have led British Telecom to seek a buyer for Mitel. British Telecom's strategy is to develop worldwide telecommunications networks and generate improved revenue from service operations.

In 1989, British Telecom organized its business into three operating divisions—British Telecom UK, British Telecom International (BTI), and the Communications Systems Division. In March 1990, however, British Telecom announced further restructuring plans that will consolidate the 27 local districts into six divisions organized by function rather than geographic region. This new organization plan, to be implemented by April 1991, will create the following divisions: Personal Communications, Business Communications, Special Businesses, Worldwide Networks Division (WND), a development and procurement group, and a worldwide products and network services group that encompasses most of BT's former Communications Systems Division.

British Telecom's restructuring also includes a job reduction program. The program calls for the elimination of as many as 30,000 jobs and several layers of management. Work force reduction and equipment modernization have been business rationalizations of the Company since it was privatized in 1984. The Company currently employs approximately 245,000 people worldwide.

For the year ended March 31, 1990, total sales were £12,315 million (US$20,196 million), up over 11 percent from £11,071 million (US$19,706 million) for the previous year. (Percentage changes refer only to £ amounts; US$ percentage changes will differ because of flunctuations in Dataquest exchange rates.) Net income for fiscal 1990 was £1,535 million (US$2,517 million), down slightly from £1,579 million (US$2,810 million) for fiscal 1989. Management attributes the loss to an exceptional charge of £390 million (US$640 million) due to restructuring.

R&D expenditure in 1990 was £228 million (US$374 million), up from £214 million (US$351 million) in 1989. Over one-half of R&D spending £94.6 million (US$155 million) was devoted to activities at BT's central research and technology laboratory in Suffolk and activities at software engineering centers in Ipswich, Belfast, London, and Glasgow.

Capital expenditure was £3.12 billion (US$5.12 billion) in fiscal 1990, an increase of 6 percent over 1989's total of £2.97 billion (US$5.11 billion). The

majority of this investment was concentrated on recabling the network, installing digital exchanges, and improving BT's Cellnet cellular telephone system.

Detailed financial statements were not available at press time and are not included in this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

British Telecom UK (BT-UK)

BT-UK's principal activity is supplying telecommunications services and equipment in the United Kingdom, which accounted for 97.0 percent of sales during the past year. The volume of inland calls increased 10.0 percent during the year, accounting for £4,864 million (US$7,977 million). Business line connections increased 10.0 percent during the year, and residential connections increased 2.9 percent. Public pay telephones in use increased by 4,000 to a total of more than 90,000 during the year.

The balance of this division's sales for the year came from telephone exchange line rentals, with sales of £1,637 million (US$2,685 million); customer premises equipment supply, with sales of £1,171 million (US$1,920 million); and other network income, with sales of £1,537 million (US$2,520 million). Total sales for BT-UK in 1989 were £9,209 million (US$15,103 million).

The division is continuing its work on modernizing the network infrastructure (exchanges, network equipment, and services) with the use of digital technology and optical fiber cables. The directory inquiry service has been expanded, and Integrated Services Digital Network (ISDN) services have been introduced in selected service areas. One area for concern in the division's future is the review of the current national duopoly system in the United Kingdom by the Department of Trade and Industry and the Office of Telecommunications. These two groups will review the country's telecom licensing program in November 1990, and it is possible that the agencies will decide to introduce more competition by licensing a third national operator in the market.

British Telecom International (BTI)

The primary business of the International Division is providing international telephone services. During 1989, BTI's international call volume increased 13 percent, accounting for sales of £1,790 million (US$2,935 million). Other services accounted for £591 million (US$969 million) in sales during the year.

BTI is responsible for the Company's international networks and services, including private circuits, data, text and fax services, private network services, videoconferencing and TV broadcasting, and aeronautical and maritime services. BTI has communication links with 217 countries and employs satellites, microwave systems, and coaxial and fiber-optic submarine cables to facilitate its international services.

The Company is currently reviewing its investment in cable television companies. In June, BTI sold its Cable Thames Valley Ltd. subsidiary and announced that it also may sell off its other cable interests in order to concentrate on network operations and expansion of its cellular mobile communications business.

In September 1990, British Telecom announced its plans for worldwide value-added data communications services called Global Network Services (GNS). GNS will provide data communications services in 84 countries, utilizing its BT Tymnet global network.

Communications Systems Division

The Communications Systems Division accounted for £1,381 million (US$2,265 million) in sales for 1989. The division consists of Mobile Communications, Customer Systems, Yellow Page Services, and network management services.

In the United Kingdom, BT provides cellular communications services through its Cellnet cellular radio subsidiary. As previously mentioned, BT acquired 20 percent in McCaw Cellular and thus has an opening as a provider of cellular services in the United States. In July 1990, BT shut down Metrocast, a nationwide radio paging company based in San Diego, California. The Company had acquired an 80 percent stake in Metrocast in July 1988.

The Customer Systems Group provides systems solutions that include terminals and computer systems. Such systems include the touch-screen dealer board systems for the international finance sector and the

M6000 UNIX computer, designed and built by BT and used in the government, military, and civil sectors.

The Company's network management services are built around BT's public data network and Dialcom Group. The Dialcom Group offers business customers electronic mail service and internationally managed network services through interconnect agreements with companies such as AT&T in the United States and OTC in Australia. BT plans to expand its network management services in Western Europe and currently has collaborative agreements with STET of Italy and Telefonica of Spain to provide network management services in those countries.

Yellow Pages Services provides directory listings within the United Kingdom. Its product range includes Electronic Yellow Pages and Talking Pages. This group also manages the Company's marketing services portfolio of businesses, which includes Sharelink, a telephone share-dealing company.

Further Information

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

1989 SALES OFFICE LOCATIONS

North America—6
Europe—16
Asia/Pacific—4

MANUFACTURING LOCATIONS

North America

Ontario, Canada
Telecommunications equipment manufacturing, customer premises equipment

Europe

England
Telecommunications equipment manufacturing
England
Optoelectronic devices

SUBSIDIARIES

North America

BT Tymnet Inc. (United States)
CTG, Inc. (Canada)
Mitel Corporation (Canada)

Europe

BT Consumer Electronics Ltd. (England)
BT (Marine) Ltd. (England)
BT (Worldwide) Ltd. (England)
British Telecom Ltd. (England)
Fulcrum Communications Ltd. (England)
International Aeradio Plc (England)
Manx Telecom Ltd. (England)
Sharelink Limited (England)
Telecom Securicor Cellular Radio Ltd. (England)
Telecom Security Ltd. (England)
Yellow Pages Sales Ltd. (England)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Kokusai Denshin Denwa (KDD) and MCI Communications
KDD, MCI, and BT have begun jointly offering the Port-PLAN private network service, a ready-made network service using voice, data, facsimile, and telex that allows users to establish their own private networks by connecting their international and domestic lines to the system at KDD's headquarters in Tokyo.

IDB Communications
IDB and BT have formed a joint venture company. The new unit, called Mobile Express, will supply transportable Ku-band earth stations services throughout Europe.

Novell, Inc.
BT and Novell have formed a joint-development alliance for Novell's NetWare local area networks (LANs). The first product will be a standalone X.400 gateway that will run on NetWare 286 LANs.

Trans-Soviet Line Development
BT, U S WEST, and six other telecommunications companies from Europe, Japan, and Australia are cooperating to establish a fiber link connecting the Soviet Union to Europe and Japan.

Mercury Communications
Mercury entered into an agreement with BT that will allow subscribers to the Mercury Data Network Service to access all of BT's network services and give reciprocal arrangements to BT customers.

MCI Communications
BT reached an agreement with MCI whereby BT's multinational customers will be able to access MCI's virtual network directly from the United Kingdom.

Northern Telecom
BT has been named the exclusive distributor in the United Kingdom for Northern Telecom's new Meridian 1 communications system.

1989

AT&T, FTCC, MCI, OTI, TRT, and Worldcom
BT has one-stop shopping agreements for international private leased circuits with AT&T, FTCC, MCI International, OTI, TRT, and Worldcom.

Saudi Arabia
BT has formed a joint-venture company in Saudi Arabia. It will be called British Telecom al-Saudia.

K-Net
BT and K-Net announced an operating agreement for the provision of packet-switched data services between Japan and the United Kingdom.

1988

Telefónica
BT agreed to provide Telefónica of Spain with a complete telecommunications network management system to be supported by a combined BT/Telefónica team based in Madrid.

Novell
BT and Novell announced a joint development agreement for X.400 electronic messaging technology for the Novell NetWare network operating system.

MERGERS AND ACQUISITIONS

1989

Tymnet
BT purchased Tymnet from McDonnell Douglas. Tymnet has users in over 70 countries, but the majority of its revenue is generated in the United States.

McCaw Cellular Communications, Inc.
BT acquired a 20 percent interest in McCaw Cellular Communications, Inc.

KEY OFFICERS

Iain D. Vallance
Chairman

John M. Raisman
Deputy chairman

Alan Rudge
Director, Group Technology and Development

Barry Romeril
Director, Group Finance

Anthony Booth
Managing director, British Telecom International

Mike Bett
Managing director, United Kingdom Communications

David Dey
Managing director, Communications Systems

Michael L. Ford
President, British Telecom, Inc.

PRINCIPAL INVESTORS

HM Government Treasury—48.1%

FOUNDERS

Information is not available.

Brother Industries, Ltd.

35, 9-chome, Horita-dori
Mizuho-ku, Nagoya 467
Telephone: 011-81-5-2824-2511
Fax: 011-81-5-2821-7628
Dun's Number: 69-057-4793

Date Founded: 1908

CORPORATE STRATEGIC DIRECTION

Brother Industries, Ltd., was established in 1908 as Yasui Sewing Machine Company and incorporated as Brother Industries in 1934 to manufacture and market sewing machines in Japan. Since that time, the Company has evolved into a multinational, Japanese conglomerate that designs, manufactures, and markets a variety of electronic products, including business machines, sewing machines, knitting machines, home electric appliances, and machine tools.

The Company's interest in the high-tech industry began in 1960 with the introduction of the Company's first typewriter, the JP1-111. Today, the Company's Business Machines Division produces printers, electronic typewriters, word processors, full-color copiers, facsimile machines, memory devices, and personal computer software. In fiscal 1989, the Business Machines Division accounted for 45.5 percent of the Company's total revenue.

Brother has established local production facilities and local sales and marketing subsidiaries that act as the Company's receptors to the needs of individual local markets.

In the United Kingdom, Brother has two production facilities. One facility located in Raubon produces the majority of Brother's matrix printers sold in Europe. The other facility, located in Wrexham, produces in excess of 30,000 electronic typewriters per month, which are sold worldwide. Together the two facilities employ over 700 people.

Brother also has invested in a 12,000-square-foot plant in Ireland that will manufacture printer circuit boards for use by Brother's UK factories.

Brother also maintains local production facilities in five other countries: Brazil, Korea, Malaysia, Taiwan, and the United States. Brother has a goal to raise overseas production to 20 percent of total production in the next few years.

Brother also has established numerous international subsidiaries whose function is to market and sell Brother's products in their respective local markets. Brother International Corporation, founded in the United States in 1954, is responsible for the marketing and sale of the parent's products in the United States. The subsidiary's seven product divisions are the Consumer Products Division, Home Appliance Division, Export Division, Industrial Products Division, Information Systems Division, Office Equipment Division, and Original Equipment Division.

Brother International Europe, Ltd., established in 1958, is responsible for the marketing and sale of the parent's products throughout Europe, with support from various local subsidiaries in 12 other European countries. Brother also has subsidiaries established in Australia, Brazil, Canada, Korea, Singapore, and Taiwan.

In the fiscal year ending November 20, 1989, nonconsolidated sales increased 0.8 percent to ¥168.4 billion (US$1.35 billion) from ¥167.1 billion (US$1.30 billion) in fiscal 1988. Domestic sales remained stable at ¥60.1 billion (US$483 million) in fiscal 1989, while international sales increased 1.3 percent to ¥108.3 billion (US$870 million) in fiscal 1989 from ¥107.0 billion (US$834 million) in fiscal 1988. Nonconsolidated net income increased 8.8 percent to ¥4.5 billion (US$36.2 million) in fiscal 1989 from ¥4.1 billion (US$32.3 million) in fiscal 1988.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Tables 3 and 4, comprehensive financial statements, are at the end of this profile. Information on revenue by distribution channel is not available.

BUSINESS SEGMENT STRATEGIC DIRECTION

Net revenue for the Company's Business Machines Division rose 2.1 percent to ¥76.58 billion (US$615.3 million) in fiscal 1989 from ¥75.03 billion (US$584.8 million) in fiscal 1988. Facsimile machines and dot matrix printers sold well domestically, and sales of full-color copiers made a significant contribution.

Printers

Brother's strength as a high-tech company lies in its range of printers. The Company maintains a full line of daisywheel and serial, impact, dot matrix printers, as well as a line of laser printers.

In 1989, the Company introduced two new versions of the HL-8 Series laser printer, the HL-8e and HL-8PS. The HL-8e emulates the Hewlett-Packard LaserJet Series II, Diablo 630, Epson FX-80, and IBM Proprinter XL printers, as well as Brother's Twinwriter Series and HPGL Plotter Emulation. The HL-8PS is a higher-performance model that offers both PostScript and LaserJet II emulations at a speed of 7.4 pages per minute. The HL-8PS's similarity in operation and appearance to the HL-8e allows for easy upgrading. Both machines utilize the Canon SX engine.

Electronic Typewriters and Word Processors

In 1989, Brother was the largest typewriter vendor in the United Kingdom. The Company offers a wide line of typewriter and word processor products ranging from portable typewriters to advanced office word processors. The Company's aim is to create a machine as sophisticated as the word processor, yet as simple as the typewriter. Two new product introductions were the EM-2050 and CX1000a, which feature large display and memory capabilities. The TS-5050 is a combination typewriter and personal computer with a unique daisywheel and dot matrix print mechanism.

Copier Machines

Brother introduced its first full-color copying machine in 1988, but full-scale sales were not commenced until 1989. The copier uses microcapsule paper to permit full-color copying of notable quality at a reasonable cost. The Company claims this product to be its most significant product introduction.

Facsimile Machines

Brother initially entered the facsimile market as an original equipment manufacturer (OEM) supplier to major domestic manufacturers (NTT was one of the first OEMs). The Company introduced its third generation of Brother brand facsimiles in 1989.

Currently, the Company offers a total of four models under the Brother brand that feature Group 3 capability, fax-teleswitch, ten-page automatic-document-feed, and automatic-document-cutter. Each model adds various telephone or broadcast capabilities, depending on the targeted market segment.

Computer Storage

Brother has a limited interest in the memory devices market. The Company currently markets one product, the FB-550, which is a 3.5-inch flexible disk drive. The Company introduced the FB-550 in 1986.

Personal Computer Software

The Company currently distributes software over telecommunications lines, using a terminal developed in 1986 in conjunction with Japan's largest independent software house, Intec Co. From any of 120 terminals (scheduled to be expanded to 300 within two years) in computer and appliance shops, a buyer can select a game or software package and have the software instantly written onto a floppy disk and ejected from the machine. The machine incorporates a high-speed copying function, so that the total time involved in the purchase can be reduced to just two or three minutes.

Further Information

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$819.0	$982.0	$1,127.3	$1,302.6	$1,353.1
Percent Change	-	19.91	14.79	15.55	3.87
Capital Expenditure	$34.5	$32.5	$38.0	$53.0	$48.0
Percent of Revenue	4.21	3.31	3.37	4.07	3.55
Number of Employees	NA	5,251	NA	5,086	5,463
Revenue ($K)/Employee	-	-	$187	$256	$248
Net Income	$36.7	$26.8	$29.6	$32.3	$36.2
Percent Change	-	(26.78)	10.25	9.06	12.20
Exchange Rate (US$1=¥)	¥223.21	¥171.67	¥147.70	¥128.30	¥124.46

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	NA	NA	NA	NA
Quarterly Profit	NA	NA	NA	NA

NA = Not available

Source: Brother Industries, Ltd.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
Japan	40.72	36.65	36.12	36.00	35.69
International	59.28	63.35	63.88	64.00	64.31
North America	25.60	29.60	NA	NA	NA
Europe	15.60	20.70	NA	NA	NA
ROW	18.10	13.00	NA	NA	NA

NA = Not available

Source: Brother Industries, Ltd.
Annual Reports and Forms 10-K
Dataquest (1990)

1990 SALES OFFICE LOCATIONS

North America—5
Europe—17
Asia/Pacific—8
ROW—2

MANUFACTURING LOCATIONS

North America

Tennessee, United States

Europe

County Louth, Ireland
Raubon, England
Wrexham, England

Asia/Pacific

Johor, Malaysia
Kaohsiung, Taiwan
Nagoya, Japan
Seoul, Korea

ROW

Sao Paulo, Brazil

SUBSIDIARIES

North America

Brother Industries (U.S.A), Inc. (United States)
Brother International Corporation (United States)
Brother International Corporation, Ltd. (Canada)

Europe

Brother France S.A. (France)
Brother Handels A.G. (Switzerland)
Brother Industries (Ireland) Ltd. (Ireland)
Brother Industries Ltd. (United Kingdom)
Brother International Corporation (Europe) Ltd. (Ireland)
Brother International Corporation (Ireland) Ltd. (Ireland)
Brother International Europe Ltd. (United Kingdom)
Brother International GmbH (Austria)
Brother International GmbH (Germany)
Brother International Industriemaschinen GmbH (Germany)
Brother International Maskinaktieselskab A/S (Denmark)
Brother International (Netherlands) B.V. (Netherlands)
Brother International (Portugal) Distribuidores De Equipamentos Electricos Lda. (Portugal)
Brother International Sweden A.B. (Sweden)
Brother Norge A.S. (Norway)
Ermaco Oy (Finland)
Jones Sewing Machine Co., Ltd. (United Kingdom)
S.A. Brother International (Belgium) N.V. (Belgium)
Thygensen + Brother Symaskiner A/S (Denmark)

Asia/Pacific

Brother Industries Pty. Ltd. (Australia)
Brother Industries Technology (M) Sdn. Bhd. (Malaysia)
Brother International Corporation (Japan)
Brother International Singapore Pte. Ltd. (Singapore)
Brother Sales, Ltd. (Japan)
Pusan Precision Industries, Ltd. (Korea)
Taiwan Brother Industries, Ltd. (Taiwan)

ROW

Brother Interamericana Maquinas E Acessorios Ltda. (Brazil)
Elgin Brother Industrial Ltda. (Brazil)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

GKK Plastics
Along with Kanematsu-Gosho, Katoh-Toku, and Gifu Plastics, Brother formed GKK Plastics, which will operate a molding plant for business machines.

Digital Research
Brother has licensed DR DOS from Digital Research to implement the operating system into a line of multiuser personal computers introduced by Brother in 1990.

1989

ShareData Inc.
ShareData and Brother formed a licensing agreement to bundle ShareData's office automation software for the TS-3050 personal computer-typewriter introduced by Brother in 1989.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Katsuji Kawashima
Chairman

Yoshihiro Yasui
President

Teizo Fukuoka
Executive vice president, Research, Development and Engineering

Tomomosa Yasui
Executive vice president, Domestic/Overseas Marketing and Sales

Masami Hanazono
Senior managing director, Overseas Operations

Tetsuo Sugiura
Senior managing director, Industrial Sewing Machines

H. Gunji
Director (president, CEO, and chairman of Brother International Corporation)

K. Tazaki
Director (managing director of Brother International Europe, Ltd.)

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

Table 3
Comprehensive Financial Statement
Fiscal Year Ending November 30
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$446.9	$627.1	$749.0	$846.2	$895.7
Cash	137.2	219.6	350.7	388.2	376.2
Receivables	134.9	182.1	197.2	220.4	266.2
Marketable Securities	95.5	119.8	79.5	90.6	100.9
Inventory	74.2	98.1	114.1	132.9	139.1
Other Current Assets	5.1	7.5	7.5	14.0	13.3
Net Property, Plants	$158.7	$199.3	$224.6	$262.5	$268.9
Other Assets	$104.1	$122.8	$138.6	$173.6	$195.8
Total Assets	$709.7	$949.2	$1,112.1	$1,282.3	$1,360.4
Total Current Liabilities	$166.8	$230.0	$262.6	$305.8	$335.3
Long-Term Debt	$99.0	$122.4	$130.6	$116.9	$92.6
Other Liabilities	$58.2	$77.8	$103.8	$118.4	$112.9
Total Liabilities	$324.0	$430.2	$497.0	$541.1	$540.7
Total Shareholders' Equity	$385.7	$519.0	$615.2	$741.2	$819.7
Common Stock	102.0	138.4	160.8	232.8	283.6
Other Equity	231.1	335.0	404.7	452.8	477.9
Retained Earnings	52.6	45.6	49.7	55.6	58.2
Total Liabilities and Shareholders' Equity	$709.7	$949.2	$1,112.1	$1,282.3	$1,360.4
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$819.0	$982.0	$1,127.3	$1,302.6	$1,353.1
Japanese	333.5	359.9	407.1	468.9	482.9
Non-Japanese	485.5	622.1	720.2	833.7	870.2
Cost of Sales	$643.1	$790.0	$901.0	$1,061.4	$1,140.9
R&D Expense	NA	NA	NA	NA	NA
SG&A Expense	$118.6	$149.9	$181.6	$207.7	$192.2
Capital Expense	$34.5	$32.5	$38.0	$53.0	$48.0
Pretax Income	$73.5	$56.7	$56.9	$53.0	$54.9
Pretax Margin (%)	8.97	5.78	5.04	4.07	4.06
Effective Tax Rate (%)	0.50	0.53	0.48	0.39	0.34
Net Income	$36.7	$26.8	$29.6	$32.3	$36.2
Shares Outstanding, Millions	254.7	255.1	255.9	257.0	261.3
Per Share Data					
Earnings	$0.14	$0.11	$0.12	$0.13	$0.14
Dividend	$0.04	$0.06	$0.07	$0.08	$0.08
Book Value	$1.51	$2.03	$2.40	$2.88	$3.14
Exchange Rate (US$1=¥)	¥223.21	¥171.67	¥147.70	¥128.30	¥124.46

NA = Not available

Source: Brother Industries, Ltd.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 4
Comprehensive Financial Statement
Fiscal Year Ending November 30
(Millions of Yen, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	¥99,746	¥107,647	¥110,627	¥108,566	¥111,484
Cash	30,621	37,697	51,804	49,810	46,823
Receivables	30,107	31,263	29,127	28,276	33,135
Marketable Securities	21,313	20,573	11,740	11,629	12,560
Inventory	16,566	16,835	16,854	17,057	17,316
Other Current Assets	1,139	1,279	1,102	1,794	1,650
Net Property, Plants	¥35,430	¥34,222	¥33,170	¥33,682	¥33,466
Other Assets	¥23,234	¥21,074	¥20,466	¥22,269	¥24,369
Total Assets	¥158,410	¥162,943	¥164,263	¥164,517	¥169,319
Total Current Liabilities	¥37,221	¥39,481	¥38,783	¥39,231	¥41,731
Long-Term Debt	¥22,104	¥21,014	¥19,292	¥14,992	¥11,521
Other Liabilities	¥12,989	¥13,351	¥15,328	¥15,194	¥14,048
Total Liabilities	¥72,314	¥73,846	¥73,403	¥69,417	¥67,300
Total Shareholders' Equity	¥86,096	¥89,097	¥90,860	¥95,100	¥102,019
Common Stock	22,760	23,751	23,751	29,872	35,303
Other Equity	51,591	57,512	59,772	58,098	59,475
Retained Earnings	11,745	7,834	7,337	7,130	7,241
Total Liabilities and Shareholders' Equity	¥158,410	¥162,943	¥164,263	¥164,517	¥169,319
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	¥182,809	¥168,585	¥166,502	¥167,129	¥168,404
Japanese	74,442	61,789	60,135	60,163	60,101
Non-Japanese	108,367	106,796	106,367	106,966	108,303
Cost of Sales	¥143,552	¥135,619	¥133,080	¥136,184	¥141,997
R&D Expense	NA	NA	NA	NA	NA
SG&A Expense	¥26,483	¥25,729	¥26,828	¥26,644	¥23,925
Capital Expense	¥7,690	¥5,577	¥5,619	¥6,797	¥5,972
Pretax Income	¥16,401	¥9,737	¥8,400	¥6,805	¥6,836
Pretax Margin (%)	8.97	5.78	5.04	4.07	4.06
Effective Tax Rate (%)	0.50	0.53	0.48	0.39	0.34
Net Income	¥8,181	¥4,607	¥4,370	¥4,140	¥4,506
Shares Outstanding, Millions	254.7	255.1	255.9	257.0	261.3
Per Share Data					
Earnings	¥32.12	¥18.06	¥17.08	¥16.10	¥17.24
Dividend	¥10.00	¥10.00	¥10.00	¥10.00	¥10.00
Book Value	¥338.03	¥349.26	¥355.06	¥370.04	¥390.43

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending November 30
(Millions of Yen, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	2.68	2.73	2.85	2.77	2.67
Quick (Times)	2.23	2.30	2.42	2.33	2.26
Fixed Assets/Equity (%)	41.15	38.41	36.51	35.42	32.80
Current Liabilities/Equity (%)	43.23	44.31	42.68	41.25	40.91
Total Liabilities/Equity (%)	83.99	82.88	80.79	72.99	65.97
Profitability (%)					
Return on Assets	-	2.87	2.67	2.52	2.70
Return on Equity	-	5.26	4.86	4.45	4.57
Profit Margin	4.48	2.73	2.62	2.48	2.68
Other Key Ratios					
Capital Spending % of Revenue	4.21	3.31	3.37	4.07	3.55
Employees	-	5,251	-	5,086	5,463
Revenue (¥K)/Employee	-	¥32,105	-	¥32,861	¥30,826
Capital Spending % of Assets	4.85	3.42	3.42	4.13	3.53
Exchange Rate (US$1=¥)	¥223.21	¥171.67	¥147.70	¥128.30	¥124.46

NA = Not available

Source: Brother Industries, Ltd.
Annual Reports and Forms 10-K
Dataquest (1990)

Burr-Brown

6730 South Tucson Boulevard
Tucson, Arizona 85734
Telephone: (602) 746-1111
Fax: (602) 889-1510
Dun's Number: 00-839-4454

Date Founded: 1956

CORPORATE STRATEGIC DIRECTION

Burr-Brown is recognized as a world leader in precision microelectronics. The Company produces more than 800 types of products, ranging from precision linear integrated circuits to data collection systems and personal computer instrumentation. The Company's IC components are used in analog and digital signal processing (DSP) applications found in medical instrumentation, factory automation, automatic test equipment, process control, defense systems, and consumer products. The Company's system products are used primarily in data collection and communications applications for enterprise automation.

Burr-Brown's total revenue decreased 4 percent to $169.5 million* in fiscal 1989 from $176.7 million in fiscal 1988. Net income decreased 25 percent to $8.7 million in fiscal 1989 from $11.5 million in fiscal 1988. The Company believes that decreases in revenue and net income can be attributed to the general industry slowdown worldwide. Burr-Brown employs 1,500 people worldwide.

Research and development expenditures totaled $18 million in fiscal 1989, representing 11 percent of revenue. Product development is facilitated by combined in-house and third-party development of software products designed to run on existing Burr-Brown or customer hardware platforms.

The overseas sales contribution to total revenue grew to $115 million in fiscal 1989. Overseas revenue accounted for 68 percent of total sales in fiscal 1989 and approximately 69 percent in fiscal 1988.

*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

Microelectronic Component Products

Burr-Brown designs and manufactures microelectronic circuits that perform signal conditioning and data conversion functions. The Company's signal conditioning components are used to strengthen, filter, transmit, and otherwise process the desired signal. These components include analog-to-digital (A/D) and digital-to-analog (D/A).

The market requirements for linear products range from high-performance industrial applications to low-performance consumer product applications. Burr-Brown's product strategy has been to identify specific markets in which new or enhanced high-performance linear components are required and to supply those components. This strategy generally has enabled the Company to avoid direct competition with the major semiconductor manufacturers. The Company's industrial components usually are designed into a customer's product and most often remain a part of that product throughout its life. The Company's experience has shown that it usually takes about five years before the sales level of its components fully matures. However, the sales life of the components may extend to 10 years or more. Once a Burr-Brown

component has been designed into a customer's product, the component's relatively low-volume, high-performance characteristics significantly deter competitors. As a result, the Company is often that customer's sole source for a particular component.

Burr-Brown manufactures and markets signal conditioning and data conversion components for commercial and military applications. Certain military application components must be manufactured and tested to stringent military specifications, and the Company has adapted and certified certain parts of its manufacturing facilities to military specifications to meet these requirements.

According to Dataquest estimates, Burr-Brown possessed less than 1 percent of the worldwide market share for analog integrated circuits.

Signal Conditioning Components

Burr-Brown's signal conditioning components include operational, power, instrumentation, programmable gains, and isolation amplifiers; current transmitters; and other analog signal processing components. These components are used to construct complete data acquisition systems, automatic test equipment, analytical instruments, medical instruments and systems, military equipment, and industrial control applications.

The Company manufactures a variety of other analog signal processing components, including mathematical function circuits, current transmitters and voltage-to-frequency converters.

Data Conversion Components

Most of Burr-Brown's data conversion components revenue derives from moderate-speed, high-resolution, high-accuracy converters. These general-purpose converters are used primarily in manufacturing process and electronic test instrumentation and automatic test and health care systems.

In the early 1980s, Burr-Brown began developing high-speed, high-resolution A/D and D/A converters (ADCs and DACs) that operate at least 10 times faster than general-purpose products. The conversion time is 100ns, or 15 times faster than any previous A/D converter developed by Burr-Brown. These converters are used in a variety of applications, such as image processing, digital oscilloscopes, ultrasound, radar and sonar, and the front end of advanced DSP designs.

In 1982, the Company introduced its first single-chip, nonindustrial DAC. Designed for the consumer high-fidelity stereo market, the DAC plays an essential role in compact disc (CD) stereo systems by converting the digital signals for each stereo channel into audio. Burr-Brown believes that it was the first in the industry to develop a complete single-chip, 16-bit DAC for this application; the Company believes that it is the largest supplier of such devices.

Several generations of products of this type have been developed and introduced to the CD system market since 1982. Most recently, similar Burr-Brown products have been designed into digital audiotape (DAT) products. DAT systems have been recently introduced into the Japanese market.

The Company believes that the technology it developed for the Pulse Code Modulator (PCM)-DAC enables it to develop products for other markets. For example, serving the CD market expedited its development of complete 16-bit DAC integrated circuits for the military and industrial markets. The Company believes that it holds a leadership position in the 16-bit converter product category for these markets based on its involvement in the CD market, which facilitated its early entry into the DAT market.

Military Application Components

These products consist of both signal conditioning and data conversion components that are manufactured and tested to stringent military specifications.

Factory Data Collection (FDC) and Component Terminals (CTMs)

Burr-Brown has introduced a number of products designed to permit factory data to be entered into computer-integrated manufacturing (CIM) systems automatically and error free. Voice input systems, radio frequency (RF) wireless linking, and noncontact tags are being used to increase the power and flexibility of FDC systems being developed and installed. In order to accelerate this development, Burr-Brown has entered into a number of agreements and strategic

alliances with other companies having expertise in FDC hardware or software. Continued development of new microterminal devices and software products has increased the flexibility of data collection and man-machine interfaces.

Digital Signal Processing Applications

Burr-Brown is developing a number of software and hardware products designed to allow user flexibility and configurability in implementing DSP solutions. The heart of the DSP product line is the DSP workstation, coupled to self-configuring DSP function blocks that perform filtering and transformation algorithms. DSP products offer a natural, vertical integration of many existing Burr-Brown component products, particularly ADCs and DACs.

The Company has developed relationships with several DSP suppliers to match its data conversion expertise with strategic partners' digital hardware expertise and form advanced, cost-effective design and system integration solutions.

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	$94,503.0	$112,788.0	$140,484.0	$176,673.0	$169,470.0
Percent Change	-	19.35	24.56	25.76	(4.08)
Capital Expenditure	$10,142.0	$13,044.0	$11,229.0	$21,291.0	$28,019.0
Percent of Revenue	10.73	11.57	7.99	12.05	16.53
R&D Expenditure	$8,308.0	$10,052.0	$12,303.0	$14,656.0	$17,988.0
Percent of Revenue	8.79	8.91	8.76	8.30	10.61
Number of Employees	1,250	1,375	1,500	1,500	1,500
Revenue ($K)/Employee	$75.60	$82.03	$93.66	$117.78	$112.98
Net Income	$4,768.0	$3,736.0	$4,286.0	$11,549.0	$8,710.0
Percent Change	-	(21.64)	14.72	169.46	(24.58)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$43,951.00	$44,078.00	$41,697.00	$39,744.00
Quarterly Profit	$3,037.00	$2,054.00	$2,048.00	$1,571.00

Source: Burr-Brown
Annual Reports and Forms 10-K
Dataquest
1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	40.00	35.00	34.00	31.00	32.00
International	60.00	65.00	66.00	69.00	68.00
Europe	0.32	0.28	0.27	0.27	0.31
Asia/Pacific	0.24	0.33	0.36	0.38	0.32
ROW	0.04	0.04	0.03	0.04	0.05

Source: Burr-Brown
Annual Reports and Forms 10-K
Dataquest
1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	75.00	75.00
Indirect Sales	25.00	25.00
VARs	-	-
Distributors	-	-
Dealers	-	-
Mass Merchandisers	-	-
Manufacturers' Representatives	25.00	25.00

Source: Dataquest
1990

1989 SALES OFFICES

North America—16
Japan—1
Europe—9

MANUFACTURING LOCATIONS

Tucson, Arizona

Atsugi, Japan

Livingston, Scotland
Production activities include the production of more than 800 products, ranging from precision linear integrated circuits to data collection systems and personal computer instrumentation.

SUBSIDIARIES

North America

Burr-Brown International Holding Corporation (United States)

Japan

Burr-Brown Japan Ltd.

Europe

Burr-Brown AB (Sweden)
Burr-Brown AG (Switzerland)
Burr-Brown International BV (Netherlands)
Burr-Brown International GmbH (Austria)
Burr-Brown International Ltd. (United Kingdom)
Burr-Brown International N.V. (Belgium)
Burr-Brown International S.A. (France)
Burr-Brown International S.R.L. (Italy)
Burr-Brown Ltd. (United Kingdom)
Burr-Brown Research GmbH (West Germany)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1988

PROMIS Systems Corporation
The companies entered a cooperative marketing agreement.

1987

Digital Equipment Corporation
The companies entered an OEM agreement.

KEY OFFICERS

James J. Burns
President and chief executive officer

Thomas R. Brown, Jr.
Chairman of the board

Thomas W. Fern
Senior vice president, Market Development

Edward C. Hagen
Vice president, Environmental Control

Bill L. Leavelle
Vice president, Strategic Direction

Frank M. Myers
Vice president, Corporate Marketing and International Operations

PRINCIPAL INVESTORS

Thomas R. Brown, Jr.
Burr-Brown Corporation Stock Bonus Plan and Trust
Wellington Management Company

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

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$57,875.0	$66,001.0	$73,329.0	$77,530.0	$89,043.0
Cash	1,284.0	1,830.0	2,521.0	2,617.0	2,352.0
Receivables	17,487.0	21,099.0	33,774.0	32,728.0	32,980.0
Marketable Securities	-	-	-	-	-
Inventory	37,404.0	38,206.0	31,946.0	35,922.0	46,488.0
Other Current Assets	1,700.0	4,866.0	5,088.0	6,263.0	7,223.0
Net Property, Plants	$40,842.0	$43,945.0	$45,610.0	$51,788.0	$67,894.0
Other Assets	$2,674.0	$3,825.0	$2,877.0	$3,299.0	$3,927.0
Total Assets	$101,391.0	$113,771.0	$121,816.0	$132,617.0	$160,864.0
Total Current Liabilities	$18,889.0	$24,838.0	$33,920.0	$38,405.0	$45,973.0
Long-Term Debt	$27,238.0	$28,085.0	$19,681.0	$13,021.0	$24,380.0
Other Liabilities	$2,050.0	$2,558.0	$2,693.0	$4,777.0	$6,105.0
Total Liabilities	$48,177.0	$55,481.0	$56,294.0	$56,203.0	$76,458.0
Total Shareholders' Equity	$53,214.0	$58,290.0	$65,522.0	$76,414.0	$84,406.0
Converted Preferred Stock	-	-	-	-	-
Common Stock	75.0	95.0	95.0	95.0	96.0
Other Equity	24,285.0	25,605.0	28,551.0	27,894.0	27,175.0
Retained Earnings	28,854.0	32,590.0	36,876.0	48,425.0	57,135.0
Total Liabilities and Shareholders' Equity	$101,391.0	$113,771.0	$121,816.0	$132,617.0	$160,864.0

Income Statement	1985	1986	1987	1988	1989
Revenue	$94,503.0	$112,788.0	$140,484.0	$176,673.0	$169,470.0
U.S. Revenue	37,505.0	40,031.0	47,084.0	54,529.0	54,116.0
Non-U.S. Revenue	56,998.0	72,757.0	93,400.0	122,144.0	115,354.0
Cost of Sales	$45,395.0	$57,338.0	$74,345.0	$83,838.0	$76,567.0
R&D Expense	$8,308.0	$10,052.0	$12,303.0	$14,656.0	$17,988.0
SG&A Expense	$28,801.0	$35,720.0	$43,630.0	$56,005.0	$55,328.0
Capital Expense	$10,142.0	$12,009.0	$11,229.0	$21,291.0	$28,019.0
Pretax Income	$7,484.0	$6,820.0	$7,123.0	$20,311.0	$15,410.0
Pretax Margin (%)	7.92	6.05	5.07	11.50	9.09
Effective Tax Rate (%)	36.50	45.20	40.00	43.10	43.50
Net Income	$4,768.0	$3,736.0	$4,286.0	$11,549.0	$8,710.0
Shares Outstanding, Thousands	4,598.9	9,457.3	9,496.4	9,549.0	9,568.8
Per Share Data					
Earnings	$0.58	$0.39	$0.44	$1.19	$0.90
Dividends	-	-	-	-	-
Book Value	$11.57	$6.16	$6.90	$8.00	$8.82

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

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	3.06	2.66	2.16	2.02	1.94
Quick (Times)	1.08	1.12	1.22	1.08	0.93
Fixed Assets/Equity (%)	76.75	75.39	69.61	67.77	80.44
Current Liabilities/Equity (%)	35.50	42.61	51.77	50.26	54.47
Total Liabilities/Equity (%)	90.53	95.18	85.92	73.55	90.58
Profitability (%)					
Return on Assets	-	3.47	3.64	9.08	5.94
Return on Equity	-	6.70	6.92	16.27	10.83
Profit Margin	5.05	3.31	3.05	6.54	5.14
Other Key Ratios					
R&D Spending % of Revenue	8.79	8.91	8.76	8.30	10.61
Capital Spending % of Revenue	10.73	10.65	7.99	12.05	16.53
Employees	1,250	1,375	1,500	1,508	1,445
Revenue ($K)/Employee	$75.60	$82.03	$93.66	$117.16	$117.28
Capital Spending % of Assets	10.00	10.56	9.22	16.05	17.42

Source: Burr-Brown
Annual Reports and Forms 10-K
Dataquest
1990

Burr-Brown Corporation

Table 1

Estimated Worldwide Semiconductor Revenue by Calendar Year (Millions of Dollars)

	1984	1985	1986	1987	1988
Total Semiconductor	71	78	113	120	144
Total Integrated Circuit	71	78	113	120	144
Bipolar Digital (Function)					
Bipolar Digital Memory					
Bipolar Digital Logic					
MOS (Function)					
MOS Memory					
MOS Microdevices					
MOS Logic					
Analog	71	78	113	120	144
Total Discrete					
Total Optoelectronic					

Table 2

Burr-Brown Worldwide Ranking by Semiconductor Markets (Sales in Millions of Dollars)

	1988 Rank	1987 Rank	1988 Revenue	Sales % Change 1987-1988	Industry % Change 1987-1988
Total Semiconductor	44	39	$144	20.0%	33.0%
Total Integrated Circuit	38	32	$144	20.0%	37.4%
Analog	19	19	$144	20.0%	16.0%

Source: Dataquest
December 1989

Burr-Brown Corporation

Table 3

Burr-Brown Corporation
Estimated 1988 Semiconductor Revenue by Geographic Region
(Millions of Dollars)

	U.S.	Japan	Europe	ROW
Total Semiconductor	$40	$53	$43	$8
Total Integrated Circuit	$40	$53	$43	$8
Bipolar Digital (Function)				
Bipolar Digital Memory				
Bipolar Digital Logic				
MOS (Function)				
MOS Memory				
MOS Microdevices				
MOS Logic				
Analog	40	53	43	8
Total Discrete				
Total Optoelectronic				

Source: Dataquest
December 1989

C. Itoh & Co., Ltd.

4-68 Kita-Kyutaromachi 4-Chome
Higashi-ku, Osaka 541, Japan
Telephone: 06-241-2121
Fax: 06-241-3167
Dun's Number: 69-053-5638

Date Founded: 1858

CORPORATE STRATEGIC DIRECTION

C. Itoh & Co., Ltd., is one of the leading *sogo-shosha*, or general trading companies, in Japan. The Japanese definition of a *sogo-shosha* is a trading company posting an annual business turnover exceeding ¥3 trillion. C. Itoh handles consumer, industrial, and commodity goods. Its activities are quite diverse; it not only trades more than 20,000 different items on a commission basis, but also engages in the following activities:

- Investing in domestic and international markets to promote new businesses
- Extending financial assistance in the form of business credits
- Making loans and payment guarantees to its subsidiaries and customers to expand their businesses
- Acting as coordinator for exporting plants, and setting up international subsidiaries and joint ventures
- Significantly increasing its involvement in offshore transactions, using its global information and marketing networks
- Acting as primary national or regional distributor for manufacturers or international suppliers under distributorship agreements

In 1989, C. Itoh began a major restructuring. The *sogo-shosha* have traditionally been exclusively trading companies, but as more of C. Itoh's customers develop the marketing and distribution capabilities that they used to buy from C. Itoh, they become increasingly self-sufficient and no longer require the trading company's services. As a result, the Company has begun to concentrate more on producing its own products and services rather than performing the functions of a middleman. The result of this new strategy is an attempt to enter the telecommunications industry through several joint ventures. C. Itoh's entrance into this market is discussed in the "Business Segment Strategic Direction" section.

Machinery and construction sales accounted for the largest segment of C. Itoh's 1989 sales, with 31 percent of the total. Metal and ore replaced energy and chemicals as the second largest segment, accounting for 24 percent of revenue. Energy and chemicals represented 16 percent, while textiles contributed 12 percent. Food and agricultural products accounted for 12 percent of the balance, with forest products and general merchandise bringing in the remaining 5 percent.

This document focuses on C. Itoh's information systems operations, the segment of the Company's business that Dataquest tracks. In 1989, revenue from these operations, which are part of the machinery and construction products sector, increased 16.6 percent, adding to the 15.0 percent increase for this segment in 1988. (Percentage changes refer only to ¥ amounts; US$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) This revenue represented 1.1 percent of C. Itoh's total revenue in fiscal 1989. This percentage is expected to increase as C. Itoh continues to increase its activity in information systems.

Total trading transactions in 1990 increased 22.1 percent to ¥19.50 trillion (US$150 billion) as a result of increased domestic demand for textiles, machinery, and food and agricultural products. Net income for fiscal 1990 also showed a significant increase, up 15 percent to ¥35 billion (US$269 million), also reflecting the strong domestic performance of C. Itoh and its subsidiaries. C. Itoh has more than 10,000 employees worldwide in 187 principal offices located in 85 countries.

C. Itoh sells computers that are manufactured by Stratus Computer and workstations that are manufactured by Sun Microsystems. C. Itoh has contracts with multiple well-established manufacturing companies to manufacture the same line of products. By contracting with more than one or two vendors,

C. Itoh is not dependent on one technology. Instead, the Company can choose the technology in which it wants to be involved.

C. Itoh lowers overhead and clean room floor space costs by not manufacturing the products itself. This form of operation grants the Company maximum inventory turnover, which in turn lowers warehousing costs. C. Itoh also contracts out the responsibility of covering warranty contracts. These contracts may be covered by C. Itoh, the original manufacturer, or a third-party dealer. By contracting out product manufacturing, C. Itoh reduced the major R&D cost found at most manufacturing facilities. Once a product is manufactured, C. Itoh modifies it and then markets it via dealers and distributors in each geographical location that it targets.

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

Information Systems

Dataquest tracks only C. Itoh's business in high-technology areas such as telecommunication and computer equipment. As a result, this profile focuses on those areas. In 1989, C. Itoh's information systems revenue totaled ¥175.6 billion (US$1.37 billion). Of this revenue, ¥81.04 billion (US$631.9 million) was generated through the sale of computer peripherals, ¥61.47 billion (US$479.3 million) through sales of workstations, ¥12.29 billion (US$95.8 million) from software sales, and the remaining ¥21.1 billion (US$164.5 million) from data communication and services.

C. Itoh Electronics

C. Itoh Electronics, which was established in 1973, is a supplier of printers, terminals, and storage peripherals. In 1990, C. Itoh Electronics announced a reorganization that included the launching of three new companies that will autonomously market and distribute their product lines to US markets. They will absorb all marketing, sales, distribution, and support activities of C. Itoh Electronics, Inc. The three companies are C-Tech Electronics, CIE America, Inc., and Image Systems, Inc.

C-Tech Electronics specializes in personal computer and office printers. Its Pro Writer 310/315, C610, and C715 dot matrix printers will be distributed through master distributors and value-added resellers (VARs). Original equipment manufacturer (OEM) products include the T6 laser and 9500/9515 dot matrix printers, which are manufactured by Tokyo Electric Company (TEC).

CIE America is itself divided into three groups: the Business Printer Group, the Sales and Licensing Group, and the Export Group. The Business Printer Group concentrates on heavy-duty business printers manufactured by Citizen Watch Co., including the CI-400/800/1000 dot matrix line printers, and the 24-wire 815, 9-wire CI-2500 and 9/18-wire CI4000/5000 dot matrix printers. The Sales and Licensing Group is responsible for the Company's disk drives, printer mechanisms, and 15-ppm laser printer. The group also arranges licensing rights for C. Itoh's terminal products. The Export Group manages the export of US-made, designed, and manufactured high-technology products.

Image Systems markets its high-volume MegaPro, MegaServe, and MegaLine ion deposition printers to both OEMs and distributors. The ion deposition printers are manufactured by Olympus Optical Co.

In 1989, C. Itoh captured less than 1 percent of the North American Display Terminal market on its shipments of approximately 24,600 units. C. Itoh concentrates in Dataquest's display terminal Segment 4, which comprises ASCII and ANSI display terminals.

Satellite Communication and International Telecommunication

In order to establish a position in the information and communications fields, two C. Itoh Group companies, Japan Communications Satellite Company, Inc. (JCSAT), and International Digital Communications Inc. (IDC) began offering communications services in April and May 1989, respectively. JCSAT, formed in 1985 as a joint venture between C. Itoh, Mitsui & Co., and Hughes Communications, launched Japan's first commercial communications satellite in March 1989.

C. Itoh established three additional joint ventures in the communications industry: Japan Satellite Communications Network Corp. (JSNET), Japan Satellite

Video, Inc. (VIDEOSAT), and Japan Video Cipher Corporation (JVCC). JSNET offers a whole package on the VSAT network, including data services and video and audio transmissions on a nationwide basis. VIDEOSAT provides full-motion video transmission services for internal and external corporate uses. JVCC provides video scrambling services for satellite users in Japan.

C. Itoh joined with Cable and Wireless Plc of the United Kingdom and Toyota Motor Corporation to form International Digital Communications (IDC), an international telecommunications carrier. IDC plans to operate Intelsat satellite earth stations as well as the North Pacific Cable (NPC), the trans-Pacific fiber-optic submarine cable system that will directly link the United States and Japan. The NPC is expected to become operational in December 1990.

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	$58,041.3	$71,859.3	$92,542.6	$112,583.0	$124,477.5
Percent Change	-	23.81	28.78	21.66	10.57
Capital Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
R&D Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
Number of Employees	NA	NA	NA	NA	NA
Revenue (US$K)/Employee	NA	NA	NA	NA	NA
Net Income	$51.9	$83.5	$125.8	$183.9	$237.4
Percent Change	-	60.89	50.66	46.18	29.09
Exchange Rate (US$1=¥)	¥250.6	¥221.26	¥159.52	¥138.03	¥128.25

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	NA	NA	NA	NA
Quarterly Profit	NA	NA	NA	NA

N/A = Not available

Source: C. Itoh & Co., Ltd. Annual Reports Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
Asia/Pacific	83.67	81.06	87.17	87.64	89.30
Japan	83.67	81.06	87.17	87.64	89.30
International	16.33	18.94	12.83	12.06	10.70
North America	7.45	6.45	5.68	6.31	3.34
Others	8.88	12.49	7.15	5.75	7.36

Source: C. Itoh & Co., Ltd. Annual Reports

1989 SALES OFFICE LOCATIONS

North America—29
Europe, Asia/Pacific, and ROW—158
Japan—41

MANUFACTURING LOCATIONS

Information is not available.

SUBSIDIARIES

North America

American Isuzu Motors, Inc. (United States)
C. Itoh & Co. (America), Inc. (United States)
C. Itoh & Co. Cotton, Inc. (United States)
C. Itoh & Co. Digital Products, Inc. (United States)
C. Itoh & Co. Industrial Machinery, Inc. (United States)
C. Itoh & Co., Ltd. (Canada)
C. Itoh Electronics, Inc. (United States)
C. Itoh International Petroleum Co., Ltd. (United States)
C. Itoh Steel, Inc. (United States)
C. I. Seafoods, Inc. (United States)
C. I. Speciality Chemicals, Inc. (United States)
C. I. Tech International, Inc. (United States)
CIGRA, Incorporated (United States)
CIPA Lumber Co., Ltd. (Canada)
Consolidated Footwear Co., Ltd. (Canada)
DX Communications, Inc. (United States)
Master-Halco, Inc. (United States)
Mazda Canada, Inc. (Canada)
Mazda Motors of America (East), Inc. (United States)
NSP, Inc. (United States)
TEXMAC, Inc. (United States)
Textile Impressions, Inc. (United States)

Europe

Asahi Shimbun International, Ltd. (United Kingdom)
C. Itoh & Co., Italiana S.p.A. (Italy)
C. Itoh Deutschland GmbH (Germany)
C. Itoh Electronics Co., Ltd. (United Kingdom)
C. Itoh Electronics GmbH (Germany)
C. Itoh et Cie (Europe) S.A. (Belgium)
C. Itoh Finance (Europe) Plc (United Kingdom)
C. Itoh France S.A. (France)
C. Itoh International Petroleum Co. (United Kingdom)
C. Itoh (UK) Plc (United Kingdom)
Cosmos Insurance Services (U.K.), Ltd. (United Kingdom)
Daihatsu Holland B.V. (Netherlands)
Hellenic Steel Company (Greece)
Kawasaki Motors France S.A. (France)
Kawasaki Motors N.V. (Netherlands)
MCL Group, Ltd. (United Kingdom)
Mazda Austria GmbH (Austria)
Mazda Motors (Deutschland) GmbH (Germany)
Nortons S.p.A. (Italy)

Asia/Pacific

Ayaha Industries Co., Ltd. (Japan)
Beijin International Tennis Center Co., Ltd. (China)
C. Itoh & Co., Ltd. (Australia)
C. Itoh & Co., Ltd. (Hong Kong)
C. Itoh & Co. (Non-ferrous Metals), Ltd. (Japan)
C. Itoh Apparel Co., Ltd. (Japan)
C. Itoh Aviation Co., Ltd. (Japan)
C. Itoh Building Materials Co., Ltd. (Japan)
C. Itoh Ceramics Corporation (Japan)
C. Itoh Construction Machinery Co., Ltd. (Japan)
C. Itoh Data Systems (Japan)
C. Itoh Electronics Corporation (Japan)
C. Itoh Energy Development Co., Ltd. (Japan)
C. Itoh Fashion System Co., Ltd. (Japan)
C. Itoh Feed Mills Co., Ltd. (Japan)
C. Itoh Fine Chemical Co., Ltd. (Japan)
C. Itoh Fuel Co., Ltd. (Japan)
C. Itoh International Petroleum Co. Pte., Ltd. (Singapore)
C. Itoh Iron & Steel Co., Ltd. (Japan)
C. Itoh Metals Co., Ltd. (Japan)
C. Itoh Petroleum Sales Co., Ltd. (Japan)
C. Itoh Plastics System Co., Ltd. (Japan)
C. Itoh Pulp & Paper Sales Co., Ltd. (Japan)
C. Itoh Real Estate Co., Ltd. (Japan)
C. Itoh Sugar Co., Ltd. (Japan)
C. Itoh TEXMAC Co., Ltd. (Japan)
C. Itoh Techno-Science Co., Ltd. (Japan)
C. Itoh Warehousing & Transport Co., Ltd. (Japan)
C.I. Kasei Company Limited (Japan)
Century 21 Real Estate of Japan, Ltd. (Japan)
Century Leasing Systems, Inc. (Japan)
Century Research Center Corporation (Japan)
Cosmos Services Company Limited (Hong Kong)
Daiken Clothing Co., Ltd. (Japan)
Daiken Trade & Industry Co., Ltd. (Japan)
Dunco Limited (Japan)
Fuji Oil Co., Ltd. (Japan)
General Electric (Japan)
Inotech (Japan)

Island Dyeing and Printing Company Limited (Hong Kong)
Japan Communications Satellite Co., Ltd. (Japan)
Japan Machines Pty., Ltd. (Australia)
Matsushita Suzuki Co., Ltd. (Japan)
Meikan Co., Ltd. (Japan)
Mitsui-C. Itoh Iron Pty., Ltd. (Australia)
Naigai Ceramics Co., Ltd. (Japan)
Naigai Travel Service Co., Ltd. (Japan)
Nishino Trading Co., Ltd. (Japan)
P.T. Garishindo Buana Leasing (Indonesia)
P.T. Industria Badja Garuda (Indonesia)
P.T. Skyline Building (Indonesia)
P.T. Steel Pipe Industry of Indonesia (Indonesia)
P.T. Unilon Textile Industrias (Indonesia)
Palmaju Edible Oil Sdn. Bhd. (Malaysia)
Roy-ne Co., Ltd. (Japan)
Sanko Co., Ltd. (Japan)
Sanko Senzai Kogyo Co., Ltd. (Japan)
Siam Synthetic Textile Industry, Ltd. (Thailand)
Taiwan Knitting Co., Ltd. (Taiwan)
Takiron Co., Ltd. (Japan)
Thai Teijin Textiles, Ltd. (Thailand)
Union Garments Co., Ltd. (Taiwan)
Yayoi Food Products Co., Ltd. (Japan)

ROW

Abu Dhabi National Plastic Pipe Fabrication Company (U.A.E.)
C. Itoh do Brasil S.A. (Brazil)
C. Itoh Middle East E.C. (Bahrain)
Comercios Unidos S.A. (El Salvador)
Fantex S.A. Industria e Comercio Textil (Brazil)
Galvanizing Industries, Ltd. (Nigeria)
Industrias Unidas S.A. (El Salvador)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Nippon Steel Corp. and Qualcom, Inc.
By 1991, C. Itoh, Nippon Steel, and Qualcom intend to begin a mobile communications service that uses a communications satellite. The companies plan to introduce the Omni Tracs system developed by Qualcom, which links communications satellite transponders with the hub ground stations of satellite communications companies, enabling two-way data communication with moving vehicles over a wide area.

Ascii and Mitsui & Co.
C. Itoh, Ascii, and Mitsui & Co. have jointly set up a satellite communications service. Ascii is a computer software company that has expanded its operations since being listed on Japan's OTC stock market in 1989.

Balfour Beatty System Engineering Pte. Ltd. (BBSE)
BBSE of Australia has formed an alliance with C. Itoh & Co. (Australia) to increase efforts to market BBSE's computer-integrated manufacturing (CIM) support software, the Greenway Protocol Conversion System. The software, which is UNIX compatible, is designed to simplify connection of fab equipment produced by different manufacturers by means of protocol conversion.

1989

Dynic, Inc.
C. Itoh and Dynic plan to invest £500,000 (US$819,672) in a joint manufacturing venture to produce printer ribbons in Cardiff, Wales.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Tokihiko Kito
Chairman

Isao Yonekura
President and chief executive officer

Teruo Hotta
Executive vice president

Yoshihide Nakayama
Executive vice president

Shunsaku Aoki
Executive vice president

Takaharu Matsui
Executive vice president

PRINCIPAL INVESTORS

Dai-Ichi Kangyo Bank—4.7 percent
Sumitomo Bank—4.4 percent
Tokyo Marine & Fire Insurance—4.1 percent
Nippon Life Insurance—3.5 percent
Asahi Mutual Life Insurance—3.2 percent

FOUNDER

Chubei Itoh

Table 3
Comprehensive Financial Statement
Fiscal Year Ending March 31
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$15,871.2	$15,798.0	$19,170.0	$23,067.3	$29,234.5
Cash	427.6	770.3	1,115.4	586.9	1,618.5
Receivables	9,790.1	7,496.5	9,663.0	11,201.1	12,808.1
Marketable Securities	1,455.2	1,631.3	1,182.6	1,298.7	1,528.1
Inventory	1,340.7	1,263.5	1,830.9	2,329.3	3,139.4
Other Current Assets	4,312.8	4,636.4	5,378.1	7,651.3	10,140.4
Net Property, Plants	$572.6	$626.3	$890.7	$1,181.6	$1,599.0
Net Investments and Noncurrent Receivables	$3,567.0	$5,055.6	$7,605.3	$10,320.2	$14,518.0
Other Assets	$165.1	$194.1	$234.1	$419.9	$479.3
Total Assets	$20,175.9	$21,674.1	$27,900.0	$34,989.3	$45,831.1
Total Current Liabilities	$16,126.7	$16,515.2	$20,056.2	$22,665.3	$27,829.0
Long-Term Debt	$3,503.9	$4,495.9	$6,517.2	$10,580.7	$14,533.8
Other Liabilities	$134.0	$77.0	$100.5	$108.1	$145.1
Total Liabilities	$19,764.6	$21,088.1	$26,673.9	$33,354.1	$42,508.2
Total Shareholders' Equity	$411.3	$586.0	$1,226.1	$1,635.2	$3,322.9
Common Stock	172.3	249.0	517.0	612.5	1,277.4
Other Equity	185.5	220.5	454.2	601.8	142.7
Retained Earnings	53.4	116.5	254.8	420.9	619.0
Total Liabilities and Shareholders' Equity	$20,175.9	$21,674.1	$27,900.0	$34,989.3	$45,831.1
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$58,041.3	$71,859.3	$92,542.6	$112,583.7	$124,477.5
Japanese Revenue	48,580.6	58,277.9	80,697.1	99,006.1	111,158.4
Non-Japanese Revenue	9,460.7	13,581.4	11,845.5	13,577.6	13,319.1
SG&A Expense	$960.8	$1,046.8	$1,398.8	$1,629.6	$1,915.1
Pretax Income	$108.6	$114.6	$138.8	$260.4	$485.1
Pretax Margin (%)	0.19	0.16	0.15	0.23	0.39
Effective Tax Rate (%)					
Domestic	58.0	58.0	58.0	56.0	56.0
Foreign Average	46.0	50.0	45.0	43.0	38.0
Net Income	$51.9	$83.5	$125.8	$183.9	$237.4
Shares Outstanding, Millions	863.5	1,026.2	1,135.8	1,145.4	1,327.0
Per Share Data					
Earnings	$0.09	$0.10	$0.12	$0.12	$0.13
Dividend	$0.29	$0.24	$0.31	$0.32	$0.35
Book Value	$0.48	$0.57	$1.08	$1.43	$2.50
Exchange Rate (US$1=¥)	¥250.60	¥221.26	¥159.52	¥138.03	¥128.25

Source: C. Itoh & Co., Ltd. Annual Reports
Dataquest (1990)

Table 4
Comprehensive Financial Statement
Fiscal Year Ending March 31
(Billions of Yen, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	¥3,977.3	¥3,495.5	¥3,058.0	¥3,184.0	¥3,749.3
Cash	107.2	170.4	178.0	81.0	207.6
Receivables	2,453.4	1,658.7	1,541.4	1,546.1	1,642.6
Marketable Securities	364.7	360.9	188.6	179.3	196.1
Inventory	336.0	279.6	292.1	321.5	402.6
Other Current Assets	1,080.8	1,025.9	857.9	1,056.1	1,300.5
Net Property, Plants	¥143.5	¥138.6	¥142.1	¥163.1	¥205.1
Net Investments and Noncurrent Receivables	¥893.9	¥1,118.6	¥1,213.2	¥1,424.5	¥1,862.0
Other Assets	¥173.4	¥254.9	¥258.5	¥445.2	¥445.2
Total Assets	¥5,056.1	¥4,795.6	¥4,450.6	¥4,829.6	¥5,877.9
Total Current Liabilities	¥4,041.3	¥3,654.2	¥3,199.4	¥3,128.5	¥3,569.1
Long-Term Debt	¥878.1	¥995.0	¥1,039.6	¥1,460.5	¥1,864.0
Other Liabilities	¥33.6	¥16.8	¥16.0	¥14.9	¥18.6
Total Liabilities	¥4,953.0	¥4,665.9	¥4,255.0	¥4,603.9	¥5,451.7
Total Shareholders' Equity	¥103.1	¥129.7	¥195.6	¥225.7	¥426.2
Common Stock	43.1	55.1	82.5	84.5	163.8
Other Equity	46.6	48.8	72.5	83.1	183.0
Retained Earnings	13.4	25.8	40.6	58.1	79.4
Total Liabilities and Shareholders' Equity	¥5,056.1	¥4,795.6	¥4,450.6	¥4,829.6	¥5,877.9
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	¥14,545.1	¥15,889.6	¥14,762.4	¥15,539.9	¥15,964.2
Japanese Revenue	12,174.2	12,888.3	12,868.9	13,665.5	14,256.6
Non-Japanese Revenue	2,370.9	3,011.3	1,893.5	1,874.4	1,707.6
SG&A Expense	¥240.8	¥231.6	¥223.1	¥224.9	¥245.6
Pretax Income	¥27.2	¥25.4	¥22.1	¥35.9	¥62.2
Pretax Margin (%)	0.19	0.16	0.15	0.23	0.39
Effective Tax Rate (%)					
Domestic	58.0	58.0	58.0	56.0	56.0
Foreign Average	46.0	50.0	45.0	43.0	43.0
Net Income	¥13.0	¥18.5	¥20.1	¥25.4	¥30.4
Shares Outstanding, Millions	863.5	1,026.2	1,135.8	1,145.4	1,327.0
Per Share Data					
Earnings	¥21.50	¥21.90	¥18.80	¥16.9	¥17.2
Dividend	¥73.90	¥52.23	¥49.10	¥44.30	¥44.90
Book Value	¥119.40	¥126.39	¥172.21	¥197.05	¥321.18

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending March 31
(Billions of Yen, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	0.98	0.96	0.96	1.02	1.05
Quick (Times)	0.90	0.88	0.86	0.91	0.94
Fixed Assets/Equity (%)	139.19	106.86	72.64	72.26	48.12
Current Liabilities/Equity (%)	3,919.79	2,817.42	1,635.69	1,386.13	837.42
Total Liabilities/Equity (%)	4,804.07	3,597.46	2,175.36	2,039.83	1,279.14
Profitability (%)					
Return on Assets	-	0.40	0.51	0.58	0.59
Return on Equity	5.56	15.89	12.36	12.06	9.33
Profit Margin	0.09	0.12	0.14	0.16	0.19
Exchange Rate (US$1=¥)	¥250.60	¥221.26	¥159.52	¥138.03	¥128.25

Source: C. Itoh & Co., Ltd. Annual Reports
Dataquest (1990)

C. Itoh & Co., Ltd.

4-68 Kita-Kyutaromachi 4-Chome
Higashi-ku, Osaka 541, Japan
Telephone: 06-241-2121
Fax: 06-241-3167
Dun's Number: 69-053-5638

Date Founded: 1949

CORPORATE STRATEGIC DIRECTION

C. Itoh & Co., Ltd., is one of the leading sogo-shosha, or general trading companies, in Japan. The Japanese definition of a sogo-shosha is a trading company posting an annual business turnover exceeding ¥3 trillion. C. Itoh handles consumer, industrial, and commodity goods. Its activities are quite diverse; it not only trades more than 20,000 different items on a commission basis, but also engages in the following activities:

- Investing in domestic and overseas markets to promote new businesses
- Extending financial assistance in the form of business credits
- Making loans and payment guarantees to its subsidiaries and customers to expand their businesses
- Acting as coordinator for exporting plants, and setting up subsidiaries and joint ventures overseas
- Significantly increasing its involvement in offshore transactions, using its global information and marketing networks
- Acting as primary national or regional distributor for manufacturers or overseas suppliers under distributorship agreements

C. Itoh's business is to buy and sell products and services. Its most important business sector in 1988 was machinery and construction, which accounted for 29.5 percent of its revenue. Energy and chemicals was next most important, accounting for 22.2 percent of revenue, followed by metal and ore products, which contributed 18.4 percent. Textiles came next, accounting for 13.1 percent of revenue, followed very closely by food and agricultural products with 11.3 percent. Forest products and general merchandise accounted for 5.5 percent.

In 1988, the information systems operations, part of the machinery and construction products sector, increased an estimated 15 percent, or approximately $829.1 million.* Because the Company is so diversified and electronics is a new field, despite the increase, less than 1 percent of C. Itoh's total revenue comes from selling information systems products. In the future, this percentage should increase as C. Itoh becomes more active in this area.

C. Itoh's total revenue increased 17 percent to $119.4 billion in fiscal 1988 from $102.2 billion in fiscal 1987. Its net income increased 40 percent to $195.0 million from $139.0 million during the same period.

The Japanese sales contribution to the total revenue grew to $66.4 billion in fiscal 1988. Japanese sales accounted for 56 percent of total sales, up slightly from 55 percent in fiscal 1987.

C. Itoh's unique strategy is to take the best advantage of its buying power. Rather than manufacturing its own electronic products, it instead acts as an OEM. C. Itoh's computers are manufactured by Stratus Computer; its workstations, by Sun Microsystems. C. Itoh has contracts with multiple well-established manufacturing companies to manufacture the same line of products.

By contracting with more than one or two vendors, C. Itoh is not dependent on one technology; instead, it can choose the technology in which it wants to be involved. The Company also lowers overhead and clean room floor space costs by not manufacturing the products itself. This form of operation grants the Company maximum inventory turnover, which in turn lowers warehousing costs. C. Itoh also contracts out the responsibility of covering warranty contracts. These contracts may be covered

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

by C. Itoh, the original manufacturer, or a third-party dealer. By contracting out product manufacturing, C. Itoh reduced the major R&D cost found at most manufacturing facilities. Once a product is manufactured, C. Itoh modifies it and then markets it via dealers and distributors in each geographical location that it targets.

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 DIRECTIONS

Peripherals

In 1988, C. Itoh netted $829.2 million from supplying serial dot and line computer printers, laser printers, digital-compatible terminals, floppy and hard disk drives, and ion deposition printers for the Apple, Digital Equipment, IBM, and PC markets. This revenue was because of the Company's aforementioned strategy, not because it has a large market share in its target geographical markets: the United States, Europe, Canada, and Japan.

Printers

The Company's revenue growth in the printer industry service is slower than the industry's projected overall growth. This is mainly because such a small portion of C. Itoh's revenue is earned through information systems. However, the Company's projected growth rate in the printer market looks better than the industry's overall projected growth rate. The reason for this is that, although C. Itoh is a significant yet small player in the printer market, the products it offers are reliable and the Company has a good reputation. In the 1988 serial printer market, C. Itoh ranked in the lower twentieth percent, whereas in the line printer market, it ranked in the lower twenty-fifth percent, according to Dataquest estimates.

Display Terminals

C. Itoh captured less than 1 percent of the display terminal worldwide market share in 1988, according to Dataquest estimates, although it has a reliable product on the market. In 1988, C. Itoh consolidated two of its U.S. affiliate operations—Cie Terminals and C. Itoh Digital Products—under the C. Itoh Electronics name in order to start optimizing the performance of subsidiaries located in the same region.

C. Itoh tried to sell a U.S. subsidiary, Cie Systems, which manufactures small business computers and software packages, to Bonneco in 1987. This was because of the decline in terminal sales, one of Cie Systems' main products. In March 1988, the sale was called off, but a new deal was supposedly in process. In 1986, C. Itoh had 6.9 percent of the U.S. market, but its market share dropped to 4.0 percent in 1987 and 3.7 percent in 1988. This market has gone very flat except in graphics video display monitors, where C. Itoh is not a significant player.

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)

	1984	1985	1986	1987	1988
Five-Year Revenue	$25,969.9	$60,975.7	$94,365.2	$102,211.4	$119,372.6
Percent Change	-	134.79	54.76	8.31	16.79
Number of Employees	N/A	N/A	N/A	N/A	N/A
Revenue ($K)/Employee	N/A	N/A	N/A	N/A	N/A
Net Income	$19.5	$54.5	$119.1	$139.0	$195.0
Percent Change	-	179.89	118.56	16.66	40.30

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	N/A	N/A	N/A	N/A
Quarterly Profit	N/A	N/A	N/A	N/A

N/A = Not Available

Source: C. Itoh & Co., Ltd. Annual Reports
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1984	1985	1986	1987	1988
Japan	45.80	44.00	44.50	55.30	55.60
International	54.20	56.00	55.50	44.70	44.40

Source: C. Itoh & Co., Ltd. Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988
Direct Sales	N/A
Indirect Sales	N/A

N/A = Not Available

Source: Dataquest January 1990

1988 SALES OFFICE LOCATIONS

Japan—41
North America—29
Europe, Asia/Pacific, and ROW—117

SUBSIDIARIES

Japan

Ayaha Industries Co., Ltd.
C. Itoh & Co. (Non-ferrous Metals), Ltd.
C. Itoh Apparel Co., Ltd.
C. Itoh Aviation Co., Ltd.
C. Itoh Building Materials Co., Ltd.
C. Itoh Ceramics Corporation
C. Itoh Construction Machinery Co., Ltd.
C. Itoh Data Systems
C. Itoh Electronics Corporation
C. Itoh Energy Development Co., Ltd.
C. Itoh Fashion System Co., Ltd.
C. Itoh Feed Mills Co., Ltd.
C. Itoh Fine Chemical Co., Ltd.
C. Itoh Fuel Co., Ltd.
C. Itoh Iron & Steel Co., Ltd.
C. Itoh Metals Co., Ltd.
C. Itoh Petroleum Sales Co., Ltd.
C. Itoh Plastics System Co., Ltd.
C. Itoh Pulp & Paper Sales Co., Ltd.
C. Itoh Real Estate Co., Ltd.
C. Itoh Sugar Co., Ltd.
C. Itoh TEXMAC Co., Ltd.
C. Itoh Techno-Science Co., Ltd.
C. Itoh Warehousing & Transport Co., Ltd.
C. I. Kasei Company Limited
Century 21 Real Estate of Japan, Ltd.
Century Leasing Systems, Inc.
Century Research Center Corporation
Daiken Clothing Co., Ltd.
Daiken Trade & Industry Co., Ltd.
Dunco Limited
Fuji Oil Co., Ltd.
General Electric
Inotech
Japan Communications Satellite Co., Ltd.
Matsushita Suzuki Co., Ltd.
Meikan Co., Ltd.
Naigai Ceramics Co., Ltd.
Naigai Travel Service Co., Ltd.
Nishino Trading Co., Ltd.
Roy-ne Co., Ltd.
Sanko Co., Ltd.
Sanko Senzai Kogyo Co., Ltd.
Takiron Co., Ltd.
Yayoi Food Products Co., Ltd.

North America

American Isuzu Motors Inc. (United States)
C. Itoh & Co. (America) Inc. (United States)
C. Itoh & Co. Cotton Inc. (United States)
C. Itoh & Co. Digital Products, Inc. (United States)
C. Itoh & Co. Industrial Machinery, Inc. (United States)
C. Itoh & Co., Ltd. (Canada)
C. Itoh Electronics, Inc. (United States)
C. Itoh International Petroleum Co., Ltd. (United States)
C. Itoh Steel, Inc. (United States)
C. I. Seafoods, Inc. (United States)
C. I. Speciality Chemicals Inc. (United States)
C. I. Tech International, Inc. (United States)
CIGRA, Incorporated (United States)
CIPA Lumber Co., Ltd. (Canada)
Consolidated Footwear Co., Ltd. (Canada)
DX Communications, Inc. (United States)
Master-Halco, Inc. (United States)
Mazda Canada, Inc. (Canada)
Mazda Motors of America (East), Inc. (United States)
NSP, Inc. (United States)
TEXMAC, Inc. (United States)
Textile Impressions, Inc. (United States)

Europe

Asahi Shimbun International Ltd. (United Kingdom)
C. Itoh & Co., Italiana S.p.A. (Italy)
C. Itoh Deutschland GmbH (West Germany)
C. Itoh Electronics Co. Ltd. (United Kingdom)
C. Itoh Electronics GmbH (West Germany)
C. Itoh et Cie (Europe) S.A. (Belgium)
C. Itoh Finance (Europe) Plc. (United Kingdom)
C. Itoh France S.A. (France)
C. Itoh International Petroleum Co. (United Kingdom)
C. Itoh (UK) Plc. (United Kingdom)
Cosmos Insurance Services (U.K.) Ltd. (United Kingdom)
Daihatsu Holland B.V. (Netherlands)
Hellenic Steel Company (Greece)
Kawasaki Motors France S.A. (France)
Kawasaki Motors N.V. (Netherlands)

MCL Group Ltd. (United Kingdom)
Mazda Austria GmbH (Austria)
Mazda Motors (Deutschland) GmbH (West Germany)
Nortons S.p.A. (Italy)

Asia/Pacific

Beijin International Tennis Center Co. Ltd. (China)
C. Itoh & Co., (Australia) Ltd. (Australia)
C. Itoh & Co., (Hong Kong) Ltd. (Hong Kong)
C. Itoh International Petroleum Co. Pte. Ltd. (Singapore)
Cosmos Services Company Limited (Hong Kong)
Island Dyeing and Printing Company Limited (Hong Kong)
Japan Machines (Australia) Pty. Ltd. (Australia)
Mitsui-C. Itoh Iron Pty. Ltd. (Australia)
P.T. Garishindo Buana Leasing (Indonesia)
P.T. Industria Badja Garuda (Indonesia)
P.T. Skyline Building (Indonesia)
P.T. Steel Pipe Industry of Indonesia (Indonesia)
P.T. Unilon Textile Industrias (Indonesia)
Palmaju Edible Oil Sdn. Bhd. (Malaysia)
Siam Synthetic Textile Industry Ltd. (Thiland)
Taiwan Knitting Co. Ltd. (Taiwan)
Thai Teijin Textiles Ltd. (Thailand)
Union Garments Co. Ltd. (Taiwan)

ROW

Abu Dhabi National Plastic Pipe Fabrication Company (U.A.E.)
C. Itoh do Brasil S.A. (Brazil)
C. Itoh Middle East E.C. (Behrain)
Comercios Unidos S.A. (El Salvador)
Fantex S.A. Industria e Comercio Textil (Brazil)
Galvanizing Industries Ltd. (Nigeria)
Industrias Unidas S.A. (El Salvador)

KEY OFFICERS

Tokihiko Kito
Chairman

Isao Yonekura
President and chief executive officer

Teruo Hotta
Executive vice president

Yoshihide Nakayama
Executive vice president

Shunsaku Aoki
Executive vice president

Takaharu Matsui
Executive vice president

PRINCIPAL INVESTORS

Dai-Ichi Kangyo Bank—4.7 percent
Sumitomo Bank—4.4 percent
Tokyo Marine & Fire Insurance—4.1 percent
Nippon Life Insurance—3.5 percent
Asahi Mutual Life Insurance—3.2 percent

FOUNDER

Chubei Itoh

Table 4
Comprehensive Financial Statement
Fiscal Year Ending March 31
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	$14,854.8	$16,673.6	$20,745.8	$21,172.8	$24,458.2
Cash	659.6	449.2	1,011.6	1,232.0	622.3
Receivables	8,739.9	10,285.1	9,844.3	12,855.0	14,982.2
Inventory	1,330.9	1,408.5	1,659.2	2,022.2	2,469.7
Other Current Assets	4,124.5	4,530.8	8,230.7	5,063.6	6,384.0
Net Property, Plants	$614.4	$601.6	$822.4	$983.8	$1,252.9
Net Investments and Noncurrent Receivables	$3,347.6	$3,747.3	$6,639.1	$8,399.7	$10,942.8
Other Assets	$158.4	$173.4	$254.9	$258.5	$445.2
Total Assets	$18,975.2	$21,195.9	$28,462.2	$30,814.9	$37,099.2
Total Current Liabilities	$15,204.9	$16,942.0	$21,687.7	$22,151.7	$24,032.1
Long-Term Debt	$3,265.9	$3,681.0	$5,903.9	$7,198.1	$11,218.8
Other Liabilities	$139.6	$140.8	$101.1	$111.0	$114.5
Total Liabilities	$18,610.4	$20,763.9	$27,692.7	$29,460.7	$35,365.4
Total Shareholders' Equity	$364.7	$432.0	$769.5	$1,354.2	$1,733.8
Common Stock	181.8	181.0	327.0	571.0	649.4
Other Equity	168.6	194.9	289.6	501.7	638.1
Retained Earnings	14.3	56.1	152.9	281.5	446.3
Total Liabilities and Shareholders' Equity	$18,975.2	$21,195.9	$28,462.2	$30,814.9	$37,099.2

Income Statement	1984	1985	1986	1987	1988
Revenue	$56,702.8	$60,975.7	$94,365.2	$102,211.4	$119,372.6
Japanese Revenue	25,969.9	26,829.3	41,992.5	56,522.9	66,371.2
Non-Japanese Revenue	30,732.9	34,146.4	52,372.7	45,688.5	53,001.4
SG&A Expense	$903.6	$1,009.4	$1,324.3	$1,545.0	$1,727.9
Pretax Income	$96.6	$114.1	$131.4	$153.3	$276.1
Pretax Margin (%)	0.37	0.19	0.14	0.15	0.23
Effective Tax Rate (%)					
Domestic	56.0	58.0	58.0	58.0	56.0
Foreign Average	46.0	46.0	50.0	45.0	43.0
Net Income	$19.5	$54.5	$119.1	$139.0	$195.0
Shares Outstanding, Millions	863.5	863.5	1,026.2	1,135.8	1,145.4
Per Share Data					
Earnings	$0.03	$0.09	$0.13	$0.13	$0.13
Dividends	$0.19	$0.31	$0.31	$0.34	$0.34
Book Value	$0.42	$0.50	$0.75	$1.19	$1.51

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending March 31
(Millions of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1984	1985	1986	1987	1988
Liquidity					
Current (Times)	0.98	0.98	0.96	0.96	1.02
Quick (Times)	0.89	0.90	0.88	0.86	0.91
Fixed Assets/Equity (%)	168.45	139.25	106.88	72.65	72.26
Current Liabilities/Equity (%)	4,168.84	3,921.35	2,818.37	1,635.83	1,386.09
Total Liabilities/Equity (%)	5,102.55	4,805.96	3,598.74	2,175.58	2,039.76
Profitability (%)					
Return on Assets	-	0.27	0.48	0.47	0.57
Return on Equity	-	13.68	19.83	13.09	12.63
Profit Margin	0.07	0.09	0.13	0.14	0.16
Exchange Rate: US$1/¥	¥237.44	¥238.54	¥168.49	¥144.43	¥130.18

Source: C. Itoh & Co., Ltd. Annual Reports
Dataquest
January 1990

Cadence Design Systems, Inc.

555 River Oaks Parkway
San Jose, California 95134
Telephone: (408) 943-1234
Fax: (408) 943-0513
Dun's Number: Not Available

Date Founded: 1988

CORPORATE STRATEGIC DIRECTION

Cadence Design Systems, Inc., developed out of a merger of ECAD, Inc., and SDA Systems, Inc., in May 1988. ECAD was founded in 1982 and SDA Systems in 1983. In early 1990, Cadence merged with Gateway Design Automation Corporation to strengthen its position in systems design and the electronic design automation (EDA) market. Cadence develops, manufactures, and markets EDA software products that automate the design of integrated circuits, circuit boards, and systems. Dataquest believes that Cadence held 1.1 percent market share of the total worldwide CAD/CAM market in terms of 1989 revenue, ranking it 21st among vendors. However, it had 3.4 percent market share of the worldwide CAD/CAM software market in terms of 1989 software revenue.

Total revenue increased 81.7 percent to $142.8 million* in fiscal year 1989, up from $78.6 million in fiscal year 1988. Cadence attributes the growth to the increased acceptance of its products by both semiconductor and electronic systems companies as well as to the expansion of sales offices both domestically and internationally. Net income totaled $27.8 million in fiscal year 1989, representing a 74.1 percent increase over fiscal year 1988. As of May 1990, Cadence employed 1,100 people worldwide.

Over the past five years, Cadence has increased its R&D expenditure; however, the percentage allocated compared with total revenue has greatly decreased from 62.6 percent in fiscal year 1985 to 20.6 percent in fiscal year 1989. During fiscal years 1989, 1988, and 1987, Cadence respectively spent $29.4 million, $14.2 million, and $8.0 million on R&D activities. These figures respectively represented 20.6, 18.1, and 19.8 percent of total revenue. In 1989, Cadence concentrated its R&D activities on three specific areas: preparation of the release of the Opus 4.0 Software, a second-generation Design Framework architecture with a significant number of enhanced and new tools; preparation of the phase two release of the Analog Artist Design System; and development by the Systems Division R&D staff of its first product offering. Cadence's R&D team of experts in database structures and industry-specific algorithm technology work out of facilities located in California, Massachusetts, Canada, India, and Taiwan.

Cadence primarily utilizes a direct sales channel with approximately 223 regional salespeople and applications engineers marketing its products throughout the United States. Cadence has also extended licensing agreements to original equipment manufacturers (OEMs), which accounted for 4 percent of Cadence's total revenue during fiscal years 1989 and 1988. Internationally, Cadence sells its products to the European and Asian markets through six wholly owned subsidiaries. Cadence also sells its products internationally through a manufacturer's representative in Europe (ES2) and full-service distributors in Japan (Innotech), South Korea (Daou Technology), and India (Sapphire Systems and Services Ltd.). During fiscal years 1989, 1988, and 1987, international sales respectively accounted for 8.8, 9.7, and 14.5 percent of total revenue, with Europe representing the majority of sales generated. (These figures are based upon products sold and shipped within international areas.)

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this backgrounder.

*All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

Software

Cadence's core business is IC design automation; however, Cadence recently established four business units. The Systems Division, Analog Division, and Microwave Group use Cadence's core tools and its Design Framework architecture, and target related markets and technologies. The Advanced CAE (ACAE) Division was formed when Gateway Design Automation merged with Cadence.

IC Design Automation Business

Cadence's primary products include Amadeus, Opus, Verilog, Dracula, and Ensemble. The design tools are linked by Design Framework or Design Framework II, a framework architecture that supplies a common database, consistent interface, software portability, and open system architecture. The products currently operate on Digital Equipment Corporation (DEC), HP/Apollo, Intergraph, MIPS, NEC, Sony, and Sun Microsystems engineering workstations.

Amadeus

Introduced in May 1990, the Amadeus Systems Design Series is an EDA solution that focuses on the needs of systems design engineers that are designing advanced electronics products. Amadeus supports the design of very high-performance systems ranging from initial specification in a hardware description language to printed circuit board (PCB) layout. Engineers can use Amadeus to take a design from a high-level description language, architectural description to final PCB, including layout and manufacturing information. Engineers can describe their ASIC and systems using top-down or bottom-up design techniques, then automatically transfer this information to layout both initially and incrementally for engineering change orders (ECOs). The series is based upon Design Framework II and consists of four basic design solutions: Amadeus Composer, Amadeus Analyzer, Amadeus Prance, and the Cadence Verilog-based family of design, analysis, and verification tools. Frame Technology's FrameMaker publication and documentation software, Genrad's System HILO logic simulator, and Synopsys' design synthesis tools are other tools available with Amadeus through either OEM or cooperative marketing.

Opus

The Opus integrated circuit design system allows IC designers with a suite of fully integrated tools to implement all phases of the IC development process from design capture through mask data generation. Opus is based on the Design Framework, which facilitates tool cooperation, allows customization by the engineer, and is portable across all major engineering workstations. Opus tools can be classified into four primary categories: CAE/CAT, cell design, automatic place and route, and design verification.

Verilog

Verilog is a mixed-mode, interactive logic simulator and hardware description language. Verilog combines high-level block descriptions with register transfer level, functional, and gate and switch level circuit representation. Verilog-XL is an accelerated version of Verilog at gate and switch level. Verilog-XL includes Verilog, provides object-oriented access routines, opens gateway design environments, and addresses the need for tight interfaces with third-party CAE tools. Veritime is a timing analyzer that is integrated with Verilog-XL and Verifault-XL. Veritime assists in finding timing problems such as setup, hold, and minimum-pulse-width timing violations; corrects such violations; and predicts circuit performance before layout and tune delay parameters. Veritime offers the option of combining static timing analysis with logic simulation.

Dracula

Cadence's first product, Dracula, is a physical design verification tool for integrated circuits. Dracula ensures that a circuit layout will conform with existing design rules. The Dracula family is divided into three versions: Dracula I, which is targeted toward users designing small circuits; Dracula II, which is aimed at designers of larger circuits in the range of 10,000 to 100,000 transistors; and Dracula III, which uses a hierarchical approach for the design of medium to very large circuits that have significant redundancy in their designs. The Dracula family consists of the following products: Design Rule Checker, Electrical Rules Checker, Layout Versus Schematic, Layout Parameter Extraction, Pattern Generation, Layout Debugger, Parasitic Resistance Extractor, Dracula Access, and Dracula On-Line.

Ensemble

The Cell-based Ensemble solution is a chip assembly environment that is a piece of the Opus family of integrated circuit design automation (ICDA) tools.

The Cell-based Ensemble consists of Cell Ensemble, Block Ensemble, and Floor Planner purchased separately or as a group. It supports all block and mixed standard cell and block designs that use both flat and hierarchical methodologies. Fabrication technologies also supported include CMOS, BiCMOS, ECL, and GaAs.

Systems Division

Cadence's Systems Division's products are planned for introduction in mid-1990. The products will be targeted toward the needs of ASIC and board-level designers in systems companies. The product strategy is focused on supplying design entry, multilevel simulation, and logic synthesis products to support a top-down design style.

Analog Division

In November 1989, Cadence's Analog Division unveiled its Analog Artist Design System, which provides the analog IC designer with a front-to-back design-automated software solution. The Systems and Analog Divisions' products are produced using the Cadence Design Framework architecture and selected core tools from the Opus system. Both divisions change the core tools and develop new tools to satisfy the design needs of their target customers.

Advanced CAE (ACAE) Division

The ACAE Division develops, sells, and supports high-performance ACAE software simulation and analysis products for the design, verification, and testing of complex digital electronic circuits and systems, including ICs and PCBs. The products use software to represent the operation of standard product ICs, application-specific integrated circuits (ASICs), and board-level systems. The strategy of the ACAE Division is to enhance the productivity of developers of electronic components and systems through an integrated family of high-performance CAE tools, based upon a common hardware description language.

Microwave Group

In May 1990, Cadence's Microwave Group introduced the Cadence Microwave Musician Design System. Microwave Musician software was developed to shorten the design time for microwave components for commercial and military applications, including cellular telephones, satellite communication, local area networks, radar systems, and smart weaponry. Microwave Musician is fully integrated within the Cadence Design Framework architecture, provides full front-to-back design capability for monolithic microwave integrated circuits (MMICs) and hybrid devices, and supports complete integration of industry-standard microwave simulators into the system.

Further Information

For more information about Cadence Design Systems' business segments, please contact the appropriate Dataquest industry service.

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$13,374.0	$21,609.0	$40,418.0	$78,610	$142,836.0
Percent Change	-	61.57	87.04	94.49	81.70
Capital Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
R&D Expenditure	$8,373.0	$9,368.0	$8,017.0	$14,221.0	$29,376.0
Percent of Revenue	62.61	43.35	19.84	18.09	20.57
Number of Employees	NA	NA	NA	433	978
Revenue ($K)/Employee	NA	NA	NA	$181.55	$146.05
Net Income	($4,805.0)	($4,685.0)	$5,927.0	$15,956.0	$27,776.0
Percent Change	-	2.50	226.51	169.21	74.08

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$29,264.00	$33,534.00	$37,699.00	$42,339.00
Quarterly Profit	$6,262.00	$6,467.00	$7,679.00	$7,368.00

NA = Not available

Source: Cadence Design Systems, Inc. Annual Reports and Forms 10-K Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	73.61	67.23	85.52	90.32	91.25
International	26.39	32.77	14.48	9.68	8.75
Europe	NA	NA	11.21	6.51	6.78
Asia/Pacific	NA	NA	3.27	3.17	1.97

NA = Not available

Source: Cadence Design Systems, Inc. Annual Reports and Forms 10-K Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	96.00	96.00
Indirect Sales	4.00	4.00
OEMs	4.00	4.00

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—11
Europe—4
Asia/Pacific—3
Japan—1

MANUFACTURING LOCATIONS

Information is not available.

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Cadre Technologies Inc.
Cadence and Cadre signed an agreement to jointly market hardware-software codesign solutions for builders of electronics systems. Under the agreement, Cadence and Cadre will provide integration between their technologies to allow hardware and software engineering to work together from the system level throughout the whole product development process.

Data I/O Corporation
Cadence signed an OEM agreement with Data I/O that brings programmable logic device (PLD) design synthesis capability to Cadence's Amadeus Systems Design Series. The agreement gives Amadeus users access to Data I/O's ABEL PLD design software.

European Silicon Structures SA (ES2)
Cadence and ES2 announced the formation of a European joint venture company, European CAD Developments Ltd. (EUCAD), which will specialize in R&D activities within the EDA and ASIC design markets.

IBM
Cadence announced that it is porting its entire suite of EDA tools onto IBM's RISC System/6000 family of engineering workstations.

Digital Equipment Corporation (DEC)
Cadence and DEC formed a joint development team to develop next-generation design framework technology. Under the three-year agreement, the two companies will jointly develop and extend Digital's PowerFrame product into a framework technology for the 1990s that automates the total product development process.

1989

Toshiba Corporation
Cadence has made a technical agreement with Toshiba. Cadence will receive development funds from Toshiba to develop CAD software to support the design of analog integrated circuits.

NEC Corporation
NEC will market a version of Cadence's EDGE Systems, a CAD software package for use in the design of advanced PCBs. The software will be ported to the 4800 Series EWSs and the user interface rewritten to accommodate the Japanese language.

Sony Microsystems Company
Sony Microsystems signed an independent software vendor agreement with Cadence. Cadence will provide third-party electronic computer-aided engineering (CAE) software tools for use with Sony's NEWS family of UNIX workstations.

Frame Technology Corporation
Cadence increased the power and flexibility of its design automation system by integrating Frame Technology's computer-publishing software, called FrameMaker.

1988

Mitsubishi Electric Corporation
Cadence and Mitsubishi formed an agreement to cooperate in the development of a CAD system. The following are the terms of the agreement: The firms will jointly develop CAD software that will be used in an integrated large-scale integration (LSI) design system to be developed later; they will modify Cadence's CAD software to run on Mitsubishi's EWS; Mitsubishi will receive interfacing data to connect CAD systems developed by Mitsubishi and Cadence; Mitsubishi will send its

engineers to Cadence to receive technical information; and Mitsubishi will provide Cadence with material on which Cadence can test its CAD software.

MERGERS AND ACQUISITIONS

1990

Automated Systems, Inc.
Cadence and Automated Systems signed an agreement to merge the two companies. Under the terms of the agreement, ASI will merge into Cadence. ASI develops and markets complex PCB design software. Through the merger, Cadence expanded its Systems Division's charter to include advanced PCB design technology.

Gateway Design Automation Corporation
Cadence acquired Gateway Design Automation. Gateway specializes in software for the simulation of circuits and testing of electronic designs and will operate as a division of Cadence.

1989

Tangent Systems
Cadence acquired Tangent Systems.

KEY OFFICERS

Joseph B. Costello
President and chief executive officer

Bruce R. Bourbon
Executive vice president, Marketing

Prabhu Goel
President, Advanced CAE Division

Tim D. Isbell
Vice president, Operations

Michael D. Lack
Vice president and general manager, Systems Division

Donald A. Millers
Executive vice president, Integrated Circuit Research and Development

Michael N. Schuh
Executive vice president, Sales

James E. Solomon
President, Analog Division

PRINCIPAL INVESTORS

Investment Advisors, Inc.—7.5 percent
Harris Corporation—6.6 percent
Intergraph Corporation—5.6 percent

FOUNDERS

Information is not available.

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

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$16,929.0	$14,957.0	$36,446.0	$64,206.0	$108,931.0
Cash	NA	7,771.0	16,636.0	28,397.0	40,924.0
Receivables	NA	6,757.0	11,979.0	21,272.0	40,873.0
Marketable Securities	NA	NA	6,946.0	12,650.0	21,750.0
Inventory	NA	NA	NA	NA	NA
Other Current Assets	NA	429.0	885.0	1,887.0	5,384.0
Net Property, Plants	NA	$7,422.0	$7,897.0	$13,937.0	$22,365.0
Other Assets	NA	$2,735.0	$7,092.0	$7,273.0	$27,636.0
Total Assets	$16,929.0	$25,114.0	$51,435.0	$85,416.0	$158,932.0
Total Current Liabilities	NA	$6,158.0	$12,373.0	$23,717.0	$40,687.0
Long-Term Debt	NA	$3,477.0	$2,914.0	$2,246.0	$9,352.0
Other Liabilities	NA	$1,137.0	$2,003.0	$1,413.0	$5,144.0
Total Liabilities	$7,743.0	$10,772.0	$17,290.0	$27,376.0	$55,183.0
Total Shareholders' Equity	$9,186.0	$14,342.0	$34,145.0	$58,040.0	$103,749.0
Converted Preferred Stock	NA	7,684.0	NA	NA	NA
Common Stock	NA	19,185.0	206.0	249.0	276.0
Other Equity	NA	(12,527.0)	40,824.0	46,283.0	64,189.0
Retained Earnings	NA	NA	(6,885.0)	11,508.0	39,284.0
Total Liabilities and Shareholders' Equity	$16,929.0	$25,114.0	$51,435.0	$85,416.0	$158,932.0

Income Statement	1985	1986	1987	1988	1989
Revenue	$13,374.0	$21,609.0	$40,418.0	$78,610.0	$142,836.0
US Revenue	9,844.0	14,528.0	34,564.0	70,999.0	130,337.0
Non-US Revenue	3,530.0	7,081.0	5,854.0	7,611.0	12,499.0
Cost of Sales	$1,307.0	$3,621.0	$5,141.0	$8,895.0	$18,636.0
R&D Expense	$8,373.0	$9,368.0	$8,017.0	$14,221.0	$29,376.0
SG&A Expense	$8,272.0	$12,500.0	$18,677.0	$31,451.0	$54,086.0
Capital Expense	NA	NA	NA	NA	NA
Pretax Income	($4,288.0)	($3,792.0)	$8,372.0	$23,447.0	$42,341.0
Pretax Margin (%)	(32.06)	(17.55)	20.71	29.83	29.64
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	($4,805.0)	($4,685.0)	$5,927.0	$15,956.0	$27,776.0
Shares Outstanding, Thousands	12,158.0	16,464.0	20,602.0	26,873.0	30,019.0
Per Share Data					
Earnings	($0.40)	($0.28)	$0.29	$0.59	$0.93
Dividend	NA	NA	NA	NA	NA
Book Value	$0.76	$0.87	$1.66	$2.16	$3.46

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

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	NA	2.43	2.95	2.71	2.68
Quick (Times)	NA	2.43	2.95	2.71	2.68
Fixed Assets/Equity (%)	NA	51.75	23.13	24.01	21.56
Current Liabilities/Equity (%)	NA	42.94	36.24	40.86	39.22
Total Liabilities/Equity (%)	84.29	75.11	50.64	47.17	53.19
Profitability (%)					
Return on Assets	-	(22.29)	15.49	23.32	22.73
Return on Equity	-	(39.82)	24.45	34.62	34.34
Profit Margin	(35.93)	(21.68)	14.66	20.30	19.45
Other Key Ratios					
R&D Spending % of Revenue	62.61	43.35	19.84	18.09	20.57
Capital Spending % of Revenue	NA	NA	NA	NA	NA
Employees	NA	NA	NA	433	978
Revenue ($K)/Employee	NA	NA	NA	$181.55	$146.05
Capital Spending % of Assets	NA	NA	NA	NA	NA

NA = Not available

Source: Cadence Design Systems, Inc. Annual Reports and Forms 10-K Dataquest (1990)

CalComp, Inc.

2411 West La Palma Avenue
Anaheim, California 92801
Telephone: (714) 821-2142
Fax: (714) 821-2832
Dun's Number: Not Available

Founded: 1958

CORPORATE STRATEGIC DIRECTION

CalComp, Inc., is a manufacturer of pen plotters, electrostatic plotters, direct imaging plotters, thermal transfer printers, digitizers, and high-resolution graphic controller boards. Over 100 CalComp products are marketed in the United States and 45 foreign countries. CalComp employs 2,650 people, 2,100 of whom are employed in the United States.

In 1986, CalComp's parent company, Sanders Associates, was purchased by Lockheed Corporation. CalComp then became an operating unit of Lockheed's Information Systems Group. In 1987, CalComp sold its systems division in order to allow the Company to focus completely on computer graphics peripheral devices.

CalComp designs, manufactures, and markets products for the computer-aided design (CAD), electronic publishing, graphic arts, mapping, and office automation industries. Original equipment manufacturer (OEM) customers include General Parametrics, Intergraph, McDonnell Douglas, Mentor Graphics, and Prime Computer.

In January 1990, CalComp joined with Japan's Nippon Steel Corporation and the Sumitomo Corporation to form a new Tokyo-based joint venture known as NS CalComp. NS CalComp markets, services, and supports CalComp's line of graphics products with the help of Sumitomo's marketing and distribution resources. The new company is the result of the sale of shares of Nippon CalComp K.K.(NCKK), a wholly owned CalComp subsidiary with 1989 sales of $34 million. CalComp retains a 44 percent share in the company, whereas Nippon Steel and Sumitomo hold 51 percent and 5 percent, respectively.

CalComp has developed two new programs, Imagine and the CalComp Masters Program, to help its value-added resellers (VARs) build their businesses and lead them into emerging growth areas. Imagine is an incentive program that awards points on sales that can be redeemed by a VAR for merchandise and travel awards. The CalComp Masters Program is designed to help VARs improve their sales, marketing, and administrative skills, and to increase technical support.

In fiscal 1989, CalComp recorded sales of approximately $460 million. Slightly more than 50 percent of this revenue came from international sales. CalComp products are marketed through VARs and through CalComp's worldwide direct sales force. In January 1990, CalComp consolidated its distribution network and decided to sell directly to a limited number of qualified VARs. The Company now distributes either through national distributors Ingram Micro D and Access Graphics Technology or directly to larger VARs. CalComp believes the new strategy will relieve the problem of overdistribution and help the Company to better support its top resellers.

Because CalComp is a subsidiary of the Lockheed Corporation, comprehensive financial information is not available.

BUSINESS SEGMENT STRATEGIC DIRECTION

CalComp is organized into three product divisions: Display Products, Digitizer Products, and Plotter Products.

Display Products Division

The Display Products Division produces high-performance graphics display products for OEM, government, and commercial markets for use in a variety of graphics-intensive applications including CAD and mapping. Located in Hudson, New Hampshire, this division accounted for approximately 25 percent of CalComp's total revenue in 1989.

In 1989, CalComp introduced the DrawingCard Graphics Display system for IBM personal computers and in 1990, for the Apple Macintosh. The DrawingCard AT Series is a high-performance color raster graphics controller for IBM PC AT and 286/386-compatible computers. DrawingCard's on-board graphics engine and display list processor perform the graphics tasks normally handled by the computer. It is available in two resolutions: 1,280x1,024 and 1,024x768 pixels. DrawingCard's single-module design requires only one 16-bit slot in the personal computer, which allows for more expansion room and an increase in system reliability.

The DrawingCard controller also has a device driver for Autodesk's AutoCAD 386. The new driver is shipped at no extra charge with all DrawingCard AT and MCA models, and includes DrawingManager, a utility for viewing and managing AutoCAD files. The utility enables users to browse through drawings up to ten times faster than with AutoCAD alone; to create multiple windows to view several individual or related drawings simultaneously; to view blocks separately within a drawing; and to zoom and pan through menu options, keystrokes, or icons.

In 1990, CalComp introduced the Model 3060, a 20-inch, high-resolution multisync color monitor, for its DrawingCard AT Series. Features of the Model 3060 include automatic scanning and synchronization of all frequencies between 31 and 64 KHz, which allow it to be used with any DrawingCard AT Series configuration and with VGA cards. Also, the monitor supports all three-, four-, and five-wire monitor-interface cable configurations.

Digitizer Products Division

The Digitizer Products Division manufactures and markets three series of digitizers. (A digitizer is an input device for transferring points, lines, and curves from a drawing to a computer. These products are used in CAD, electronic publishing, graphic arts, and architectural design.) This division, located in Scottsdale, Arizona, generated approximately 10 percent of CalComp's revenue in 1989.

The Digitizer Products Division also manufactures WIZ, a new mouse product bundled with an intelligent graphics pad, with models for both the Macintosh and IBM personal computers.

In 1990, CalComp expanded its DrawingBoard 2300 Series of A-, B-, and C-size tablets to include three large-format models (D-, E-, and J-size tablets). CalComp has also added large-format tablets to the 2300A Series DrawingBoard, which is specially configured to support Apple Macintosh II and SE computers. The new models, the 23360, 23480, and 23600, have active digitizing areas of 24 by 36, 36 by 48, and 44 by 60 inches, respectively. The new models include a power supply, an RS-232-C serial or an Apple Desktop Bus (ADB) interface, a data cable, a technical manual, a one-year on-site warranty, and a choice of a 4- or 16-button cursor or a pen stylus.

Plotter Products Division

The Plotter Products Division designs and produces plotters and printers using a wide range of technologies, including electrostatic and thermal transfer, for a variety of CAD, presentation graphics, and graphic arts applications. Products include the ColorMaster thermal printers and one of the broadest range of pen and electrostatic plotters in the industry. The Plotter Products Division, located in Anaheim, California, accounts for the remaining 65 percent of CalComp's total revenue.

In April 1990, CalComp introduced a dual-mode model to its Artisan Plus pen plotter family. The new Artisan Plus Model 1026 can produce drawings on either cut-sheet or roll-feed media. It is a high-performance 8-pen plotter that can produce a continuous drawing up to 20 feet long. For AutoCAD users, CalComp's BatchPlot software utility allows up to 60 drawings to be plotted in a single batch run. CalComp's Plot Manager firmware is standard on the 1026 and increases throughput by minimizing pen changes and movement. Also, optional memory expansion cartridges allow the user to download entire plot files from the host computer for storage in the Artisan.

CalComp replaced the now discontinued CalComp 5700 family with a new generation of high-resolution, high-performance electrostatic plotters: the 57000 Series. The new models, the 57424, 57436, and 57444, accommodate media widths of 24, 36, and 44 inches, respectively, and provide a resolution of 400 dots per inch. The plotters accept random vector plot data directly from the host computer or magnetic tape, sort the vectors, rasterize the data, and plot without the help of an add-on controller. The 57000 Series features Quickplot, which doubles plotting speed, and standard vector memory of 25 megabytes, with memory configurations of 50 and 140 megabytes available as options.

CalComp also introduced an E-size DrawingMaster plotter to supplement its family of direct imaging plotters. The new DrawingMaster (Model 52236) produces one- and two-color E-/AO-size drawings for a variety of CAD/CAE applications. It is suitable for designers who produce complex drawings or large quantities of plots. The 52236 employs no pens, toner, chemicals, or ribbon; the imaging process occurs entirely in the thermosensitive paper or film it plots on. It is software- and controller-compatible with CalComp electrostatic plotters and current CalComp pen plotters, and comes standard with four multiplexed ports: three RS-232-C serial and one Centronics/Dataproducts parallel. Options include IBM and Ethernet interfaces, an operator communications terminal, and a wall-mounting kit.

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

Anaheim, California
Pen plotters, electrostatic plotters, thermal transfer plotter/printers, and direct imaging plotters

Hudson, New Hampshire
Graphics display products

Scottsdale, Arizona
Digitizers

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Nippon Steel Corp. and Sumitomo Corp.
Nippon CalComp K.K.(NCKK), formerly a wholly owned subsidiary of CalComp, is now a joint venture of CalComp, Nippon Steel, and Sumitomo. CalComp received approximately $20 million from the sale of 51 percent of NCKK stock to Nippon Steel and 5 percent to Sumitomo.

Zenographics Inc.
CalComp has signed a licensing agreement with Zenographics whereby CalComp will market the Zenographics SuperPrint utility for use with CalComp ColorMaster, PlotMaster, and ColorView color printers. The CalComp printers will be compatible with all application software that supports Windows.

1989

Computer Associates International
CalComp signed an agreement to license Computer Associates International's CA-Cricket Expression 2.0 as a device driver for its PlotMaster color thermal transfer plotter/printer.

1988

Pixelworks, Inc.
Pixelworks, a New Hampshire-based high-performance graphics company, signed a technology transfer and marketing agreement with CalComp. The agreement provides CalComp with access to Pixelworks' advanced graphics technology, with which CalComp intends to manufacture and market a number of proprietary products.

Minolta Camera Co., Ltd.
Minolta formed a contract to supply its thermal transfer color printer to CalComp on an OEM basis. Minolta planned to supply over 10,000 units of the products to CalComp over a three-year period. The two companies also joined forces to develop, produce, and market a new series of desktop color plotters for CAD applications. Designed jointly and marketed by CalComp under

the CalComp label, the plotters employ thermal transfer technology. Minolta produced the engines and casings, while CalComp provided the electronics.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

William P. Conlin
President

Larry Sanders
Senior vice president, Sales and Marketing

David L. Schlotterbeck
Senior vice president, Corporate Development

Roger M. Damphousse
Senior vice president, Display Products Division

Gary R. Long
Senior vice president, Digitizer Products Division

William L. Barber
Vice president and Company counsel

Kenneth D. Van Kleeck
Senior vice president, Finance and Administration

PRINCIPAL INVESTORS

CalComp is a wholly owned subsidiary of the Lockheed Corporation.

FOUNDERS

Information is not available.

California Eastern Laboratories

California Eastern Laboratories
3260 Jay Street
Santa Clara, CA 95054
(408)988-3500

Established 1959
No. of Employees: Approximately 130

BACKGROUND

California Eastern Laboratories is a closely held corporation and is the exclusive North American sales agent for NEC's microwave semiconductors. (See "NEC Corporation" company profile for additional data.)

COMPANY EXECUTIVES

- President/CEO—Jerry Arden
- Executive Vice President—Tom Fuller
- Vice President Marketing and Sales—Leonard Lea
- Vice President Engineering—Mark Burkett

SERVICES

- Applications engineering
- Design engineering
- Testing, including MIL-STD-19500 screening

PRODUCTS

- GaAs low-noise and power MESFETs and HEMTs
- Diodes
- MMICs and analog ICs
- DigICs including 200-gate and 500-gate BFL arrays and standard logic
- Hybrids

California Eastern Laboratories

Applications include satellites, space probes, weather monitoring, earth resources; microwave data links and digital radio; avionics, radar, ECM and defense communications; consumer–cellular phones, radar detectors, TVRO, and CATV.

FACILITIES

- Santa Clara, California—Design and test only, no fab facilities (NEC Corporation makes the devices)

California Devices, Inc.

THE COMPANY

Background

California Devices, Inc. (CDI), was founded in 1978 by Robert Lipp, Bernard Aronson and Brian Tighe to design and produce CMOS gate arrays. The Company produces gate arrays for a wide variety of customers including consumer, industrial, computer, and military users. Fifty percent of the Company's shares are owned by CDI's founders and employees, and 50 percent by outside venture capitalists.

Operations

CDI's corporate headquarters and manufacturing facilities are in San Jose, California. The Company has full design, metallization fabrication, and test capability. CDI also has a design and training center in Grass Valley, California.

Marketing

CDI sells its products and services in the United States through its corporate headquarters and a network of representatives. European operations include a sales and field applications office in Paris and representatives elsewhere in Western Europe. CDI has also entered into an agreement with CorinTech, a United Kingdom manufacturer of hybrid circuits, under which CorinTech has exclusive rights to use and market CDI gate arrays in the United Kingdom and a non-exclusive license to sell in Europe.

The Company's marketing and sales headquarters are:

United States

California Devices, Inc.
282 Kinney Drive
San Jose, CA 95112

Telephone: (408) 295-3700
(408) 280-1620
Telex: 352120

Europe

California Devices, Inc.
Residence de la Croix-en-laye
53, Rue de Chamboury
78300 Poissy
France

Telephone: 33-397-92587
Telex: 695477

CorinTech
Rolfes House
Milford Street
Salisbury, Wiltshire
SP1 2BP United Kingdom

Telephone: 0722-33-7582
Telex: 477880

California Devices, Inc.

Customer Interface

CDI is a full-service gate array company that can enter the design/production cycle of a device at any point the customer requires. The Company can work directly from a logic schematic in SSI form (gates and flip-flops), or can translate an MSI schematic into suitable form. Once the appropriate schematic is complete, the device is breadboarded by the customer, using SSI devices, and/or simulated by the customer or CDI using a computer. Further processing, by CDI, of the test pattern, which is used as the input to the logic simulator, automatically produces a test program compatible with Fairchild Sentry VII and Series 20 testers. At this stage, changes can be made to ensure that the design fulfills the device requirements.

The next step is symbolic layout of the design to achieve optimal use of the gate array cells. This is followed by another check to make certain the design still conforms with the original concept. The layout is then digitized using a computer. This step converts the physical representation in a digital one. Once these steps have been completed, the pattern generation (PG) tape is produced and the masks are prepared; again with careful checks at each step. Prototype devices are then made and tested using Fairchild Series 20 test equipment. The parts are then shipped to the customer for final evaluation and acceptance. CDI will have the equipment and software for fully automating the design process operational by the second quarter of 1983.

CDI commonly supplies prototype devices in ceramic packages and production runs in ceramic or plastic packages. The Company can, however, use any commercially available package type requested by the customer including leadless chip carriers, (which are recommended for devices over 40 pins). CDI can also supply unpackaged chips in die form.

CDI offers high reliability screening up to MIL. STD. 883B Class B, as well as burn-in, temperature cycling, and full AC and DC parametric testing.

Turnaround time from approved schematic to prototype production is typically 6 to 12 weeks. The Company is currently capable of producing eight new designs requiring full CDI engineering support, plus 20 custom tooling jobs per month.

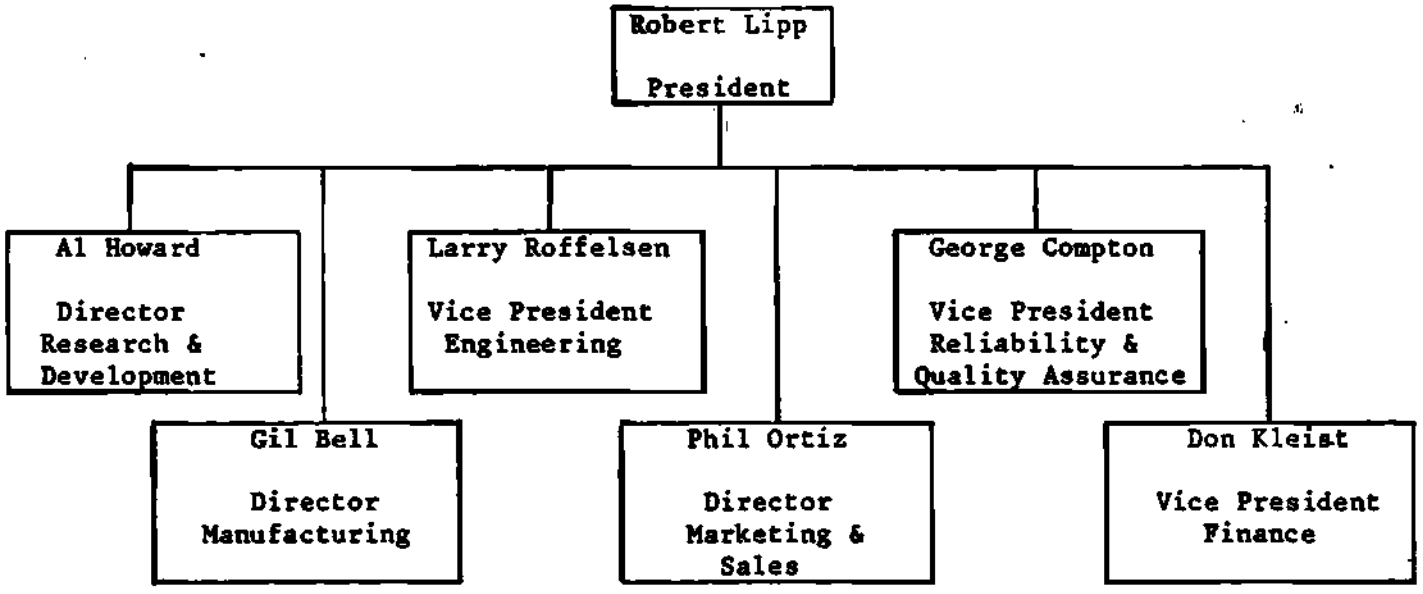
Employees

In January 1983, CDI employed more than 70 people, approximately half of whom were engineering, design and software specialists. Figure 1 shows the Company's organization chart.

California Devices, Inc.

Figure 1

California Devices, Inc.
ORGANIZATION CHART



Source: DATAQUEST
January 1983

California Devices, Inc.

Products

CDI offers six series of gate array products as shown in Table 1.

Table 1

California Devices, Inc.
PRODUCTS

Product Family	Process	Array Type	Technology	Maximum Complexity	Typical Gate Delay
CDI Series	CMOS	Digital	Metal gate 6 micron	880 gates	20 ns
HC Series	CMOS	Digital	Silicon gate 5 micron	1,260 gates	5 ns
HCS Series	CMOS	Digital	Silicon gate 4 micron	1,782 gates	3.5 ns
DLM Series*	CMOS	Digital	Silicon gate 2.5 micron	10,000 gates	-
LD Series	CMOS	Linear & Digital	Silicon gate 4 micron	1,000 gates	-
CLIC Series	Bipolar	Linear	-	500 components	-

*Available second quarter 1983

Source: California Devices, Inc.
DATAQUEST
January 1983

The CDI series of metal gate CMOS arrays is a low-cost family of seven gate arrays that range in complexity from 60 to 880 equivalent gates and from 22 to 72 pins. The HC series of silicon gate CMOS arrays is a high-performance family of seven devices that range from 300 to 1782 equivalent gates and from 40 to 92 pins. The HCS series is compatible with the HC series but offers higher performance and density. Seven HCS series devices are available, ranging from 300 to 1782 gates in complexity and from 40 to 92 pins. The LD series of silicon gate CMOS arrays enables the user to integrate both linear and digital functions onto a single semi-custom LSI circuit. The CLIC series is a family of 11 monolithic bipolar arrays. The simplest device in the series contains 30 transistors and 70 resistors, while the most complex includes 205 transistors and over 300 resistors.

California Devices, Inc.

In the second quarter of 1983, CDI plans to offer its DLM series of silicon gate arrays. This family will offer complexities of up to 10,000 gates with geometries of 2.5 microns.

CDI offers its CMOS gate arrays to military specifications, with radiation hardening up to one megarad.

The Company has metallization fabrication facilities and can handle single- and double-layer metallization down to 4 micron line-widths. CDI's wafers are manufactured by a number of suppliers including GTE, National Semiconductor, Precision Monolithics, and Supertex.

Second Sources

The HC series was designed by CDI and is licensed to American Microsystems, LSI Logic, and Telmos. The LD series is second-sourced by Telmos.

OTHER ACTIVITIES

CDI also operates a design and training center in Grass Valley, California to train customers' engineers in the design of gate arrays. The Company also pursues an active technology licensing program, including licensing its array technology to captive manufacturers.

FINANCIAL INFORMATION

CDI was operating at a run rate of $7 million a year in January 1983. The Company has been growing by more 100 percent per year, and expects to continue on this growth path in the foreseeable future. DATAQUEST understands that CDI recently completed a multi-million dollar round of financing with Bay Partners, 1.1.1. Industries, Innoven, Oxford Partners, Alan Patrickoff and Associates, and J.F. Shea and Co. We believe that this financing will enable the Company to proceed with its growth plans.

DATAQUEST estimates of CDI's annual sales are shown in Table 2. Based on total U.S. market estimates in DATAQUEST's SIS ASIC study, this means that CDI had 7 percent of the U.S. market for metal-gate semicustom devices and 6 percent of the U.S. market for silicon-gate semicustom devices in 1981.

California Devices, Inc.

Table 2

California Devices, Inc.
ESTIMATED SALES
(Millions of Dollars)

Year	Estimated Sales
1980	$ 1
1981	$ 2.5
1982	$ 5 - $6
1983	$11 - $13

Source: DATAQUEST
January 1983

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$8,633.3 million) in fiscal 1988. (Percantage changes refer only ¥ amounts; US$ 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 flatbed 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
Copyer 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 NZDlr13.25 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

Giichi 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
Liquidity					
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
Profitability (%)					
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
Other Key Ratios					
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)

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 was founded in 1937 and has embarked on its second half century as a top manufacturer of cameras and a leading manufacturer of business machines and precision optical equipment. The Company has applied the technology it developed with cameras to other product areas. Canon considers itself a global competitor with a strong emphasis on research and development. It has been in the forefront of copier technology with highlight color, cartridges that contain the key workings of the copier, and digital technology.

Canon recently designed its Global Corporation Plan to direct its progress through 1992. The Company's strengths include its size and successful history, which means that Canon can provide a substantial investment and wait for a return over time. Product development goals include new technology with particular emphasis on digital transmission systems for high-definition television (HDTV).

The Company's total revenue increased 10.5 percent to $8.8 billion* in fiscal 1988 from $7.9 billion in fiscal 1987. Net income increased 173.4 percent to $294 million in fiscal 1988 from $108 million in fiscal 1987. Canon employs more than 40,000 people worldwide.

The non-U.S. sales contribution to Canon's total revenue grew to $6.1 billion in fiscal 1988. Non-U.S. sales accounted for 70 percent of total sales, up from 68 percent in fiscal 1987. Eighty-five percent of Canon's sales offices are outside the United States. The Company has manufacturing locations worldwide with a concentration in Japan.

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

Research and development expenditures totaled $520 million in fiscal 1988, representing approximately 5.9 percent of revenue. Capital spending totaled $659 million in fiscal 1988, representing 7.5 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 profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Workstations

NeXT Inc. has announced that it will distribute its computer workstation in Japan through Canon. Canon already supplies the erasable optical disk drives used in the NeXT system as well as the engine at the core of its laser printer. Recently, Canon invested $100 million for a 16.67 percent stake in NeXT. Within a year, the two companies intend to be selling computers capable of displaying the 7,000 characters of the kanji alphabet. NeXT has chosen to enter the rapidly growing Asian workstation market because there is no market leader in this region.

As an investor in NeXT, Canon now has a vested interest in the success of the computer company both in Asia and throughout the world; NeXT's interest in Canon arose from the long-term stability Canon could provide. Through this arrangement, Canon is entitled to one seat on NeXT's board of directors to be filled

by a mutually acceptable individual. Canon's holdings cannot exceed 20 percent of NeXT for at least 10 years, and Canon receives no technology licensing or manufacturing rights. Included in other terms of this agreement is the provision that Canon will not distribute any other workstations. Machines distributed by Canon will be made at NeXT's factory in Fremont, California, and exported to Asia.

Copiers and Peripherals

Canon's business machines registered strong growth in 1988, led by copiers, laser beam printers, and facsimile transceivers. Canon's technologies provide a complete line of copiers, including color laser and high-speed copiers for the high-end market and the PC series for personal use. The rapid uptrend in sales of laser beam printers and facsimile transceivers contributed to the strong showing of business machines. In 1988, Canon ranked third in the facsimile transceiver industry with 10.5 percent market share. Business machine sales accounted for 78.8 percent of consolidated sales.

Optical Disk Drives

Canon has been shipping 5.25-inch erasable disk drives in moderate volumes for only a few months. As of now, no clear leader stands out among the three companies shipping this product: Canon, Ricoh, and Sony. Canon's 5.25-inch erasable optical disk drive is the primary storage device on the NeXT computer.

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 U.S. Dollars)

	1984	1985	1986	1987	1988
Five-Year Revenue	$3,308.3	$4,778.9	$5,523.1	$7,940.7	$8,777.8
Percent Change	-	44.45	15.57	43.77	10.54
Capital Expenditure	$302.4	$458.8	$504.8	$516.2	$659.3
Percent of Revenue	9.14	9.60	9.14	6.50	7.51
R&D Expenditure	$152.4	$247.3	$343.7	$464.1	$520.0
Percent of Revenue	4.61	5.17	6.22	5.84	5.92
Number of Employees	30,000	34,000	35,500	37,000	40,000
Revenue ($K)/Employee	$110.28	$140.56	$155.58	$214.61	$219.45
Net Income	$139.6	$185.3	$66.6	$107.7	$294.4
Percent Change	-	32.74	(64.06)	61.71	173.35

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	N/A	N/A	N/A	N/A
Quarterly Profit	N/A	N/A	N/A	N/A

N/A = Not Available

Source: Canon Incorporated Annual Reports
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1984	1985	1986	1987	1988
North America	36.43	37.86	34.77	32.48	30.25
International	63.57	62.14	65.23	67.52	69.75
Japan	28.98	28.56	30.83	29.73	31.51
Europe	25.89	24.22	27.45	30.48	30.70
ROW	8.70	9.36	6.95	7.31	7.55

Source: Canon Incorporated Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988
Direct Sales	N/A
Indirect Sales	N/A

N/A = Not Available

Source: Dataquest January 1990

1988 SALES OFFICE LOCATIONS

North America—4
Japan—4
Europe—13
Asia/Pacific—2
ROW—3

MANUFACTURING LOCATIONS

Japan

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

North America

Canon Business Machines, Inc. (United States)
Produces consumables for copiers and electronic typewriters
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 Inc. (Taiwan)
Manufactures 35mm range-finder cameras and micromotors for audio products

SUBSIDIARIES

North America

Ambassador Office Equipment, Inc. (United States)
Astro Office Products, Inc. (United States)
Canon Canada Inc. (Canada)
Canon Copyer Sales, Co., Ltd. (United States)
Canon Eiken Co., Inc. (United States)
Canon Sales Co., Inc. (United States)
Canon Software Inc. (United States)
Canon System Sales Co., Inc. (United States)
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.
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 (Sweden)
Selex France S.A. (France)

Asia/Pacific

Canon Australia Pty. Ltd. (Australia)
Canon Hong Kong Trading Co., Ltd. (Hong Kong)
Canon Marketing (Malaysia) Sdn. Bhd. (Malaysia)
Canon Marketing Services Pte. Ltd. (Singapore)
Canon Singapore Pte. Ltd. (Singapore)

ROW

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

ALLIANCES, JOINT VENTURES, LICENSING AGREEMENTS

United States

Eastman Kodak
Copiers, medical equipment

Hewlett-Packard
Computers

Intel Corp.
Jointly working out a specialized large-scale integration for copiers; Canon to consign production to Intel

National Semiconductor
Microprocessors, software

West Germany

Siemens AG
Facsimile connections for integrated service digital networks

Technology Import

United States

Eastman Kodak
Super 8mm sound cameras, bubble jet printers

Electroprint Inc.
Electrophotography method

Energy Conversion
Electrophotography drum devices

Gould Inc.
Ink jet

Hewlett-Packard
Electrophotography method

Prof. Noel A. Clark
Ferrodielectric liquid

Qume Corp.
Daisywheels

Tandon Corp.
Double-sided floppy disk drives

Vivitar Corp.
Flash units

China

NeXT
Distribution agreement

Sweden

S.T. Lagerwall A.B.
Crystal

KEY OFFICERS

Ryuzaburo Kaku
Chairman

Dr. Keizo Yamaji
President and representative director

Hajime Mitarai
Senior managing and representative director

Shigeru Nishioka
Senior managing director

PRINCIPAL INVESTORS

Dai-Ichi Mutual Life Insurance Co.—7.3 percent

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	$2,725.6	$3,651.8	$4,437.2	$6,730.7	$7,624.6
Cash	595.6	884.9	843.9	2,053.5	3,084.5
Receivables	533.4	836.8	1,049.4	1,328.5	1,538.1
Marketable Securities	639.4	584.2	768.4	1,252.7	419.4
Inventory	839.4	1,172.7	1,542.5	1,785.8	2,203.9
Other Current Assets	117.8	173.2	233.0	310.2	378.7
Net Property, Plants	$712.8	$1,076.8	$1,437.4	$1,923.9	$2,032.9
Other Assets	$213.6	$276.6	$395.6	$563.9	$658.7
Total Assets	$3,652.0	$5,005.2	$6,270.2	$9,218.5	$10,316.2
Total Current Liabilities	$1,835.5	$2,390.5	$2,806.1	$3,898.2	$4,774.3
Long-Term Debt	$396.4	$671.8	$1,035.5	$1,811.2	$1,635.6
Other Liabilities	$44.9	$55.3	$67.8	$88.7	$86.3
Total Liabilities	$2,276.8	$3,117.6	$3,909.4	$5,798.1	$6,496.2
Minority Interests	$162.8	$221.9	$271.0	$402.5	$514.7
Total Shareholders' Equity	$1,212.4	$1,665.7	$2,089.8	$3,017.9	$3,305.3
Converted Preferred Stock	0	0	0	0	0
Common Stock	110.4	144.3	190.9	291.7	344.3
Other Equity	565.6	700.6	862	1,321.6	1,358.9
Retained Earnings	536.4	820.8	1,036.9	1,404.6	1,602.1
Total Liabilities and Shareholders' Equity	$3,652.0	$5,005.2	$6,270.2	$9,218.5	$10,316.2

Income Statement	1984	1985	1986	1987	1988
Revenue	$3,308.3	$4,778.9	$5,523.1	$7,940.7	$8,777.8
U.S. Revenue	1,205.3	1,809.5	1,920.2	2,579.3	2,655.2
Non-U.S. Revenue	2,103.0	2,969.4	3,602.9	5,361.4	6,122.6
Cost of Sales	$1,798.7	$2,618.5	$3,304.6	$4,814.4	$5,088.7
R&D Expense	$152.4	$247.3	$343.7	$464.1	$520.0
SG&A Expense	$1,174.9	$1,716.3	$2,031.7	$2,749.8	$2,991.4
Capital Expense	$302.4	$458.8	$504.8	$516.2	$659.3
Pretax Income	$315.4	$226.4	$172.4	$327.1	$681.2
Pretax Margin (%)	9.53	4.74	3.12	4.12	7.76
Effective Tax Rate (%)	58.00	53.40	64.60	62.70	51.10
Net Income	$139.6	$185.3	$66.6	$107.7	$294.4
Shares Outstanding, Millions	554.0	563.9	577.1	598.2	612.5
Per Share Data					
Earnings	$0.24	$0.29	$0.11	$0.18	$0.45
Dividends	$0.04	$0.06	$0.08	$0.08	$0.10
Book Value	$2.19	$2.95	$3.62	$5.04	$5.40

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1984	1985	1986	1987	1988
Liquidity					
Current (Times)	1.48	1.53	1.58	1.73	1.60
Quick (Times)	1.03	1.04	1.03	1.27	1.14
Fixed Assets/Equity (%)	58.79	64.65	68.78	63.75	61.50
Current Liabilities/Equity (%)	151.39	143.51	134.28	129.17	144.44
Total Liabilities/Equity (%)	187.79	187.16	187.07	192.12	196.54
Profitability (%)					
Return on Assets	-	4.28	1.18	1.39	3.01
Return on Equity	-	12.88	3.55	4.22	9.31
Profit Margin	4.22	3.88	1.21	1.36	3.35
Other Key Ratios					
R&D Spending % of Revenue	4.61	5.17	6.22	5.84	5.92
Capital Spending % of Revenue	9.14	9.60	9.14	6.50	7.51
Employees	30,000	34,000	35,500	37,000	40,000
Revenue ($K)/Employee	$110.28	$140.56	$155.58	$214.61	$219.45
Capital Spending % of Assets	8.28	9.17	8.05	5.60	6.39

Source: Canon Incorporated
Annual Reports
Dataquest
January 1990

Casio Computer Co., Ltd.

6-1, 2-chome Nishi-Shinjuku
Shinjuku-ku, Tokyo 163, Japan
Telephone: (03) 347-4803
Fax: (03) 348-3629
Dun's Number: 05-185-7019

Date Founded: 1957

CORPORATE STRATEGIC DIRECTION

Casio Computer Co., Ltd., was founded in Tokyo in 1946 by four Kashio brothers. (The name *Casio* is the Anglicized version of the surname *Kashio*.) In 1957, following Toshio Kashio's invention of the electric calculator, the brothers organized Casio as Japan's only manufacturer specializing in electric calculators. The development of semiconductor technology made possible the electronic calculator. Casio introduced the first electronic desktop calculator with memory in 1965 and remains a leading innovator in electronic calculator technology.

Casio relies on advanced technologies to develop and produce high-quality, multifunctional electronic products for both consumer and business markets. In addition to advanced calculators for business and science, Casio manufactures digital and analog watches and clocks, electronic musical keyboards and synthesizers, liquid crystal display pocket televisions, music systems, office equipment, and electronic cash registers.

Casio markets its products worldwide in more than 140 countries. The Company operates international divisions and units in the United States, Canada, the United Kingdom, Germany, Taiwan, and South Korea. In 1986, Casio established Casio Europe B.V., headquartered in Amsterdam, to coordinate sales to all European countries other than Great Britain and Germany. Casio, Inc., headquartered in New Jersey, is the American subsidiary of Casio Computer Co., Ltd. This unit generates about 23 percent of Casio's worldwide sales.

Casio's consolidated revenue of ¥270.8 billion (US$2.1 billion) in the period ending March 31, 1989, increased 9 percent from ¥248.4 billion (US$1.8 billion) in fiscal 1988. (Percentage changes refer only to ¥ amounts; US$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) Net income increased 37.5 percent to ¥6.6 billion (US$51.8 million) in fiscal 1989, compared with ¥4.8 billion (US$35.0 million) in 1988.

R&D expenditure increased to ¥10.4 billion (US$81.3 million), or 3.8 percent of total sales. Total capital investment was ¥22.6 billion (US$176.1 million). The Japanese domestic sales contribution to Casio's total revenue was ¥96.0 billion (US$748.5 million) for fiscal 1989, which represented 35 percent of sales.

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 regarding revenue by distribution channel is not available. Tables 3 and 4, comprehensive financial statements, are at the end of this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

Consumer Products

The calculator division is dedicated to applying Casio's technology to high-performance products. Casio's Digital Diaries, with expanded memory capacity and wide displays, have been especially successful in the domestic Japanese market. Worldwide sales for this division totaled ¥103.6 billion (US$807.8 million), or about 38 percent of total revenue.

In the digital timepiece segment, Casio offers a wide range of products. In fiscal 1989, Casio established a

manufacturing facility in South Korea for full-scale production of digital and analog watches. Casio has developed the Data Bank series of watches, which are capable of storing telephone numbers and dialing them automatically when held to a standard touch-tone telephone. This division contributed 22 percent of Casio's sales with revenue of ¥60 billion (US$467.8 million).

Casio also sells a wide range of products through its electronic musical instrument division. In both the domestic and international markets, a new line of electronic keyboards featuring Casio's newly developed Casio Dynamic (CD) sound source has been offered. This division also creates a wide selection of products for performing musicians, including advanced digital synthesizers and guitar synthesizers. Total sales reached ¥36.5 billion (US$284.6 million) and represented 14 percent of Casio's total revenue.

The electronic office equipment and other divisions earned revenue of ¥70.8 billion (US$552 million) and represented 26 percent of Casio's sales. In the personal computer market, the Company focuses its efforts on the development and marketing of computers that feature the UNIX operating system. The computers are capable of networking and high-speed data processing. In fiscal 1989, Casio introduced its Active Data Processing System (ADPS) product. The ADPS R1 is capable of automated data processing without the necessity of programming. Casio values ADPS as a strategic product and aims to expand its business activities by making use of ADPS in the Company's overall business foundation.

Further Information

For further information about Casio's business segments, please contact Dataquest's Japanese Semiconductor Application Markets Service.

Table 1
Corporate Highlights* (Millions of US Dollars)

	1988	1989
Two-Year Revenue	$1,799.6	$2,111.7
Percent Change	-	17.34
Capital Expenditure	$169.1	$176.1
Percent of Revenue	9.40	8.34
R&D Expenditure	$89.8	$81.3
Percent of Revenue	4.99	3.85
Number of Employees	NA	NA
Revenue ($K)/Employee	NA	NA
Net Income	$35.0	$51.8
Percent Change	-	48.00
Exchange Rate (US$1=¥)	¥138.03	¥128.25

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	NA	NA	NA	NA
Quarterly Profit	NA	NA	NA	NA

*Financial information for 1985 through 1987 is not available.
NA = Not available

Source: Casio Computer Co., Ltd. Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1988	1989
Japan	NA	35.00
International	NA	65.00

NA = Not available

Source: Casio Computer Co., Ltd. Annual Reports
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Casio Manufacturing Corporation (United States)
Musical instruments

Asia/Pacific

Casio Korea Co., Ltd. (South Korea)
Watches
Kofu Product Control and Technical Center (Japan)
Function not available
Ome Product Control and Technical Center (Japan)
Function not available
Tokyo Product Control and Technical Center (Japan)
Function not available

ROW

Casio Electromex SA CV (Mexico)
Function not available

SUBSIDIARIES

North America

Casio Canada Limited (Canada)
Casio, Inc. (United States)

Europe

Casio Computer Co., GmbH Deutschland (Germany)
Casio Electronics Co., Ltd. (United Kingdom)
Casio Europe B.V. (Netherlands)

Asia/Pacific

Aichi Casio Co., Ltd (Japan)
Casio Central System Corporation (Japan)
Casio Computer (Hong Kong), Ltd. (Hong Kong)
Casio Electronics Manufacturing Co., Ltd. (Japan)
Casio Information Service Co., Ltd. (Japan)
Casio Korea Co., Ltd. (South Korea)
Casio Micronics Co., Ltd. (Japan)
Casio System Development Co., Ltd. (Japan)
Casio Taiwan, Ltd. (Taiwan)
Keiji Casio Co., Ltd. (Japan)
Kofu Casio Co., Ltd. (Japan)
Kyowa Seiki Co., Ltd. (Japan)
Osaka Minami Casio Co., Ltd. (Japan)
The Casio Lease Co., Ltd. (Japan)
Yamagata Casio Co., Ltd. (Japan)
Yamato Seimitsu Industrial Co., Ltd. (Japan)
Yokohama Casio Systems Co., Ltd. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Sogo Data Center
Casio Computer Co., Ltd., plans to purchase a 35 percent stake in Sogo Data Center, a software development firm located in Tokyo. Sogo Data Center develops systems for financial organizations.

MERGERS AND ACQUISITIONS

Casio has not participated in any mergers or acquisitions.

KEY OFFICERS

Toshio Kashio
Chairman

Kazuo Kashio
President

Tadao Kashio
Senior advisor

Yukio Kashio
Senior managing director

Toshio Kohzai
Senior managing director

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Toshio Kashio
Kazuo Kashio
Tadao Kashio
Yukio Kashio

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

Balance Sheet	1988	1989
Total Current Assets	$1,312.7	$1,898.5
Cash	562.0	879.7
Receivables	347.9	392.5
Marketable Securities	70.5	58.1
Inventory	297.8	512.8
Other Current Assets	34.5	55.4
Net Property, Plants	$519.7	$565.0
Other Assets	$108.2	$148.1
Total Assets	$1,940.6	$2,611.6
Total Current Liabilities	$778.2	$789.9
Long-Term Debt	$295.6	$701.7
Other Liabilities	$32.3	$36.3
Total Liabilities	$1,106.6	$1,527.9
Total Shareholders' Equity	$834.0	$1,083.7
Converted Preferred Stock	0	0
Common Stock	173.0	273.6
Other Equity	356.4	475.1
Retained Earnings	304.6	335.0
Total Liabilities and Shareholders' Equity	$1,940.6	$2,611.6
Income Statement	**1988**	**1989**
Revenue	$1,799.6	$2,111.7
Japan	NA	748.5
International	NA	1363.2
Cost of Sales	$1,370.5	$1,469.4
R&D Expense	$89.8	$81.3
SG&A Expense	$377.1	$459.6
Capital Expense	$169.1	$176.1
Pretax Income	$78.5	$102.7
Pretax Margin (%)	4.36	4.86
Effective Tax Rate (%)	56.00	56.00
Net Income	$35.0	$51.8
Shares Outstanding, Millions	NA	NA
Per Share Data	NA	NA
Earnings	NA	NA
Dividend	NA	NA
Book Value	NA	NA
Exchange Rate (US$=¥)	¥138.03	¥128.25

*Financial information for 1985 through 1987 is not available.
NA = Not available

Source: Casio Computer Co., Ltd. Annual Reports
Dataquest (1990)

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

Balance Sheet	1988	1989
Total Current Assets	¥181,186.0	¥243,479.0
Cash	77,568.0	112,827.0
Receivables	48,015.0	50,334.0
Marketable Securities	9,732.0	7,445.0
Inventory	41,107.0	65,765.0
Other Current Assets	4,764.0	7,108.0
Net Property, Plants	¥71,732.0	¥72,457.0
Other Assets	¥14,947.0	¥19,003.0
Total Assets	¥267,865.0	¥334,939.0
Total Current Liabilities	¥107,409.0	¥101,303.0
Long-Term Debt	¥40,801.0	¥89,988.0
Other Liabilities	¥4,545.0	¥4,657.0
Total Liabilities	¥152,755.0	¥195,948.0
Total Shareholders' Equity	¥115,110.0	¥138,991.0
Converted Preferred Stock	0	0
Common Stock	23,876.0	35,087.0
Other Equity	49,193.0	60,935.0
Retained Earnings	42,041.0	42,969.0
Total Liabilities and Shareholders' Equity	¥267,865.0	¥334,939.0

Income Statement	1988	1989
Revenue	¥248,405.0	¥270,821.0
Japanese	NA	94,787.4
International	NA	176,033.6
Cost of Sales	¥175,772.0	¥188,448.0
R&D Expense	¥12,394.0	¥10,425.0
SG&A Expense	¥52,057.0	¥58,950.0
Capital Expense	¥23,337.0	¥22,590.0
Pretax Income	¥10,837.0	¥13,173.0
Pretax Margin (%)	4.36	4.86
Effective Tax Rate (%)	56.00	56.00
Net Income	¥4,832.0	¥6,644.0
Shares Outstanding, Millions	NA	NA
Per Share Data	NA	NA
Earnings	NA	NA
Dividends	NA	NA
Book Value	NA	NA

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

Key Financial Ratios	1988	1989
Liquidity		
Current (Times)	1.69	2.40
Quick (Times)	1.30	1.75
Fixed Assets/Equity (%)	62.32	52.13
Current Liabilities/Equity (%)	93.31	72.88
Total Liabilities/Equity (%)	132.70	140.98
Profitability (%)		
Return on Assets	-	2.20
Return on Equity	-	5.23
Profit Margin	1.95	2.45
Other Key Ratios		
R&D Spending % of Revenue	4.99	3.85
Capital Spending % of Revenue	9.39	8.34
Employees		
Revenue ($K)/Employee	NA	NA
Capital Spending % of Assets	8.71	6.74

*Financial information for 1985 through 1987 is not available.
NA = Not available

Source: Casio Computer Co., Ltd. Annual Reports
Dataquest (1990)

Celeritek, Inc.

Celeritek, Inc.
617 River Oaks Parkway
San Jose, CA 95134
(408) 433-0335

Established 1984
No. of Employees: 60

BACKGROUND

Celeritek was founded to design, develop, and produce GaAs FET amplifiers. The Company is named for the high-speed (celerity) technology in which it specializes. Founders and other key persons are from Avantek and Watkins-Johnson; some were with Avantek for at least eight years. Celeritek received $3.2 million in funding from Sutter Hill and others in March 1985. The Company's initial product strategy was focused in the area of 2- to 6-GHz and 6- to 18-GHz low-noise temperature-compensated amplifiers and GaAs FETs. Celeritek's first GaAs FET shipments were made in 1986. Present microwave products are focused in the frequency range of 0.5 to 60 GHz.

COMPANY EXECUTIVES

- President--Tamar Husseini (formerly general manager of Microwave, Avantek)
- Vice President, Amplifier Operations--Gary J. Policky (formerly manager of Advanced Development, Microwave, Avantek)
- Vice President, Semiconductor Operations--Dr. J. Ross Anderson (formerly manager of GaAs Development, Avantek)
- Vice President, Finance--John W. Beman (formerly controller/treasurer, Avantek)
- Vice President, Marketing/Sales--Robert D. Jones (formerly director of marketing, Avantek)

FINANCIAL BACKING

- March 1985--Initial financing of $3.2 million from Greylock Management, Sutter Hill, and Venrock Associates.
- August 1985--Follow-on financing of $1.0 million from original investors.
- August 1986--Round 1 financing of $4.2 million from original investors; Burr, Egan, Deleage; Glynn Ventures; Mayfied Fund; and Morgan Stanley.

Celeritek, Inc.

STRATEGIC ALLIANCES

None

SERVICES

Celeritek provides custom product design, manufacturing, and assembly services.

PROCESS TECHNOLOGY

- 1u GaAs MESFET
- DSW
- 3–inch wafers

PRODUCTS

- CMA and CMT Series of broadband temperature–compensated LNAs
- CPA and CPT Series of medium power amplifiers
- CF Series of GaAs FETs
- Microwave subsystems

Applications

- Military electronic warfare (EW) equipment
- UHF and microwave communications
- Radar
- Telecommunications

Future Products

Celeritek will produce digital integrated circuits (digICs).

FACILITIES

The Company's San Jose, California, facility has 23,000 square feet including a 1,000–square–foot Class 100 clean room.

Celeritek, Inc.

Celeritek, Inc.
617 River Oaks Parkway
San Jose, CA, 95134
(408) 433-0335

Established 1984
No. of Employees: 60

BACKGROUND

Celeritek was founded to design, develop, and produce GaAs FET amplifiers. The Company is named for the high-speed (celerity) technology in which it specializes. Founders and other key persons are from Avantek and Watkins-Johnson; some were with Avantek for at least eight years. Celeritek received $3.2 million in funding from Sutter Hill and others in March 1985. The Company's initial product strategy is focused in the area of 2-6 and 6-18 GHz low-noise temperature-compensated amplifiers and GaAs FETs. Celeritek's first GaAs FET shipments were made in 1986.

COMPANY EXECUTIVES

- President—Tamar Husseini (formerly general manager of Microwave, Avantek)
- Vice President, Amplifier Operations—Gary Policky (formerly manager of Advanced Development, Microwave, Avantek)
- Vice President, Semiconductor Operations—Ross Anderson (formerly manager of GaAs Development, Avantek)
- Vice President, Finance—John Beman (formerly controller/treasurer, Avantek)
- Vice President, Marketing/Sales—Robert Jones (formerly director of marketing, Avantek)

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Celeritek, Inc.

STRATEGIC ALLIANCES

None

SERVICES

Celeritek provides design, manufacturing, and assembly services.

PROCESS TECHNOLOGY

- 1u GaAs MESFET
- DSW
- 3-inch wafers

PRODUCTS

- CMA and CMT Series of 2-6 and 6-18 GHz temperature compensated LNAs and GaAs FETs

Applications

- Military/aerospace
- UHF and microwave communications

FUTURE PRODUCTS

In the future, Celeritek will produce military and commercial range MMICs, GaAs FETs, and radar and communications amplifiers.

FACILITIES

The Company's San Jose, California, facility has 23,000 square feet including a 1,000-square-foot class 100 clean room.

Centigram Communications Corporation

4415 Fortran Court
San Jose, California 95134
Telephone: (408) 942-3500
Fax: (408) 942-3560
Dun's Number: 08-700-6714

Date Founded: 1980

CORPORATE STRATEGIC DIRECTION

Centigram Communications Corporation, a privately held company, manufactures and markets telephone-based communications products. As of April 19, 1990, Centigram Corporation completed its acquisition of Speech Plus, a voice response system and board manufacturer. The combined companies now operate under the new corporate name Centigram Communications Corporation.

Centigram has shipped over 3,000 systems since entering the voice processing market in 1983. According to Dataquest estimates, Centigram's revenue was $36 million* in 1989. Centigram employs 190 people.

Centigram markets its products to service providers, including independent telephone companies (telcos) and regional Bell operating companies (RBOCs), major end users, and distributors through sales offices in Atlanta, Baltimore, Chicago, Kansas City, Los Angeles, Minneapolis, New York, and San Jose. Centigram's primary competition is from Octel and VMX.

Centigram's distributors are located throughout the United States, Canada, Puerto Rico, and Japan. These distributors include ALLTEL Supply, Ameritech, Bell South, Contel Corporation, CTG/British Telecom, Dialogue, Memorex Telex, Mitel, Sharp Corporation, VSAR, and 16 regional independent distributors. Centigram sells exclusively through distributors. Centigram's account managers work closely with distributors in account development.

Centigram's voice messaging systems are based on proprietary Modular Expandable System Architecture (MESA). This architecture enables modular expandability, compatibility, and easy installation and maintenance. Centigram's systems can be integrated with Centrex, Hitachi DX, Intecom IBX, ITT 3100, NEC 2400, and Northern Telecom SL-1.

Centigram's R&D efforts focus on digital networking and full integration of office automation systems. These business tools include PBX switches, E-mail systems, facsimiles, and computers.

No financial statements are included because Centigram Communications Corporation is a privately held company.

*All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

Centigram's business development strategy is to penetrate the high-volume user market. Centigram is focusing on companies with 100 users or more. Management sees entry into the RBOC market as a method of serving the heavy-user market.

Voice Messaging

VoiceMemo II is a small, modular, freestanding voice messaging system (28 x 8 x 21 inches) that may be placed in an ordinary office or in a central office environment. The system requires no special environmental conditions, is compatible with any PBX or Centrex, and can accommodate 50 to 2,500 users. The system's maximum capacity is expandable in two-port increments from 2 to 24 ports and in five-hour increments from 5 to 30 hours. Optional software is available to enable the systems to integrate with many PBXs and to allow the systems to perform call processing functions. This product was introduced in 1987.

Centigram also provides a low-volume offering in the VoiceMemo product family, the VoiceMemo VS (Very Small). This product is for companies and branch offices that require a system for up to 200 users. The system has the ability to expand from two to eight ports and from three to nine hours of storage. Also, the VS can be upgraded to a VoiceMemo II.

Voice Response

Through the purchase of Speech Plus, Centigram acquired a voice response product offering: CallText Voice Gateway Systems. Centigram chose to acquire the product rather than to develop or license one. Centigram's and Speech Plus' products both use the same architecture and operating systems. Both companies have common investors and a number of key executives that have previously worked together.

Software

Centigram offers MESA-Net, which is an enhancement to the VoiceMemo VS and VoiceMemo II. MESA-Net allows up to 1,500 remotely located systems to be digitally networked. It allows users in a system to exchange messages transparently with users whose mailboxes are on separate systems.

Centigram provides the MESA-Info, which enables users of Centigram's VoiceMemo II family of voice processing systems to design full-featured audiotext services, utilizing rotational mailboxes, "tree" structured information mailboxes, and broadcast mailboxes.

Centigram's Receptionist II is an automated telephone attendant that answers, screens, and forwards calls. Receptionist II is a call processing software enhancement providing expanded customized automated telephone attendant services.

Centigram also offers an automated dispatch communications system, which allows field service operations to dispatch technicians through voice messages and to track technician availability using proprietary displays.

Furthermore, Centigram provides a software utility package that allows customers to structure their service to meet the needs of their individual users.

Further Information

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

1989 SALES OFFICE LOCATIONS

North America—8

MANUFACTURING LOCATIONS

North America

San Jose, California
Manufacturing and assembling phone-based telecommunications systems

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Northern Telecom
Centigram and Northern Telecom entered into a joint sales and marketing agreement on Centigram's VoiceMemo II system that addresses the voice processing needs of businesses with mixed PBX networks, including both Northern Telecom and other PBXs. Under the agreement, Centigram will provide modified VoiceMemo II systems for the non-Northern Telecom PBXs within the mixed network. Centigram will develop a special user interface similar to that of Northern Telecom's Meridian Mail. Also, the two companies will work together to develop an enhanced version of the recently announced AMIS (Audio Message Interchange Standards) intermachine messaging standard.

Voice-Tel
Centigram and Voice-Tel, a franchiser of voice messaging service centers, signed an agreement whereby Voice-Tel will purchase Centigram equipment valued at more than $15 million over the next five years.

1989

Mitel and ROLM
Centigram, Mitel, and ROLM entered into a licensing agreement under which Mitel and ROLM will sell Centigram voice processing systems with their PBX lines.

Nynex
Centigram and Nynex entered an 18-month agreement under which Nynex will buy Centigram's voice processing systems for residences and businesses that want to order voice messaging services from Nynex telcos.

1988

Ameritech Communications
Centigram and Ameritech entered into a distribution agreement under which Ameritech will market Centigram's VoiceMemo II voice messaging systems.

Contel and United Telecommunications
Centigram, Contel, and United Telecommunications entered into distribution agreements. Under the agreements, Contel will distribute Centigram products in 30 states, both for consumer premises equipment sales and network services. United Telecommunications will use Centigram products exclusively for network services throughout the United States.

Mitel and Sharp
Centigram, Mitel, and Sharp entered into distribution agreements under which Mitel and Sharp will distribute Centigram VoiceMemo II and VoiceMemo VS products for customer premises equipment.

MERGERS AND ACQUISITIONS

1990

Speech Plus
Centigram Corporation acquired Speech Plus, a text-to-speech system and board manufacturer. The combined companies now operate under the name Centigram Communications Corporation.

KEY OFFICERS

George Sollman
President and chief executive officer

Bob Nugent
Senior vice president, Sales and Marketing

Skip Cameron
Vice president, Operations

Rod Hoo
Vice president, Engineering

Carl Berney
Vice president, Systems Engineering

Peter Loyd
Vice president, Strategic Planning

Doug Zorn
Vice president, Finance

William H. Warren
Vice president, Customer Service

PRINCIPAL INVESTORS

The total investment in Centigram by venture capitalists and corporate investors is more than $21 million.

FOUNDERS

Information is not available.

Central Point Software Inc.

15220 N.W. Greenbrier Parkway, #200
Beaverton, Oregon 97006
Telephone: (503) 690-8090
Fax: (503) 690-8083
Dun's Number: 00-792-4772

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Central Point Software Inc. is a privately held company that develops and markets utility software and archival backup software for personal computers. Although founded in 1981 as a producer of archival backup software, the Company currently views itself as a utility software company. In fiscal year ending March 31, 1990, archival products accounted for less than 20 percent of total revenue, while the Company's flagship utility product, PC Tools, accounted for 65 percent.

The Company's current product development strategy is focused on the long-term utility software needs of personal computer users and the expansion of the utility market. Four main goals have been targeted for future product development: to simplify PC use and increase productivity; to focus more toward the personal computing mainstream; to provide multilevel user interface (beginner, intermediate, and advanced levels); and to adhere to the current and emerging industry standards such as IBM's System Application Architecture (SAA), Windows, Presentation Manager, UNIX, and the emerging telecommunications standards for modem and facsimile transmission.

The Company's main competition in the application-focused utility products market comes from Peter Norton Computing, Paul Mace Software, and Fifth Generation. In the desktop manager portion of the market, Borland International and Lotus Development Corporation are Central Point's main competitors.

Central Point's net sales increased 44 percent to $25.8 million* for fiscal year ending March 31, 1990 from $17.9 million. Net profit margins remained approximately 20 percent. The Company shipped a total of 839,000 copies of its utilities programs in fiscal 1990. The Company currently employs 220 people worldwide.

*All dollar amounts are in US dollars.

In January 1990, the Company received $5 million in funding from the following investment firms: Hummer Winbald Venture Partners of San Francisco, California; Sequoia Capital of Menlo Park, California; and Hughes Investment Company of Los Angeles, California. Central Point has stated that it will use the investment to expand its US and international sales and marketing activities, to enlarge its customer base in the corporate/financial market, and to expand its research and development activities. The investment also enables the Company to take advantage of market opportunities and to acquire strategic technologies.

No finanacial statements are included because Central Point Software is a privately held company.

BUSINESS SEGMENT STRATEGIC DIRECTION

Utility Software

The Company's leading product, PC Tools Deluxe, employs a consistent, SAA/CUA-compliant user interface, provides support for Novell and IBM Token Ring local area networks, and can be made memory resident. Its major capabilities include disk diagnostic and recovery utilities, a DOS shell, hard disk backup, a desktop manager, a disk optimizer, and a disk cache. The product's functions are presented to the user in a windowed environment with full mouse support and have been translated into several languages, including French and German. In 1989, the Company shipped 711,000 copies of PC Tools Deluxe.

In March 1990, the Company introduced the latest version of PC Tools Deluxe, Version 6, which incorporates all of the capabilities of its predecessors and adds 30 enhancements. The significant new features

include: support for the QIC 40/80 and Irwin tape standards for backup to tape drives; accessible DOS Command Line, from which a user can invoke DOS commands from within PC Shell; over 20 new file viewers that support more than 30 different applications; an integrated version of Traveling Software's LapLink, which enables users to extend the capabilities of PC Shell to a connected portable computer; facsimile board support; and customized user interface that allows users to select from three different levels of functionality (beginner, intermediate, and advanced) of PC Tools according to user skill level. Within the first 90 days prior to its introduction, the Company shipped 365,000 copies of the 6.0 version.

PC Tools MAC is a version of PC Tools developed specifically for the Apple Macintosh. It includes hard disk backup, file undelete, file unfragmenter, recovery from damaged disks or hard drives, and file encryption and compression. It also includes a utility for location of files using key words or phrases, and a fast file copier for nonprotected diskettes.

In June 1990, the Company introduced MacTools Deluxe. The product features nine utilities, including data recovery, hard disk backup, disk optimization, and file management.

Archival Backup Software

Copy II, the Company's base archival software, is used by PC users for archival backup of most protected software. It is standard software available in three versions: Copy II MAC, Copy II PC, and Copy II Plus. Copy II MAC is designed for the Apple Macintosh, and Copy II PC is a complete backup program available for the IBM PC. Copy II Plus is a menu-driven, easy-to-use utility package that allows backing up of most software and readily handles synchronized tracks, quarter- and half-tracks, bit insertion, spiral tracks, and other protection schemes.

Further Information

For further information on the Company's business segment, please contact the appropriate industry services.

1989 SALES OFFICE LOCATIONS

North America—4
Europe—1
ROW—0

MANUFACTURING LOCATIONS

North America

Beaverton, Oregon
Disk duplication, packaging, and software design.

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Wangtek
Wangtek agreed to bundle Central Point's PC backup software with Wangtek's Model 3040 40-megabyte and Model 3080 80-megabyte tape drive systems.

N.V. Philips
N.V. Philips agreed to bundle PC Tools Deluxe Version 6 in its newest family of 286- and 386-based personal computers, the PCD line. The agreement also permits Philips to bundle PC Shell, PC Tools' DOS Shell, and disk and file management modules with all models of the PCD line.

Egghead and Corporate Software
Central Point has formed a partnership with these corporate resellers to increase the sales effort applied to Fortune 1000 companies.

Storage Dimensions
In June 1990, Central Point entered into an expanded OEM agreement in which Storage Dimensions will bundle MACTools Deluxe software with every MacinStor hard disk subsystem.

KEY OFFICERS

Michael Brown
Chief executive officer

Corey Smith
President and chief operating officer

Tim Pettibone
Vice president, Research and Development

Bob Critchlow
Director of European Operations

Phil Catterall
Vice president of Sales

Sal D'Auria
Vice president of Marketing

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Michael Brown and Susan Brown

Chartered Semiconductor Pte., Ltd.

No. 2 Science Park Drive
Singapore Science Park
Singapore, 0511
Telephone: (65) 777-2566
Fax: (65) 777-1933
Dun's Number: Not Available

Date Founded: 1987

CORPORATE STRATEGIC DIRECTION

Chartered Semiconductor Pte., Ltd., is a joint venture between Sierra Semiconductor (17.5 percent equity) and the Singapore government (82.5 percent equity). It is a leading Southeast Asian semiconductor company that creates, manufactures, and markets leading-edge CMOS technology. During 1989, Chartered began producing CMOS ASICs at its US$50 million plant in the Singapore Science Park. Sierra is providing its proprietary Triple Technology CMOS process that permits analog, digital, and E2 integration memory on the same chip.

The Company expects its capacity to be sold out through the second quarter of 1990. Chartered Semiconductor has 245 employees to date.

Company financial information and semiconductor revenue for 1989 are not included because Chartered's first full year of operation began in 1990.

BUSINESS SEGMENT STRATEGIC DIRECTION

Silicon Wafer Foundry

Chartered Semiconductor provides foundry services for unprobed or probed wafers.

Semiconductors

Chartered Semiconductor's main products are cell-based custom devices, ASICs, and standard devices.

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

Asia

Singapore Science Park, Singapore
Digital CMOS, analog, EEPROM devices

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1987

Sierra Semiconductor
The companies made an agreement to manufacture CMOS ASICs and analog, digital, and electrically erasable memories.

MERGERS AND ACQUISITIONS

The Company has undertaken no mergers or acquisitions.

KEY OFFICERS

Lim Ming Seong
Chairman of the board

John Hambidge
President

Ho Ching
Director

Lee K. Heng Nam
Director

Ray Becker
Manager, Sales and Marketing

PRINCIPAL INVESTORS

Singapore Technology Industrial Corporation—82.5 percent
Sierra Semiconductor—17.5 percent

FOUNDERS

Information is not available.

Cherry Electrical Products Corp.

COMPANY

Background

Cherry Electrical Products Corporation was incorporated in 1953 in Illinois and reincorporated in Delaware on June 30, 1978. In August 1977, the Company acquired Micro Components Corporation, a manufacturer of custom digital and linear integrated circuits, which was renamed Cherry Semiconductor Corporation. Micro Components Corporation was founded in 1972. Cherry's three major segments are Electrical Products, Electronic Products, and Semiconductor Products.

Operations

Cherry Electrical Products' corporate offices and main plant are located in Waukegan, Illinois. Cherry Semiconductors' executive offices and manufacturing facilities are located in Rhode Island. Foreign facilities are in West Germany, England, and Brazil, and an unconsolidated joint venture is located in Japan. In 1981 Cherry consolidated its semiconductor manufacturing into a new 70,000 square foot facility in East Greenwich, Rhode Island. This facility is devoted to production of semicustom and custom integrated circuits.

Marketing

Most of Cherry's semiconductor sales are made directly to original equipment manufacturers through independent representatives.

Semiconductor marketing and sales headquarters are:

Cherry Semiconductor Corporation
2000 South County Trail
East Greenwich, RI 02818
Telephone: (401) 885-3600

Research and Development

Cherry Electrical Products is projecting a combined compound annual growth rate of more than 20 percent over the next four years for its three product segments. During this period the Company plans to spend about $27 million on new product engineering and research.

Employees

At the end of its 1981 fiscal year, Cherry Electrical Products employed a total of 2,261 people, 250 of whom were with Cherry Semiconductor.

Cherry Electrical Products Corp.

SEMICONDUCTOR DIVISION

Cherry entered the semiconductor market in 1977 by acquiring Micro Components Corporation, which was renamed Cherry Semiconductor Corporation.

The Company specializes in custom and semi-custom linear and digital integrated circuits, some of which incorporate linear and digital I^2L circuitry on a single chip. Many of the Company's products are used in photographic equipment, especially in cameras. Other applications include two-way communications equipment, smoke detectors, data processing, and, increasingly, automotive equipment.

OTHER ACTIVITIES

Cherry Electrical Products has two other major segments, Electrical Products and Electronic Products. Electrical Products manufactures snap-action switches and special-use automotive switches, and accounted for 42 percent of the Company's sales in fiscal 1981. The Electronic Products segment manufactures keyboard assemblies employing solid state, membrane, and conventional switching: keyswitches; thumbwheel, rotary, and matrix selector switches; and gas discharge displays. Approximately 45 percent of the Company's sales came from this segment in fiscal 1981.

Cherry Electrical Products Corp.

Cherry Electrical Products Corporation
3600 Sunset Avenue
Waukegan, Illinois 60085
Telephone: (312) 689-7600
(Millions of Dollars Except Per Share Data)

Balance Sheet (February 28)

	1979	1980	1981
Working Capital	$20.6	$20.8	$20.3
Long-Term Debt	$ 3.6	$ 3.6	$ 6.1
Shareholders' Equity	$35.0	$41.9	$47.1
After-Tax Return on Average Equity (%)	22.0	20.0	13.0

Operating Performance (Fiscal Year Ending February 28)

	1979	1980	1981
Revenue	$69.7	$88.0	$90.2
U.S. Revenue*	$48.5	$67.9	$65.1
Non-U.S. Revenue*	$21.2	$20.1	$25.1
Cost of Revenue	$44.0	$56.0	$62.1
R&D Expense	$ 3.1	$ 3.6	$ 4.7
SG&A Expense	$12.3	$15.2	$18.0
Pretax Income	$11.7	$14.3	$10.0
Pretax Margin (%)	17.0	16.0	11.0
Effective Tax Rate (%)	47.0	48.0	42.0
Net Income	$ 6.2	$ 7.5	$ 5.8
Average Shares Outstanding (Millions)	4.2	4.5	4.5
Per Share			
Earnings	$ 1.47	$ 1.67	$ 1.29
Dividends	$ 0.08	$ 0.12	$ 0.12
Book Value	$ 7.81	$ 9.36	$10.54
Price Range	$ 8.50-18.50	$ 9.50-14.50	$ 8.00-19.25
Total Employees	2,405	2,252	2,261

*DATAQUEST estimates

Source: Cherry Electrical Products Corp.
Annual Reports
DATAQUEST, Inc.
April 1982

Cherry Electrical Products Corp.

Cherry Electrical Products Corporation
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

Segment	Calendar Years 1979	1980	1981
Bipolar Digital	$2	$4	$5
Memory			
MPU			
Logic	2	4	5
MOS			
Memory			
MPU			
Logic			
Linear	2	5	6
Total	$4	$9	$11

Source: Cherry Electrical Products Corp.
Annual Reports
DATAQUEST, Inc.
April 1982

Chips & Technologies, Inc.

3050 Zanker Road
San Jose, California 95134
Telephone: (408) 434-0600
Fax: (408) 434-0412
Dun's Number: 12-137-5380

Date Founded: December 1984

CORPORATE STRATEGIC DIRECTION

Chips & Technologies, Inc., designs, manufactures, and markets very large-scale integrated circuits and related software for IBM-compatible microcomputer systems and add-in circuit boards for IBM and IBM-compatible microcomputer systems. Chips covers products in five areas: system logic, graphics, communications, mass storage, and software. According to Dataquest's 1989 estimates, the Company ranked tenth in the MOS microdevices market with a 3 percent market share.

Total revenue increased 53.8 percent to $217.6 million* in fiscal year 1989 from $141.5 million in fiscal 1988. Net income reached $33.0 million in fiscal 1989, resulting in a growth rate of 50.0 percent over fiscal 1988. Chips & Technologies credited this growth to the strong acceptance and ongoing success of its high-performance PC AT-compatible CHIPSets. The Company employs 498 people throughout the world.

On September 26, 1989, Chips & Technologies announced its agreement with IBM Corporation to codevelop Bus Master Adapter chips. In November 1989, Chips revealed a number of new products and services for the personal computer industry; these included advanced system logic chips for both AT- and Micro Channel-compatible computers, controllers for portable and desktop computers, and other products for communications and mass storage.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

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

BUSINESS SEGMENT STRATEGIC DIRECTION

Systems Logic

Chips & Technologies produces a family of systems logic products that allow increasing levels of integration, functionality, and performance. The PC AT-compatible CHIPSet is a five-chip set that integrated and replaced 63 of the 94 nonmemory components on the IBM PC AT system board. This product succeeded at reducing the development time, board space, and manufacturing costs of AT-compatible 80286-based systems. It also allowed manufacturers to produce AT-compatible microcomputers that ran considerably faster than IBM's original PC AT. Other system logic products include CHIPSets for i486-, 80386-, 386SX-, 80286-, and 8088/86-based systems where each CHIPset has been designed and marketed along with the Company's graphics, communications, mass storage, and BIOS products. In March 1988, Chips & Technologies unveiled a family of products compatible with IBM Micro Channel Architecture. For the fiscal 1989, sales from the systems logic products accounted for 87 percent of the Company's net sales.

Graphics

Chips produces graphics controller products for the desktop and laptop markets, graphics circuits compatible with the Video Graphics Array (VGA) standard set by IBM, LCD controllers for low-end laptop and notebook computers, and VGA-compatible display controllers for flat panel displays. In June 1989, a single-chip graphics controller compatible with IBM's 8514/A graphics adapter was introduced. Graphics products sales represented 8 percent of the Company's net sales for fiscal 1989.

Communications

Along with its CHIPSpak and CHIPSport communications chips for parallel and serial ports, Chips markets PC-to-mainframe communications controllers, sets of communications interface circuits for parallel and serial ports, and sets of business interface circuits for various add-in cards.

Mass Storage

In January 1989, a set of hard disk controllers for the Micro Channel Architecture market was unveiled as the mass storage group's first product. Additional mass storage products are currently under development.

Software

Chips & Technologies offers system software and firmware support for the Company and its customers consisting of BIOS, software drivers, and operating system software expertise and products.

Further Information

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

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

	1986	1987	1988	1989
Four-Year Revenue	$12,721.0	$80,236.0	$141,478.0	$217,601.0
Percent Change	-	530.74	76.33	53.81
Capital Expenditure	N/A	$711.0	$2,764.0	$4,913.0
Percent of Revenue	0	0.89	1.95	2.26
R&D Expenditure	$2,944.0	$7,008.0	$18,735.0	$33,552.0
Percent of Revenue	23.14	8.73	13.24	15.42
Number of Employees	63	58	150	498
Revenue ($K)/Employee	$201.92	$1,383.38	$943.19	$436.95
Net Income	$1,496.0	$12,905.0	$22,097.0	$33,045.0
Percent Change	-	762.63	71.23	49.55

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$57.37	$61.79	$70.95	$11.10
Quarterly Profit	$9.38	$10.06	$9.11	$11.52

N/A = Not Available

Source: Chips & Technologies, Inc. Annual Reports and Forms 10-K
Dataquest
1990

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989
North America	N/A	61.00	44.00	43.00
International	N/A	39.00	56.00	57.00
Europe	N/A	3.00	7.00	11.00
Other	N/A	36.00	49.00	46.00

N/A = Not Available

Source: Chips & Technologies, Inc. Annual Reports and Forms 10-K
Dataquest
1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	75.00	75.00
Indirect Sales	25.00	25.00

Source: Chips & Technologies, Inc. Annual Reports and Forms 10-K
Dataquest
1990

1989 SALES OFFICE LOCATIONS

North America—8
Japan—1
Europe—1
Asia/Pacific—2

MANUFACTURING LOCATIONS

Chips & Technologies contracts its integrated circuit production to various semiconductor manufacturers throughout the world. The Company believes that it has reduced the risk of obsolescence of expensive manufacturing equipment due to these independent manufacturers' abilities to produce circuits at a lower cost because of their advanced production facilities and manufacturing economies of scale. In the United States, the integrated circuits are manufactured by LSI Logic Corporation and National Semiconductor. In Japan, the manufacturers are Fujitsu Microelectronics, NEC Corporation, Oki Semiconductor, Ricoh Corporation, Seiko, Toshiba International Corporation, and Yamaha International Corporation.

SUBSIDIARIES

Asia/Pacific

Chips & Technologies Korea, Inc. (Korea)
Chips & Technologies Taiwan, Inc. (Taiwan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

IBM Corporation
The companies are codeveloping Bus Master Adapter chips focused at providing Micro Channel-compatible add-in card developers with a single-chip VLSI bus interface solution.

1988

Adaptec
The companies cointroduced a series of integrated hardware products that provide complete solutions for producing desktop computers fully compatible with IBM PS/2 Models 50, 60, and 80.

Adaptec, Phoenix Technologies, and The Santa Cruz Operation
These three companies, together with Chips & Technologies, provide consulting services to OEMs that wish to make PS/2 clones using Adaptec disk drive controllers and the Phoenix ROM BIOS.

Yamaha Corporation
The companies established a joint venture for developing and designing LSIs.

1986

National Semiconductor
National manufactures CMOS ICs for Chips & Technologies under a fabrication services agreement.

MERGERS AND ACQUISITIONS

1989

Scientific Micro Systems Inc. (SMS)
The Company purchased SMS' assets. SMS is a supplier of mass storage data controllers.

KEY OFFICERS

Gordon A. Campbell
Chairman of the board, president and chief executive officer

David M. Bowman
Vice president, Sales

Marc E. Jones
Vice president, Corporate Development, and general counsel

Morris E. Jones, Jr.
Vice president and chief technical officer

Stephen F. Kahng
Vice president and general manager, Design Services

Keith R. Lobo
Vice president and chief operating officer

Gary P. Martin
Vice president, Finance and Administration, chief financial officer and secretary

James F. Stafford
Vice president, Product Line Operations

PRINCIPAL INVESTORS

Gordon A. Campbell—14.3 percent
Loomis, Sayles & Co.—10.2 percent
William L. Marocco—7.0 percent

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

Balance Sheet	1986	1987	1988	1989
Total Current Assets	$6,589.0	$48,061.0	$86,486.0	$120,958.0
Cash	2,393.0	3,389.0	47,488.0	59,290.0
Receivables	3,285.0	12,344.0	28,267.0	36,474.0
Marketable Securities	256.0	26,182.0	N/A	N/A
Inventory	529.0	4,234.0	7,190.0	19,900.0
Other Current Assets	126.0	1,912.0	3,541.0	5,294.0
Net Property, Plants	$1,682.0	$2,522.0	$7,000.0	$14,883.0
Other Assets	$64.0	$141.0	$1,094.0	$5,382.0
Total Assets	$8,335.0	$50,724.0	$94,580.0	$141,223.0
Total Current Liabilities	$3,533.0	$23,216.0	$25,139.0	$29,593.0
Long-Term Debt	$966.0	$997.0	$2,647.0	$6,164.0
Other Liabilities	$73.0	$81.0	$148.0	$62.0
Total Liabilities	$4,572.0	$24,294.0	$27,934.0	$35,819.0
Total Shareholders' Equity	$3,763.0	$26,430.0	$66,646.0	$105,404.0
Converted Preferred Stock	42.0	N/A	N/A	N/A
Common Stock	64.0	130.0	139.0	144.0
Other Equity	3,230.0	12,968.0	31,078.0	36,786.0
Retained Earnings	427.0	13,332.0	35,429.0	68,474.0
Total Liabilities and Shareholders' Equity	$8,335.0	$50,724.0	$94,580.0	$141,223.0

Income Statement	1986	1987	1988	1989
Revenue	$12,721.0	$80,236.0	$141,478.0	$217,601.0
U.S. Revenue	N/A	48,944.0	62,250.3	93,568.4
Non-U.S. Revenue	N/A	31,292.0	79,227.7	124,032.6
Cost of Sales	$4,961.0	$38,501.0	$69,407.0	$106,655.0
R&D Expense	$2,944.0	$7,008.0	$18,735.0	$33,552.0
SG&A Expense	$2,885.0	$9,971.0	$19,426.0	$29,036.0
Capital Expense	N/A	$711.0	$2,764.0	$4,913.0
Pretax Income	$1,846.0	$25,397.0	$35,997.0	$51,664.0
Pretax Margin (%)	14.51	31.65	25.44	23.74
Effective Tax Rate (%)	N/A	N/A	N/A	N/A
Net Income	$1,496.0	$12,905.0	$22,097.0	$33,045.0
Shares Outstanding, Thousands	4,250.0	12,729.0	14,349.0	14,790.0
Per Share Data				
Earnings	$0.14	$1.01	$1.54	$2.23
Dividends	N/A	N/A	N/A	N/A
Book Value	$0.89	$2.07	$4.64	$7.31

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

Key Financial Ratios	1986	1987	1988	1989
Liquidity				
Current (Times)	1.86	2.07	3.44	4.09
Quick (Times)	1.72	1.89	3.15	3.41
Fixed Assets/Equity (%)	44.70	9.54	10.50	14.12
Current Liabilities/Equity (%)	93.89	87.84	37.72	28.08
Total Liabilities/Equity (%)	121.50	91.92	41.91	33.98
Profitability (%)				
Return on Assets	35.90	43.70	30.41	28.03
Return on Equity	79.51	85.48	47.48	38.41
Profit Margin	11.76	16.08	15.62	15.19
Other Key Ratios				
R&D Spending % of Revenue	23.14	8.73	13.24	15.42
Capital Spending % of Revenue	0	0.89	1.95	2.26
Employees	63	58	150	498
Revenue ($K)/Employee	$201.92	$1,383.38	$943.19	$436.95
Capital Spending % of Assets	0	1.40	2.92	3.48

N/A = Not Available

Source: Chips & Technologies, Inc Annual Reports and Forms 10-K
Dataquest
1990

Chips & Technologies, Inc.

Table 1

Estimated Worldwide Semiconductor Revenue by Calendar Year (Millions of Dollars)

	1986	1987	1988
Total Semiconductor	41	112	160
Total Integrated Circuit	41	112	160
Bipolar Digital (Function)	10	25	30
Bipolar Digital Memory			
Bipolar Digital Logic	10	25	30
MOS (Function)	31	87	130
MOS Memory			
MOS Microdevices	31	87	130
MOS Logic			
Analog			
Total Discrete			
Total Optoelectronic			

Table 2

Chips & Technologies, Inc. Worldwide Ranking by Semiconductor Markets (Sales in Millions of Dollars)

	1988 Rank	1987 Rank	1988 Revenue	Sales % Change 1987-1988	Industry % Change 1987-1988
Total Semiconductor	42	45	$160	42.9%	33.0%
Total Integrated Circuit	34	37	$160	42.9%	37.4%
Bipolar Digital (Function)	20	21	$ 30	20.0%	9.2%
Bipolar Digital Logic	20	20	30	20.0%	9.0%
MOS (Function)	33	36	$130	49.4%	54.5%
MOS Microdevices	13	15	130	49.4%	39.9%

Source: Dataquest
December 1989

Chips & Technologies, Inc.

Table 3

Chips & Technologies, Inc.
Estimated 1988 Semiconductor Revenue by Geographic Region
(Millions of Dollars)

	U.S.	Japan	Europe	ROW
Total Semiconductor	$89	$12	$7	$52
Total Integrated Circuit	$89	$12	$7	$52
Bipolar Digital (Function)	$16	$ 2	$1	$11
Bipolar Digital Memory				
Bipolar Digital Logic	16	2	1	11
MOS (Function)	$73	$10	$6	$41
MOS Memory				
MOS Microdevices	73	10	6	41
MOS Logic				
Analog				
Total Discrete				
Total Optoelectronic				

Source: Dataquest
December 1989

Citizen America Corporation

2450 Broadway Suite 600
Santa Monica, California 90404-3060
Telephone: (213) 453-0614
Fax: (213) 453-2814
Dun's Number: 12-098-4935

Date Founded: 1984

CORPORATE STRATEGIC DIRECTION

Citizen America Corporation, a wholly owned American subsidiary of Citizen Watch Company, Ltd., was established in 1984 as the US sales and marketing unit for Citizen's medium-speed dot matrix printers. Currently, the Company is involved in the sale and marketing of low-end dot matrix impact printers, as well as personal computers and 3.5-inch floppy disk drives. The Company's products are targeted at the personal computer and small office markets. The Company's customers are distributors, OEMs, system integrators, value-added resellers (VARs) and dealers, retail dealers, and mass merchandisers.

Citizen America's current corporate strategy is to expand its product lines to a level that will meet all consumer needs in the personal computer industry. In 1990, the Company took another step toward reaching its goal by introducing its first line of personal computers, which it plans to build into a complete line in the future.

Because Citizen America is a wholly owned subsidiary of Citizen Watch Company, Citizen America's financial position and performance is consolidated into Citizen Watch Company's financial statements. Specific financial information is not disclosed by the Company.

BUSINESS SEGMENT STRATEGIC DIRECTION

Impact Printers

The printer product line is the Company's main revenue generator. Citizen America is the seventh largest (by unit volume shipments) manufacturer of serial printers in the North American market, with an estimated 3 to 8 percent market share in 1989. The Company's printer product strategy is the following: Initiate entrance at the low-end, mass market level, establish a reputation as a quality manufacturer at that level, then extend product offerings into the higher end of the market.

The first two stages of the strategy have been completed. Citizen currently markets a full line of 9-wire dot matrix printers in the under $500 price range. In 1989, approximately 84 percent of the 9-wire printers that sold in the United States were priced under $500.

In 1989, the Company entered the third stage of its strategy by introducing a 24-wire dot matrix printer, the GSX-140. It is also priced at under $500. The Company is also investigating entering the non-impact printer market.

Personal Computers

The Company's product strategy in the personal computer market is to design and sell products as "foundation units." In other words, the Company designs and sells its personal computers as a base product with expansion capabilities. The user is able to add the options that specifically fulfill his or her computing needs. As the user's needs change, other options may be added to expand the product's capabilities. This strategy enables Citizen to sell a wide range of personal computer capabilities from a narrow line of products.

In 1990, Citizen introduced its first two personal computer products, the 286 and 386/SX. These two IBM-compatible personal computers come standard with 1 MByte of main memory (expandable to 8 MBytes) and a 1.2-MByte flexible disk drive. Optional accessories include hard disks and video cards.

Floppy Disk Drives

Citizen America's presence in the flexible disk drive market is limited. In 1989, the Company introduced two 3.5-inch flexible disk drives: a 1-inch high and a 3/4-inch high. The drives are targeted at the personal computer market.

1989 SALES OFFICE LOCATIONS

Santa Monica, California

MANUFACTURING LOCATIONS

None in the United States

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

KEY OFFICERS

Hiroshi Takahashi
President

Mike Del Vecchio
Senior vice president, Sales and Marketing

Robert Lee Davis
Vice president, Finance and Administration

Henry Oshima
Vice president, Corporate Planning

Bob Adam
Director of Marketing

PRINCIPAL INVESTORS

Citizen Watch Company, Ltd.—100 percent

FOUNDERS

Information is not available.

Commodore International Limited

1200 Wilson Drive
West Chester, Pennsylvania 19380
Telephone: (215) 413-9100
Fax: (215) 431-9156

Date Founded: 1958

CORPORATE STRATEGIC DIRECTION

Commodore International Limited is known for its microcomputers and hobby-oriented computers. Since the early 1980s, Commodore's strategy has been to increase its presence in both the home microcomputer market and the business PC market. Dataquest estimates that Commodore ranked second in the worldwide personal computer market in 1989 with an 8 percent share. Commodore is an international company, having had much more success with its PCs in the international market than in the domestic market. The Company's efforts will focus on business titles, higher-end education software, desktop publishing, and a new multimedia authoring system for audio, video, and advanced graphics applications in 1990.

Commodore has developed four product lines, each targeted at specific customer needs. According to Commodore, the Amiga is the Company's most noted product and was the single largest contributor in 1989, accounting for 45 percent of total worldwide sales. The Amiga is targeted toward business applications and professional users. The Commodore 64 and the Commodore 128D contributed 31 percent to total sales and are targeted toward home users. Other MS-DOS PC compatibles manufactured by Commodore are targeted toward the professional sector. These computers accounted for 24 percent of total 1989 sales. Lastly, Commodore has introduced the CDTV PLAYER. The PLAYER is a new category of consumer electronics product for the home that operates a new generation of interactive, multimedia applications on compact disc for education, information, reference, and entertainment. Commodore also manufactures semiconductors for use in Commodore machines, as well as for sale to third parties.

Commodore's total revenue increased 8 percent to $939.7 million*in fiscal year 1989 from $871.1 million in fiscal 1988. The Company's net income decreased 8 percent to $51.3 million in fiscal 1989 from $55.8 million in fiscal 1988. The strength of the US dollar versus European currencies had an unfavorable impact on sales, and a 14 percent increase in operating expenses had an adverse affect on net income. Commodore employs 3,200 people worldwide.

The Company's research and development (R&D) expenditure totaled $19.3 million in fiscal 1989, representing 2.05 percent of revenue. This research is focused in three major areas: hardware systems design, software systems design, and semiconductor chip design. The increase in R&D expenditure can be partially attributed to the efforts concentrated on the design of the Amiga UX 2500, the Amiga 3000, AmigaVision, and the PC60-III.

Commodore's capital expenditure for fiscal year 1989 was $24.0 million, which represented 2.6 percent of total revenue, compared with $10.5 million representing 1.2 percent of total revenue for fiscal 1988. The increase in expenditure primarily was due to the upgrading of production facilities in the United States and Hong Kong.

In fiscal 1989, European sales accounted for 69 percent of Commodore's revenue while North American sales accounted for nearly 24 percent. Asia and the Pacific Rim/Rest of World regions accounted for the remaining 7 percent of revenue for fiscal 1989. In fiscal 1988, Europe accounted for 68 percent of revenue; North America and Asia/Pacific Rim/Rest of World accounted for 26 percent and 6 percent, respectively. Commodore's largest markets in Europe are the United Kingdom, France, the Netherlands, and West Germany, accounting for the majority of Commodore's European revenue.

Commodore has started distributing its line of Amiga 500 computers through retail stores in the United States, taking full advantage of mass merchants. This

*All dollar amounts are in US dollars.

distribution practice has been successfully employed in Europe and is designed not only to expand distribution of the computers but also to attract software developers.

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

Personal Computers

The Amiga 500 is marketed to the consumer and education markets and the Amiga 2000, 2500, and 3000 to the education, government, and business sectors. Presently, Amiga computers run on Amiga DOS operating systems, while the Professional Amiga computers run on Amiga DOS, Windows, and OS/2 through use of Commodore bridgeboards. Commodore is currently field testing the Amiga UX, which runs on a UNIX operating system.

Commodore manufactures and sells a broad range of PC-compatible computers, using the Intel 8088, 80286, and 80386 microprocessor technology. These computers are marketed to the consumer, education, business, and government markets. The Professional Series PC Compatibles are aimed at professional users and include the Amiga 3000, Amiga 2500, and Amiga 2000. The Consumer Amiga Series includes the Amiga 500P and the 512K Amiga 500C.

The 64C and the 128D computers are marketed to both the home market and the professional market as entry-level, low-end computers. The Professional Series PC Compatibles include the 80386DX PC60-III, 80386SX PC50-II, and 80286 PC40-III. The home/office PC compatibles include the 8088 PC10-III, 8088 PC20-III, and 80286 PC30-III. These computers generated approximately 31 percent of total Commodore revenue in fiscal 1989, compared with 39 percent in fiscal year 1988. This decline in revenue generated is the result of reductions in the manufacturing of this product, market demand shifts to the Amiga 500, and lower prices for the older 8-bit technology.

Semiconductor Integrated Circuits

Commodore manufactures microprocessors, logic circuits, custom CMOS and NMOS large-scale integrated circuit (LSI) semiconductors, and read-only memory (ROM) chips. Commodore uses virtually all of its internally manufactured semiconductors in its own microcomputer systems. The Company sells the balance of semiconductor components to third parties.

Applications

Commodore introduced a new software system called AmigaVision in 1990. This software system is designed to aid users in developing new applications by combining graphics, text, and video and audio components in a multimedia format. Multimedia is a method of designing and integrating computer technologies on a single platform enabling the end user to input, create, manipulate, and output text, and create audio and video graphics, utilizing a single user interface. This software will support the overall corporate strategy by moving the Company into the business computer market.

The Company introduced several networking capabilities to help increase the appeal of the Amiga family of computers while also increasing its products' competitive positions in the United States market. The networking products include; the A2065-Ethernet, the A2060-Arcnet, the AS220-NetWare, TCP/IP and NFS, and DECnet. These products are key components in Commodore's strategy to significantly penetrate the business, higher education, and government markets.

Further Information

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$883.1	$889.3	$806.7	$871.1	$939.7
Percent Change	-	0.70	(9.29)	7.98	7.88
Capital Expenditure	$63.8	$201.3	$9.5	$10.5	$24.0
Percent of Revenue	7.22	22.64	1.18	1.21	2.55
R&D Expenditure	$46.5	$36.8	$38.7	$56.8	$19.3
Percent of Revenue	5.27	4.14	4.80	6.52	2.05
Number of Employees	3,800	3,100	3,200	3,200	3,200
Revenue ($K)/Employee	$232.39	$286.87	$252.09	$272.22	$293.66
Net Income	($113.9)	($127.9)	$28.6	$55.8	$51.3
Percent Change	-	(12.29)	122.36	95.10	(8.06)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$200.2	$349.0	$210.2	$180.3
Quarterly Profit	$9.6	$38.2	$12.4	($8.9)

Source: Commodore International Limited Annual Reports and Forms 20-F Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	42	44	32	26	24
International	58	56	68	74	76
Europe	54	51	63	68	69
Asia/Pacific	4	5	5	6	7

Source: Commodore International Limited Annual Reports and Forms 20-F Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	80	80
Indirect Sales	20	20
Distributor	20	20

Source: Dataquest (1990)

1990 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Norristown, Pennsylvania
Semiconductor manufacturing
West Chester, Pennsylvania
Product assembly

Europe

West Germany, Braunschweig
Personal computer and Amiga ranges

Asia/Pacific

Hong Kong
Personal computers

SUBSIDIARIES

North America

Commodore-Amiga, Inc. (United States)
Commodore Business Machines, Inc. (United States)
Commodore Business Machines Limited (Canada)
Commodore Semiconductor Group (United States)

Europe

Commodore AB (Sweden)
Commodore A.G. (Switzerland)
Commodore B.V. (Netherlands)
Commodore Buromaschinen GmbH (Austria)
Commodore Buromaschinen GmbH (West Germany)
Commodore Business Machines UK Limited (United Kingdom)
Commodore Computer Norge A/S (Norway)
Commodore Computers N.V./S.A. (Belgium)
Commodore Data A/S (Denmark)
Commodore Electronics Limited (Switzerland)
Commodore France S.A.R.L. (France)
Commodore Italiana S.p.A. (Italy)
Commodore Marketing International (United Kingdom)
Commodore S.A. (Spain)

Asia/Pacific

Commodore Business Machines Ltd. (Korea)
Commodore Business Machines Pty. Ltd. (Australia)
Commodore Computers (N.Z.) Limited (New Zealand)
Commodore Electronics Limited (Hong Kong)
Commodore Electronics Limited (Taiwan)
Commodore Japan Ltd. (Japan)

ROW

Commodore Electronics Limited (Bahamas)

KEY OFFICERS

Irving Gould
Chairman of the board and chief executive officer

Mehdi R. Ali
President

Henri Rubin
Executive vice president and chief operating officer

Joseph C. Benedetti
Vice president, general counsel, and secretary

Thomas H. Matson
Vice president and controller

Peter Bayley
Vice president, International Marketing

Mikio Izumi
Vice president, Japan

Carden N. Welsh
Treasurer

PRINCIPAL INVESTORS

Gould, Irving—20 percent

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	$509.2	$375.1	$416.6	$495.1	$547.9
Cash	8.4	31.8	49.0	78.0	114.1
Receivables	142.6	129.0	167.0	168.9	179.7
Inventory	314.7	202.3	193.3	241.0	247.9
Other Current Assets	43.5	12.0	7.3	7.2	6.2
Net Property, Plants	$125.0	$93.4	$76.2	$67.1	$73.6
Other Assets	$46.6	$36.4	$24.7	$16.3	$8.8
Total Assets	$680.8	$504.9	$517.5	$578.5	$630.3
Total Current Liabilities	$413.5	$243.4	$220.3	$246.4	$228.9
Long-Term Debt	$34.1	$154.5	$149.6	$130.0	$158.8
Other Liabilities	$10.7	$2.0	$2.6	$1.8	$2.3
Total Liabilities	$458.3	$399.9	$372.5	$378.2	$390.0
Total Shareholders' Equity	$222.5	$105.0	$145.0	$200.3	$240.3
Converted Preferred Stock	0	0	0	0	0
Common Stock	0.3	0.3	0.3	0.3	0.3
Other Equity	28.6	32.3	32.3	32.6	33.3
Retained Earnings	216.8	88.9	117.5	173.3	220.1
Treasury Stock and Other Liabilities	(23.2)	(16.5)	(5.1)	(5.9)	(13.4)
Total Liabilities and Shareholders' Equity	$680.8	$504.9	$517.5	$578.5	$630.3

Income Statement	1985	1986	1987	1988	1989
Revenue	$883.1	$889.3	$806.7	$871.1	$939.7
US Revenue	375.5	397.7	255.9	223.3	224.4
Non-US Revenue	507.6	491.6	550.8	647.8	715.3
Cost of Sales	$718.0	$718.8	$594.3	$603.2	$640.6
R&D Expense	$46.5	$36.8	$38.7	$56.8	$19.3
SG&A Expense	$199.6	$201.3	$138.2	$160.8	$183.8
Capital Expense	$63.8	$201.3	$9.5	$10.5	$24.0
Pretax Income	($124.6)	($123.7)	$32.4	$67.6	$60.6
Pretax Margin (%)	(14.11)	(13.91)	4.02	7.76	6.45
Effective Tax Rate (%)	46	NA	30	29	17
Net Income	($113.9)	($127.9)	$28.6	$55.8	$51.3
Shares Outstanding, Millions	31.1	31.3	32.1	31.8	32.4
Per Share Data					
Earnings	($3.66)	($4.08)	$0.71	$1.51	$1.55
Dividend	0	0	0	0	0
Book Value	$7.15	$3.35	$4.52	$6.30	$7.42

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

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	1.23	1.54	1.89	2.01	2.39
Quick (Times)	0.47	0.71	1.01	1.03	1.31
Fixed Assets/Equity (%)	56.18	88.95	52.55	33.50	30.63
Current Liability/Equity (%)	185.84	231.81	151.93	123.02	95.26
Total Liabilities/Equity (%)	205.98	380.86	256.90	188.82	162.30
Profitability (%)					
Return on Assets	(16.75)	(21.57)	5.59	10.18	8.49
Return on Equity	(41.65)	(78.11)	22.88	32.32	23.29
Profit Margin	(12.90)	(14.38)	3.55	6.41	5.46
Other Key Ratios					
R&D Spending % of Revenue	5.27	4.14	4.80	6.52	2.05
Capital Spending % of Revenue	7.22	22.64	1.18	1.21	2.55
Employees	3,800	3,100	3,200	3,200	3,200
Revenue ($K)/Employee	$232.39	$286.87	$252.09	$272.22	$293.66
Capital Spending % of Assets	9.37	39.87	1.84	1.82	3.81

NA = Not available

Source: Commodore International Limited Annual Reports and Forms 20-F Dataquest (1990)

Commodore International Limited

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West Chester, Pennsylvania 19380
Telephone: (215) 413-9100
Fax: (215) 431-9156

Date Founded: 1958

CORPORATE STRATEGIC DIRECTION

Commodore International Limited is known for its microcomputers and hobby-oriented computers. Since the early 1980s, Commodore strategy has been a continuous effort to maintain a significant presence in both the home microcomputer market and the business PC market. In 1988, Commodore ranked sixth in worldwide personal computer market share, Dataquest estimates. Commodore views itself as an international company, having had much more success with its PCs in the international market than in the domestic market. In 1990, the Company's efforts will focus on business titles, higher-end education software, desktop publishing, and a new multimedia authoring system for audio, video, and advanced graphics applications.

Commodore has developed three product lines, each targeted at specific customer needs. The Amiga, the Company's most important product, was the largest contributor to sales in 1989, accounting for 45 percent. It is targeted toward business applications and professional users. The C64/C128D contributed 31 percent to total sales and is targeted toward home users. Other MS-DOS PC compatibles are manufactured by Commodore and are targeted toward the professional sector. These computers accounted for 24 percent of total 1989 sales.

Commodore's total revenue increased 8 percent to $939.7 million* in fiscal 1989 from $871.1 million in fiscal 1988, but its net income decreased 8 percent to $51.3 million from $55.8 million in fiscal 1988. Commodore employs 4,500 people worldwide.

The non-U.S. sales contribution to the total revenue grew to $715.3 million in fiscal 1989. This constituted 76 percent total revenue, up from 74 percent in fiscal 1988.

The Company's research and development expenditures totaled $19.3 million in fiscal 1989, representing 2.1 percent of revenue. Capital spending totaled $24.0 million during the same period, representing 2.6 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

Personal Computers

Commodore's strategy is to provide superior microcomputer technology at an attractive price. Its computers are aimed at separate markets. The Amiga 500 and the traditional Commodore computers are aimed at the education and home sectors, whereas the Amiga 2000 Series and Commodore's line of MS-DOS PC-compatible computers are aimed at the government and business sectors.

Further Information

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

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$883.1	$889.3	$806.7	$871.1	$939.7
Percent Change	(43.49)	0.70	(9.29)	7.98	7.88
Capital Expenditure	$63.8	$201.3	$9.5	$10.5	$24.0
Percent of Revenue	7.22	22.64	1.18	1.21	2.55
R&D Expenditure	$46.5	$36.8	$16.4	$15.4	$19.3
Percent of Revenue	5.27	4.14	2.03	1.76	2.05
Number of Employees	3,800	3,100	4,500	4,500	4,500
Revenue ($K)/Employee	$232.39	$286.87	$179.27	$193.58	$208.82
Net Income	($113.9)	($127.9)	$28.6	$55.8	$51.3
Percent Change	(179.21)	12.29	(122.36)	95.10	(8.06)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	N/A	$180.3	$165.3	N/A
Quarterly Profit	N/A	($8.90)	($6.50)	N/A

N/A = Not Available

Source: Commodore International Limited
Annual Reports and Forms 20-F
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	42.00	44.00	32.00	26.00	24.00
International	58.00	56.00	68.00	74.00	76.00
Europe	54.00	51.00	63.00	68.00	69.00
Asia/Pacific	4.00	5.00	5.00	6.00	7.00

Source: Commodore International Limited
Annual Reports and Forms 20-F

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	80.00	80.00
Indirect Sales	20.00	20.00
Distributor	20.00	20.00

Source: Dataquest
January 1990

SALES OFFICE LOCATIONS

North America—Not Available
Japan—Not Available
Europe—Not Available
Asia/Pacific—Not Available
ROW—Not Available

MANUFACTURING LOCATIONS

North America

Norristown, Pennsylvania
Semiconductor manufacturing

Europe

West Germany, Braunschweig
Personal computer and Amiga ranges

Asia/Pacific

Hong Kong
Personal computers

SUBSIDIARIES

North America

Commodore-Amiga, Inc. (United States)
Commodore Business Machines, Inc. (United States)
Commodore Business Machines Limited (Canada)
Commodore Semiconductor Group (United States)

Japan

Commodore Japan Ltd.

Europe

Commodore AB (Sweden)
Commodore A.G. (Switzerland)
Commodore B.V. (Netherlands)
Commodore Buromaschinen GmbH (Austria)
Commodore Buromaschinen GmbH (West Germany)
Commodore Business Machines U.K. Limited (United Kingdom)
Commodore Computer Norge A/S (Norway)
Commodore Computers N.V./S.A. (Belgium)
Commodore Data A/S (Denmark)
Commodore Electronics Limited (Switzerland)
Commodore France S.A.R.L. (France)
Commodore Italiana S.p.A. (Italy)
Commodore S.A. (Spain)

Asia/Pacific

Commodore Business Machines Ltd.
Commodore Business Machines Pty. Ltd. (Australia)
Commodore Electronics Limited (Hong Kong)
Commodore Electronics Limited (Taiwan)

ROW

Commodore Electronics Limited (Bahamas)

KEY OFFICERS

Irving Gould
Chairman of the board and chief executive officer

Mehdi R. Ali
President

Henri Rubin
Executive vice president and chief operating officer

Joseph C. Benedetti
Vice president, general counsel, and secretary

Thomas H. Matson
Vice president and controller

Peter Bayley
Vice president, International Marketing

Mikio Izumi
Vice president, Japan

Brian C. Weyman
Vice president, Worldwide Manufacturing and Purchasing

Carden N. Welsh
Treasurer

PRINCIPAL INVESTORS

Bahamas—19.4 percent

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

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$509.2	$375.1	$416.6	$495.1	$547.9
Cash	8.4	31.8	49.0	78.0	114.1
Receivables	142.6	129.0	167.0	168.9	179.7
Marketable Securities	0	0	0	0	0
Inventory	314.7	202.3	193.3	241.0	247.9
Other Current Assets	43.5	12.0	7.3	7.2	6.2
Net Property, Plants	$125.0	$93.4	$76.2	$67.1	$73.6
Other Assets	$46.6	$36.4	$24.7	$16.3	$8.8
Total Assets	$680.8	$504.9	$517.5	$578.5	$630.3
Total Current Liabilities	$413.5	$243.4	$220.3	$246.4	$228.9
Long-Term Debt	$34.1	$154.5	$149.6	$130.0	$158.8
Other Liabilities	$10.7	$2.0	$2.6	$1.8	$2.3
Total Liabilities	$458.3	$399.9	$372.5	$378.2	$390.0
Total Shareholders' Equity	$222.5	$105.0	$145.0	$200.3	$240.3
Converted Preferred Stock	0	0	0	0	0
Common Stock	0.3	0.3	0.3	0.3	0.3
Other Equity	28.6	32.3	32.3	32.6	33.3
Retained Earnings	216.8	88.9	117.5	173.3	220.1
Treasury Stock and Other Liabilities	(23.2)	(16.5)	(5.1)	(5.9)	(13.4)
Total Liabilities and Shareholders' Equity	$680.8	$504.9	$517.5	$578.5	$630.3

Income Statement	1985	1986	1987	1988	1989
Revenue	$883.1	$889.3	$806.7	$871.1	$939.7
U.S. Revenue	375.5	397.7	255.9	223.3	224.4
Non-U.S. Revenue	507.6	491.6	550.8	647.8	715.3
Cost of Sales	$718.0	$718.8	$594.3	$603.2	$640.6
R&D Expense	$46.5	$36.8	$16.4	$15.4	$19.3
SG&A Expense	$199.6	$201.3	$138.2	$160.8	$183.8
Capital Expense	$63.8	$201.3	$9.5	$10.5	$24
Pretax Income	($124.6)	($123.7)	$32.4	$67.6	$60.6
Pretax Margin (%)	(14.11)	(13.91)	4.02	7.76	6.45
Effective Tax Rate (%)	46.00	N/A	30.00	29.00	17.00
Net Income	($113.9)	($127.9)	$28.6	$55.8	$51.3
Shares Outstanding, Millions	31.1	31.3	32.1	31.8	32.4
Per Share Data					
Earnings	($3.66)	($4.08)	$0.71	$1.51	1.55
Dividends	0	0	0	0	0
Book Value	$7.15	$3.35	$4.52	$6.30	$7.42

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

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	1.23	1.54	1.89	2.01	2.39
Quick (Times)	0.47	0.71	1.01	1.03	1.31
Fixed Assets/Equity (%)	56.18	88.95	52.55	33.50	30.63
Current Liability/Equity (%)	185.84	231.81	151.93	123.02	95.26
Total Liabilities/Equity (%)	205.98	380.86	256.90	188.82	162.30
Profitability (%)					
Return on Assets	(16.75)	(21.57)	5.59	10.18	8.49
Return on Equity	(41.65)	(78.11)	22.88	32.32	23.29
Profit Margin	(12.90)	(14.38)	3.55	6.41	5.46
Other Key Ratios					
R&D Spending % of Revenue	5.27	4.14	2.03	1.76	2.05
Capital Spending % of Revenue	7.22	22.64	1.18	1.21	2.55
Employees	3,800	3,100	4,500	4,500	4,500
Revenue ($K)/Employee	$232.39	$286.87	$179.27	$193.58	$208.82
Capital Spending % of Assets	9.37	39.87	1.84	1.82	3.81

N/A = Not available

Source: Commodore International Limited
Annual Reports and Forms 20-F
Dataquest
January 1990

Compaq Computer Corporation

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Houston, Texas 77070
Telephone: (713) 370-0670
Fax: (713) 374-1740
Dun's Number: 00-389-7733

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Since its inception in 1982, Compaq Computer Corporation has been a technology leader in the manufacturing and marketing of industry standard personal computers. Dataquest estimates that for the year ended December 31, 1989, Compaq had a worldwide unit market share of 14 percent in the portable PC market and 3 percent for all PCs. In April 1990, Compaq was ranked 157 in *Fortune* magazine's list of top 500 manufacturing companies.

The slow growth of the PC market affected Compaq's sales and earnings in 1989. Compaq posted its first-ever earnings drop during the fourth quarter ended December 31. In that quarter, the Company's sales increased 18 percent; however, earnings dropped 14 percent from the same quarter in 1988. Overall, Compaq's sales for 1989 grew 39 percent over 1988 levels to $2.9 billion,* and earnings were up 31 percent to $333 million. International sales, principally in Europe, accounted for 45 percent of revenue, growing 62 percent in 1989 to $1.3 billion. North American revenue increased 24 percent over 1988 levels, to $1.6 billion in 1989.

With low-end PC sales slowing, Compaq believes that its future lies in the high-end systems market. Dataquest estimates that worldwide shipments of PCs will grow between 12 percent and 15 percent in 1990 compared with 20 percent in 1989. Compaq expects its revenue to run 3 percent to 5 percent ahead of estimated unit market levels because of sales of high-end 386- and 486-based products.

Originally focused on the portables market, Compaq currently offers a full line of personal computers, including notebook, portable, and desktop systems. As the personal computer market developed, Compaq concentrated its efforts in the high-performance end of the market and focused on business and professional users. Compaq's strategy requires the Company to continue to introduce new products that offer technological advances and features beyond those of its competitors. The Company believes that its products' performance features are a more important factor than price in the purchase decisions of its target market.

Compaq sells its products exclusively through independent, full-service computer specialty dealers for resale to end users. The Company provides training and support programs to over 3,000 Authorized Dealers in 64 countries worldwide. Because of the increasingly complex and sophisticated nature of the Compaq product line, the company has expanded its dealer support programs. Under the SalesPaq program, Compaq has included incentives for resellers to participate in advanced technical training and improve service capabilities. In response, Compaq resellers have enhanced their level of service, employing approximately 3,500 systems engineers and 10,000 service technicians to support new product sales. In addition, Compaq has opened a service and repair center in Stirling, Scotland, to support its European market base.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Desktop Computers

Compaq's products consist of notebook, portable, and desktop personal computers and PC systems. These computers incorporate microprocessors developed by Intel Corporation, with the first portable product

*All dollar amounts are in US dollars.

based on the Intel 8088. With each subsequent microprocessor family—the 8086, 80286, 80386, 80386SX, and 80486—Compaq has added increased performance to its products while maintaining compatibility with its earlier computers. In keeping with its commitment to industry standards, Compaq supports the Extended Industry Standard Architecture (EISA), which is used to accommodate high-performance 32-bit expansion boards.

For 1989, desktop products provided the bulk of Compaq's sales. Product offerings in the desktop line include the Deskpro 286N, the Deskpro 286e, the Deskpro 386 series, and the recently introduced Deskpro 486/25 and Systempro. During 1989, the 386-based personal computers exceeded sales of the 286-based product, accounting for approximately 72 percent of Compaq's desktop PC unit sales according to Dataquest estimates.

During the fourth quarter of 1989, Compaq introduced the Deskpro 486/25 and the Systempro personal computer system. The Deskpro 486/25 uses Intel's 486 microprocessor teamed with the EISA 32-bit I/O bus architecture. With its optional UNIX operating system and 15-mips performance rating, the Deskpro is targeted to markets that require high performance, such as CAD, software development, and portfolio management. Although announced in 1989, the product was unavailable for delivery until 1990.

The Systempro PC System is based on Intel 386 and 486 processors and the EISA bus. The product actually comprises a range of machines running on one or two 386 or 486 chips. It is available with multidisk arrays containing up to eight disks for a total storage capacity of 4.28GB. The system is designed to handle multiple users and can act as a hub for up to 100 PCs in a network environment. Performance speeds range from 8 to 40 mips. Compaq has positioned the Systempro as a cost-effective alternative to minicomputers for multiuser applications.

With the introduction of the Deskpro 486/25 and Systempro products, Compaq products are moving beyond the normal classification of the personal computer market. Although there were no sales of these products in 1989, Dataquest expects both products to have an impact in the minicomputer and PC LAN market segments. The Deskpro also is expected to affect the low-end workstation market in the area of CAD/CAE and software development applications.

Portable Computers

In its portable line, the Compaq SLT/286 led sales for 1989, representing over 68 percent of Compaq's portable unit sales for the year. Overall, portable products accounted for 24 percent of Compaq's unit sales during the year. Currently, the portable product line includes the 80286-based Compaq Portable III and the Compaq Portable 386. In October 1989, Compaq introduced the Compaq LTE and LTE/286 notebook-sized personal computers. These six-pound notebook products offer 20MB and 40MB internal fixed disk drives and use a 3.5-inch diskette drive. The notebook products are targeted toward professionals who travel frequently, such as executives, sales and service representatives, and journalists.

Other Investments and Activities

Compaq currently has a cross-license agreement with IBM that includes Micro Channel patents; however, there are no plans at this time to develop an MCA product. In addition to its agreements with IBM, Compaq signed an agreement with Novell, Inc., in February 1990 to jointly develop enhanced network-system fault tolerance for use in PC network environments.

Compaq has maintained its investment in Conner Peripherals, Inc., which it began in 1986. As of December 1989, Compaq controlled nearly 31 percent of Conner's equity securities. Compaq continues to buy disk drives from Conner with purchases of $204 million during 1989.

In March 1990, Compaq made an estimated $5 million to $10 million investment in Nexgen Microsystems. Nexgen currently is developing a microprocessor product that is expected to compete with the Intel 80486. Although the product is not yet available, Nexgen reports that the chip will be compatible with the existing Intel 486 design, allowing users to run existing software on systems incorporating the Nexgen chip.

Further Information

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$503,880	$620,138	$1,224.1	$2,065.5	$2,876,062
Percent Change	53.15	23.07	96.00	68.74	-
Capital Expenditure	$36,492	$50,402	$104,393	$273,477	$367,645
Percent of Revenue	7.24	8.13	8.53	13.24	10.0
R&D Expenditure	$15,996	$26,594	$47,104	$74,859	$132,474
Percent of Revenue	3.17	4.29	3.85	3.62	4.6
Number of Employees	1,860	2,200	6,900	8,000	9,700
Revenue ($K)/Employee	$270.90	$281.88	$177.41	$258.19	$296.50
Net Income	$26,595	$42,897	$136,267	$255,242	$333,300
Percent Change	106.71	61.30	217.66	87.31	-

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$682.90	$722.08	$683.00	$788.1
Quarterly Profit	$83.21	$83.94	$87.00	$79.0

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

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	89.80	81.00	74.00	61.40	55.0
International	10.20	19.00	26.00	38.60	45.0
Europe	10.00	17.50	23.80	35.60	41.8
ROW	0.20	1.50	2.20	3.00	3.2

Source: Compaq Computer Corporation Annual Reports and Forms 10-K Dataquest (July 1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1987
Direct Sales	-	-
Indirect Sales	100.00	100.00
Dealers	100.00	100.00

Source: Compaq Computer Corporation Forms 10-K

1989 SALES OFFICE LOCATIONS

North America—17
Europe—17
Asia/Pacific—1

MANUFACTURING LOCATIONS

North America

Houston, Texas
Personal computers, surface-mount printed circuit boards

Europe

Erskine, Scotland
Personal computers

Asia/Pacific

Singapore
Printed circuit boards

SUBSIDIARIES

North America

Compaq Canada Inc./Ubciroiree D/B/A Compaq Canada, Inc. (Canada)
Compaq Finance Corp., Ltd. (United States)
Compaq Foreign Sales Corp. (United States)
Compaq International Corp. (United States)
Compaq Telecommunication Corp. (United States)

Europe

Compaq Computer AB
Compaq Computer AG (Switzerland)
Compaq Computer A.S. (Denmark)
Compaq Computer B.V. (Netherlands)
Compaq Computer GmbH (W. Germany)
Compaq Computer Group Ltd. (United Kingdom)
Compaq Computer Ltd. (United Kingdom)
Compaq Computer Manufacturing Ltd. (United Kingdom)
Compaq Computer Norway A.S. (Norway)
Compaq Computer N.V./S.A. (Belgium)
Compaq Computer S.A. (Spain)
Compaq Computer S.A.R.L. (France)
Compaq Computer S.p.A. (Italy)
Compaq Scandinavia AB (Sweden)
Deskpro Computer AB (Sweden)

Asia/Pacific

CCA Systems Pty. Ltd. (Australia)
Compaq Computer Asia Pte. Ltd. (Singapore)
Compaq Computer Holding Pte. Ltd. (Singapore)
Compaq Computer New Zealand Ltd. (New Zealand)
Compaq Computer Hong Kong Ltd. (Taiwan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Novell Inc.
In February, Compaq entered into a technology development agreement with Novell, Inc., to apply resources of both companies toward the enhancement of network systems fault tolerance. The purpose of the joint effort is to develop products that take advantage of Novell's system fault tolerance and Compaq's multiprocessing technology to improve reliability for PC-based networks.

1989

IBM
Both companies signed a patent cross-licensing agreement in which both companies granted to one another a worldwide, nonexclusive license covering patents having an effective filing date before July 1, 1993.

1988

Digital Equipment Corporation
A technology exchange agreement to ensure connectivity of the two companies' products. In addition, Digital will provide support for Compaq personal computers on DECnet/OSI networks.

1988

EISA
On September 13, Compaq and eight other personal computer manufacturers entered into EISA Patent License Agreements that cover worldwide patent rights filed prior to October 1995 associated with the EISA I/O subsystems ("EISA Patents"). The list of companies involved in the "EISA Alliance" has since grown to include over 60 manufacturers of personal computers and related products.

Microsoft
Compaq has nonexclusive licenses from Microsoft for the MS-DOS and MS OS/2 operating systems, Microsoft GW-Basic computer language, and other Microsoft software.

KEY OFFICERS

Joseph R. Canion
President and chief executive officer

Eckhard Pfeiffer
President, European and International Division

Daryl J. White
Senior vice president, Finance, and chief financial officer

Michael S. Swavely
President, North American Division

B. Kevin Ellington
Senior vice president, International Development

James M. Harris
Senior vice president, Engineering

Robert E. Vieau
Senior vice president, Corporate Manufacturing

Gary Stimac
Senior vice president, Systems Engineering

PRINCIPAL INVESTORS

Lazard Freres and Co.
Kleiner Perkins et al.
Sevin L J et al.

FOUNDERS

Rod Canion
James M. Harris
William F. Murtro
Seven other former Texas Instruments employees

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$239,682	$259,779	$680,828	$1,114,642	$1,312,499
Cash	76,984	57,133	132,276	281,179	161,313
Receivables	83,624	116,490	254,596	428,338	530,228
Inventory	75,783	81,190	275,988	386,973	559,042
Other Current Assets	3,291	4,966	17,963	18,152	61,916
Investments in Affiliated Companies	0	$9,535	$18,896	$35,731	$58,671
Net Property, Plants	$66,733	$101,975	$192,271	$428,937	$705,475
Other Assets	$5,583	$6,392	$9,040	$10,687	$13,742
Total Assets	$311,998	$377,681	$901,030	$1,589,997	$2,090,387
Total Current Liabilities	$99,253	$118,837	$342,558	$479,847	$563,448
Long-Term Debt	$75,000	$72,809	$148,915	$274,930	$274,434
Other Liabilities	$1,137	$2,733	$10,025	$20,666	$80,872
Total Liabilities	$175,390	$194,379	$501,498	$775,443	$918,754
Total Shareholders' Equity	$136,608	$183,302	$399,532	$814,554	$1,171,635
Converted Preferred Stock	0	0	0	0	0
Common Stock	265	270	342	385	393
Other Equity	96,780	100,572	180,463	340,200	363,973
Retained Earnings	39,563	82,460	218,727	473,969	807,269
Total Liabilities and Shareholders' Equity	$311,998	$377,681	$901,030	$1,589,997	$2,090,389

Income Statement	1985	1986	1987	1988	1989
Revenue	$503,880	$620,138	$1,224.1	$2,065.5	$2,876,062
US Revenue*	452,484	502,312	905,834	1,268.2	-
Non-US Revenue	51,396	117,826	318,266	797,283	-
Cost of Sales	$325,804	$360,698	$717,336	$1,233.3	$1,715,243
R&D Expense	$15,996	$26,594	$47,104	$74,859	$132,474
SG&A Expense	$109,934	$152,043	$225,996	$397,363	$538,721
Capital Expense	$36,492	$50,402	$104,393	$273,477	$367,645
Pretax Income	$8,364	$76,536	$228,065	$366,847	$484,539
Pretax Margin (%)	1.66	12.34	18.63	17.76	-
Effective Tax Rate (%)	39.30	41.70	40.70	32.50	34.1
Net Income	$26,595	$42,897	$136,267	$255,242	$333,300
Shares Outstanding, Millions	26.46	27.04	34.17	38.55	39.35
Per Share Data					
Earnings	$0.90	$1.33	$3.57	$6.27	$7.76
Dividend	0	0	0	0	0
Book Value	$5.16	$6.78	$11.69	$21.13	$29.77

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	2.41	2.19	1.99	0.00	2.33
Quick (Times)	1.65	1.50	1.18	(0.80)	1.34
Fixed Assets/Equity (%)	48.85	55.63	48.12	52.66	60.21
Current Liabilities/Equity (%)	72.66	64.83	85.74	58.91	48.09
Total Liabilities/Equity (%)	128.39	106.04	125.52	95.20	78.42
Profitability (%)					
Return on Assets	9.79	12.44	21.31	56.56	31.86
Return on Equity	21.65	26.82	46.76	42.05	33.56
Profit Margin	5.28	6.92	11.13	12.36	11.59
Other Key Ratios					
R&D Spending % of Revenue	3.17	4.29	3.84	3.60	4.6
Capital Spending % of Revenue	7.24	8.13	8.53	13.24	12.78
Employees	1,860	2,200	6,900	8,000	9,700
Revenue ($K)/Employee	$270.90	$281.88	$177.41	$258.19	$296.5
Capital Spending % of Assets	11.70	13.35	11.59	17.20	17.6

*US revenue should be read as North American revenue. It includes data for the United States and Canada.

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

COMPAREX Informationssysteme GmbH

Gottlieb-Daimler-Strasse 10
D-6800 Mannheim 1, Germany
Telephone: 06 21-40 09-0
Fax: 06 21-40 09-744
Dun's Number: 32-061-4720

Date Founded: 1987

CORPORATE STRATEGIC DIRECTION

COMPAREX Informationssysteme GmbH was formed in January 1987 by BASF and Siemens as a joint marketing and service venture for IBM plug-compatible mainframes and peripherals. The new company was formed by the IBM plug-compatible divisions of BASF and Siemens. COMPAREX is a highly diversified multinational corporation with headquarters in Germany. The Company develops, markets, and supports mainframe computers and peripherals devices through an extensive sales and support organization. However, COMPAREX does not sell its products in the United States. COMPAREX is owned by BASF AG (66.5 percent) and Siemens AG (33.5 percent). Revenue results from the sales, rental, and maintenance of electronic data processing machines and software products. Revenue in fiscal 1989 was affected by negotiations with Hitachi Ltd. concerning the takeover of National Advanced Systems (NAS), Europe. The intended takeover by COMPAREX was unsuccessful.

COMPAREX competes across the range of IBM ES/9000 models. The Company also competes against other plug-compatible manufacturers selling Hitachi-based systems such as Hitachi Data Systems (HDS) and Fujitsu-based systems such as those from Amdahl.

Sales for fiscal 1989 were DM 919.5 million (US$489.1 million), a 5 percent decrease from 1988 revenue of DM 961.3 million (US$546.2 million). (Percentage changes refer only to DM amounts; US$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) Net income decreased 36 percent from DM 47.7 million (US$27.1 million) in fiscal 1988 to DM 30.5 million (US$16.2 million) in 1989. International sales were DM 437 million (US$232.4 million), representing 48 percent of revenue. Peripherals accounted for 62 percent of sales while CPUs accounted for 38 percent. COMPAREX employs 1,145 people worldwide, 642 of which are in Germany. The Company employs 331 people in marketing and engineering, 558 in maintenance and technical divisions, and 256 in other areas.

Financial tables are not included in this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

Revenue from peripherals represented 52 percent of sales, mainframes 32 percent, and servicing/technical support 16 percent. COMPAREX offers a variety of computer storage products including high-speed semiconductor storage systems, disk controllers, cartridge tape storage systems, optical storage systems, optical channel extenders, and automatic mass storage systems. The Company offers a range of other peripherals including laser printers, line printers, and software products.

COMPAREX provides three ranges of IBM plug-compatible models, all based on Hitachi-manufactured processors, the 8/8X, 8/9X, and 9/9XX Series. The 7/6X, 7/7X, 7/8X, and 7/9X models have been discontinued and are no longer manufactured. The 8/8X main storage starts at 32MB and increases in increments of 32MB to 256MB. The 8/9X main storage starts at 64MB and increases to 2,048MB. The 9/9XX main storage starts at 128MB and increases to 2,048MB. Working storage is 256 or 512KB for the 8/8X models, 1 to 4MB for the 8/9X series, and 4MB for the 9/9XX series.

The 9/9XX models provide separate expanded storage facilities—the 9/940 provides up to 8GB. Sales of mainframe products represented 32 percent of revenue.

COMPAREX is a stable international operation that maintains a support staff for wide geographic coverage. Service and technical support represented 16 percent of revenue.

Further Information

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

1989 SALES OFFICE LOCATIONS

Europe—32
ROW—12

MANUFACTURING LOCATIONS

COMPAREX has no manufacturing facilities.

SUBSIDIARIES

Europe

COMPAREX Informationssysteme AG (Switzerland)
COMPAREX Informations Systeme Ges. mbH (Austria)
COMPAREX Information Systems AB (Sweden)
COMPAREX Information Systems b.v. (Netherlands)
COMPAREX Information Systems Ltd. (United Kingdom)
COMPAREX Information Systems SA (Belgium)
COMPAREX Informations Systems SA (France)
COMPAREX Sistemas Informaticos SA (Spain)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Hitachi Data Systems
Hitachi will manufacture products for COMPAREX in France.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Rolf Brillinger
Chairman

Horst Kinzius-Franken
Executive director, Finance and Administration, and deputy chairman

Ramon Gil de Luigi
Executive director, Technical Support

Hans-Dieter Jonescheit
Executive director, Sales

PRINCIPAL INVESTORS

BASF AG—66.5 percent
Siemens AG—33.5 percent

FOUNDERS

Information is not available.

Compaq Computer Corporation

20555 FM 149
Houston, Texas 77070
Telephone: (713) 370-0670
Fax: (713) 374-1740
Dun's Number: 00-389-7733

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

After having been a "transportable computer vendor," positioned mostly as a niche market player, Compaq Computer Corporation now offers a broad range of products. Unlike vendors that introduce a whole family of products at the same time, Compaq traditionally announces a single product, which in most cases offers new, advanced technological features. Supported by its high level of technological expertise, Compaq's strategy has been to anticipate the market developments and keep its product range extremely well updated. The Company is looking toward the growth of markets in networking, computer-aided design (CAD) and engineering, desktop publishing, and artificial intelligence (AI) to help fuel its growth in the 1990s.

One of Compaq's main goals in the next year will be the successful development of Extended Industry Standard Architecture (EISA). EISA provides a 32-bit extension to the present 8- and 16-bit industry-standard bus that controls the flow of data inside most of today's personal computers; it will serve as an alternative to the IBM-designated Micro Channel Architecture-based personal computers. Compaq has joined 70 other PC vendors to announce the EISA consortium. Compaq, being the largest personal computer company in direct competition with IBM, has the most to gain or lose from the success of this group.

Compaq's total revenue increased 69 percent to $2.1 billion* in fiscal 1988 from $1.1 billion in fiscal 1987. Net income increased 87 percent to $255.2 million in fiscal 1988 from $136.2 million in fiscal 1987. Compaq employs 8,000 people worldwide.

U.S. sales contribution to the total revenue grew to $1,268.5 million in 1988. U.S. sales accounted for 61 percent of the total, down from 74 percent in fiscal 1987. Sixty percent of Lotus' sales offices are in U.S. locations. Research and development expenditures totaled $74.9 million in fiscal 1988, representing 4 percent of revenue. Capital spending expenditures totaled $273.5 million in fiscal 1988, representing 13 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

Personal Computers

Compaq is a world leader in the manufacturing of desktop, portable, and laptop personal computers and is the leading worldwide supplier of 80386 business personal computers. Compaq products strongly support advancements to the Industry Standard Architecture on which a majority of the world's business personal computers are based. Compaq made corporate history in 1987 by becoming the first company to surpass the billion dollar milestone in sales after only five years of operations. In 1988, it exceeded $2 billion in revenue.

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

The Company's overall goal is to become the leading personal computer manufacturer and supplier. At the present time, it ranks third of all the personal computer manufacturers in the United States with 5.9 percent of the U.S. market share. It is the second-largest seller of personal computers in Europe.

Workstations

Compaq is not yet a major player in the workstation market. In 1988, Compaq had less than 1 percent market share.

Further Information

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

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

	1984	1985	1986	1987	1988
Five-Year Revenue	$329,013	$503,880	$620,138	$1,224.1	$2,065.5
Percent Change	-	53.15	23.07	96.00	68.74
Capital Expenditure	$30,276	$36,492	$50,402	$104,393	$273,477
Percent of Revenue	9.20	7.24	8.13	8.53	13.24
R&D Expenditure	$10,961	$15,996	$26,594	$47,104	$74,859
Percent of Revenue	3.33	3.17	4.29	3.85	3.62
Number of Employees	1,300	1,860	2,200	6,900	8,000
Revenue ($K)/Employee	$253.09	$270.90	$281.88	$177.41	$258.19
Net Income	$12,866	$26,595	$42,897	$136,267	$255,242
Percent Change	-	106.71	61.30	217.66	87.31

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$682.90	$722.08	$683.00	N/A
Quarterly Profit	$83.21	$83.94	$87.00	N/A

N/A = Not Available

Source: Compaq Corporation
Annual Reports and Forms 10-K
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1984	1985	1986	1987	1988
North America	100.00	89.80	81.00	74.00	61.40
International	0	10.20	19.00	26.00	38.60
Europe	0	10.00	17.50	23.80	35.60
ROW	0	0.20	1.50	2.20	3.00

Source: Compaq Corporation
Annual Reports and Forms 10-K
Dataquest
January 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1987	1988
Direct Sales	0	0
Indirect Sales	100.00	100.00
Dealer	100.00	100.00

Source: Compaq Corporation
Forms 10-K

1988 SALES OFFICE LOCATIONS

North America—17
Europe—10
Asia/Pacific—1

MANUFACTURING LOCATIONS

North America

Houston, Texas
Personal computers, surface-mount printed circuit boards

Europe

Erskine, Scotland
Personal computers

Asia/Pacific

Singapore
Printed circuit boards

SUBSIDIARIES

North America

Compaq Canada Inc./Ubciroiree D/B/A Compaq Canada, Inc. (Canada)
Compaq Finance Corp., Ltd. (United States)
Compaq Foreign Sales Corp. (United States)
Compaq International Corp. (United States)
Compaq Telecommunication Corp. (United States)

Europe

Compaq Computer AG (Switzerland)
Compaq Computer B.V. (Netherlands)
Compaq Computer GmbH (Germany)
Compaq Computer Group Ltd. (United Kingdom)
Compaq Computer Ltd. (United Kingdom)
Compaq Computer Manufacturing Ltd. (United Kingdom)
Compaq Computer N.V./S.A. (Belgium)
Compaq Computer Norway A.S.(Norway)
Compaq Computer S.A. (Spain)
Compaq Computer S.A.R.L. (France)
Compaq Computer S.P.A. (Italy)
Deskpro Computer AB (Sweden)

Asia/Pacific

CCA Systems Pty. Ltd. (Australia)
Compaq Asia Pte. Ltd. (Singapore)
Compaq Computer Asia Pte. Ltd. (Singapore)
Compaq Computer New Zealand Ltd. (New Zealand)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

IBM
Both companies signed a patent cross-licensing agreement in which both companies granted to one another a worldwide, nonexclusive license covering patents having an effective filing date before July 1, 1993.

1988

Digital Equipment Corporation
A technology exchange agreement was signed to ensure connectivity of the two companies' products. In addition, Digital will provide support for Compaq personal computers on DECnet/OSI networks.

1988

AST Research, Inc.
Industry alliance to support EISA

Epson America, Inc.
Industry alliance to support EISA

Hewlett-Packard Co.
Industry alliance to support EISA

NEC Information Systems, Inc.
Industry alliance to support EISA

Ing. C. Olivetti & Co.
Industry alliance to support EISA

Tandy Corporation
Industry alliance to support EISA

Wyse Technology
Industry alliance to support EISA

Zenith Data Systems
Industry alliance to support EISA

Intel Corporation
Industry alliance to support EISA

Microsoft Corporation
Industry alliance to support EISA

Digital Communication Assoc.
Industry alliance to support EISA

Novell, Inc.
Industry alliance to support EISA

3Com Corporation
Industry alliance to support EISA

KEY OFFICERS

Joseph R. Canion
President and chief executive officer

Eckhard Pfeiffer
President, European and International Division

Daryl J. White
Vice president, Finance, and chief financial officer

Michael S. Swavely
President, North American Division

James M. Harris
Vice president, Engineering

Robert E. Vieau
Vice president, Manufacturing

Gary Stimac
Vice president, Systems Engineering

PRINCIPAL INVESTORS

Lazard Freres and Co.—6.1 percent
Kleiner Perkins et al.
Sevin L J et al.

FOUNDERS

Rod Canion
James M. Harris
William F. Murtro
Seven other former Texas Instruments employees

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	$189,161	$239,682	$259,779	$680,823	$1,114.6
Cash	27,499	76,984	57,133	132,276	281,179
Receivables	75,680	83,624	116,490	254,596	428,338
Inventory	84,732	75,783	81,190	275,988	386,973
Other Current Assets	1,250	3,291	4,966	17,963	18,152
Investments in Affiliated Companies	0	0	$9,535	$18,896	$35,731
Net Property, Plants	$39,130	$66,733	$101,975	$192,271	$428,937
Other Assets	$2,761	$5,583	$6,392	$9,040	$10,687
Total Assets	$231,052	$311,998	$377,681	$901,030	$1,590
Total Current Liabilities	$121,520	$99,253	$118,837	$342,558	$479,847
Long-Term Debt	0	$75,000	$72,809	$148,915	$274,930
Other Liabilities	$405	$1,137	$2,733	$10,025	$20,666
Total Liabilities	$121,925	$175,390	$194,379	$501,498	$775,443
Total Shareholders' Equity	$109,127	$136,608	$183,302	$399,532	$814,554
Converted Preferred Stock	0	0	0	0	0
Common Stock	262	265	270	342	385
Other Equity	95,897	96,780	100,572	180,463	340,200
Retained Earnings	12,968	39,563	82,460	218,727	473,969
Total Liabilities and Shareholders' Equity	$231,052	$311,998	$377,681	$901,030	$1,590

Income Statement	1984	1985	1986	1987	1988
Revenue	$329,013	$503,880	$620,138	$1,224.1	$2,065.5
U.S. Revenue	329,013	452,484	502,312	905,834	1,268.2
Non-U.S. Revenue	0	51,396	117,826	318,266	797,283
Cost of Sales	$232,197	$325,804	$360,698	$717,336	$1,233.3
R&D Expense	$10,961	$15,996	$26,594	$47,104	$74,859
SG&A Expense	$66,131	$109,934	$152,043	$225,996	$397,363
Capital Expense	$30,276	$36,492	$50,402	$104,393	$273,477
Pretax Income	$16,394	$8,364	$76,536	$228,065	$366,847
Pretax Margin (%)	4.98	1.66	12.34	18.63	17.76
Effective Tax Rate (%)	21.50	39.30	41.70	40.70	32.50
Net Income	$12,866	$26,595	$42,897	$136,267	$255,242
Shares Outstanding, Millions	26.19	26.46	27.04	34.17	38.55
Per Share Data					
Earnings	-	$0.90	$1.33	$3.49	$6.12
Dividends	0	0	0	0	0
Book Value	$4.17	$5.16	$6.78	$11.69	$21.13

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1984	1985	1986	1987	1988
Liquidity					
Current (Times)	1.56	2.41	2.19	1.99	0
Quick (Times)	0.86	1.65	1.50	1.18	(0.80)
Fixed Assets/Equity (%)	35.86	48.85	55.63	48.12	52.66
Current Liabilities/Equity (%)	111.36	72.66	64.83	85.74	58.91
Total Liabilities/Equity (%)	111.73	128.39	106.04	125.52	95.20
Profitability (%)					
Return on Assets	-	9.79	12.44	21.31	56.56
Return on Equity	-	21.65	26.82	46.76	42.05
Profit Margin	3.91	5.28	6.92	11.13	12.36
Other Key Ratios					
R&D Spending % of Revenue	3.33	3.17	4.29	3.84	3.60
Capital Spending % of Revenue	9.20	7.24	8.13	8.53	13.24
Employees	1,300	1,860	2,200	6,900	8,000
Revenue ($K)/Employee	$253.09	$270.90	$281.88	$177.41	$258.19
Capital Spending % of Assets	13.10	11.70	13.35	11.59	17.20

Source: Compaq Corporation
Annual Reports and Forms 10-K
Dataquest
January 1990

Computer Associates International Inc.

711 Stewart Avenue
Garden City, New York 11530-4787
Telephone: (516) 227-3300
Fax: (516) 227-3939
Dun's Number: 10-655-6945

Date Founded: 1976

CORPORATE STRATEGIC DIRECTION

Computer Associates International Inc. designs, develops, markets, and supports systems management, information management, and business applications software for a broad range of mainframe, midrange, and desktop computers. Computer Associates is recognized as one of the world's leading independent software vendors, with sales in excess of $1 billion.*

Incorporated in 1976, Computer Associates was primarily a supplier of systems software for IBM mainframe computers using the VSE operating systems. Since that time, the Company has increased the breadth of its product offerings with internally developed products and a series of company and product acquisitions.

In fact, during the past three years, Computer Associates has made several major acquisitions. These include UCCEL Corporation in 1987, Applied Data Research in 1988, and Cullinet Software in 1989. Other acquisitions made during 1989 include Bedford Software and Cricket Software.

As part of its strategy to integrate acquisitions into existing operations and to form a cohesive marketing entity, Computer Associates reorganized its operations during 1989 into three groups that develop, market, and support products according to functional and marketplace characteristics. The first of these is the Information and Systems Product Group (ISPG), focused on systems software and database management products. The second is the Business Applications Group (BAG), responsible for financial accounting, banking, human resources, manufacturing, distribution, and graphics products. The third group is the Micro Products Group (MPG), which is responsible for products operating on workstation and desktop platforms.

*All dollar amounts are in US dollars.

Computer Associates' revenue for fiscal year 1990 was $1.3 billion, a 5.1 percent increase over fiscal year 1989 revenue of $1.2 billion. Net income for the year was $157.8 million, a 6.5 percent increase over fiscal year 1989 earnings of $148.3 million. These numbers reflect restatement of financial operations to include the operations of Cullinet Software, which was accounted for as a pooling of interests. One-time costs associated with the acquisition of Cullinet contributed to the low revenue growth rate for the year.

International sales improved in fiscal year 1990, accounting for $603 million, or 46.5 percent of total sales. US sales during the same period were $693 million. Computer Associates currently has direct subsidiaries in more than 20 countries, supplemented by independent distributors in an additional 15 nations worldwide.

The Company's restated fiscal year 1990 capital expenditure was $22.8 million, a decrease from $27.4 million for the previous year. Research and development costs for the year were $171.2 million, an increase from $163.2 million during fiscal year 1989. The number of employees grew to 6,900 as of April 30, 1990, approximately 4,400 in the United States and 2,500 in foreign offices. An estimated 1,850 employees are involved in product development and 3,400 in sales and support functions.

In April 1990, in an effort to address clients' concerns about the viability of the Company's product strategies, Computer Associates announced the CA90s program. This program is the Company's plan for integrating and unifying its software products across the various computer architectures it supports. Computer Associates is attributing its first ever earnings decline (for the quarter ended June 30, 1990) to the cost of implementing the CA90s program. Revenue for the quarter was $255 million, a decline of 16 percent from $303 million for the same quarter in 1989.

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 Associates currently offers more than 200 products that support a broad range of mainframe, mini-, and microcomputers from a variety of vendors including Data General, Digital Equipment Corporation (DEC), IBM, and Unisys. The Company's products include systems software, database management, and applications and graphics software packages.

As mentioned earlier, CA90s is the Company's strategic program, developed to integrate and unify its various software offerings. The integration of the CA90s strategy provides support for software running on VMS, MS-DOS, OS/2, OS/400, MVS, VM, and UNIX operating environments. In addition, the CA90s endorses IBM's SAA and DEC's NAS architectures and promises to provide products that work across both platforms.

The acquisition of Bedford Software and Cricket Software helped to expand Computer Associates' offerings to include financial, accounting, and graphics software for Apple Macintosh systems. The Company further increased its business applications software offerings with the addition of CA-IDMS/PC and CA-ADS/PC, acquired with DBMS Inc. in April 1990. The DBMS Inc. products provide tools for use with Cullinet database products.

The Cullinet acquisition provided additions to Computer Associates' information management software with its CA-IDMS/DB database management system. Cullinet also provided a relational database management system (RDBMS) and development tool set for the DEC VAX/VMS environment. In addition, Cullinet products increased the Company's business applications software offerings in human resources, manufacturing, and distribution systems.

Further Information

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

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

	1986	1987	1988	1989*	1990
Five-Year Revenue	$191.0	$452.3	$709.1	$1,233.1	$1,296.0
Percent Change	-	136.81	56.78	73.90	5.10
Capital Expenditure	$26.2	$20.8	$16.2	$27.4	$22.8
Percent of Revenue	13.72	4.60	2.28	2.22	1.76
R&D Expenditure	$25.4	$64.3	$81.5	$163.2	$171.2
Percent of Revenue	13.30	14.22	11.49	13.23	13.21
Number of Employees	1,640	2,700	4,500	6,500	6,900
Revenue ($K)/Employee	$0.12	$0.17	$0.16	$0.19	$0.19
Net Income	$18.5	$50.2	$101.8	$148.3	$157.8
Percent Change	-	171.35	102.79	45.68	6.41

1990 Fiscal Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$303.21	$282.04	$347.08	$363.66
Quarterly Profit	$10.69	$9.61	$70.53	$66.93

*Data for 1989 and 1990 show the combined results of Cullinet and Computer Associates. 1989 was restated to reflect the merger.

Source: Computer Associates International Inc. Annual Reports and Forms 10-K Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	61.05	64.05	60.61	59.12	53.47
International	38.95	35.95	39.39	40.88	46.53

Source: Computer Associates International Inc. Annual Reports and Forms 10-K Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1989
Direct Sales*	99.00
Indirect Sales*	1.00
Distributor	1.00

*Dataquest estimate

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—4
Asia/Pacific—2

MANUFACTURING LOCATIONS

North America

C.A. Computer Islandia Realty Inc.
CA Services Inc.
Computer Associates International
Cullinet Software Inc.

Asia/Pacific

Computer Associates Korea Ltd. (South Korea)
Computer Associates Sdn. Bhd. (Malaysia)

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

1990

DBMS Inc.
Computer Associates acquired all outstanding shares of DBMS Inc., a privately held company that develops database software tools.

1989

Cullinet Software
Computer Associates acquired Cullinet Software, which provides additions to information management software with its CA-IDMS/DB database management systems.

Bedford Software
Computer Associates acquired Bedford Software to expand its financial, accounting, and graphics software line for Apple's Macintosh.

Cricket Software
Computer Associates acquired Cricket Software to expand its financial, accounting, and graphics software line for Apple's Macintosh.

KEY OFFICERS

Charles B. Wang
Chairman of the board and chief executive officer

Anthony W. Wang
President and chief operating officer

Russ M. Artzt
Executive vice president

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

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

Balance Sheet	1986	1987	1988	1989*	1990
Total Current Assets	$135.3	$409.4	$465.3	$607.7	$725.3
Cash	21.7	46.9	109.0	53.4	76.3
Receivables	86.7	200.1	293.5	514.3	590.1
Marketable Securities	18.7	147.2	42.2	19.3	33.6
Inventory	8.2	15.2	20.6	20.7	25.3
Net Property, Plants	$13.3	$42.4	$48.6	$128.5	$118.1
Installed Receivables	$26.4	$65.7	$117.0	$220.7	$291.0
Purchased Software	$69.4	$165.2	$134.9	$243.1	$199.4
Other Assets	$0.8	$36.1	$73.3	$100.1	$119.4
Total Assets	$245.2	$718.8	$839.1	$1,300.1	$1,453.2
Total Current Liabilities	$51.6	$134.1	$175.8	$348.3	$329.0
Long-Term Debt	$6.1	$199.0	$116.8	$51.0	$26.1
Other Liabilities	$11.6	$27.9	$46.9	$87.2	$108.0
Total Liabilities	$69.3	$361.0	$339.5	$486.5	$463.1
Total Shareholders' Equity	$175.9	$357.8	$499.6	$813.6	$990.1
Converted Preferred Stock	0	0	0	0	0
Common Stock	4.9	7.8	15.9	18.4	18.6
Other Equity	116.3	308.4	329.7	503.6	514.8
Retained Earnings	54.2	35.0	143.1	296.0	438.9
Equity Adjustment	0.5	6.6	10.9	(4.4)	17.8
Total Liabilities and Shareholders' Equity	$245.2	$718.8	$839.1	$1,300.1	$1,453.2

Income Statement	1986	1987	1988	1989*	1990
Revenue	$191.0	$452.3	$709.1	$1,233.1	$1,296.0
US Revenue	116.6	289.7	429.8	704.3	693.0
Non-US Revenue	74.4	162.6	279.3	528.8	603.0
Cost of Sales	NA	NA	NA	NA	NA
R&D Expense	$25.4	$64.3	$81.5	$163.2	$171.2
SG&A Expense	$91.8	$212.8	$335.8	$626.2	$705.0
Capital Expense	$26.2	$20.8	$16.2	$27.4	$22.8
Pretax Income	$33.3	$94.8	$170.1	$250.0	$235.7
Pretax Margin (%)	17.43	20.96	23.99	20.27	18.19
Effective Tax Rate (%)	46.00	46.00	46.00	46.00	33.00
Net Income	$18.5	$50.2	$101.8	$148.3	$157.8
Shares Outstanding, Millions	99.52	158.46	167.62	184.30	186.50
Per Share Data					
Earnings	$0.37	$0.65	$1.02	$0.81	$0.85
Dividends	0	0	0	0	0
Book Value	$1.77	$2.26	$2.98	$4.41	$5.31

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

Key Financial Ratios	1986	1987	1988	1989*	1990
Liquidity					
Current (Times)	2.62	3.05	2.65	1.74	2.20
Quick (Times)	2.46	2.94	2.53	1.69	2.13
Fixed Assets/Equity (%)	7.56	11.85	9.73	15.79	11.93
Current Liabilities/Equity (%)	29.33	37.48	35.19	42.81	33.23
Total Liabilities/Equity (%)	39.40	100.89	67.95	59.80	46.77
Profitability (%)					
Return on Assets	9.40	10.41	13.07	13.86	11.46
Return on Equity	13.16	18.81	23.75	22.59	17.50
Profit Margin	9.69	11.10	14.36	15.88	15.88
Other Key Ratios					
R&D Spending % of Revenue	13.30	14.22	11.49	13.23	13.21
Capital Spending % of Revenue	13.72	4.60	2.28	2.22	1.76
Employees	1,640	2,700	4,500	6,500	6,900
Revenue ($K)/Employee	$0.12	$0.17	$0.16	$0.19	$0.19
Capital Spending % of Assets	10.69	2.89	1.93	2.11	1.57

*Data for 1989 and 1990 show the combined results of Cullinet and Computer Associates. 1989 was restated to reflect the merger.
NA = Not available

Source: Computer Associates International Inc. Annual Reports and Forms 10-K
Dataquest (1990)

AGFA Compugraphic

200 Ballardvale Street
Wilmington, Massachusetts 01887
Telephone: (508) 658-5600
Fax: (508) 658-0200
Dun's Number: 00-101-4174

Date Founded: 1960

CORPORATE STRATEGIC DIRECTION

AGFA Compugraphic, a division of AGFA Corporation, is a supplier of professional-quality electronic and photographic prepress systems and advanced phototypesetting materials to the professional graphic arts and publishing markets. AGFA Compugraphic provides integrated prepress systems that can be tailored for any specific application.

The Compugraphic Corporation was a publicly held company from 1960 to 1987, but went private in 1988. In 1989, Compugraphic was acquired by the AGFA Corporation, a subsidiary of Bayer USA, which changed Compugraphic's name to AGFA Compugraphic and made it a division of AGFA Corporation. AGFA Compugraphic, which is headquartered in Wilmington, Massachusetts, employs about 4,000 people and has annual sales of approximately $600 million.*

AGFA Corporation was formed in 1989 with the merger of Agfa-Gavaert, Compugraphic Corporation, and Matrix Corporation. AGFA Corporation is a pioneer in typesetting systems; Agfa-Gavaert is a longtime leader in photographic equipment, media, and supplies for graphic arts professionals; and Matrix Corporation is a specialist in medical diagnostic imaging systems, presentation graphics systems, and nondestructive testing.

AGFA Compugraphic competes on various levels with many different electronic and photographic prepress suppliers. Its major competitors include Du Pont, Fuji, Kodak, and 3M, which, like AGFA Compugraphic, are multinational organizations with businesses in the professional graphic arts and publishing worlds.

*All dollar amounts are in US dollars.

AGFA Compugraphic's products are sold through a unified direct sales force in the United States and through more than 75 international subsidiaries. The Company's products also are sold through authorized domestic and international dealers. The direct sales force and the dealers are supported by telemarketing representatives. The US direct sales force numbers about 125 and is organized into six regions.

The Company's objective is to be a leading supplier of electronic and photographic prepress systems. Its strategy is to be market-driven, customer-oriented, and technology supported.

No financial statements are included because the AGFA Corporation is a privately held company.

BUSINESS SEGMENT STRATEGIC DIRECTION

AGFA Publishing Systems Environment (APSE)

AGFA Compugraphic has developed a marketing and product development model called the AGFA Publishing Systems Environment (APSE). APSE directs AGFA Compugraphic's marketing, development, and support strategies. It establishes a framework for development of modular, flexible, and easily integrated systems based on markets, applications, and industry standards.

Color Electronic Prepress

In 1990, AGFA Compugraphic announced its entry into the electronic color prepress market with the

launch of the ColorScape product line. ColorScape is a family of PostScript-based products that offer commercial-quality color along with modularity and cost-effectiveness. With the use of industry-standard networks, ColorScape products can be configured as total prepress network solutions.

Also in 1990, AGFA Compugraphic introduced the new high-performance 9000 PS Max Plus raster image processor (RIP).

Input Equipment

AGFA Compugraphic offers hardware and software for image capture and retouching, creation of text and graphics, and page composition and layout. In 1990, ColorScape product announcements include PIX, a professional color image retouching and manipulation product for the Sun 386i workstation. The Company also provides a range of high-resolution color and black-and-white scanners for fast, easy input.

Output Equipment

AGFA Compugraphic provides a wide array of laser imagesetters and plain-paper printers. Announcements in 1990 include three levels of PostScript imagesetters with varying price/performance combinations. StudioSet 2000 is a low-priced, high-quality laser imagesetter; ProSet 9800 is a midrange laser imagesetter; and SelectSet 5000 is the Company's premium image recorder.

Photographic and Press Equipment and Supplies

In 1990, AGFA Compugraphic announced the AGFA Super 260 Rapid Access Processor, which provides high-speed film processing. Other products include Copyrapid anodized aluminum offset plates and Supermaster film plates, designed for one-step exposure and quick, reliable production; the Agfastar system, a single developer/replenisher process; and Agfaproof, an automated prepress proofing system that closely simulates the effect of actual ink, paper stock, finish, and press conditions.

AGFA Compugraphic also manufactures a total assortment of clear, matte, and wash-off films, papers, chemicals, and automatic processors designed for professional prepress applications. Gevascan is a family of films for electronic color separation scanners. Litex is a class of films with consistent sensitivity, screen range, and superior dot quality. Copyline is for repographic applications such as engineering drawing and reproduction, and design and production of phototools for printed circuits, cartography, and aerial mapping. The Company also manufactures mixing and recycling units that address the ecological concerns of the graphic arts industry.

In addition, AGFA Compugraphic offers a full line of cameras.

Type

AGFA Compugraphic formed an in-house group called Typographic Systems to develop and promote high-quality, industry-standard type. Presently, AGFA Compugraphic offers the AgfaType Collection of PostScript and Intellifont designs and fonts.

In 1990, AGFA Compugraphic introduced its CD-ROM product for the Apple Macintosh. The compact disc provides Mac users with over 770 quality PostScript typefaces in both screen and printer fonts. The new AgfaType Collection CD-ROM consists of two separate PostScript font product lines, the Professional Series and the Studio Series. The Professional Series, true hinted Type 1 fonts, includes all of the Adobe Type library. The PostScript-compatible Studio Series (Type 3 fonts) offers users greater flexibility in typographic applications. In addition to standard text and headline use, Studio Series font outlines can be modified through commercially available software programs, allowing users to create their own style variations, logos, and special-effect headlines.

Customer Service

AGFA Compugraphic offers a comprehensive customer service and support program called AgfaCare. Through AgfaCare, customers can arrange for technical and maintenance assistance for AGFA and non-AGFA products. Other service and support programs include systems integration services; consulting, which includes instruction on graphic arts processes, needs assessment, and system recommendations; educational seminars on a variety of products and technologies; and a toll-free PostScript technical assistance center.

Further Information

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

1989 SALES OFFICE LOCATIONS

North America—10
Europe—6
Asia/Pacific—2

MANUFACTURING LOCATIONS

North America

Haverhill, North Reading, and Wilmington, Massachusetts (United States)

SUBSIDIARIES

North America

Compugraphic Canada, Inc. (Canada)
Compugraphic Canada, Ltd. (Canada)
Compugraphic Canada, Ltd./Compugraphique, Ltd. (Canada)
Compugraphic Financial Corporation (United States)

Europe

Compugraphic International Products, Ltd. (Ireland)

ROW

Compugraphic de Mexico S.A. (Mexico)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Digital Technology International (DTI)
AGFA Compugraphic and DTI entered into an agreement calling for DTI to form a worldwide strategic alliance to provide technologically advanced production and management systems for the newspaper publishing industry. DTI designs and produces Macintosh and PC-based systems for makeup of display ads, editorial and classified ads, and systems for accounts receivable and general accounting.

1989

Adobe Systems
AGFA Compugraphic and Adobe entered into a licensing agreement calling for AGFA to incorporate Adobe's proprietary font technology to develop typefaces for PostScript output devices.

1987

Hewlett-Packard (HP)
AGFA and HP entered into an agreement calling for the companies to jointly develop electronic publishing technology.

Autographix
AGFA and Autographix entered into a distribution and technology exchange alliance.

NEC
AGFA and NEC entered into an agreement calling for the companies to jointly market workstations based on NEC microcomputers for graphic use.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Ken Draeger
President

Bob Crevels
Senior vice president, Electronic Publishing Systems

Juergen Stolt
Senior vice president, Graphic Systems Business Group

Michael Paige
Senior vice president, Product Development

Dave Costa
Vice president, Output Systems

Harry Dahl
Vice president, Input Systems

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

COMSAT Laboratories

COMSAT Laboratories
22300 Comsat Drive
Clarksburg, MD 20871
(301)428–4000

Established 1963
No. of Employees: 310

BACKGROUND

COMSAT Laboratories is the research and development center of the Communication Satellite Corporation. The Company is actively developing MMICs for small signal and power applications.

COMPANY EXECUTIVES

- Laboratory Director—Dr. John Evans
- Director, GaAs Lab—Dr. Ho Huang
- Marketing Director—Fred Gould

SERVICES

COMSAT Labs' capabilities include custom MMIC design, analysis, fabrication, and testing to government and military standards.

PROCESS TECHNOLOGY

- GaAs 0.5u and smaller gate-length MESFETs using VPE, MOCVD and MBE, implanted layers, E-beam direct-write equipment, Ti/Pt/Au metallization

PRODUCTS

- GaAs power FETs
- GaAs HEMTs
- GaAs MMICs

COMSAT Laboratories

FACILITIES

The Clarksburg, Maryland, facilities include 5,000 square feet of space of Class 100/10 clean rooms.

Computer Associates International, Inc.

711 Stewart Avenue
Garden City, New York 11530-4787
Telephone: (516) 227-3300
Fax: (516) 227-3937
Dun's Number: 08-039-9256

Date Founded: 1976

CORPORATE STRATEGIC DIRECTION

Computer Associates International, Inc., is known for software development. In 1988, the Company held 2 percent of the market share; presently it is the leading independent software company in the world. Computer Associates has grown extensively in recent years through acquisitions, a policy that it plans to continue.

Over the past five years, Computer Associates has been improving its profitability. In 1987, its profit margin was between the median and upper quartile of the industry average. In 1989, the profit margin rose so that it was just slightly less than that of the upper quartile; the Company's return on assets is now 15 percent higher than the industry average. The five-year trend portrays a company that is becoming more efficient in its modes of operation.

Computer Associates' total revenue increased 45 percent to $1.0 billion* in fiscal 1989 from $709.1 million in fiscal 1988. Net income increased 61 percent to $163.5 million in fiscal 1989 from $101.8 million in fiscal 1988. Computer Associate employs more than 6,500 people worldwide.

The U.S. sales contribution to the Company's total revenue grew to $609.0 million in fiscal 1989. U.S. sales accounted for 59 percent of the total, down from 61 percent in fiscal 1988.

Research and development expenditures totaled $133.5 million in fiscal 1989, representing 13 percent of revenue. Capital expenditures totaled $22.4 million in fiscal 1988, representing 2 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

Software

Computer Associates is engaged in the development, marketing and support of systems, application, and database management software products for use on mainframe and midrange computers and microcomputers of many manufacturers. The company offers more than 200 systems, application, and database management software products.

Further Information

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

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$129.0	$191.0	$452.3	$709.1	$1,030.2
Percent Change	-	48.06	136.81	56.78	45.28
Capital Expenditure	$2.6	$26.2	$20.8	$16.2	$22.4
Percent of Revenue	2.02	13.72	4.60	2.28	2.18
R&D Expenditure	$17.4	$25.4	$64.3	$81.5	$133.5
Percent of Revenue	13.49	13.30	14.22	11.49	12.96
Number of Employees	N/A	1,640	2,700	4,500	6,500
Revenue ($K)/Employee	N/A	$116.48	$167.51	$157.58	$158.49
Net Income	$13.3	$18.5	$50.2	$101.8	$163.5
Percent Change	-	39.10	171.35	102.79	60.61

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$268.37	$244.02	$282.04	N/A
Quarterly Profit	N/A	N/A	N/A	N/A

N/A = Not Available

Source: Computer Associates International, Inc. Annual Reports and Forms 10-K
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	72.87	61.05	64.05	60.61	59.12
International	27.13	38.95	35.95	39.39	40.88
Europe	27.11	38.94	35.95	39.39	40.88

Source: Computer Associates International, Inc. Annual Reports and Forms 10-K
Dataquest
January 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	99.00	99.00
Indirect Sales	1.00	1.00
Distributors	1.00	1.00

Source: Dataquest
January 1990

SALES OFFICE LOCATIONS

North America—More than 50
Japan—2
Europe—28
Asia/Pacific—8
ROW—2

SUBSIDIARIES

North America

ADR International Corp. (Delaware, United States)*
Applied Data Research, Inc. (New Jersey, United States)*
Atrium Information Group, Inc. (Iowa, United States)*
Basic Software Group of America, Inc. (Nevada, United States)*
BPI Systems, Inc. (Texas, United States)*
CA Management, Inc. (Delaware, United States)
Computer Associates Canada Ltd. (Canada)
Com-Tech Inc. (Connecticut, United States)
Consco Enterprises, Inc. (New Jersey, United States)*
CS Services Inc. (Delaware, United States)
Integrated Software Systems Corporation (California, United States)*
Softrend, Inc. (New Hampshire, United States)*
Software International Corporation (Delaware, United States)*
UCCEL Corporation (Delaware, United States)*

Japan

Computer Associates K.K. (Japan)

Europe

ADR Applied Data Research (Nederland) B.V. (Netherlands)*
ADR Applied Data Research (Europe) AG (Switzerland)*
Applied Data Research (ADR) Belgium S.A.N.V. (Belgium)*
Applied Data Research AG (Switzerland)*
Applied Data Research (Deutschland) GmbH (West Germany)*
Applied Data Research France S.A. (France)*
Applied Data Research Ges.m.b.H. (Austria)*
Applied Data Research Ltd. (United Kingdom)*
C.A. Computer Associates GmbH (West Germany)
C.A. Computer Associates Limited (United Kingdom)
Computer Associates AG (Switzerland)
Computer Associates Finland Oy (Finland)
Computer Associates International Ges.m.b.H. (Austria)
Computer Associates Norway A/S (Norway)
Computer Associates Products Nederland B.V. (Netherlands)
Computer Associates Products S.A. (Belgium)
Computer Associates S.A. (France)
Computer Associates Scandinavia A/S (Denmark)
Computer Associates (Spain)
Computer Associates S.p.A. (Italy)
Computer Associates Sweden AB (Sweden)
ISSCO Deutschland GmbH (West Germany)*

Asia/Pacific

Computer Associates H.K. (Hong Kong)
Computer Associates (N.Z.) Ltd. (New Zealand)
Computer Associates Pte. Ltd. (Singapore)
Computer Associates Pty. Ltd. (Australia)
ISSCO New Zealand (New Zealand)*
Terotola Pty. Limited (New Zealand)*

ROW

ADR International Inc. (Virgin Islands)*
C.A. Computer Associates Israel Ltd. (Israel)
Computer Associates do Brasil Ltda. (Brazil)
Transcomputer Asociados S.A. (Argentina)*
VN Limited (Bermuda)*

MERGERS AND ACQUISITIONS

1989

Cricket Software

Computer Associates acquired all of the business and assets of Cricket Software. These products will continue to be developed and enhanced by Computer Associates.

*Subsidiary is inactive.

Bedford
Computer Associates Canada acquired the Bedford Accounting Series and related assets. The sale included the rights to the trade name "Bedford," so Bedford Software Limited has changed its name to Stratford Software Corporation.

Cullinet Software, Inc.
Computer Associates and Cullinet announced a merger agreement in which Computer Associates will pay a total of approximately $333 million in stock for all outstanding Cullinet common shares. The acquisition adds application-generation tools and vertical applications in banking, human resources, manufacturing, and distribution to Computer Associates' product catalog.

1988

Applied Data Research, Inc.
Computer Associates acquired the products and staff of Applied Data Research.

1987

UCCEL Corporation
Computer Associates acquired UCCEL.

KEY OFFICERS

Charles B. Wang
Chairman and chief executive officer

Anthony W. Wang
President and chief operating officer

Russell M. Artzt
Executive vice president, Research and Development

Sanjay Kumar
Senior vice president, Planning

Arnold S. Mazur
President, Financial and Micro Products Group

Bryan R. Shepherd
President, Information and Systems Products Group

Peter A. Schwartz
Senior vice president and chief financial officer

David J. Wardle
President, Far East Products Group

PRINCIPAL INVESTORS

Walter Haefner—20.6 percent

Table 4
Comprehensive Financial Statement
Fiscal Year Ending March 31
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$82.9	$135.3	$409.4	$465.3	$527.9
Cash	10.3	21.7	46.9	109.0	33.3
Receivables	52.5	86.7	200.1	293.5	460.2
Marketable Securities	10.1	18.7	147.2	42.2	19.3
Inventory	10.0	8.2	15.2	20.6	15.1
Net Property, Plants	$9.6	$13.3	$42.4	$48.6	$97.3
Installed Receivables	$11.4	$26.4	$65.7	$117.0	$218.5
Purchased Software	$43.8	$69.4	$165.2	$134.9	$227.5
Other Assets	$0.6	$0.8	$36.1	$73.3	$96.0
Total Assets	$148.3	$245.2	$718.8	$839.1	$1,167.2
Total Current Liabilities	$27.7	$51.6	$134.1	$175.8	$285.0
Long-Term Debt	$8.7	$6.1	$199.0	$116.8	$44.2
Other Liabilities	$6.5	$11.6	$27.9	$46.9	$90.3
Total Liabilities	$42.9	$69.3	$361.0	$339.5	$419.5
Total Shareholders' Equity	$105.4	$175.9	$357.8	$499.6	$747.7
Converted Preferred Stock	0.06	0	0	0	0
Common Stock	2.2	4.9	7.8	15.9	16.7
Other Equity	70.1	116.3	308.4	329.7	430.4
Retained Earnings	35.6	54.2	35.0	143.1	306.6
Equity Adjustment	(2.6)	0.5	6.6	10.9	(5.0)
Total Liabilities and Shareholders' Equity	$148.3	$245.2	$718.8	$839.1	$1,167.2

Income Statement	1985	1986	1987	1988	1989
Revenue	$129.0	$191.0	$452.3	$709.1	$1,030.2
U.S. Revenue	94.0	116.6	289.7	429.8	609.0
Non-U.S. Revenue	35.0	74.4	162.6	279.3	421.2
Cost of Sales	$26.3	$40.8	$83.9	$124.1	$163.7
R&D Expense	$17.4	$25.4	$64.3	$81.5	$133.5
SG&A Expense	$65.7	$91.8	$212.8	$335.8	$466.8
Capital Expense	$2.6	$26.2	$20.8	$16.2	$22.4
Pretax Income	$24.4	$33.3	$94.8	$170.1	$268.4
Pretax Margin (%)	18.91	17.43	20.96	23.99	26.10
Effective Tax Rate (%)	46.00	46.00	46.00	46.00	46.00
Net Income	$13.3	$18.5	$50.2	$101.8	$163.5
Shares Outstanding, Millions	99.13	99.52	158.46	167.62	170.00
Per Share Data					
Earnings	$0.21	$0.37	$0.65	$1.02	$1.20
Dividends	0	0	0	0	0
Book Value	$1.06	$1.77	$2.26	$2.98	$4.40

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending March 31
(Millions of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	2.99	2.62	3.05	2.65	1.85
Quick (Times)	2.63	2.46	2.94	2.53	1.80
Fixed Assets/Equity (%)	9.11	7.56	11.85	9.73	13.01
Current Liabilities/Equity (%)	26.29	29.33	37.48	35.19	38.12
Total Liabilities/Equity (%)	40.72	39.40	100.89	67.95	56.11
Profitability (%)					
Return on Assets	17.88	9.40	10.41	13.07	16.30
Return on Equity	25.17	13.16	18.81	23.75	26.22
Profit Margin	10.31	9.69	11.10	14.36	15.88
Other Key Ratios					
R&D Spending % of Revenue	13.49	13.30	14.22	11.49	12.96
Capital Spending % of Revenue	2.02	13.72	4.60	2.28	2.18
Employees	N/A	1,640	2,700	4,500	6,500
Revenue ($K)/Employee	N/A	$0.12	$0.17	$0.16	$158.50
Capital Spending % of Assets	1.75	10.69	2.89	1.93	1.92

N/A = Not Available

Source: Computer Associates International, Inc. Annual Reports and Forms 10-K
Dataquest
January 1990

Concurrent Computer Corporation

106 Apple Street
Tinton Falls, New Jersey 07724
Telephone: (201) 758-7000
Fax: (201) 758-7047
Dun's Number: 06-351-0622

Date Founded: November 1985

CORPORATE STRATEGIC DIRECTION

Concurrent Computer Corporation originated as the Data Systems Group of Perkin-Elmer Corporation. Perkin-Elmer purchased Interdata Inc., a manufacturer of high-performance minicomputers, software, and integrated systems, in 1974. In 1976, Perkin-Elmer formed its Data Systems Group, which combined products manufactured by Interdata, Wangco, and Perkin-Elmer's terminal division.

In November 1985, Perkin-Elmer incorporated Concurrent, contributing all of the business and operating assets and liabilities of the Data Systems Group in exchange for 9.4 million shares of Concurrent common stock. In September 1988, Concurrent merged with Massachusetts Computer Corporation (MASSCOMP) upon completion of MASSCOMP's tender offer for all outstanding common stock of the former Concurrent at a cost of approximately $240 million.* MASSCOMP changed its name to Concurrent Computer Corporation.

Concurrent's marketing strategy is to be the world's leading provider of systems solutions for real-time computing problems. The Company has targeted two markets: real-time technical systems and real-time transaction processing systems. The transaction processing markets consist of three major segments: financial, communications, and the public sector. The Company's real-time technical market also consists of three segments: measurement and control; command, control, compute, and intelligence (C4I); and simulation and training.

The operations of MASSCOMP and the former Concurrent were consolidated during the fiscal year ended June 30, 1989. As a part of the consolidation program, all administrative functions were combined at the Company's New Jersey headquarters. The combined work force was reduced by approximately 250 and worldwide marketing and service functions also were consolidated. The Company had previously moved its Westford, Massachusetts, manufacturing operations to a combined facility in Oceanport, New Jersey.

In January 1990, Concurrent announced a restructuring of its operations to better respond to customer requirements. The new organization included the formation of two product and market divisions: the Small Systems Division operating out of Westford and the High Performance Systems Division (large systems) in Tinton Falls, New Jersey. Each division is responsible for its own product development, planning, and management.

The Small Systems Division is responsible for development of small systems products employing RTU, Concurrent's real-time UNIX operating system, in addition to applications platform development. The High Performance Systems Division is responsible for enhancing Concurrent's proprietary OS/32 product line and providing a migration strategy to incorporate future development in standards and technology.

In addition to new product divisions, Concurrent established three strategic marketing groups as part of its restructuring program. The Commercial Markets Group is targeted at companies in financial, communications, and public sector markets. The Real-Time Systems Group sells to the C4I and measurement and control markets. The Federal Programs Group sells to the simulation and training markets.

In April 1989, the Company sold a 40 percent interest in its Tokyo-based subsidiary, MASSCOMP Japan, Inc., to Nippon Steel Corporation. The subsidiary later was merged into Concurrent Nippon Corporation, owned 60 percent by Concurrent and 40 percent by Nippon Steel.

*All dollar amounts are in US dollars.

Concurrent's sales increased to $278.0 million for the year ended June 30, 1989, up from $76.5 million in fiscal 1988. Costs associated with the purchase of the former Concurrent and restructuring of the organization resulted in the Company posting a net loss of $24.7 million in fiscal 1989, as opposed to a net loss of $7.9 million for fiscal 1988.

Computer system sales were $191.9 million in fiscal 1989, primarily because of increased sales in international markets. Sales in Europe accounted for over 58 percent of Concurrent's total international sales. Service and other operating revenue increased $2.3 million in 1989 because of the increase in the computer systems installed base and resulting maintenance contract revenue.

Concurrent markets its systems primarily to original equipment manufacturers (OEMs), systems integrators, and value-added resellers (VARs), which combine the Company's products with other equipment or additional application software for resale to end users. Concurrent also markets directly to end users through its domestic and foreign sales subsidiaries. In addition to its direct sales force, the Company offers packaged systems targeted at specific industries and applications through manufacturers' representatives in the United States.

The Company spent more than $32 million on R&D in fiscal 1989. Capital expenditure for the year totaled $12.7 million. As of June 30, 1990, Concurrent employed approximately 2,900 people in the United States, Ireland, and sales offices in 18 countries around the world. As part of the restructuring announced in January 1990, Concurrent reduced its work force by an estimated 250 employees worldwide.

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 and Business Computers

As noted earlier, Concurrent markets systems for transaction processing (business/commercial) and technical real-time applications. Dataquest estimates that Concurrent received $181.6 million in revenue from computer systems sales for the year ended December 31, 1989. Business system sales accounted for 25 percent of sales, with technical systems accounting for the remaining 75 percent, according to Dataquest's Computer Systems Group.

Although the Company offers systems ranging in price from $10,000 to $1 million, Dataquest classifies Concurrent's systems in the midrange computer market. Concurrent systems offerings are grouped along three main product lines: the 5000/6000 family, the 3200 family, and, most recently, the 8000 family.

At the entry-level price range is the 5000/6000 product family. The 5000/6000 systems are based on the Motorola 68xxx microprocessor and RTU, a real-time UNIX operating system originally developed by MASSCOMP. System configurations range from single-processor models to models with five microprocessors operating at 35 mips. The 6000 series open architecture enables the system to be upgraded with more powerful standard microprocessors as they become available.

In February 1990, Concurrent introduced the 8000 product family. Based on the MIPS R3000 RISC microprocessor coupled with RTU, the 8000 series is designed for the application demands of transaction processing, simulation, and signal processing markets. The 8000 family comprises three models—the 8300, 8400, and 8500—with one to eight CPUs and performance ratings of 20 to 160 mips and 4 to 35 mflops. The 8000 family provides the midrange of Concurrent's product line, between the low-end 6000 and high-performance 3200.

Concurrent's high-performance product line is the 3200 product family. The 3200 family is a series of multiprocessor systems using parallel processing technology and Concurrent's proprietary OS/32 operating system for real-time environments. The 3200 systems are configured with 2 to 12 CPUs and performance ratings of 12 to 76 mips and 2.4 to 14.0 mflops.

In April 1989, Concurrent expanded the 3200 product line with the introduction of the Micro3200 products. The Micro3200 consists of two product series: the MicroThree and MicroFive. Both incorporate a single-board CPU with the OS/32 operating system.

The MicroThree provides an entry-level system, rated from 3 to 15 mips, with the features of the Series 3200 architecture in a competitively priced package. The MicroFive system extends the range of performance, rated at 5 to 25 mips, in the midrange of the Series 3200 product line.

In April 1990, the Company announced the AP/Server product line. The AP/Server line consists of the AP/600 and AP/800 series multiprocessor servers using the Company's RTU, and the AP/320, based on the OS/32 operating system. The systems support TCP/IP, Ethernet, NFS, SNA, X.25, and Open Systems Interconnection. The AP/Server provides a unified distributed computing environment between the Company's 6000, 8000, and 3200 product families.

Concurrent also offers connectivity to Digital Equipment Corporation and Sun Microsystems systems through its RTnet products, announced in October 1989. Other major announcements in 1989 included RTU version 5.0, providing a guaranteed response time of less than 1ms; and E/SP, an interactive, visual programming environment for converting sequential FORTRAN programs to a parallel format for use with Concurrent's multiprocessor systems.

Further Information

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

Table 1
Corporate Highlights (Millions of US Dollars)

	1988	1989
Two-Year Revenue	$76.5	$278.0
Percent Change	-	263.40
Capital Expenditure	$19.5	$12.7
Percent of Revenue	25.49	4.57
R&D Expenditure	$9.7	$32.3
Percent of Revenue	12.68	11.62
Number of Employees	3,500	3,250
Revenue ($K)/Employee	$21.86	$85.54
Net Income	($7.9)	($24.7)
Percent Change	-	(212.66)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$18.72	$90.68	$83.00	$85.62
Quarterly Profit	($0.37)	($14.82)	($8.83)	($0.63)

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

Table 2
Revenue by Geographic Region (Percent)

Region	1988	1989
North America	73.82	59.78
International	26.18	40.22
Europe	13.77	21.79
Other	12.41	18.43

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

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	10.00	10.00
Indirect Sales	90.00	90.00
VARs	52.00	49.00
OEMs	38.00	41.00

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—100
Europe—20
Asia/Pacific—5
ROW—5

MANUFACTURING LOCATIONS

North America

Oceanport, New Jersey
High performance and standards-based computer systems

Europe

Cork, Ireland
Computer systems

SUBSIDIARIES

Asia/Pacific

Concurrent Nippon Corporation

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Concurrent has made no alliances, joint ventures, or licensing agreements.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

James K. Sims
President, chief executive officer, chairman of the board

Salvatore Alini
Vice president, High Performance Systems Division

Henk J. Schalke
Vice president, Small Systems Division

William A. Feldman
Vice president, Sales and Marketing

James P. McCloskey
Vice president, Finance, and treasurer, chief financial officer

PRINCIPAL INVESTORS

Venture Capital Funds—10.5 percent
Greylock Management Corporation—8.6 percent
J. H. Whitney & Co.—5.4 percent

FOUNDERS

Information is not available.

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

Balance Sheet	1988*	1989
Total Current Assets	$53.9	$161.0
Cash	16.4	12.0
Receivables	15.7	82.7
Marketable Securities	0	0
Inventory	16.8	58.4
Other Current Assets	5.0	7.9
Net Property, Plants	$29.2	$113.9
Other Assets	$5.5	$52.5
Total Assets	$88.6	$327.4
Total Current Liabilities	$23.3	$104.5
Long-Term Debt	$13.1	$175.9
Other Liabilities	$1.0	$9.5
Total Liabilities	$37.3	$289.9
Total Shareholders' Equity	$51.3	$37.5
Converted Preferred Stock	0.9	0.9
Common Stock	0.1	0.2
Other Equity	0	0
Retained Earnings	0	0
Total Liabilities and Shareholders' Equity	$88.6	$327.4
Income Statement	**1988***	**1989**
Revenue	$76.5	$278.0
US Revenue	56.5	166.2
Non-US Revenue	20.0	111.8
Cost of Sales	$37.2	$163.7
R&D Expense	$9.7	$32.3
SG&A Expense	$28.4	$87.4
Capital Expense	$19.5	$12.7
Pretax Income	($6.9)	($21.4)
Pretax Margin (%)	(9.02)	(7.70)
Effective Tax Rate (%)	14.90	15.20
Net Income	($7.9)	($24.7)
Shares Outstanding, Millions	15.1	18.0
Per Share Data		
Earnings	($0.53)	($1.43)
Dividend	0	0
Book Value	$3.40	$2.08

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

Key Financial Ratios	1988*	1989
Liquidity		
Current (Times)	2.31	1.54
Quick (Times)	1.59	0.98
Fixed Assets/Equity (%)	56.92	303.73
Current Liabilities/Equity (%)	45.42	278.67
Total Liabilities/Equity (%)	72.71	773.07
Profitability (%)		
Return on Assets	-	(11.88)
Return on Equity	-	(55.63)
Profit Margin	(10.33)	(8.88)
Other Key Ratios		
R&D Spending % of Revenue	12.68	11.62
Capital Spending % of Revenue	25.49	4.57
Employees	3,500	3,250
Revenue ($K)/Employee	$21.86	$85.54
Capital Spending % of Assets	22.01	3.88

*In September 1988, Concurrent merged with MASSCOMP to become Concurrent Computer Corporation and reclassified 1988 numbers to conform to the current year's presentation.
NA = Not available

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

Concurrent Computer Corporation

106 Apple Street
Tinton Falls, New Jersey 07724
Telephone: (201) 758-7000
Fax: (201) 758-7678
Dun's Number: 06-351-0622

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

On September 27, 1988, MASSCOMP changed its name to Concurrent Computer Corporation upon completion of the merger of Concurrent Computer Corporation, formerly the Data Systems Group of Perkin-Elmer Corporation, with MASSCOMP.

Concurrent is a leading worldwide supplier of high-performance, real-time systems. It develops and markets 32-bit superminicomputers; multiprocessors and multiuser microcomputers; and software for commercial transaction processing and computation, computer-aided design and manufacturing (CAD/CAM), and other data processing applications.

Concurrent Computer Corporation's total revenue increased 264 percent to $278 million* in fiscal 1989 from $76 million in fiscal 1988. Included in fiscal 1989 net sales was $206.5 million attributable to former Concurrent, representing an increase of $10.4 million, or 5.3 percent, over its comparable prior year period. Net income decreased 213 percent to a $25 million loss in fiscal 1989 from an $8 million loss in fiscal 1988. This decrease resulted primarily from four factors: noncash charges attributable to the amortization and depreciation of the allocation of the purchase price to the acquired assets of former Concurrent, an increase in expense due to the additional debt to finance the acquisition of former Concurrent, noncash charges due to plant consolidation, and an increase in operating and tax expenses. Concurrent Computer Corporation employs approximately 3,200 people worldwide.

The U.S. sales contribution to the Company's total revenue grew to $166 million in 1989. U.S. sales accounted for 60 percent of total sales, down from 74 percent in fiscal 1988. The Company has two manufacturing plants, one in Ireland and one in New Jersey.

Research and development expenditures totaled $32 million in fiscal 1989, representing 12 percent of revenue. Capital spending totaled $13 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 profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Technical and Business Computers

In 1988, Concurrent Computer Corporation was estimated to hold less than 1 percent of the worldwide market share in the technical and business computer segment, according to Dataquest. Its market share percentage for technical computers alone was much larger, however.

Concurrent systems satisfy the full performance range for time-critical applications. Low to midrange performance requirements are served by the MC 5000 and 6000 Series systems. The upper limits of midrange performance requirements and the very high performance and response requirements of real-time applications are addressed by the Series 3200 systems. The MC and 3200 Systems provide a wide

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

range of integrated software capabilities. Operating system capabilities include a standards-based UNIX (RTU) and proprietary (OS/32) operating systems for real-time environments. Language capabilities include, among others, industry-accepted Ada, COBOL, and optimized and parallelized FORTRAN.

In July 1989, Concurrent Computer Corporation introduced the industry's first visual programming environment for converting and tuning real-time FORTRAN programs to optimal parallel form. Its new product is called E/SP for Environment for Sequential-to-Parallel processing.

The consistent architecture and full compatibility within the MC and Series 3200 product lines allows applications developed on smaller systems to be employed on more powerful machines in the product lines. This parallel processing flexibility is to make application expansion an inexpensive, orderly, modular process to ensure application continuity and long life cycles. Through broad network capabilities, the MC and Series 3200 systems can be connected with other suppliers' machines and an array of user interfaces, from personal computers through specialized graphics terminals. Systems in both product lines can exchange data through high-speed interconnects such as ISO- or TCP/IP-based data communications standards.

Further Information

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

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

	1988*	1989
Two-Year Revenue	$76.4	$278.0
Percent Change	-	263.87
Capital Expenditure	$19.5	$12.7
Percent of Revenue	25.52	4.57
R&D Expenditure	$9.7	$32.3
Percent of Revenue	12.70	11.62
Number of Employees	3,500	3,250
Revenue ($K)/Employee	$21.83	$85.54
Net Income	($7.9)	($24.7)
Percent Change	-	(212.66)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$83.00	$85.60	$86.99	N/A
Quarterly Profit	($8.83)	($0.60)	($1.63)	N/A

*In September 1988, Concurrent merged with MASSCOMP to become Concurrent Computer Corporation and reclassified 1988 numbers to conform to 1989's presentation.
N/A = Not Available

Source: Concurrent Computer Corporation Forms 10-K Dataquest 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1988*	1989
North America	73.82	59.78
International	26.18	40.22
Europe	13.77	21.79
All Others	12.41	18.43

*In September 1988, Concurrent merged with MASSCOMP to become Concurrent Computer Corporation and reclassified 1988 numbers to conform to 1989's presentation.

Source: Concurrent Computer Corporation Forms 10-K Dataquest 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	10.00	10.00
Indirect Sales	90.00	90.00
VARs	52.00	49.00
OEMs	38.00	41.00

Source: Dataquest 1990

1989 SALES OFFICE LOCATIONS

North America—60
Europe—25

MANUFACTURING LOCATIONS

North America

Oceanport, New Jersey
Manufactures technical computers

Europe

Cork, Ireland
Manufactures technical computers

SUBSIDIARIES

Concurrent Nippon Corporation (60 percent ownership)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Scientific-Atlanta Spectral Dynamics Division
The companies have an OEM agreement.

SKY Computers, Inc.
SKY Computers was named one of Concurrent's distributed products marketing program partners for array processors.

1987

Apollo Computer
The companies agreed to integrate Apollo's workstation-based computing system with Concurrent's Series 3250 superminicomputer.

CSPI
The companies made a joint development agreement. CSPI is a leading manufacturer of array processors for scientific and engineering applications.

Nippon Steel of Tokyo
The companies undertook a joint venture to form Concurrent Nippon Corporation. Concurrent owns 60 percent; Nippon, 40 percent.

MERGERS AND ACQUISITIONS

1988

MASSCOMP
Concurrent Computer Corporation, formerly the Data Systems Group of Perkin-Elmer Corporation, merged with MASSCOMP.

KEY OFFICERS

James K. Sims
Chairman of the board, president, chief executive officer

James P. McCloskey
Vice president, Finance; treasurer, chief financial officer

Arthur M. Toscanini
Vice president, controller, principal accounting officer

Salvatore Alini
Vice president, Research and Development

Gary J. Bowen
Vice president, Marketing

William A. Feldman
Vice president, general manager, Sales

PRINCIPAL INVESTORS

Venture Capital Funds—10.5 percent
Greylock Management Corp.—8.6 percent
J.H. Whitney & Co.—5.4 percent

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

Balance Sheet	1988*	1989
Total Current Assets	$53.9	$161.0
Cash	16.4	12.0
Receivables	15.7	82.7
Marketable Securities	0	0
Inventory	16.8	58.4
Other Current Assets	5.0	7.9
Net Property, Plants	$29.2	$113.9
Other Assets	$5.5	$52.5
Total Assets	$88.6	$327.4
Total Current Liabilities	$23.3	$104.5
Long-Term Debt	$13.1	$175.9
Other Liabilities	0	$8.5
Total Liabilities	$36.4	$288.9
Total Shareholders' Equity	$52.2	$38.5
Converted Preferred Stock	0.9	0.9
Common Stock	0.1	0.2
Other Equity	51.2	37.4
Retained Earnings	0	0
Total Liabilities and Shareholders' Equity	$88.6	$327.4
Income Statement	**1988**	**1989**
Revenue	$76.4	$278.0
U.S. Revenue	56.4	166.2
Non-U.S. Revenue	20.0	111.8
Cost of Sales	$37.2	$163.7
R&D Expense	$9.7	$32.3
SG&A Expense	$28.4	$87.4
Capital Expense	$19.5	$12.7
Pretax Income	($6.9)	($21.4)
Pretax Margin (%)	(9.03)	(7.70)
Effective Tax Rate (%)	14.90	15.20
Net Income	($7.9)	($24.7)
Shares Outstanding, Millions	15.1	18.0
Per Share Data		
Earnings	($0.53)	($1.43)
Dividends	0	0
Book Value	$3.46	$2.14

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

Key Financial Ratios	1988*	1989
Liquidity		
Current (Times)	2.31	1.54
Quick (Times)	1.59	0.98
Fixed Assets/Equity	55.94	295.84
Current Liabilities/Equity (%)	44.64	271.43
Total Liabilities/Equity (%)	69.73	750.39
Profitability (%)		
Return on Assets	-	(11.88)
Return on Equity	-	(54.47)
Profit Margin	(10.34)	(8.88)
Other Key Ratios		
R&D Spending % of Revenue	12.70	11.62
Capital Spending % of Revenue	25.52	4.57
Employees	3,500	3,250
Revenue ($K)/Employee	$21.83	$85.54
Capital Spending % of Assets	22.01	3.88

*In September 1988, Concurrent merged with MASSCOMP to become Concurrent Computer Corporation and reclassified 1988 numbers to conform to 1989's presentation.

Source: Concurrent Computer Corporation
Forms 10-K
Dataquest
1990

Conner Peripherals, Inc.

3081 Zanker Road
San Jose, California 95134-2128
Telephone: (408) 433-3340
Fax: (408) 433-3303
Dun's Number: 15-161-1852

Date Founded: 1985

CORPORATE STRATEGIC DIRECTION

Conner Peripherals, Inc., was incorporated in June 1985, launched business in February 1986 when it merged with and into Co-Data Memory Corporation, and went public in 1988. Conner Peripherals designs, manufactures, and markets high-performance 2.5-inch and 3.5-inch Winchester disk drives. Dataquest estimates that Conner Peripherals possessed 19.8 percent share of the 3.5-inch disk drive market in 1989. The disk drives are primarily used in laptop, portable, and desktop microcomputers and workstations based on 32-bit, high-performance 16-bit, or RISC-based microprocessors. Conner Peripherals classifies its drives into seven types: the 40-megabyte drive, the 100-megabyte drive, the low-profile 20- and 40-megabyte drives, the 212-megabyte drive, the Kato drive, the Stubby drive, and the Hopi drive.

Total revenue increased 174.7 percent to $704.9 million* in fiscal year 1989, up from $256.6 million in fiscal year 1988. Conner Peripherals credits the increase to growth in new original equipment manufacturer (OEM) customers and in sales of its 100-megabyte, two-disk 40-megabyte, and low-profile single-disk 20- and 40-megabyte drives. Net income reached a high of $41.4 million for fiscal year 1989, representing a 109.7 percent increase over fiscal year 1988. Conner Peripherals employs 5,298 people throughout the world.

Conner Peripherals markets its product primarily through its direct sales force to OEM customers. Conner Peripherals has greatly increased its customer base from less than 15 OEMs in fiscal year 1988 to over 40 in fiscal year 1989. The notebook laptop, portable, and desktop microcomputer and workstation markets are Conner Peripherals' main target markets. In fiscal years 1989 and 1988, Conner Peripherals increasingly penetrated the international markets. International sales accounted for 43 percent and 22 percent, respectively, of total revenue. Conner Peripherals has been successful in acquiring new sales in the Japanese market, where five of the top personal computer manufacturers now use Conner Peripherals' disk drive products.

Conner Peripherals' manufacturing operation is greatly dependent on outside vendors that provide high-level subassemblies. Through its use of these external sources, Conner Peripherals believes that it can maintain greater flexibility in its product development and can take greater advantage of new technologies at an earlier stage. Conner Peripherals conducts initial production in the United States; after a product's feasibility and manufacturing characteristics have been established, volume production is conducted in Singapore, where its suppliers and a number of its customers are located.

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

Disk Drive Segment

The 40-Megabyte Drive

The 40-megabyte drive is a two-disk, 40-megabyte, 3.5-inch Winchester disk drive introduced by Conner Peripherals during the first quarter of 1987. The 40-megabyte drive was the first 3.5-inch drive available for volume delivery and the first 3.5-inch drive to

*All dollar amounts are in US dollars.

incorporate closed-looped servo and voice-coil technology. Conner Peripherals anticipates this drive to be discontinued in 1990.

The 100-Megabyte Drive

The 100-megabyte drive is similar in its fundamental architecture to the 40-megabyte drive and supports the same interfaces; however, it offers a faster average access time and incorporates certain mechanical design enhancements aimed at improving manufacturability and reliability. The 100-megabyte drive is designed for use in high-end desktop and portable microcomputers, as well as in single-user workstations.

The Low-Profile 20- and 40-Megabyte Drives

Conner Peripherals' low-profile disk drives are specifically targeted to the laptop computer market. The low-profile 20-megabyte 3.5-inch Winchester disk drive is designed to address the requirements of high-performance laptop microcomputers. The product features a single magnetic disk and has very low power consumption. The drive's 1-inch profile allows the product to be inserted in the industry-standard 3.5-inch floppy disk drive slot without requiring significant redesign of the microcomputer's housing. The drive also permits the fast access time and high storage capacity required by the new generation of 16-bit and higher-performance 32-bit microcomputers. The 40-megabyte disk drive is similar to the 20-megabyte drive but enables double the storage capacity on a single disk.

The 212-Megabyte Drive

At the end of 1989, Conner Peripherals introduced the 212-megabyte 3.5-inch disk drive. The 212-megabyte drive is designed to meet the requirements for increased storage capacity and faster average access time of high-performance desktop microcomputers and workstations. It offers low power consumption, quiet operation, and 212 megabytes of storage capacity in a four-disk package similar to the 100-megabyte drive.

The Kato Drive

During the fourth quarter of 1989, Conner Peripherals introduced the Kato drive, a 2.5-inch disk drive. Kato is designed to address the storage requirements for battery-operated notebook computers that require small size, low power and weight, high performance, and high shock resistance. Kato provides 20 megabytes of storage capacity on a single 2.5-inch disk.

The Stubby Drive

The Stubby drive was also introduced during the fourth quarter of 1989. The Stubby series is the industry's first 3.5-inch quarter-height hard disk drive made for entry-level laptops and full-featured notebook computers. Its reduced physical length and height makes it an alternative storage device to 2.5-inch disk drives. Conner Peripherals makes both 20- and 40-megabyte versions of the Stubby drive that incorporate a single magnetic disk.

The Hopi Drive

Introduced during the fourth quarter of 1989, the Hopi drive addresses the expanded storage requirements for desktop and high-end laptop computers. The Hopi is the industry's first 3.5-inch 120-megabyte disk drive in a 1-inch-high package.

Further Information

For more information on Conner Peripherals' 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	NA	NA	$113,236.0	$256,639.0	$704,908.0
Percent Change	-	-	-	126.64	174.67
Capital Expenditure	NA	$1,807.0	$17,310.0	$30,379.0	$65,803.0
Percent of Revenue	-	-	15.29	11.84	9.33
R&D Expenditure	$160.0	$3,171.0	$3,527.0	$8,607.0	$39,653.0
Percent of Revenue	-	-	3.11	3.35	5.63
Number of Employees	NA	NA	NA	2,900	5,298
Revenue ($K)/Employee	NA	NA	NA	$88.50	$133.05
Net Income	($160.0)	($4,339.0)	$11,377.0	$19,768.0	$41,449.0
Percent Change	-	(2,611.88)	362.20	73.75	109.68

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$130,870.00	$163,971.00	$184,352.00	$225,715.00
Quarterly Profit	$5,656.00	$9,431.00	$11,774.00	$14,588.00

*Period from inception on June 18, 1985, to December 31, 1985. Conner was privately held until 1988.
NA = Not available

Source: Conner Peripherals, 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	NA	78.00	57.00
International	NA	NA	NA	22.00	43.00

*Period from inception on June 18, 1985, to December 31, 1985. Conner was privately held until 1988.
NA = Not available

Source: Conner Peripherals, 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)

1990 SALES OFFICE LOCATIONS

North America—4
Europe—4
Asia/Pacific—1
  Japan—1
ROW—1

MANUFACTURING LOCATIONS

North America

Longmont, Colorado
  New product development
San Jose, California
  New product development and pilot production

Asia/Pacific

Lorong Chuan, Singapore
  Disk drive manufacturing
Penang, Malaysia
  Disk drive manufacturing

Europe

Irvine, Scotland
  Select product manufacturing for the European market
Ivrea, Italy
  Disk drive subassembly manufacturing

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Olivetti
Conner Peripherals Europe and Olivetti agreed to build a joint-venture computer components plant in Pont Saint Martin, Italy. Conner Peripherals Europe will own 51 percent of the joint venture.

1988

C. Itoh Techno-Science Co., Ltd.
A sales agent agreement called for C. Itoh Techno-Science Co. to market 3.5-inch hard disk drives in Japan.

Olivetti
Conner Peripherals and Olivetti agreed to jointly form Conner Peripherals Europe, which will manufacture Winchester disks. Conner Peripherals will own 51 percent of the new company, which will be located in Ivrea, Italy.

MERGERS AND ACQUISITIONS

1990

Domain Technology
Conner Peripherals acquired Domain Technology's sputtering operation, which coats disks with storage material.

KEY OFFICERS

Finis F. Conner
Chairman of the board and chief executive officer

William J. Schroeder
Vice chairman and director

William J. Almon
President, chief operating officer, and director

John P. Squires
Executive vice president, R&D, and director

C. Scott Holt
Executive vice president, Sales and Marketing

Carl W. Neun
Senior vice president, Administration, and chief financial officer

Albert A. Pimentel
Vice president, Finance

PRINCIPAL INVESTORS

Compaq Computer Corporation—40.4 percent
Finis F. Conner—8.6 percent
Terry Johnson—5.9 percent
John P. Squires—5.9 percent

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	NA	$10,309.0	$75,473.0	$150,736.0	$366,114.0
Cash	NA	5,360.0	30,109.0	9,657.0	103,855.0
Receivables	NA	415.0	18,044.0	65,687.0	146,907.0
Inventory	NA	4,139.0	22,327.0	66,368.0	99,172.0
Other Current Assets	NA	395.0	4,993.0	9,024.0	16,180.0
Net Property, Plants	NA	$1,753.0	$18,297.0	$44,233.0	$98,312.0
Other Assets	NA	NA	0	$2,667.0	$3,669.0
Total Assets	$125.0	$12,062.0	$93,770.0	$197,636.0	$468,095.0
Total Current Liabilities	NA	$3,859.0	$43,467.0	$68,304.0	$123,621.0
Long-Term Debt	NA	$68.0	$3,684.0	$19,383.0	$122,893.0
Other Liabilities	NA	$93.0	$1,060.0	$4,547.0	$18,230.0
Total Liabilities	$16.0	$4,020.0	$48,211.0	$92,234.0	$264,744.0
Minority Interest	NA	NA	NA	NA	$2,515.0
Total Shareholders' Equity	$109.0	$8,042.0	$45,559.0	$105,402.0	$200,836.0
Common Stock	NA	12,541.0	38,681.0	78,756.0	132,741.0
Other Equity	NA	NA	NA	NA	NA
Retained Earnings	NA	(4,499.0)	6,878.0	26,646.0	68,095.0
Total Liabilities and Shareholders' Equity	$125.0	$12,062.0	$93,770.0	$197,636.0	$468,095.0
Income Statement	**1985***	**1986**	**1987**	**1988**	**1989**
Revenue	NA	NA	$113,236.0	$256,639.0	$704,908.0
US Revenue	NA	NA	NA	200,178.4	401,797.6
Non-US Revenue	NA	NA	NA	56,460.6	303,110.4
Cost of Sales	NA	NA	$84,046.0	$201,512.0	$556,094.0
R&D Expense	NA	$3,171.0	$3,527.0	$8,607.0	$39,653.0
SG&A Expense	NA	$1,311.0	$8,971.0	$19,464.0	$46,002.0
Capital Expense	NA	$1,807.0	$17,310.0	$30,379.0	$65,803.0
Pretax Income	($160.0)	($4,339.0)	$17,185.0	$27,292.0	$56,119.0
Pretax Margin (%)	NA	NA	15.18	10.63	7.96
Effective Tax Rate (%)	NA	NA	33.80	27.60	26.10
Net Income	($160.0)	($4,339.0)	$11,377.0	$19,768.0	$41,449.0
Shares Outstanding, Thousands	2,110.0	13,277.0	26,450.0	34,297.0	37,949.0
Per Share Data					
Earnings	($0.08)	($0.33)	$0.43	$0.58	$1.09
Dividend	NA	NA	NA	NA	NA

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

Key Financial Ratios	1985*	1986	1987	1988	1989
Liquidity					
Current (Times)	NA	2.67	1.74	2.21	2.96
Quick (Times)	NA	1.60	1.22	1.24	2.16
Fixed Assets/Equity (%)	NA	21.80	40.16	41.97	48.95
Current Liabilities/Equity (%)	NA	47.99	95.41	64.80	61.55
Total Liabilities/Equity (%)	14.68	49.99	105.82	87.51	131.82
Profitability (%)					
Return on Assets	-	(71.21)	21.50	13.57	12.45
Return on Equity	-	(106.47)	42.45	26.19	27.07
Profit Margin	NA	NA	10.05	7.70	5.88
Other Key Ratios					
R&D Spending % of Revenue	NA	NA	3.11	3.35	5.63
Capital Spending % of Revenue	NA	NA	15.29	11.84	9.33
Employees	-	-	-	2,898	5,298
Revenue ($K)/Employee	NA	NA	NA	$88.58	$133.05
Capital Spending % of Assets	NA	14.98	18.46	15.37	14.06

*Period from inception on June 18, 1985, to December 31, 1985. Conner was privately held until 1988.
NA = Not available

Source: Conner Peripherals, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

Control Data Corporation

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Fax: (612) 853-5300
Dun's Number: 00-625-5996

Date Founded: 1957

CORPORATE STRATEGIC DIRECTION

Until the mid-1980s, Control Data Corporation operated as a highly diversified conglomerate with a wide array of businesses ranging from computers to insurance to agriculture. After a disastrous year in 1985, however, Control Data began a major reorganization to restore profitability. Although Control Data achieved marginal profitability in 1987 and 1988, net income was low. In fact, Control Data's tremendous financial problems throughout the past five years has led to the divestiture and discontinuance of many of its businesses. In 1989, Control Data again experienced a massive loss in the process of reorganizing into eight separate businesses: Computer Products; Empros Systems International; Government Systems; Automated Wagering; Micrognosis, Inc.; Data Services; Business Management Services (BMS); and The Arbitron Company. With a new president, Lawrence Perlman, in charge, Control Data now has adopted a strategy to focus on technology-based data solutions.

Along with restructuring, Control Data is taking significant actions to position itself for the 1990s. These include the following:

- The number of businesses Control Data sold accounted for one-third of its total revenue. Imprimis Technology Inc. was purchased by Seagate Technology for $450 million.* Although Imprimis was an important profit contributor during 1988 and 1989 (representing 31.6 and 25.6 percent, respectively, of total revenue), the sale allowed Control Data to focus its resources on value-added data solutions businesses. Control Data also sold Burke market research; Action Data Services; European third-party computer maintenance, training, and education services; and Ticketron sports and entertainment operations.
- Control Data closed its unprofitable ETA supercomputer operation. ETA faced many problems in getting its systems to market, so its discontinuance allowed Control Data to eliminate a financial drain. The closing resulted in the single largest restructuring charge ever encountered by Control Data.
- The Company changed its Computer Products business strategy to focus on providing its customer base with high-performance computer solutions for engineering and scientific computing and for managing large databases and networks.
- Control Data plans to sell its VTC semiconductor subsidiary in 1990.
- The Company reduced its number of employees from 33,500 at the beginning of 1989 to 18,000 at the end of that year.

Total revenue decreased 19.1 percent from $3.6 billion in fiscal year 1988 to $2.9 billion in fiscal 1989. Net income decreased significantly from a net gain of $1.7 million during fiscal 1988 to a net loss of $680.4 million during fiscal 1989. This loss was caused primarily by Control Data's pretax, net restructuring charges equaling $663.3 million.

Control Data's greatest restructuring cost was incurred from shutting down ETA, the subsidiary involved in the development and manufacturing of supercomputers. Since its founding in 1983, ETA had sustained significant losses and required large cash infusions. Some of the problems ETA encountered in getting its systems to market included longer-than-expected development time, poor system reliability, delays in software development, and a late move to a UNIX operating system. These factors, along with highly uncertain revenue forecasts, led to ETA's termination, resulting in a $335 million restructuring charge for 1989.

During fiscal years 1989, 1988 and 1987, R&D expenditure totaled $250 million, $336 million, and

*All dollar amounts are in US dollars.

$323 million, respectively. These amounts accounted respectively for 8.5, 9.3, and 9.6 percent of total revenue. R&D activities focus principally on the development and enhancement of computer network technology, operating system and applications software, and manufacturing processes. The decrease in R&D expenses in 1989 resulted primarily from the closing of Control Data's supercomputer operations, the downsizing of its Computer Products operations, and the sale of Imprimis.

Control Data markets and supports its systems and services primarily through its direct sales force. Since Control Data's decentralization, each of its businesses is responsible for its own sales force. During the past five years, international sales have represented approximately one-third of total revenue.

More detailed information is available in Tables 1 through 3, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region and distribution channel. Table 4, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Computer Products

Computer Products offers high-performance computer systems targeted at the computational processing requirements of the engineering and scientific markets. It provides workstations, departmental systems, mainframes, supercomputers and tools for information management, product design, networking, and systems integration.

Computer Products is Control Data's biggest revenue generator, representing 28.5 percent of The Company's total revenue. During fiscal years 1989, 1988, and 1987, Computer Products revenue totaled $835.9 million, $1,058.9 million, and $1,209.4 million, respectively. Approximately 60 percent of the revenue decrease from 1988 to 1989 was because of operations having been sold or discontinued during those years, including third-party maintenance operations in Europe, Control Data Institutes in Europe, and a data processing services business. In January 1990, Computer Products also sold its third-party maintenance operations in the United States and Canada.

Most of Computer Products' revenue comes from the sale or lease of general-purpose CYBER mainframes, which use the Company's proprietary NOS and NOS/VE operating systems. These products are sold to customers that maintain centralized computing environments. The CYBER mainframe line consists of high-performance compatible computers capable of processing a mixed work load on a flexible delivery platform. The CYBER line includes the entry-level, air-cooled CYBER 930 models, the midrange CYBER 960 models, which are air-cooled mainframes with dual-state operating capability, and the high-end CYBER 990 models. During fourth quarter 1989, Computer Products unveiled a new high-end mainframe model, the CYBER 2000, which will be available in late 1990. The CYBER 2000 is air-cooled, uses a 14,000-gate ECL logic chip, supplies twice the power of the CYBER 990, and runs the Company's NOS/VE operating system.

Computer Products also provides the CYBER 910 line of integrated graphics workstations and the CYBER 920 line of network servers designed to provide file- and compute-serving for CYBER 910 workstations. CYBER 910 and 920 products are UNIX-based and are produced for the Company by Silicon Graphics, Inc. In early 1990, Computer Products also introduced the Control Data 4000 series of departmental computers, which incorporate reduced-instruction-set computing (RISC) processors designed by MIPS Computer Systems, Inc.

Empros Systems International

Empros Systems International, formerly known as Energy Management Systems, provides information systems for managing electrical power generation, transmission, and distribution for larger electric utilities worldwide. During fiscal 1989, Empros' revenue contributed 3.2 percent of Control Data's total revenue. Most of Empros revenue comes from relatively long-term contracts for the sale of turnkey systems for managing electrical power transmission. These systems incorporate Control Data hardware and that of other vendors with proprietary application software. Although Empros experienced an increase in international sales from fiscal 1988 to fiscal 1989, it experienced a decrease in US sales. Empros believes that the decreased demand in the US market reflected increasing competitive pressures on electric utilities due to deregulation, continuing price/performance improvements in workstations and smaller computer

systems, and a domestic trend toward expanding and evolving existing systems rather than replacing them. Therefore, Empros anticipates that international activity will represent a larger proportion of its power transmission systems business and that greater resources will be directed toward supplying smaller systems for managing the distribution of electrical power from substations to individual utility customers.

Government Systems

Accounting for 12.5 percent of Control Data's total revenue, Government Systems provides computer systems, hardware, software, and related services that target the needs of the defense and space industries worldwide. Government Systems' US operations focus on the following products: avionic computers, including the AN/AYK-14 standard Navy airborne computer; the UYH-3 and MMSD standard Navy shipboard disk drives; storage management subsystems; advanced parallel processing computer systems; and space computers. Government Systems' Canadian operations, Computing Devices of Canada, produces display products, antisubmarine warfare subsystems, and ground system fire control computers for the US Army M-1 tank and the UK Challenger tank. Government Systems also conducts research, design, and development services in connection with various government-sponsored research and development projects.

Automated Wagering

Control Data's Automated Wagering business markets on-line computer systems for state lotteries, off-track betting operations, and other competitions. These systems were formerly part of the Company's Ticketron division, which Control Data sold at the end of 1989. Revenue from Automated Wagering, together with that from the Ticketron ticketing and reservation operations, accounted for 5.5 percent of Control Data's 1989 total revenue.

Micrognosis, Inc.

The Company's Micrognosis subsidiary designs, manufactures, and installs trading room information distribution systems for banks, securities firms, insurance companies, and the treasury departments of large companies in the United States and various foreign countries. Micrognosis' revenue was $99.1 million in fiscal year 1989, accounting for 3.4 percent of Control Data's total revenue.

Data Services

Control Data's Data Services business provides computer-based services to credit unions for loan and deposit accounting, transaction processing, and financial reporting. Data Services revenue was $106 million for fiscal year 1989, or 3.6 percent of Control Data's total revenue.

Business Management Services (BMS)

BMS provides payroll processing, payroll tax filing, accounting, human resource management, and health claims processing services to a range of businesses throughout the United States. The majority of BMS' revenue is generated from payroll processing services. During fiscal year 1989, BMS' revenue reached $170.5 million, representing 5.8 percent of Control Data's total revenue.

The Arbitron Company

In fiscal year 1989, The Arbitron Company accounted for 9.9 percent of Control Data's total revenue, or $290 million. The Arbitron Company measures radio and television audiences, tracks the sale of packaged goods in supermarkets and drugstores, monitors television and radio commercials, and tracks the sales promotion activities of packaged goods manufacturers and retailers in local markets.

Further Information

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$3,680.0	$3,347.0	$3,367.0	$3,628.0	$2,935.0
Percent Change	NA	(9.05)	0.59	7.78	(19.12)
Capital Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
R&D Expenditure	$316.0	$314.0	$323.0	$336.0	$250.0
Percent of Revenue	8.59	9.38	9.59	9.25	8.52
Number of Employees	39,500	35,500	34,500	33,500	18,000
Revenue ($K)/Employee	$93.16	$94.27	$97.58	$108.31	$163.03
Net Income	($567.5)	($264.5)	$19.3	$1.7	($680.4)
Percent Change	-	53.39	107.30	(91.19)	(40,123.53)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$843.5	$804.3	$763.0	$523.7
Quarterly Profit	$3.5	($497.3)	$9.8	($196.4)

NA = Not available

Source: Control Data Corporation Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	71.00	70.00	67.00	71.00	67.00
International	29.00	30.00	33.00	29.00	33.00

Source: Control Data Corporation Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	100.00	100.00
Indirect Sales	0	0

Source: Dataquest (1990)

1990 SALES OFFICE LOCATIONS

Control Data Corporation has become a decentralized organization. Each group possesses its own sales office locations; thus, this information is unavailable to report.

MANUFACTURING LOCATIONS

North America

Arden Hills, Minnesota
Computers, hardware and software development/ assembly
Bloomington, Minnesota
Computers, hardware and software development/ assembly, peripheral memories and components
Eden Prairie, Minnesota
Militarized computer hardware
Minneapolis, Minnesota
Computers, hardware and software development/ assembly
Plymouth, Minnesota
Computers, hardware and software development/ assembly
Rockville, Maryland
Militarized computer hardware
Sunnyvale, California
Computers, hardware and software development/ assembly

SUBSIDIARIES

North America

1151 Seven Locks Corp. (United States)
Bancroft Franklin Investors Ltd. (United States)
Bemidji Seed Capital Fund L.P. (United States)
Burke Marketing Services Inc. (United States)
CCC Alternative Energy Venture Inc. (United States)
CYB Systems Inc. (United States)
Computer Support Corp. (United States)
Con Med Inc. (United States)
Control Data Asia Inc. (United States)
Control Data Automated Wagering Inc. (United States)
Control Data Belgium Inc. (United States)
Control Data Canada Ltd. (Canada)
Control Data Caribbean Basin Inc. (United States)
Control Data China Inc. (United States)
Control Data Commerce International Inc. (United States)
Control Data EBAL Inc. (United States)
Control Data Energy Management Systems Inc. (United States)
Control Data Greece Inc. (United States)
Control Data Indo-Asia Co. (United States)
Control Data International Trading Inc. (United States)
Control Data International Sales Corp. (United States)
Control Data Middle East Inc. (United States)
Control Data Optical Drives Inc. (United States)
Control Data Optical Media Inc. (United States)
Control Data Pan American Corp. (United States)
Control Data Properties Inc. (United States)
Control Data Research Inc. (United States)
Control Data Temporary Personnel Services Inc. (United States)
DSC Nortech Inc. (United States)
Earth Energy Systems Inc. (United States)
Financial Information Services International Inc. (United States)
Garid Inc. (United States)
Human Resources Corp. (United States)
INTERMICROS Corp. (United States)
Inference Corp. (United States)
Inter-American Control Data Corp. (United States)
Interactive Computer Modelling Inc. (United States)
Micro-Quartz Technology Corp. (United States)
Microelectronics & Computer Technology Corp. (United States)
Micrognosis, Inc. (United States)
Microtechnology Sources Ltd. (United States)
Minnesota Seed Capital Fund Inc. (United States)
Northside Child Development Center Inc. (United States)
PlanWare Inc. (United States)
Positran Inc. (United States)
Princeton Montrose Corp. (United States)
Radio-TV Reports Inc. (United States)
Ramtek Corp. (United States)
SAMI/Burke Inc. (United States)
The Arbitron Company (United States)
The Service Bureau Corp. (United States)
United School Services of America Inc. (United States)
VTC Inc. (United States)
Wave Technologies Corp. (United States)

Europe

Assigraph S.A. (France)
CD Iberica, S.A. (Spain)
Control Data (Ireland) Ltd. (Ireland)

Control Data A/S (Denmark)
Control Data AB Oy (Finland)
Control Data B.V. (Netherlands)
Control Data Consulting Services Ltd. (Greece)
Control Data France S.A. (France)
Control Data GesmbH (Austria)
Control Data Holding AG (Switzerland)
Control Data Italia S.p.A. (Italy)
Control Data Ltd. (United Kingdom)
Control Data Portuguesa S.A.R.L. (Portugal)
Control Data Services B.V. (Netherlands)
Creation D'Activites Nouvelles S.A., Ste. de (SOCRAN) (Belgium)
Data Plus (France)
Sigha S.A. (France)
Standard Computer Komponentent GmbH (Germany)

Asia/Pacific

Control Data Australia Pty. Ltd. (Australia)
Control Data Hong Kong Ltd. (Hong Kong)
Control Data Indo-Asia Pte. Ltd. (Singapore)
Control Data Japan Ltd. (Japan)
Microgrosis International Ltd. (New Zealand)
Techniche Pty. Ltd. (Australia)

ROW

Circuitos Impresos de Alta Tecnologia S.A. de C.V. (Mexico)
Control Data Brazil Computadores, Ltda. (Brazil)
Control Data Overseas Finance Corp. N.V. (Netherlands Antilles)
ROM Control Data S.R.L. (Romania)
WTG Systems Ltd. (Jamaica)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Storage Technology Corporation
Storage Technology Corporation entered an original equipment manufacturer (OEM) agreement with Control Data's Computer Products Group. Under the terms of the agreement, the Computer Products Group will market StorageTek's high-capacity 4400 Automated Cartridge System (ACS), 4480 Cartridge Subsystem, and Library Server software for use with Control Data's mainframe and departmental computer systems.

MIPS Computer Systems Inc.
Through an OEM agreement signed with MIPS Computer Systems, Control Data will offer a new series of RISC-based departmental computers.

Union of Soviet Socialist Republics
Control Data formed a joint venture in the Soviet Union. Control Data is to export six CYBER mainframes, which will aid safety analysis in the nuclear industry.

1989

Convex Computer Corp.
CDC and Convex announced a joint marketing and sales agreement in which CDC will sell and integrate Convex's C Series family of supercomputers in selected geographic regions, markets, and accounts.

Arix Corporation
Control Data Corporation (CDC) and Arix Corporation signed an an agreement in which CDC will develop software and provide support for Arix's line of UNIX-based multiprocessors.

International Air Transport Association
Control Data licensed its airline yield management software to the International Air Transport Association in a multimillion dollar deal.

Cray Research
CDC and Cray made a joint marketing arrangement in which CDC will resell Cray supercomputers.

MERGERS AND ACQUISITIONS

1989

Seagate Technology
CDC agreed to sell Imprimis Technology to Seagate for $450 million in cash and paper.

Primerica Corp.
CDC sold Action Data Service to Primerica.

Computer Power Group Ltd.
CDC sold its 22 CDC Institutes in Germany and France to Computer Power Group.

1988

Silicon Graphics
CDC acquired 20 percent of the outstanding stock of Silicon Graphics, a leader in the 3-D graphics workstation market, for $68.9 million.

1987

SAMI/Burke Inc.
CDC acquired SAMI/Burke, a market research organization. However, in February 1989, CDC signed a letter of intent to sell its Burke market research business.

KEY OFFICERS

Lawrence Perlman
President, chief executive officer

John R. Eickhoff
Vice president and corporate controller

Jacklyn J. Elverum
Vice president, Business Analysis

Anthony J. Avrichio
President, The Arbitron Company

Catherine M. Hapka
President, Data Services

W. Herbert Plummer
President, Automated Wagering

Robert E. Handberg
President, Government Systems

James E. Ousley
Executive vice president and president, Computer Systems

David P. White
Executive vice president, Information Services

Lois D. Rice
Senior vice president, Government Affairs

PRINCIPAL INVESTORS

Shearson Lehman Hutton Inc.—7.9 percent
Batterymarch Financial Management—5.7 percent

FOUNDERS

Information is not available.

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	$1,339.00	$1,540.50	$1,740.00	$1,675.00	$1,273.60
Cash	81.40	400.90	405.20	197.90	524.70
Receivables	566.90	570.00	711.20	709.30	483.20
Inventory	656.40	539.00	598.70	730.90	245.00
Other Current Assets	34.30	30.60	24.90	36.90	20.70
Net Property, Plants	$414.00	$420.70	$457.90	$450.90	$170.50
Other Assets	$1,319.50	$633.70	$440.70	$407.60	$416.60
Total Assets	$3,072.50	$2,594.90	$2,638.60	$2,533.50	$1,860.70
Total Current Liabilities	$1,460.20	$929.60	$1,068.80	$918.90	$842.70
Long-Term Debt	$96.20	$485.60	$384.40	$379.40	$352.30
Other Liabilities	$313.50	$188.60	$137.90	$181.00	$254.20
Total Liabilities	$1,869.90	$1,603.80	$1,591.10	$1,479.30	$1,449.20
Total Shareholders' Equity	$1,202.60	$991.10	$1,047.50	$1,054.20	$411.50
Converted Preferred Stock	11.00	10.90	10.90	10.90	10.90
Common Stock	20.60	20.70	21.10	21.10	21.40
Other Equity	407.10	460.60	497.70	503.20	541.00
Retained Earnings	763.90	498.90	517.80	519.00	(161.80)
Total Liabilities and Shareholders' Equity	$3,072.50	$2,594.90	$2,638.60	$2,533.50	$1,860.70
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$3,679.70	$3,346.70	$3,366.50	$3,628.30	$2,934.50
US Revenue	2,620.60	2,333.80	2,247.20	2,579.20	1,976.50
Non-US Revenue	1,059.10	1,012.90	1,119.30	1,049.10	958.00
Cost of Sales	$2,582.10	$2,263.70	$2,347.30	$2,523.80	$2,046.00
R&D Expense	$316.10	$313.90	$322.80	$335.70	$249.90
SG&A Expense	$752.80	$683.30	$600.80	$643.70	$552.30
Capital Expense	NA	NA	NA	NA	NA
Pretax Income	($484.00)	($280.60)	$57.40	$16.40	($668.30)
Pretax Margin (%)	(13.15)	(8.38)	1.71	0.45	(22.77)
Effective Tax Rate (%)	NA	NA	NA	NA	NA
Net Income	($567.50)	($264.50)	$19.30	$1.70	($680.46)
Shares Outstanding, Millions	39.00	40.9	41.5	41.9	42.3
Per Share Data					
Earnings	($14.56)	($6.48)	$0.45	$0.03	($16.11)
Dividend	$0.54	0	0	0	0

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	0.92	1.66	1.63	1.82	1.51
Quick (Times)	0.47	1.08	1.07	1.03	1.22
Fixed Assets/Equity (%)	34.43	42.45	43.71	42.77	41.43
Current Liabilities/Equity (%)	121.42	93.79	102.03	87.17	204.79
Total Liabilities/Equity (%)	155.49	161.82	151.89	140.32	352.17
Profitability (%)					
Return on Assets	-	(9.33)	0.74	0.07	(30.97)
Return on Equity	-	(24.11)	1.89	0.16	(92.84)
Profit Margin	(15.42)	(7.90)	0.57	0.05	(23.19)
Other Key Ratios					
R&D Spending % of Revenue	8.59	9.38	9.59	9.25	8.52
Capital Spending % of Revenue	NA	NA	NA	NA	NA
Employees	39,500	35,500	34,500	33,500	18,000
Revenue ($K)/Employee	$93.16	$94.27	$97.58	$108.31	$163.03
Capital Spending % of Assets	NA	NA	NA	NA	NA

NA = Not available

Source: Control Data Corporation
Annual Reports
Dataquest (1990)

Control Data Corporation

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Telephone: (612) 853-8100
Fax: (612) 853-5300
Dun's Number: 00-625-5996

Date Founded: 1957

CORPORATE STRATEGIC DIRECTION

Control Data Corporation (CDC), founded in 1957, provides computer services and products for business, scientific, and engineering applications. As of 1988, CDC had five major product/service areas: Computer Systems and Services, Data Storage Products, Information Services, Government Systems, and other (including VTC, Inc.) These areas represented 33, 32, 25, 9, and 1 percent of sales, respectively. However, with the sale of Imprimis, the Data Storage Products division was eliminated in 1989.

CDC's computer products include CYBER 910 workstations and the CYBER 900 family of mainframes. The CYBER 900 products are sold primarily to vertical markets such as the petroleum industry, electric utilities, computer-aided design/computer-aided manufacturing (CAD/CAM), government, and higher education.

CDC has partly recovered from its 1985 financial collapse, when it reported one of the biggest losses ($567.5 million*) in industry history. CDC adopted four basic strategies in 1986:

- Focus on those businesses where CDC can be successful.
- Move CDC from a product orientation to a market orientation.
- Develop new products and services that have a unique competitive advantage.
- Make a commitment to quality.

Since 1985, CDC has been restructuring its operations to restore profitability and focus attention on its core computer business. The Company regained profitability in 1987 and in 1988 replaced its entire CYBER mainframe line. Early in 1989, CDC's reorganizing focused on meeting financial obligations. Starting in April 1989, CDC agreed to sell its profitable Imprimis Technology Inc. to Seagate Technology for $450 million, announced that it was shutting down the money-losing ETA subsidiary supercomputer operation, sold its training and education service, and laid off 3,000 employees.

CDC faces an uphill battle to restore momentum in its mainframe business, which is now primarily an upgrade and replacement business. The Company's poor financial outlook may send existing customers to other vendors. CDC hopes to win new customers with its department level mainframes, workstations, and its Transparent Computing Environment (TCE) connectivity strategy. CDC has endorsed products that meet industry standards such as UNIX, Oracle, and TCP/IP, and plans to offer a native version of UNIX for its CYBER family later in 1990.

After another disappointing year in 1988 and a disappointing first half of 1989, CDC set the following goals for fiscal 1989 to regain profitability:

- To resolve the profitability problems of the computer mainframe and supercomputer businesses
- To ensure that Imprimis continues as a leader in the high-performance disk drive market
- To continue the growth and momentum of the Company's services businesses
- To reduce the losses of VTC, the semiconductor subsidiary

CDC must also renegotiate its loan agreements with banks and is expected to continue selling noncore businesses to meet bank obligations.

CDC reported revenue for fiscal 1988 of $3.6 billion, up 7.8 percent from fiscal 1987. However, net income declined 91.2 percent, from $19.3 million in fiscal 1987 to $1.7 million in fiscal 1988.

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

Research and development expenditures totaled $336 million in fiscal 1988, or 9.3 percent of revenue. Capital expenditures totaled $156 million, or 4.3 percent of revenue.

During 1988, CDC employed more than 33,000 people worldwide.

The Company markets and supports its systems through dozens of domestic and international offices. Virtually all systems sales are direct because the Company has no reseller 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

Computer Systems

Dataquest estimates that CDC held less than 1 percent of both the technical and business computer market during 1988.

CDC's CYBER 900 mainframe line now consists of 13 models in three product families. The CYBER 900 Series, which replaced the CYBER 180 line, was completely upgraded in 1988. All CYBER mainframes use the proprietary NOS/VE CYBER operating system and are based on CYBER 180 architecture. CDC continues to devote efforts to move its entire product line to the UNIX operating system by 1991.

Control Data's basic mainframe line begins with the CYBER 932 model department level mainframes introduced in 1988. The CYBER 932 Series replaced the 930 processor. The midrange CYBER 960 models were first shipped in 1988 and replaced the CYBER 800 systems. The high-end, large-scale CYBER 990 models were introduced in 1985 and upgraded in 1988.

In addition to mainframes, CDC offers CYBER 910 graphics workstations produced by Silicon Graphics, Inc. CDC markets the workstations with CAD/CAE/CAM applications software. CDC also offers CYBER 920 systems, a series of UNIX-based network servers for workstations. Dataquest estimates that CDC's technical computer factory revenue was $145 million in 1988, or less than 1 percent of the market.

On-Line Transaction Processing (OLTP)

CDC provides information processing and training services primarily through its Arbitron Ratings Company, SAMI operations, Business Management Services, Business Information Services, Quorum Systems, Credit Union Services, training and education, and Ticketron computer services. Micrognosis, a CDC subsidiary, provides automated systems for brokers and financial traders to access financial information.

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 U.S. Dollars)

	1984	1985	1986	1987	1988
Five-Year Revenue	$3,693	$3,680	$3,347	$3,367	$3,628
Percent Change	-	(0.35)	(9.05)	0.59	7.78
Capital Expenditure	$209	$160	$85	$71	$156
Percent of Revenue	5.67	4.36	2.54	2.11	4.31
R&D Expenditure	$297	$316	$314	$323	$336
Percent of Revenue	8.04	8.59	9.38	9.59	9.25
Number of Employees	48,000	39,500	35,500	34,500	33,500
Revenue ($K)/Employee	$0.08	$0.09	$0.09	$0.10	$0.11
Net Income	$5.1	($567.5)	($264.5)	$19.3	$1.7
Percent Change	-	(11,227.45)	53.39	107.30	(91.19)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$843.5	$804.3	$763.0	N/A
Quarterly Profit	$3.5	($497.3)	($9.8)	N/A

N/A = Not Available

Source: Control Data Corporation Annual Reports
Dataquest
1990

Table 2
Revenue by Geographic Region (Percent)

Region	1984	1985	1986	1987	1988
North America	72.00	71.00	70.00	67.00	71.00
International	28.00	29.00	30.00	33.00	29.00

Source: Control Data Corporation Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988
Direct Sales	100.00
Indirect Sales	0

Source: Dataquest 1990

1988 SALES OFFICE LOCATIONS

North America—45
Japan—1
Europe—18
Asia/Pacific—8
ROW—2

MANUFACTURING LOCATIONS

North America

Arden Hills, Minnesota
Computers, hardware and software development/ assembly
Bloomington, Minnesota
Computers, hardware and software development/ assembly, peripheral memories and components
Colorado Springs, Colorado
Peripheral memories and components
Eden Prairie, Minnesota
Militarized computer hardware
Edina, Minnesota
Peripheral memories and components
Minneapolis, Minnesota
Computers, hardware and software development/ assembly
Minnetonka, Minnesota
Peripheral memories and components
Norristown, Pennsylvania
Peripheral memories and components
Oklahoma City, Oklahoma
Peripheral memories and components
Omaha, Nebraska
Peripheral memories and components
Plymouth, Minnesota
Computers, hardware and software development/ assembly
Rockville, Maryland
Militarized computer hardware
Sunnyvale, California
Computers, hardware and software development/ assembly

Europe

Heppenheim, Germany
Peripheral memories and components
Palmela, Portugal
Peripheral memories and components

Asia/Pacific

Penang, Malaysia
Peripheral memories and components
Singapore
Peripheral memories and components

SUBSIDIARIES

North America

Arbitron Ratings Company
CCC Alternative Energy Venture Inc.
Computing Devices Holding Ltd.
Con Med Inc.
Control Data Canada Ltd.
Control Data Energy Management Systems, Inc.
Control Data International Trading Inc.
Control Data Ltd.
Control Data Optical Drives Inc.
Control Data Optical Media Inc.
Control Data Pan American Corp.
Control Data Properties Inc.
Control Data Research Inc.
Earth Energy Systems, Inc.
Financial Information Services International Inc.
Inter-American Control Data Corp.
Laser Magnetic Storage International Co.
Micrognosis, Inc.
Radio-TV Reports, Inc.
SAMI/Burke Inc.
Silicon Graphics
VTC, Inc.

Japan

Control Data Japan Ltd.

Europe

CD Iberica, S.A.
Control Data A/S
Control Data B.V.
Control Data Belgium Inc.
Control Data France S.A.
Control Data Greece Inc.
Control Data Holding AG
Control Data Italia S.p.A.
Control Data Portuguesa S.A.R.L.
Control Data Services BV

Asia/Pacific

Control Data Asia Inc.
Control Data Australia Pty. Ltd.
Control Data China Inc.
Control Data Far East Inc.
Control Data Hong Kong Ltd.
Control Data Indo-Asia Co.
Control Data Indo-Asia Pte. Ltd.

ROW

Control Data Brazil Computadores, Ltda.
Control Data Middle East Egypt Inc.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Convex Computer Corp.
CDC and Convex announced a joint marketing and sales agreement in which CDC will sell and integrate Convex's C Series family of supercomputers in selected geographic regions, markets, and accounts.

Cray Research
CDC and Cray made a joint marketing arrangement in which CDC will resell Cray supercomputers.

MERGERS AND ACQUISITIONS

1989

Seagate Technology
CDC agreed to sell Imprimis Technology Inc. to Seagate for $450 million in cash and paper.

Primerica Corp.
CDC sold Action Data Service to Primerica.

Computer Power Group Ltd.
CED sold its 22 CDC Institutes in West Germany and France to Computer Power Group.

1988

Silicon Graphics
CDS acquired 20 percent of the outstanding stock of Silicon Graphics, a leader in the 3-D graphics workstation market, for $68.9 million.

1987

SAMI/Burke Inc.
CDC acquired SAMI/Burke, a market research organization. In February 1989, CDC signed a letter of intent to sell its Burke market research business.

KEY OFFICERS

Robert M. Price
Chairman, chief executive officer

Lawrence Perlman
President, chief operating officer

John K. Buckner
Vice chairman, chief financial officer

Catherine M. Hapka
Vice president, Corporate Marketing

PRINCIPAL INVESTORS

Shearson Lehman Hutton Inc.—7.9 percent
Batterymarch Financial Management—5.7 percent

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	$1,562.90	$1,339.00	$1,540.50	$1,740.00	$1,675.00
Cash	49.60	81.40	400.90	405.20	197.90
Receivables	621.40	566.90	570.00	711.20	709.30
Inventory	864.50	656.40	539.00	598.70	730.90
Other Current Assets	27.40	34.30	30.60	24.90	36.90
Net Property, Plants	$428.90	$414.00	$420.70	$457.90	$450.90
Other Assets	$1,497.40	$1,319.50	$633.70	$440.70	$407.60
Total Assets	$3,489.20	$3,072.50	$2,594.60	$2,638.60	$2,533.50
Total Current Liabilities	$1,098.80	$1,460.20	$929.60	$1,068.80	$918.90
Long-Term Debt	$322.60	$96.20	$485.60	$384.40	$379.40
Other Liabilities	$309.00	$313.50	$188.60	$137.90	$181.00
Total Liabilities	$1,730.40	$1,869.90	$1,603.80	$1,591.10	$1,479.30
Total Shareholders' Equity	$1,758.80	$1,202.60	$991.10	$1,047.50	$1,054.20
Converted Preferred Stock	11.30	11.00	10.90	10.90	10.90
Common Stock	19.30	20.60	20.70	21.10	21.10
Other Equity	375.40	407.10	460.60	497.70	503.20
Retained Earnings	1,352.80	763.90	498.90	517.80	519.00
Total Liabilities and Shareholders' Equity	$3,489.20	$3,072.50	$2,594.90	$2,638.60	$2,533.50

Income Statement	1984	1985	1986	1987	1988
Revenue	$3,692.60	$3,679.70	$3,346.70	$3,366.50	$3,628.30
U.S. Revenue	2,675.20	2,620.60	2,333.80	2,247.20	2,579.20
Non-U.S. Revenue	1,017.40	1,059.10	1,012.90	1,119.30	1,049.10
Cost of Sales	$2,362.70	$2,582.10	$2,263.70	$2,347.30	$2,523.80
R&D Expense	$297.00	$316.10	$313.90	$322.80	$335.70
SG&A Expense	$742.80	$752.80	$683.30	$600.80	$643.70
Capital Expense	$209.2	$160.3	$84.9	$71.1	$156.3
Pretax Income	($50.00)	($484.00)	($280.60)	$57.40	$16.40
Pretax Margin (%)	(1.35)	(13.15)	(8.38)	1.71	0.45
Effective Tax Rate (%)	N/A	N/A	N/A	57.00	110.00
Net Income	$5.10	($567.50)	($264.50)	$19.30	$1.70
Shares Outstanding, Millions	38.6	39.0	40.9	41.5	41.9
Per Share Data					
Earnings	$0.12	($14.56)	($6.48)	$0.45	$0.03
Dividends	$0.66	$0.54	0	0	0
Book Value	$45.56	$30.84	$24.23	$25.24	$25.16

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1984	1985	1986	1987	1988
Liquidity					
Current (Times)	1.42	0.92	1.66	1.63	1.82
Quick (Times)	0.64	0.47	1.08	1.07	1.03
Fixed Assets/Equity (%)	24.39	34.43	42.45	43.71	42.77
Current Liabilities/Equity (%)	62.47	121.42	93.79	102.03	87.17
Total Liabilities/Equity (%)	98.39	155.49	161.82	151.89	140.32
Profitability (%)					
Return on Assets	-	(17.30)	(9.33)	0.74	0.07
Return on Equity	-	(38.33)	(24.11)	1.89	0.16
Profit Margin	0.14	(15.42)	(7.90)	0.57	0.05
Other Key Ratios					
R&D Spending % of Revenue	8.04	8.59	9.38	9.59	9.25
Capital Spending % of Revenue	5.67	4.36	2.54	2.11	4.31
Employees	48,000	39,500	35,500	34,500	33,500
Revenue ($K)/Employee	$0.08	$0.09	$0.09	$0.10	$0.11
Capital Spending % of Assets	6.00	5.22	3.27	2.69	6.17

N/A = Not Available

Source: Control Data Corporation
Annual Reports
Dataquest
1990

Copyer Company, Ltd.

6-3-3 Shimorenjaku, Mitaka-shi
Tokyo, Japan
Telephone: 011-81-422-47-7151
Fax: Not Available
Dun's Number: 69-058-2820

Date Founded: 1923

CORPORATE STRATEGIC DIRECTION

Copyer Company, Ltd., a subsidiary of Canon Incorporated, designs, manufactures, and markets office automation equipment, including plain paper copy (PPC) machines and diazo machines, as well as other related products. The Company markets its products in Japan under its Copyer brand name, and internationally under its original brand name, SELEX. Marketing in Japan is handled by Copyer's subsidiary, Copyer Sales Co., Ltd., which has 8 branch offices and 49 regional offices. Worldwide marketing and distribution is handled by a network of subsidiaries and distributors. Copyer products are also sold on an OEM basis around the world.

Copyer works closely with its parent company, Canon, in the areas of R&D, manufacturing, and domestic marketing. In fiscal 1989, approximately 70 percent of Copyer's products were sold to Canon and marketed under the Canon name. However, during 1990, Copyer plans to expand its SELEX sales, which will lower the ratio of the Company's production for Canon, potentially to as little as 50 percent.

As Copyer decreases production for Canon, it plans to compensate for the loss of sales by increasing its exports. The Company recognizes the trend toward an economic globalization and is currently positioning itself to take advantage of some emerging opportunities. As part of its strategy, Copyer plans to establish a comprehensive distribution center in Europe in early 1991, while continuing to utilize its current network of foreign subsidiaries, distributors, and OEM partners.

Copyer's net sales increased 17 percent to ¥61.02 billion (US$442 million) in fiscal 1989 from ¥52.07 billion (US$407 million) in fiscal 1988. (Percentage changes refer only to ¥ amounts; US$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) However, the cost of sales increased 18 percent and net income decreased 5 percent to ¥457 million (US$3.3 million) in fiscal 1989 from ¥482 million (US$3.8 million) in fiscal 1988. The decrease in net income can be attributed partially to an inflated 1988 net income figure that resulted from a ¥741 million (US$5.8 million) gain on the sale of marketable and investment securities.

No financial statements are included because Copyer is a subsidiary of Canon.

BUSINESS SEGMENT STRATEGIC DIRECTION

Plain Paper Copy Machines

Copyer receives 83 percent of its revenue from the sale of its PPC machines, which increased 21 percent to ¥50.4 billion (US$365 million) in fiscal 1989 from ¥41.6 billion (US$325 million) in fiscal 1988. The Company manufactures these products for its own distribution and for distribution by other companies. Internationally, PPC machines are marketed under OEM agreements. In the United States, Copyer's PPCs are distributed through Canon and Lanier Worldwide, a division of the Harris Corporation.

The PPC product line is expanding rapidly to include compact models designed for home use, high-speed machines with fully automatic options, and large models capable of A2-size copying.

Diazo Equipment

The Company receives 4 percent of its revenue from the sale of diazo machines. Sales remained stable at ¥2.0 billion (US$15 million) in fiscal 1989. Copyer manufactures a full line of low-cost machines, medium-size models, and compact, large-format models. The Company also offers a diazo copying machine with an automatic exposure (AE) system.

Other Related Products

Copyer receives 9 percent of its revenue from the sale of diazo paper, which decreased 2 percent to ¥3.8 billion (US$28 million) in fiscal 1989 from ¥3.9 billion (US$31 million) in fiscal 1988. The diazo paper products are produced in its Kansai Factory.

Further Information

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

1989 SALES OFFICE LOCATIONS

Asia/Pacific—57

MANUFACTURING LOCATIONS

Asia/Pacific

Kansai Factory
  OPC materials for photoconductors for PPC machines; the main production facility for sensitized paper used in diazo equipment
Kofu Factory
  PPC machines
Tachikawa Factory
  Main production facility for PPC machines

SUBSIDIARIES

Europe

Selex Europe B.V. (Netherlands)
Selex France S.A. (France)
Selex (U.K.) Ltd. (United Kingdom)

Asia/Pacific

Copyer Sales Co., Ltd. (Japan)
Selex Singapore Pte., Ltd. (Singapore)

Affiliated Production Companies

Asia/Pacific

Fujino Copyer Industries Co., Ltd. (Japan)
Sagami Supply Co., Ltd. (Japan)
Sowa Copyer Industries Co., Ltd. (Japan)
Top Business Machines Co., Ltd. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Eiichiro Nishijima
President

Heizaburo Higuchi
Senior executive managing director

Katsumi Nagamatsu
Executive managing director

Takeo Kato
Executive managing director

Kakuju Umeda
Executive managing director

PRINCIPAL INVESTORS

Canon Incorporated—50.4 percent

FOUNDERS

Information is not available.

CONVEX Computer Corporation

3000 Waterview Parkway
P.O. Box 833851
Richardson, Texas 75083-3851
Telephone: (214) 497-4000
Fax: (214) 497-4848
Dun's Number: 05-680-3489

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

CONVEX Computer Corporation was founded in 1982, shipped its first systems in March 1985, and became a publicly owned firm in 1986. CONVEX designs, manufactures, and markets a line of supercomputers for engineering, scientific, and technical users. CONVEX now has 650 systems in use in 33 countries throughout the world by 400 major industrial and research customers. The number of installations increased by 30 percent in 1989, totaling 171 installations. CONVEX manufactured and shipped 300 processors during 1989, representing a 50 percent growth rate over 1988. CONVEX targets the computer-aided engineering (CAE) and design market, the government/aerospace market, the computational chemistry market, the petroleum market, and the advanced research market.

Total revenue increased 50.2 percent to $158.6 million* in fiscal year 1989, up from $105.6 million in fiscal year 1988. CONVEX believes that the growth came from increases in shipments of CONVEX's C2 products and an increase in customer demand for high-end multiprocessor systems. Net income reached $11.7 million in fiscal year 1989, representing a 92.5 percent increase over fiscal year 1988. CONVEX employed 997 people throughout the world during 1989.

For the respective fiscal years 1989, 1988, and 1987, R&D expenditure totaled $20.7 million, $13.6 million, and $9.7 million. These respective figures account for 13.0, 12.9, and 14.0 percent of total revenue. R&D activities are aimed toward broadening and enhancing CONVEX's existing products and developing the next generation of products. CONVEX believes that R&D activities are important in intensifying its competitive position.

*All dollar amounts are in US dollars.

CONVEX primarily uses a direct sales channel comprising 49 sales offices with 191 direct sales and technical sales support personnel. Direct sales to end users are conducted throughout the world, specifically in the United States, Canada, the United Kingdom, France, Germany, Italy, the Netherlands, Switzerland, Japan, and Australia. CONVEX also utilizes original equipment manufacturers (OEMs) and independent distributors in certain foreign countries. During fiscal years 1989, 1988, and 1987, international sales represented approximately 50 percent of total revenue. European sales accounted for almost 35 percent and Japan accounted for 15 percent of international sales in fiscal year 1989.

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

Hardware

CONVEX offers a family of seven 64-bit scalar/vector supercomputers ranging from the entry-level C120 to the C240. All products in the C Series are standalone, air-cooled, UNIX-based computers that can be upgraded to meet customers' growing needs. CONVEX's initial product, the CONVEX C1, was first shipped in 1985. The C120, originally introduced as the C1 XP in 1986, is a single-CPU system that uses CMOS and TTL semiconductor technology. The C120 is the lowest-priced computer CONVEX offers.

In the first quarter of 1988, CONVEX introduced its second generation of computer systems, the CONVEX C2 Series. The C201 and C202 share the architecture and instruction set of the higher-performance C2 Series members and thus provide an entry into the CONVEX parallel processor line. The C201 and C202 systems use ECL and CMOS semiconductor technology for increased speed. The other members of the C2 Series are the C210, C220, C230, and C240. These computers possess a 200-MBps port to memory for each processor, a large memory subsystem that is expandable to 2 gigabytes, and a dedicated 200-MBps I/O bus that is directly connected to main memory. As do the C201 and C202, the systems utilize CMOS and ECL semiconductor technology for increased speed in a compact environment. The C240 is the largest and most powerful of the C2 Series. It is a four-processor, parallel-processing system with performance levels of 224-whetstone mips and 200 64-bit mflops. The C2 Series hardware architecture is enhanced by the following features and characteristics:

- Integrated scalar, vector, and parallel processing—C2 Series systems integrate the three forms of processing common in scientific and engineering applications: scalar, in which operations are performed on one element at a time; vector, in which simultaneous operations occur on arrays of data; and parallel, in which two or more processors simultaneously operate on different portions of a program.
- Automatic Self-Allocating Processors (ASAP)—The C2 Series uses the distinctive ASAP hardware-based technology to keep all available CPUs busy. The hardware automatically takes code that has been parallelized by the CONVEX compilers and splits it among the available processors. The ASAP approach never requires the programmer to use special programming techniques to take advantage of the parallel hardware technology.
- Memory subsystems—A nonblocking memory crossbar gives each processor the full bandwidth it requires without conflict from other processors. The memory system can serve up to five memory ports simultaneously at 200 MBps. This ensures that memory access is not a bottleneck, allowing all processors to operate at their full potential. The C2 Series' memory is expandable up to 2 gigabytes and enables applications to fit in physical memory, reducing time for large simulations. The C2 Series incorporates gallium arsenide technology in the memory subsystem components to provide significantly reduced power consumption.

During 1989, CONVEX introduced the Open Supercomputing concept, which enhances the C2 product line as a central computing resource. The Integrated Disk Channel (IDC) offers high bandwidth between processor and disk storage for data-intensive applications. The Enhanced Scalar Processor (ESP) provides significantly increased scalar performance.

Software

The CONVEX family of supercomputers is binary-instruction-set compatible, allowing the opportunity to move up in performance to higher-end CONVEX products while still being able to use all of the software that was being used on CONVEX's earlier products. CONVEX's software products fall under five groups: operating system, language compilers, third-party applications programs, networking, and VAX/VMS compatibility.

Operating System

The ConvexOS operating system (OS) is an enhanced high-performance version of UNIX 4.2 and 4.3 BSD. The ConvexOS is compatible with POSIX. Extensions range from file system performance enhancements that enable programs to profit from the innate parallelism in the input/output (I/O) systems to features that allow a single process greater access to system resources such as memory. The ConvexOS features a highly tuned I/O system that delivers fast throughput for total application efficiency, disk striping capabilities that provide higher throughput of data on disks and faster data retrieval, highly vectorized runtime libraries that further speed execution of scientific and engineering applications, a parallelized operating system that supports parallel processing and multiprocessing simultaneously, large virtual memory that can process most jobs up to 2 gigabytes for each process, shared memory that allows processes to share portions of their address space, distributed batch processing that automatically selects the best system in a complex to run a job, a powerful accounting system that makes outside billing and in-house costs easy to track, and system security that features restricted access for unauthorized users and pinpoints security violations.

Language Compilers

The compiler technology allows programmers to take advantage of vector and parallel processing without learning new programming techniques. This technology is available for FORTRAN, C, and Ada programming languages. The compilers identify opportunities for optimization and vectorization,

instruction pipelining, and parallel processing. The compilers then automatically generate code that best utilizes the CONVEX architecture. The compilers accept industry-standard language and are compatible with the most popular dialects of each of those languages. CONVEX FORTRAN accommodates FORTRAN 77, VAX FORTRAN, and CRAY CFT programs. CONVEX C is compatible with the portable C compiler (PCC), and CONVEX Ada is compatible with the Ada Joint Program Office.

Third-Party Applications Programs

CONVEX offers over 575 third-party applications programs that run on CONVEX systems, including industry-leading programs used in each of CONVEX's leading target markets. Key applications available are structural analysis, computational fluid dynamics, graphics, and leading applications for petroleum, mechanical engineering, and chemistry markets. CONVEX also offers a variety of application library packages designed to provide portions of programs coded in assembly language for higher speed and accuracy, without requiring the user to become expert in CONVEX architecture or assembly language.

Networking

CONVEX provides connectivity to almost every industry-standard network interface. Ethernet and transmission control protocol/internet protocol (TCP/IP) enable connections to other UNIX-based systems, non-UNIX systems, and workstations. TCP/IP communication allows file transfers, electronic mail, and virtual terminal services. All systems supporting TCP/IP can be connected to any C Series machine.

CONVEX Network File System (NFS) enables users to share a common base of files across different systems, thus allowing the user to save time by not having to copy files from one system to another.

CONVEX systems can be integrated into DECnet networks through the VAX/VMS compatibility products. CONVEX also supports HYPERChannel, which provides a link between CONVEX systems and large-scale supercomputers and mainframes that support TCP/IP.

For Ultra Network Technologies' UltraNet, CONVEX has a family of high-performance networking products. The Ultra products provide the C Series with high-speed communication with other supercomputers, near-supercomputers, and workstation products.

CONVEX's X Window provides a network-based window system that defines a distributed asynchronous protocol by which graphics servers and applications communicate. The X Window System greatly increases compatibility among different hardware platforms and provides users with a wider array of computing resources.

VAX/VMS Compatibility

CONVEX offers the CONVEX-to-VAX User Environment (COVUE) family of software products to ease the transition from the VMS environment to the UNIX environment. The COVUE family includes the following products:

- COVUEshell duplicates the function of the VMS DCL Command Interpreter and provides VAX/VMS command language compatibility. With COVUEshell, users employ VMS commands and relate to the CONVEX system as though its operating system were VMS.
- COVUEnet, a layered product to connect C Series systems to Phase IV DECnet networks, offers DECnet compatibility to network CONVEX systems into a VAX environment.
- COVUEedt provides a screen-oriented editor that supports the DEC EDT User Interface.
- COVUEbatch allows a VAX user to use a CONVEX system as a computational server. Users can submit jobs from the VAX and receive output back to the VAX. Users can use the CONVEX system for computationally intensive workloads and use the VAX for time-sharing.
- COVUElib is a runtime library that provides compatibility with 183 of the most frequently used VMS system services and runtime library routines. It allows users of existing VAX FORTRAN and VAX C applications to run those applications on the CONVEX systems with less effort.
- COVUEbinary serves as a bridge between VAX/VMS files and CONVEX FORTRAN. COVUEbinary's primary operation is to convert files to a record format that is understood by the other system.

Further Information

For more information about CONVEX's business segments, please contact Dataquest's Technical Computer Systems Industry Service.

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

	1985	1986	1987	1988	1989
Five-Year Revenue	$13,507.0	$40,182.0	$69,647.0	$105,613.0	$158,607.0
Percent Change	-	197.49	73.33	51.64	50.18
Capital Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
R&D Expenditure	$3,855.0	$6,753.0	$9,743.0	$13,594.0	$20,659.0
Percent of Revenue	28.54	16.81	13.99	12.87	13.03
Number of Employees	207	362	509	700	997
Revenue ($K)/Employee	$65,251	$111,000	$136,831	$150,876	$159,084
Net Income	($5,575.0)	$3,994.0	$8,845.0	$6,101.0	$11,747.0
Percent Change	-	171.64	121.46	(31.02)	92.54

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$33.33	$37.40	$41.24	$46.67
Quarterly Profit	$2.26	$2.41	$3.08	$4.01

NA = Not available

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

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	NA	NA	50.00	50.00	50.00
International	NA	NA	50.00	50.00	50.00
Europe	NA	NA	NA	NA	35.00
Asia/Pacific	NA	NA	NA	NA	15.00
Japan	NA	NA	NA	NA	15.00

NA = Not available

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

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	72.00	71.00
Indirect Sales	28.00	29.00

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—49
Europe—6
Asia/Pacific—2
Japan—1

MANUFACTURING LOCATIONS

North America

Richardson, Texas
Assembly and test of all product parts, components, subassemblies, and final assemblies

SUBSIDIARIES

North America

CONVEX Computer Canada Ltd. (Canada)

Europe

CONVEX Computer AG (Switzerland)
CONVEX Computer B.V. (Netherlands)
CONVEX Computer GmbH (Germany)
CONVEX Computer Ltd. (United Kingdom)
CONVEX Computer S.A. (France)
CONVEX Computers S.p.A. (Italy)

Asia/Pacific

CONVEX Computer Australia (Australia)
CONVEX Computer Pte. Ltd. (Singapore)
CONVEX K.K. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Stardent Computer
According to an agreement with Stardent Computer, CONVEX will be able to license Stardent's Computer Application Visualization System (AVS) to provide supercomputer customers with leading visualization tools.

1989

Ingres Corporation
An agreement calls for Ingres to market its INGRES family of products on CONVEX supercomputers.

Control Data Corporation
A joint marketing agreement calls for Control Data Corporation to sell CONVEX Computer's departmental supercomputers, providing one-stop shopping for connectivity and maintenance.

Mitek Systems
A joint marketing agreement calls for Mitek Systems' OpenConnect connectivity products and services to be offered as a solution linking IBM systems to CONVEX supercomputers.

Computer Aided Design Software, Inc. (CADSI)
CONVEX and CADSI jointly announced the availability of Dynamic Analysis and Design System (DADS), a mechanical engineering software package from CADSI, on CONVEX supercomputers.

Unisys Electronia Ltd.
CONVEX gave Unisys Electronia sole rights to market and service CONVEX's supercomputers in Brazil.

1988

Tokyo Electron Limited
Tokyo Electron will produce and market CONVEX's C1-J departmental supercomputer in Japan.

Meta-Software, Inc.
CONVEX and Meta-Software announced the availability of the optimizing HSPICE circuit simulator on the CONVEX C Series of supercomputers.

Structural Dynamics Research Corporation
A joint marketing agreement calls for the sale and promotion of Structural Dynamics Research Corporation's Flodyn software on the CONVEX family of supercomputers.

Nippon Kokan K.K.
Nippon Kokan K.K. will resell CONVEX's departmental supercomputers. Nippon will sell the systems together with its application software on a nonexclusive basis to Japanese aerospace, automotive, construction, defense, and electric companies, as well as to government and university research labs.

1987

Apollo Computer
Apollo Computer will jointly market CONVEX's supercomputers with Apollo's workstations in a distributed multivendor network.

Oracle
CONVEX will market Oracle's relational database management system on its 64-bit departmental supercomputers in a nonexclusive agreement.

Polygen
A joint marketing agreement calls for Polygen's molecular simulation and modeling software to be marketed on CONVEX's 64-bit departmental supercomputers.

Silicon Graphics Inc.
CONVEX will jointly market its C1 Series of supercomputers with Silicon Graphics' IRIS Superworkstation for interactive graphics applications.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Robert J. Paluck
Chairman of the board, president and chief executive officer

Steven J. Wallach
Senior vice president, Technology

Larry Abernathy
Vice president, Quality

Nelson W. Bye
Vice president, US Western Field Operations

Iain J. M. Davidson
Vice president, European Field Operations

Harold W. Dozier
Vice president, Advanced Development

Thomas M. Jones
Vice president, Advanced Development

Stanton Joseph
Vice president, US Eastern Field Operations

Frank J. Marshall
Senior vice president, Engineering

Terrance L. Rock
Senior vice president, Operations

Frank P. Vince
Vice president, Marketing

J. Adrian Wise
Senior vice president, Sales and Service

PRINCIPAL INVESTORS

Jan Phillip F. Reemtsma—8.6 percent
L. J. Sevin—6.8 percent
Sevin Rosen Management Co.—6.2 percent

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	$20,756.0	$51,957.0	$128,830.0	$131,686.0	$136,745.0
Cash	1,286.0	3,379.0	7,170.0	62,893.0	47,635.0
Receivables	6,539.0	16,300.0	33,359.0	39,946.0	53,082.0
Marketable Securities	9,450.0	24,261.0	70,342.0	NA	NA
Inventory	3,178.0	7,273.0	14,871.0	23,053.0	27,999.0
Other Current Assets	303.0	744.0	3,088.0	5,794.0	8,029.0
Net Property, Plants	$4,053.0	$9,586.0	$14,191.0	$24,775.0	$28,670.0
Other Assets	$502.0	$1,328.0	$4,559.0	$4,625.0	$7,691.0
Total Assets	$25,311.0	$62,871.0	$147,580.0	$161,086.0	$173,106.0
Total Current Liabilities	$4,169.0	$10,703.0	$21,825.0	$24,824.0	$31,464.0
Long-Term Debt	$2,976.0	$6,175.0	$70,133.0	$72,495.0	$62,124.0
Other Liabilities	NA	NA	NA	NA	NA
Total Liabilities	$7,145.0	$16,878.0	$91,958.0	$97,319.0	$93,588.0
Total Shareholders' Equity	$18,166.0	$45,993.0	$55,622.0	$63,767.0	$79,518.0
Converted Preferred Stock	96.0	NA	NA	NA	NA
Common Stock	36.0	169.0	171.0	176.0	182.0
Other Equity	18,034.0	45,824.0	55,451.0	63,591.0	79,336.0
Retained Earnings	NA	NA	NA	NA	NA
Total Liabilities and Shareholders' Equity	$25,311.0	$62,871.0	$147,580.0	$161,086.0	$173,106.0
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$13,507.0	$40,182.0	$69,647.0	$105,613.0	$158,607.0
US Revenue	NA	NA	34,823.5	52,806.5	79,303.5
Non-US Revenue	NA	NA	34,823.5	52,806.5	79,303.5
Cost of Sales	$8,973.0	$14,398.0	$26,890.0	$44,378.0	$66,353.0
R&D Expense	$3,855.0	$6,753.0	$9,743.0	$13,594.0	$20,659.0
SG&A Expense	$6,993.0	$15,205.0	$26,283.0	$38,608.0	$54,239.0
Capital Expense	NA	NA	NA	NA	NA
Pretax Income	($5,575.0)	$4,303.0	$8,922.0	$8,961.0	$16,865.0
Pretax Margin (%)	(41.27)	10.71	12.81	8.48	10.63
Effective Tax Rate (%)	NA	47.60	38.20	35.80	32.10
Net Income	($5,575.0)	$3,994.0	$8,845.0	$6,101.0	$11,747.0
Shares Outstanding, Thousands	12,703.0	14,778.0	18,013.0	18,026.0	18,912.0
Per Share Data					
Earnings	($0.44)	$0.27	$0.49	$0.34	$0.62
Dividend	NA	NA	NA	NA	NA
Book Value	$1.43	$3.11	$3.09	$3.54	$4.20

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

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	4.98	4.85	5.90	5.30	4.35
Quick (Times)	4.22	4.17	5.22	4.38	3.46
Fixed Assets/Equity (%)	22.31	20.84	25.51	38.85	36.05
Current Liabilities/Equity (%)	22.95	23.27	39.24	38.93	39.57
Total Liabilities/Equity (%)	39.33	36.70	165.33	152.62	117.69
Profitability (%)					
Return on Assets	-	9.06	8.41	3.95	7.03
Return on Equity	-	12.45	17.41	10.22	16.40
Profit Margin	(41.27)	9.94	12.70	5.78	7.41
Other Key Ratios					
R&D Spending % of Revenue	28.54	16.81	13.99	12.87	13.03
Capital Spending % of Revenue	NA	NA	NA	NA	NA
Employees	207	362	509	700	997
Revenue ($K)/Employee	$65,251	$111,000	$136,831	$150,876	$159,084
Capital Spending % of Assets	NA	NA	NA	NA	NA

NA = Not available

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

12.02 Cramer Electronics, Inc.

Cramer Electronics, Inc.
85 Wells Avenue
Newton, Massachusettes 02159
(617) 969-7700

Balance Sheet (September 30)

	1977	1978	Percent Change 1977-1978
Working Capital ($ Millions)	$ 19.0	$ 16.8	(11.8%)
Long-Term Debt ($ Millions)	$ 5.7	$ 3.4	(41.1%)
Shareholders' Equity ($ Millions)	$ 19.8	$ 18.5	(6.5%)
Equity as a Percent of Assets (%)	31.8%	29.8%	
After-Tax Return on Average Equity (%)	(7.1%)	(6.6%)	

Operating Performance (Fiscal Year Ending September 30)

	1977	1978	Percent Change 1977-1978
Revenue ($ Millions)	$153.0	$150.7	(1.5%)
Cost of Goods ($ Millions)	$118.0	$114.6	(2.8%)
Marketing, SG&A Expense ($ Millions)	$ 31.4	$ 32.4	3.2%
Pretax Income ($ Millions)	($ 1.9)	($ 1.3)	
Pretax Margin (%)	(1.2%)	(0.8%)	
Net Income ($ Millions)	($ 1.4)	($ 1.3)	
Per Share Data[1]			
Earnings ($)	($ 0.64)	($ 0.56)	
Dividends ($)	$ 0.00	$ 0.00	
Book Value ($)	$ 8.91	$ 8.31	(6.7%)
Average Shares Outstanding (Millions)	2.25	2.25	
Capital Expenditures ($ Millions)	$ 0.6	$ 0.2	(72.1%)
Sales/Average Assets	2.38	2.43	2.1%
Sales/Average Inventory	4.47	4.73	5.8%
Total Employees	1,130	1,217	7.7%

[1]Fully diluted

Source: Cramer Electronics Form 10K and Annual Reports
DATAQUEST, Inc.

12.02 Cramer Electronics, Inc.

Table 12.02-1

Cramer Electronics, Inc.
FINANCIAL STATEMENT HISTORY 1971-78
(Dollars in Millions)

		Fiscal Year Ending September 30									
		1971	1972	1973	1974	1975	1976	1977	1978	TREND	CMPD GR
	BALANCE SHEET										
1	*CASH & LIQUID SECURITIES*	0.43	1.17	1.43	2.77	2.78	1.19	0.75	0.58	(0.02)	(0.75)
3	*RECEIVABLES*	13.22	16.98	19.95	22.94	18.25	21.50	22.73	24.18	1.26	7.00
4	*INVENTORY*	18.73	25.66	29.67	44.67	35.37	36.80	31.63	32.10	1.61	6.42
5	*OTHER CURRENT ASSETS*	0.42	0.37	0.49	0.17	1.24	0.31	0.35	0.06	(0.02)	(14.18)
7	*EXCESS FUNDS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	*TOTAL CURRENT ASSETS*	32.80	44.17	51.54	70.55	57.62	59.80	55.46	56.93	2.82	6.44
9	*GROSS P P E*	3.79	4.01	4.04	5.60	7.24	8.51	9.06	7.99	0.83	15.07
10	*ACCUMULATED DEPRECIATION*	0.98	1.23	1.33	1.59	1.94	2.32	2.82	3.12	0.31	18.40
11	*NET P P E*	2.81	2.78	2.71	4.01	5.30	6.19	6.24	4.86	0.52	13.48
12	*MISC ASSETS*	0.66	0.54	0.44	0.25	0.27	0.27	0.24	0.11	(0.07)	(19.27)
14	*GOODWILL*	0.21	0.32	0.28	0.24	0.20	0.17	0.13	0.09	(0.03)	(13.25)
15	**TOTAL ASSETS**	36.48	47.82	54.97	75.05	63.40	66.42	62.07	62.00	3.24	6.66
16	*NOTES PAYABLE*	8.50	14.00	14.08	23.85	18.77	23.02	21.65	26.15	2.18	14.37
17	*ACCOUNTS PAYABLE*	3.54	8.13	10.45	17.87	11.86	11.41	11.01	9.30	0.61	10.17
18	*ACCRUED TAXES*	0.07	0.11	2.45	1.42	0.08	0.04	0.35	0.39	(0.06)	3.32
19	*ACCRUED LIABILITIES*	0.38	0.49	0.79	1.44	1.44	1.50	1.56	1.89	0.21	25.11
20	*CURR MAT LONG TERM DEBT*	0.09	0.50	0.62	0.49	1.54	1.88	2.03	2.43	0.34	51.39
22	*TOTAL CURR LIABILITIES*	12.58	23.23	28.38	45.07	33.68	37.85	36.60	40.16	3.30	13.95
23	*LONG TERM DEBT*	9.17	9.13	8.51	8.90	8.57	7.39	5.70	3.36	(0.73)	(11.05)
24	*DEFERRED TAXES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	*MISC LIABILITIES*	0.16	0.27	0.22	0.13	0.04	0.00	0.00	0.00	(0.04)	(96.76)
27	*DEFICIT FUNDS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	*TOTAL LIABILITIES*	21.91	32.63	37.11	54.10	42.29	45.24	42.30	43.52	2.53	7.98
29	*PREFERRED STOCK*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	*COMMON STOCK*	1.89	1.98	2.04	2.10	2.17	2.23	2.30	2.30	0.06	2.91
31	*CAPITAL SURPLUS*	7.71	8.44	8.83	9.03	9.12	9.34	9.51	9.35	0.22	2.56
32	*RETAINED EARNINGS*	5.53	5.50	7.70	10.47	10.38	10.08	8.36	7.10	0.38	5.68
33	*TREASURY STOCK & OTHER*	(0.56)	(0.74)	(0.72)	(0.65)	(0.56)	(0.48)	(0.39)	(0.28)	0.05	(10.61)
34	*TOTAL EQUITY*	14.57	15.19	17.86	20.95	21.11	21.18	19.77	18.48	0.72	4.25
35	**TOTAL LIAB & EQUITY**	36.48	47.82	54.97	75.05	63.40	66.42	62.07	62.00	3.24	6.66
36	*NET WORKING CAPITAL*	20.22	20.94	23.16	25.48	23.94	21.95	18.86	16.77	(0.47)	(2.42)
	INCOME & EXPENSE										
38	*SALES*	60.14	88.21	121.80	151.05	122.04	138.55	153.04	150.73	11.66	11.79
40	*COST OF GOODS*	44.20	66.73	90.33	112.75	91.14	104.22	117.95	114.59	9.15	12.28
41	*GROSS PROFIT*	15.94	21.48	31.47	38.30	30.90	34.33	35.09	36.13	2.51	10.30
42	*S G & A EXPENSE*	12.49	17.88	22.54	27.53	25.91	28.13	31.40	32.39	2.64	12.76
43	*R & D EXPENSE*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	*OPERATING PROFIT*	3.44	3.60	8.93	10.77	4.99	6.21	3.70	3.74	(0.14)	(1.36)
46	*DEPRECIATION*	0.32	0.35	0.38	0.41	0.45	0.50	0.63	0.48	0.03	8.35
47	*LEASE PAYMENTS*	0.37	0.54	1.06	0.62	0.66	1.70	1.55	1.71	0.19	23.09
48	*INTEREST EXPENSE(INCOME)*	1.20	1.55	1.88	3.34	3.52	3.38	3.23	3.50	0.35	16.72
49	*MISC EXPENSE*	0.00	0.00	0.00	0.02	0.13	0.43	0.15	(0.01)	0.02	*********
51	*MISC INCOME*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.06	443.75
53	*PRETAX PROFIT*	1.56	1.15	5.61	6.39	0.24	0.19	(1.86)	(1.26)	(0.68)	*********
54	*INCOME TAXES*	0.71	0.55	2.88	3.24	0.12	0.18	(0.42)	0.00	(0.25)	*********
56	*NET PROFIT*	0.85	0.60	2.74	3.15	0.12	0.02	(1.44)	(1.26)	(0.43)	*********
57	*EPS AFTER PFD DIVIDENDS*	0.41	0.28	1.23	1.30	0.05	0.01	(0.64)	(0.56)	(0.19)	*********
58	*COMMON DIV PER SHARE*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Cramer Electronics Form 10K and Annual Reports
DATAQUEST, Inc.

12.02 Cramer Electronics, Inc.

Table 12.02-2

Cramer Electronics, Inc.
FINANCIAL STATEMENT HISTORY 1971-78
(Percent)

		Fiscal Year Ending September 30									
		1971	1972	1973	1974	1975	1976	1977	1978	TREND	CMPD GR
BALANCE SHEET											
1	*CASH & LIQUID SECURITIES*	1.18	2.44	2.60	3.69	4.38	1.79	1.21	0.94	(0.11)	(6.95)
3	*RECEIVABLES*	36.24	35.51	36.29	30.56	28.78	32.38	36.61	39.00	0.14	0.32
4	*INVENTORY*	51.35	53.65	53.98	59.52	55.78	55.40	50.96	51.78	(0.12)	(0.22)
5	*OTHER CURRENT ASSETS*	1.15	0.77	0.90	0.23	1.95	0.47	0.56	0.10	(0.09)	(19.54)
7	*EXCESS FUNDS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	*TOTAL CURRENT ASSETS*	89.92	92.37	93.77	94.01	90.89	90.03	89.35	91.83	(0.19)	(0.21)
9	*GROSS P P E*	10.38	8.39	7.35	7.46	11.43	12.81	14.60	12.88	0.82	7.88
10	*ACCUMULATED DEPRECIATION*	2.67	2.57	2.41	2.12	3.06	3.49	4.55	5.04	0.36	11.01
11	*NET P P E*	7.71	5.82	4.94	5.34	8.37	9.31	10.05	7.85	0.46	6.40
12	*MISC ASSETS*	1.80	1.13	0.79	0.33	0.42	0.40	0.39	0.18	(0.19)	(24.32)
14	*GOODWILL*	0.57	0.68	0.50	0.32	0.32	0.25	0.21	0.15	(0.07)	(18.67)
15	**TOTAL ASSETS**	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
16	*NOTES PAYABLE*	23.30	29.28	25.62	31.78	29.60	34.65	34.87	42.18	2.20	7.23
17	*ACCOUNTS PAYABLE*	9.70	17.00	19.00	23.81	18.71	17.18	17.74	15.00	0.36	3.29
18	*ACCRUED TAXES*	0.19	0.23	4.46	1.89	0.12	0.07	0.57	0.63	(0.12)	(3.13)
19	*ACCRUED LIABILITIES*	1.06	1.03	1.43	1.92	2.27	2.26	2.52	3.04	0.29	17.30
20	*CURR MAT LONG TERM DEBT*	0.24	1.04	1.13	0.65	2.43	2.83	3.27	3.93	0.52	41.94
22	*TOTAL CURR LIABILITIES*	34.49	48.58	51.63	60.05	53.13	56.99	58.97	64.77	3.25	6.84
23	*LONG TERM DEBT*	25.12	19.09	15.48	11.86	13.51	11.12	9.19	5.42	(2.37)	(16.60)
24	*DEFERRED TAXES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	*MISC LIABILITIES*	0.45	0.57	0.39	0.17	0.07	0.00	0.00	0.00	(0.09)	(97.21)
27	*DEFICIT FUNDS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	*TOTAL LIABILITIES*	60.06	68.24	67.51	72.09	66.71	68.12	68.15	70.19	0.80	1.24
29	*PREFERRED STOCK*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	*COMMON STOCK*	5.19	4.13	3.72	2.80	3.42	3.36	3.70	3.72	(0.15)	(3.51)
31	*CAPITAL SURPLUS*	21.12	17.66	16.07	12.03	14.38	14.07	15.31	15.09	(0.69)	(3.84)
32	*RETAINED EARNINGS*	15.16	11.50	14.01	13.95	16.37	15.18	13.47	11.45	(0.12)	(0.92)
33	*TREASURY STOCK & OTHER*	(1.53)	(1.54)	(1.31)	(0.87)	(0.88)	(0.72)	(0.63)	(0.45)	0.17	(16.19)
34	*TOTAL EQUITY*	39.94	31.76	32.49	27.91	33.29	31.88	31.85	29.81	(0.80)	(2.25)
35	**TOTAL LIAB & EQUITY**	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
36	*NET WORKING CAPITAL*	55.43	43.79	42.13	33.96	37.76	33.04	30.39	27.06	(3.44)	(8.51)
INCOME & EXPENSE											
38	*SALES*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
40	*COST OF GOODS*	73.50	75.65	74.16	74.64	74.68	75.22	77.07	76.03	0.33	0.44
41	*GROSS PROFIT*	26.50	24.35	25.84	25.36	25.32	24.78	22.93	23.97	(0.33)	(1.33)
42	*S G & A EXPENSE*	20.77	20.27	18.51	18.23	21.23	20.30	20.52	21.49	0.17	0.87
43	*R & D EXPENSE*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	*OPERATING PROFIT*	5.73	4.08	7.33	7.13	4.09	4.48	2.41	2.48	(0.51)	(11.76)
46	*DEPRECIATION*	0.53	0.40	0.31	0.27	0.37	0.36	0.41	0.32	(0.01)	(3.07)
47	*LEASE PAYMENTS*	0.61	0.62	0.87	0.41	0.54	1.23	1.01	1.13	0.08	10.11
48	*INTEREST EXPENSE(INCOME)*	1.99	1.76	1.54	2.21	2.88	2.44	2.11	2.32	0.09	4.41
49	*MISC EXPENSE*	0.00	0.00	0.00	0.01	0.10	0.31	0.10	(0.01)	0.02	*********
51	*MISC INCOME*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.04	425.47
53	*PRETAX PROFIT*	2.60	1.31	4.61	4.23	0.20	0.14	(1.22)	(0.84)	(0.64)	*********
54	*INCOME TAXES*	1.18	0.63	2.36	2.14	0.10	0.13	(0.27)	0.00	(0.26)	*********
56	*NET PROFIT*	1.42	0.68	2.25	2.09	0.10	0.01	(0.94)	(0.84)	(0.39)	*********
57	*EPS AFTER PFD DIVIDENDS*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
58	*COMMON DIV PER SHARE*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Cramer Electronics Form 10K and Annual Reports
DATAQUEST, Inc.

12.02 Cramer Electronics, Inc.

Table 12.02-3

Cramer Electronics, Inc.
FUNDS FLOW HISTORY 1972-78
(Dollars in Millions)

		Fiscal Year Ending September 30								
		1972	1973	1974	1975	1976	1977	1978	TREND	CMPD GR
SOURCES										
56	*NET PROFIT*	0.60	2.74	3.15	0.12	0.02	(1.44)	(1.26)	(0.61)	*********
46	*DEPRECIATION*	0.35	0.38	0.41	0.45	0.50	0.63	0.48	0.04	8.02
61	*NEW LONG TERM DEBT*	0.46	0.00	0.88	1.20	0.70	0.34	0.09	(0.02)	240.22
62	*NEW EQUITY*	0.19	(0.08)	(0.13)	(0.06)	(0.02)	(0.05)	(0.14)	(0.03)	*********
63	*INCR OTHER LIABILITIES*	0.11	(0.06)	(0.09)	(0.09)	(0.04)	0.00	0.00	(0.01)	*********
66	*TOTAL SOURCES*	1.71	2.98	4.22	1.63	1.15	(0.52)	(0.83)	(0.63)	*********
USES										
67	*P P E EXPENDITURES*	0.32	0.31	1.70	1.75	1.39	0.68	(0.89)	(0.11)	*********
68	*REPAYMENT LONG TERM DEBT*	0.09	0.50	0.62	0.49	1.54	1.88	2.03	0.34	59.17
69	*PREFERRED DIVIDENDS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	*COMMON DIVIDENDS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	*INCR WORKING CAPITAL*	1.13	2.34	2.19	(0.49)	(1.65)	(2.94)	(1.68)	(0.82)	*********
71	*INCR OTHER ASSETS*	0.00	(0.15)	(0.22)	(0.02)	(0.04)	(0.06)	(0.17)	0.00	52.57
74	*TOTAL USES*	1.54	3.00	4.29	1.73	1.23	(0.44)	(0.72)	(0.60)	*********
75	*EXCESS/DEFICIT*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	*CUMULATIVE SUR/DEF*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Cramer Electronics Form 10K and Annual Reports
DATAQUEST, Inc.

12.02 Cramer Electronics, Inc.

Table 12.02-4

Cramer Electronics, Inc.
FINANCIAL RATIO HISTORY 1971-78

	Fiscal Year Ending September 30									
	1971	1972	1973	1974	1975	1976	1977	1978	ST AV	MTD AVG
LIQUIDITY										
1 *CURRENT RATIO*	2.607	1.901	1.816	1.565	1.711	1.580	1.515	1.418	1.764	1.614
2 *QUICK RATIO*	1.085	0.781	0.753	0.570	0.624	0.599	0.642	0.617	0.709	0.648
3 *CASH RATIO*	0.034	0.050	0.050	0.082	0.082	0.031	0.021	0.015	0.043	0.039
4 *WORKING CAPITAL/SALES*	0.336	0.237	0.190	0.169	0.196	0.158	0.123	0.111	0.190	0.159
6 *DAYS RECEIVABLES*	80.238	70.256	59.782	55.423	54.575	56.653	54.203	58.555	61.211	57.846
7 *DAYS INVENTORY*	154.704	140.325	119.890	144.615	141.635	128.876	97.888	102.259	128.774	121.061
LEVERAGE										
8 *LONG TERM DEBT/CAPITALIZ*	0.386	0.375	0.323	0.298	0.289	0.259	0.224	0.154	0.288	0.253
11 *LONG TERM DEBT/EQUITY*	0.629	0.601	0.476	0.425	0.406	0.349	0.288	0.182	0.420	0.349
12 *TOTAL DEBT/EQUITY*	1.218	1.556	1.299	1.587	1.368	1.524	1.486	1.729	1.471	1.522
COVERAGE										
13 *EBIT/INTEREST*	2.304	1.745	3.987	2.913	1.068	1.058	0.424	0.640	1.767	1.366
14 *FIXED CHARGE COVERAGE*	1.997	1.551	2.911	2.616	1.057	1.038	0.610	0.758	1.567	1.282
16 *REPAY LTD+FIX CHARGE COV*	*********	1.489	2.490	2.262	0.946	0.797	0.438	0.545	1.281	0.981
OPER PERFORMANCE										
17 *GROSS PROFIT/SALES*	0.265	0.243	0.258	0.254	0.253	0.248	0.229	0.240	0.249	0.245
18 *OPER PROFIT/SALES*	0.057	0.041	0.073	0.071	0.041	0.045	0.024	0.025	0.047	0.041
21 *PRETAX PROFIT/SALES*	0.026	0.013	0.046	0.042	0.002	0.001	(0.012)	(0.008)	0.014	0.006
22 *NET PROFIT/SALES*	0.014	0.007	0.022	0.021	0.001	0.000	(0.009)	(0.008)	0.006	0.001
23 *NET PROFIT/AVG EQUITY*	*********	0.040	0.166	0.162	0.006	0.001	(0.071)	(0.066)	0.034	0.000
24 *NET PROFIT/AVG CAPITALIZ*	*********	0.025	0.108	0.112	0.004	0.001	(0.053)	(0.053)	0.020	(0.003)
26 *NET PROFIT/AVG TOT ASSETS*	*********	0.014	0.053	0.048	0.002	0.000	(0.022)	(0.020)	0.011	0.000
27 *E P S GROWTH RATE*	*********	(0.313)	3.412	0.057	(0.959)	(0.868)	*********	(0.128)	**********	
28 *SALES GROWTH RATE*	*********	0.467	0.381	0.240	(0.192)	0.135	0.105	(0.015)	0.160	0.085
TURNOVER										
31 *SALES/AVG EQUITY*	*********	5.929	7.371	7.784	5.804	6.553	7.476	7.882	6.971	7.144
32 *SALES/AVG CAPITALIZ*	*********	3.671	4.806	5.374	4.101	4.758	5.665	6.372	4.964	5.292
33 *SALES/AVG TOT DEBT + EQTY*	*********	2.480	3.050	3.171	2.343	2.679	2.983	3.027	2.819	2.855
34 *SALES/AVG TOTAL ASSETS*	*********	2.093	2.370	2.324	1.763	2.134	2.382	2.430	2.214	2.244
35 *SALES/AVG OPER ASSETS*	*********	2.137	2.407	2.345	1.775	2.149	2.397	2.441	2.236	2.261
36 *SALES/AVG GROSS P P E*	*********	22.624	30.262	31.351	19.007	17.592	17.423	17.685	22.278	20.340
BALANCE SHEET										
37 *CASH/SALES*	0.007	0.013	0.012	0.018	0.023	0.009	0.005	0.004	0.011	0.010
38 *RECEIVABLES/SALES*	0.220	0.192	0.164	0.152	0.150	0.155	0.149	0.160	0.168	0.158
41 *INVENTORY/SALES*	0.312	0.291	0.244	0.296	0.290	0.266	0.207	0.213	0.265	0.250
42 *OTH CURR ASSETS/SALES*	0.007	0.004	0.004	0.001	0.010	0.002	0.002	0.000	0.004	0.003
44 *GROSS P P E/SALES*	0.063	0.045	0.033	0.037	0.059	0.061	0.059	0.053	0.051	0.053
46 *MISC ASSETS/SALES*	0.011	0.006	0.004	0.002	0.002	0.002	0.002	0.001	0.004	0.002
47 *ACCOUNTS PAYABLE/SALES*	0.059	0.092	0.086	0.118	0.097	0.082	0.072	0.062	0.084	0.082
48 *ACCRUED TAXES/SALES*	0.001	0.001	0.020	0.009	0.001	0.000	0.002	0.003	0.005	0.004
51 *ACCRUED LIABILITY/SALES*	0.006	0.006	0.006	0.010	0.012	0.011	0.010	0.013	0.009	0.010
53 *DEFERRED TAXES/SALES*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
54 *MISC LIABILITIES/SALES*	0.003	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.001	0.001
MISCELLANEOUS										
57 *EQUITY PER COMMON SHARE*	6.948	7.044	8.018	8.636	9.333	9.322	8.781	8.214	8.287	8.595
58 *RETIRE/PREV GROSS P P E*	*********	(0.026)	(0.069)	(0.035)	(0.018)	(0.017)	(0.015)	(0.020)	(0.029)	(0.023)
61 *DEPREC/PREV GROSS P P E*	*********	0.093	0.093	0.101	0.081	0.069	0.074	0.053	0.081	0.074
62 *COM DIVS/ERN-PFD DIVS*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
63 *TAX RATE*	0.455	0.479	0.512	0.507	0.492	0.918	0.224	0.000	0.448	0.403
64 *COST OF GOODS/SALES*	0.735	0.757	0.742	0.746	0.747	0.752	0.771	0.760	0.751	0.755
65 *S G & A/SALES*	0.208	0.203	0.185	0.182	0.212	0.203	0.205	0.215	0.202	0.204

Source: Cramer Electronics Form 10K and Annual Reports
DATAQUEST, Inc.

Cray Research, Inc.

608 Second Avenue South
Minneapolis, Minnesota 55402
Telephone: (612) 333-5889
Fax: (612) 334-6726
Dun's Number: 05-903-5543

Date Founded: 1972

CORPORATE STRATEGIC DIRECTION

Cray Research, Inc. (CRI), was founded in 1972 by Seymour Cray and a group of colleagues from Control Data Corporation. CRI's mission is to design, manufacture, market, and support the most powerful computer systems (supercomputers) available for the large-scale scientific segment of the computer industry. CRI's supercomputers are used primarily for physical simulation in applications such as weather forecasting, aircraft and automotive design, nuclear research, geophysical research, chemistry simulations, and seismic analysis.

CRI is to supercomputers what IBM is to mainframe computers. It dominated the supercomputer market with a 38.5 percent market share by shipment revenue in 1989, according to Dataquest. When Control Data Corporation closed its ETA subsidiary in May 1989, CRI became the only US vendor producing traditional supercomputers. However, other vendors intend to challenge CRI in every area of the supercomputer market, a market that Dataquest forecasts to be $4.1 billion* in 1994.

In May 1989, CRI announced its restructuring into two companies. Mr. Cray, the founder, left the original company to form Cray Computer Corporation (CCC), based in Colorado Springs, Colorado, which will complete the development of the CRAY-3 computer. CRI will continue to market the X-MP EA, Y-MP, and CRAY-2 computers, and continue development of the Y-MP16 computer system as a follow-on product.

The two companies entered into cross-licensing and technology transfer agreements involving both hardware and software. CRI will provide CCC with $50 million in facilities, equipment, and inventories, and up to $100 million in operating funds to be paid over two years. CRI retained 10 percent of CCC's stock and distributed the remaining 90 percent to CRI shareholders.

CRI announced a layoff of about 400 of its assembly workers, or 7 percent of its worldwide work force, which took place during 1989. CRI cited several reasons for the reduction. Essentially, the Company has completed the transition from the CRAY X-MP system to the CRAY Y-MP product line. The CRAY Y-MP is based on new technology that uses manufacturing methods requiring fewer people. Furthermore, current growth in demand for the Company's systems is not keeping pace with the underlying advances in technology.

As of December 31, 1989, CRI had an installed base of 265 computer systems. During 1989, 57 new computer systems were installed, consisting of 35 CRAY Y-MPs, 14 CRAY X-MP EAs, five CRAY-2s and three CRAY X-MPs. Additionally, 21 used systems were installed, consisting of 19 CRAY X-MPs and two CRAY-2s.

Total revenue increased by 4 percent to $785 million in fiscal 1989 from $756 million in fiscal 1988. Net income decreased 43 percent to $89 million in fiscal 1989 from $157 million in fiscal 1988. Cray Research employs about 4,700 people worldwide.

R&D expenditure totaled $143 million in fiscal 1989, representing 18 percent of revenue. Capital spending totaled $99 million in fiscal 1989, representing 13 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

Technical Computers

CRI's initial product, the CRAY-1, was first installed in 1976 and was discontinued in 1984. In 1983, CRI began installing the CRAY X-MP Series; in 1985, the Company first installed its next-generation supercomputer, the CRAY-2. In 1988, CRI introduced the CRAY Y-MP system, discontinued the CRAY X-MP series, and introduced the CRAY X-MP EA systems.

CRAY Y-MP Series

The CRAY Y-MP, as the follow-on to the CRAY X-MP EA Series and the successor to the CRAY-2 Series, was announced in February 1988 and represents CRI's most advanced component technology. The CRAY Y-MP series was available during the year in frame sizes—two, four, or eight—denoting the maximum number of central processing units (CPUs) each can accommodate. Each CPU has a 6.0-nanosecond cycle time, scalar and vector processing capability, and can access all of central memory. The CRAY Y-MP has up to 128 million words of central memory. Included as standard equipment on the CRAY Y-MP series is an input/output subsystem (IOS) that contains up to 64 million bytes of buffer memory and is capable of transferring data directly to and from central memory at extremely high rates without interrupting central processing operations. A second IOS can be added as an option. The CRAY Y-MP uses a UNICOS operating system, based on AT&T's UNIX System V operating system, which is compatible with the CRAY X-MP EA and CRAY-2 series. CRI expects the majority of its new installations in 1990 to consist of CRAY Y-MPs.

CRAY X-MP EA Series and CRAY-2 Series

CRI also continues to market the CRAY X-MP EA series and CRAY-2 series, although availability is limited because production ended during 1989 on the CRAY X-MP EA series and is ending in 1990 for the CRAY-2 series. The CRAY X-MP EA and CRAY-2 are available with up to four CPUs and a maximum central memory size of 64 million and 512 million words, respectively. Cycle time for each CPU is 8.5 nanoseconds for the CRAY X-MP EA and 4.1 nanoseconds for the CRAY-2. Both products use the UNICOS software operating system, and the CRAY X-MP EA also uses COS.

Peripheral Equipment

CRI's Solid State Storage Device (SSD) is designed to enhance CRAY Y-MP and CRAY X-MP EA performance by providing fast access to large data sets and temporary storage for system programs. Traditional disk storage units transfer data at rates up to 10 million bytes per second, as opposed to the SSD transfer rate of 100 million to two billion bytes per second. The SSD is available with memory sizes ranging from 32 million to 512 million words.

CRI currently markets three high-performance magnetic storage disk drives, the DD-39, DD-49, and DS-40. They are designed to support the data capacity and transfer speed requirements of the CRAY Y-MP, CRAY X-MP EA, and CRAY-2 systems. The DD-39 and DD-49 have a 1,200-megabyte capacity and are capable of reading and writing data at 7 and 12 megabytes per second, respectively. The DS-40, which consists of a cabinet, four disk controllers, and four disk drives, has a 20,800-megabyte capacity and is capable of reading and writing data at 10 megabytes per second.

Software

CRI's software product releases include operating systems, compilers, and communications packages. CRI supports COS and UNICOS operating systems; the latter functions across CRI's entire line of hardware products. FORTRAN, C, and Pascal compilers provide automatic vectorizing and scalar optimizing. The CFT77 FORTRAN compiler also includes autotasking, which automatically partitions a program into tasks for efficient parallel processing. Additionally, in 1989, a new version of CRI's C compiler was released, which includes microtasking, a parallel processing tool. Communications packages include a wide array of networking software and station software packages. Station software gives users access to CRI's systems through a front end such as a Control Data, Digital Equipment Corporation, or IBM mainframe.

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	$380	$596	$687	$756	$785
Percent Change	-	65.94	56.84	15.27	3.84
Capital Expenditure	$50	$60	$40	$75	$99
Percent of Revenue	13.16	10.07	5.82	9.92	12.61
R&D Expenditure	$49	$88	$109	$118	$143
Percent of Revenue	12.89	14.77	15.87	15.61	18.22
Number of Employees	3,180	3,999	4,308	5,237	4,708
Revenue ($K)/Employee	$119.56	$149.21	$159.54	$144.41	$166.67
Net Income	$76	$125	$147	$157	$89
Percent Change	-	64.47	17.60	6.80	(43.31)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	$116.14	$128.26	$210.16	$330.14
Quarterly Profit	$1.51	$4.41	$30.60	$52.48

Source: Cray Research, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	82.00	70.00	63.00	65.00	62.00
International	18.00	30.00	37.00	35.00	38.00

Source: Cray Research, 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—30
Europe—12
Asia/Pacific—6
  Japan—1
ROW—1

MANUFACTURING LOCATIONS

North America

Chippewa Falls, Wisconsin
  Manufacturing, engineering, development, technical operations
Mendota Heights, Minnesota
  Software development
Rice Lake, Wisconsin
  Module assembly

SUBSIDIARIES

North America

Cray Canada Inc. (Canada)

Europe

Cray Research France S.A. (France)
Cray Research France S.P.R.L. (Belgium)
Cray Research GmbH (Germany)
Cray Research S.A.E. (Spain)
Cray Research S.R.L. (Italy)
Cray Research (Suisse) S.A. (Switzerland)
Cray Research (UK) Ltd. (England)

Asian/Pacific

Cray Asia/Pacific, Inc. (Hong Kong)
Cray Research (Australia) Pty. Ltd. (Australia)
Cray Research (India) Ltd. (India)
Cray Research Japan Ltd. (Japan)

ROW

Cray Computadores do Brasil (Brazil)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Hitachi Ltd.
CRI and Hitachi agreed to cross-license their patents for computer hardware. The agreement does not call for any transfer of technology between Hitachi and CRI.

Control Data
CRI and Control Data entered a joint marketing arrangement, allowing each to include the other company's products in its solution packages. Both companies will develop, improve, and market new and existing products that offer transparent links between Control Data's Cyber Line and CRAY supercomputers.

Landmark Graphics Corp.
CRI will provide OpenWorks (a new software designed by Landmark Graphics) on its supercomputers under UNICOS to make CRI systems more accessible to interpreters within petroleum companies.

Sun Microsystems
CRI and Sun announced the signing of a strategic alliance under which Sun workstations will be integrated with CRI supercomputers.

1988

StorageTek
StorageTek and CRI have signed a cooperative development agreement to develop the interface needed for CRI supercomputers to access the StorageTek 4400 automated tape cartridge system.

1987

Digital Equipment Corporation (DEC)
The two companies agreed to develop a high-speed interface between Digital's VAX 8200 computer and CRI's X-MP supercomputer.

MERGERS AND ACQUISITIONS

1990

Supertek Computers Inc.
CRI acquired Supertek Computers, a private company partially owned by Yokogawa Electric of Japan. Supertek designs and manufactures CRAY-compatible minisupercomputer systems.

KEY OFFICERS

John A. Rollwagen
Chairman and chief executive officer

Andrew Scott
Vice chairman, counsel, and director

Lester T. Davis
Executive vice president, Chippewa Falls Operations

John F. Carlson
Executive vice president and chief financial officer

Robert Ewald
Executive vice president, Software

Edward A. Masi
Senior vice president, Marketing

Charles Brekenridge
Vice president, Government Marketing

Michael G. Dickey
Vice president, International Marketing

Gerald M. Brost
Vice president, Engineering

PRINCIPAL INVESTORS

Trinity Investment Management Corp.—5.6 percent
State Treasurer, State of Michigan—5.3 percent

FOUNDER

Seymour Cray

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	$249	$324	$470	$539	$455
Cash	75	80	175	181	68
Receivables	27	50	97	117	178
Inventory	140	187	193	236	203
Other Current Assets	7	7	5	5	6
Net Property, Plants	$93	$137	$152	$198	$205
Other Assets	$102	$239	$280	$255	$295
Total Assets	$444	$700	$902	$992	$955
Total Current Liabilities	$111	$118	$168	$200	$217
Long-Term Debt	$12	$123	$109	$110	$144
Other Liabilities	$15	$17	$15	$5	-
Total Liabilities	$138	$258	$292	$315	$361
Total Shareholders' Equity	$306	$442	$610	$677	$594
Common Stock	30	30	31	31	31
Other Equity	71	82	103	13	(32)
Retained Earnings	205	330	476	633	595
Total Liability and Shareholders' Equity	$444	$700	$902	$992	$955
Income Statement	**1985**	**1986**	**1987**	**1988**	**1989**
Revenue	$380	$596	$687	$756	$785
US Revenue	310	419	433	495	485
Non-US Revenue	70	177	254	261	300
Cost of Sales	$133	$203	$245	$289	$377
R&D Expense	$49	$88	$109	$118	$143
SG&A Expense	$65	$90	$112	$131	$147
Capital Expense	$50	$60	$40	$75	$99
Pretax Income	$136	$225	$232	$234	$127
Pretax Margin (%)	35.79	37.75	33.77	30.95	16.18
Effective Tax Rate (%)	44.30	44.60	36.70	33.00	30.00
Net Income	$76	$125	$147	$157	$89
Shares Outstanding, Millions	30.4	32.0	32.4	32.1	31.0
Per Share Data					
Earnings	$3.99	$3.99	$4.65	$4.99	$3.02
Dividend	0	0	0	0	0
Book Value	$0.01	$0.01	$0.02	$0.02	$19.16

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of US Dollars, except Per Share Data)

Key Financial Ratios	1985	1986	1987	1988	1989
Liquidity					
Current (Times)	2.24	2.75	2.80	2.70	2.10
Quick (Times)	0.98	1.16	1.65	1.52	1.16
Fixed Assets/Equity (%)	30.39	31.00	24.92	29.25	34.15
Current Liability/Equity (%)	36.27	26.70	27.54	29.54	36.53
Total Liability/Equity (%)	45.10	58.37	47.87	46.53	60.77
Profitability (%)					
Return on Assets	-	21.85	18.35	16.58	9.14
Return on Equity	-	33.42	27.95	24.40	14.00
Profit Margin	20.00	20.97	21.40	20.77	11.34
Other Key Ratios					
R&D Spending % of Revenue	12.89	14.77	15.87	15.61	18.22
Capital Spending % of Revenue	13.16	10.07	5.82	9.92	12.61
Employees	3,180	3,999	4,308	5,237	4,708
Revenue ($K)/Employee	$119.56	$149.21	$159.54	$144.41	$166.67
Capital Spending % of Assets	11.26	8.57	4.43	7.56	10.37

Source: Cray Research, Inc.
Annual Reports and Forms 10-K
Dataquest (1990)

Cray Research, Inc.

608 Second Avenue South
Minneapolis, Minnesota 55402
Telephone: (612) 333-5889
Fax: (612) 334-6726
Dun's Number: 05-903-5543

Date Founded: 1972

CORPORATE STRATEGIC DIRECTION

Cray Research, Inc. (CRI), was founded in 1972 by Seymour Cray and a group of colleagues from Control Data Corporation. CRI's mission is to design, manufacture, market, and support the most powerful computer systems (supercomputers) available for the large-scale scientific segment of the computer industry. CRI's supercomputers are used primarily for physical simulation in applications such as weather forecasting, aircraft and automotive design, nuclear research, geophysical research, and seismic analysis.

CRI is to supercomputers what IBM is to mainframe computers. It dominates the traditional supercomputer market with a 63 percent market share for supercomputer production in 1988. When Control Data Corporation closed its ETA subsidiary in May 1989, CRI became the only U.S. vendor producing traditional supercomputers. However, other vendors intend to challenge Cray in every area of the supercomputer market, a market that Dataquest forecasts to be $2.2 billion* in 1992.

In May 1989, Cray Research announced that it will be restructured into two companies. Mr. Cray, the founder, is leaving the original company to form Cray Computer Corporation (CCC), based in Colorado Springs, Colorado, which will complete the development of the CRAY-3. CRI will continue to market the X-MP EA, Y-MP, and CRAY-2 computers, and continue development of the C-90 computer system as a follow-on product.

The two companies will enter into cross-licensing and technology transfer agreements involving both hardware and software. Cray Research will provide CCC with $50 million in facilities, equipment, and inventories and up to $100 million in operating funds to be paid over two years. CRI intends to retain 10 percent of CCC stock and distribute the remaining 90 percent to CRI shareholders.

From fiscal 1987 to fiscal 1988, Cray Research's total revenue increased to $756 million, up 10 percent. Net income rose 7 during fiscal 1988 to $157 million, compared with $147 million in fiscal 1987.

Research and development expenditures remained at a constant 16 percent of total revenue for fiscal 1987 and 1988 at $109 million and $118 million, respectively. Capital spending for fiscal 1988 was $75 million, or 10 percent of total revenue.

Cray announced a layoff of about 400 of its assembly workers, or 7 percent of its worldwide work force, which will take place by the end of 1989. Cray cited several reasons for the reduction. Essentially, Cray has completed the transition from the CRAY X-MP system to the CRAY Y-MP product line. The CRAY Y-MP is based on new technology that requires manufacturing methods requiring fewer people. Further, current growth in demand for the Company's systems is not keeping pace with the underlying advances in technology.

As of December 31, 1988, CRI had an installed base of 240 systems and 156 customers in 17 countries. CRI added 37 new customers during 1988, and signed 62 new contracts worth $608 million. Approximately 32 percent of CRI's 1988 contract value is from international customers. Government customers, including NASA and Lawrence Livermore Laboratory, accounted for approximately 53 percent of the contract value for 1988, as opposed to 65 percent in 1987. In the commercial market, CRI sold primarily

*All dollar amounts are in U.S. dollars

to the automotive industry, which accounted for 8 percent of total 1988 contract value. University customers accounted for roughly 26 percent of total 1988 contract value, up from 4 percent in 1987.

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.

DIVISIONAL STRATEGIC DIRECTION

Technical Computers

CRI's initial product, the CRAY-1, was first installed in 1976 and was discontinued in 1984. In 1983, CRI began installing the CRAY X-MP Series; in 1985, the Company first installed its next-generation supercomputer, the CRAY-2. In 1988, CRI introduced the CRAY Y-MP system, discontinued the CRAY X-MP series, and introduced the CRAY X-MP EA systems. The CRAY 3 will probably ship in limited quantities in 1990, followed by the C-90 a year later.

As of December 31, 1988, CRI had an installed base of 240 computer systems as mentioned previously; of these, 12 percent were leased. During 1988, 56 new systems were accepted, including 31 CRAY X-MPs, 10 CRAY X-MP EAs, 10 CRAY-2s, and 5 CRAY Y-MPs.

Computer Storage

CRI markets three high-performance magnetic storage disk drives, the DD-39, DD-49, and DS-40. CRI also offers a Solid-State Storage Device (SSD) to enhance X-MP and Y-MP performance.

Software

CRI's software includes operating systems, compilers, and communications packages. CRI supports COS and UNICOS operating systems. Communications packages include an array of networking software and station software packages that give users access to Cray systems through a front-end system such as a CDC, a Digital, or an IBM.

In January 1989, Cray Research announced the availability of a new graphics package called Multipurpose Graphics System (MPGS). Designed to take advantage of both a CRAY computer and a graphics workstation in a distributed environment, the software permits the user's work load to be split in a way that optimizes the use of both computer systems while minimizing network traffic. Typically, numerically and memory-intensive computational tasks are handled on the supercomputers, while the user interface and graphics manipulation are assigned to the workstation. MPGS has an extremely easy-to-use user interface, which emphasizes "point and click" and minimizes keyboard input.

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 U.S. Dollars)

	1984	1985	1986	1987	1988
Five-Year Revenue	$229	$380	$596	$687	$756
Percent Change	-	65.94	56.84	15.27	10.04
Capital Expenditure	$26	$50	$60	$40	$75
Percent of Revenue	11.35	13.16	10.07	5.82	9.92
R&D Expenditure	$38	$49	$88	$109	$118
Percent of Revenue	16.59	12.89	14.77	15.87	15.61
Number of Employees	2,203	3,180	3,999	4,308	5,237
Revenue ($K)/Employee	$103.85	$119.56	$149.21	$159.54	$144.41
Net Income	$45	$76	$125	$147	$157
Percent Change	-	68.89	64.47	17.60	6.80

Calendar Year	Q1	Q2	Q3	Q4
1989 Quarterly Revenue	$116.14	$128.56	$210.16	N/A
Quarterly Profit	$1.51	$4.41	$30.65	N/A

N/A = Not Available

Source: Cray Research
Annual Reports and Forms 10-K
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1984	1985	1986	1987	1988
North America	58.00	82.00	70.00	63.00	65.00
International	42.00	18.00	30.00	37.00	35.00

Source: Cray Research
Annual Reports and Forms 10-K
Dataquest
January 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1987	1988
Direct Sales	100	100
Indirect Sales	0	0

Source: Dataquest
January 1990

1988 SALES OFFICE LOCATIONS

North America—31
Japan—1
Europe—22
Asia/Pacific—4
ROW—1

MANUFACTURING LOCATIONS

North America

Chippewa Falls, Wisconsin
Manufacturing, engineering, development, technical operations
Rice Lake, Wisconsin
Module assembly
Colorado Springs, Colorado
Development and manufacturing
Cray's manufacturing facilities total 813,700 square feet.

SUBSIDIARIES

North America

Cray Canada Inc. (Canada)

Japan

Cray Research Japan, Ltd.

Europe

Cray Research France S.A. (France)
Cray Research France S.P.R.L. (Belgium)
Cray Research, GmbH (West Germany)
Cray Research, S.A.E. (Spain)
Cray Research S.R.L. (Italy)
Cray Research, (Suisse) S.A. (Switzerland)
Cray Research, (UK) Ltd. (England)

Asia/Pacific

Cray Asia/Pacific, Inc. (Hong Kong)
Cray Research (Australia) Pty. Ltd. (Australia)
Cray Research (India) Ltd. (India)

ROW

Cray Computadores do Brasil etc. (Brazil)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

June 1989

Landmark Graphics Corp.
Cray will provide OpenWorks (a new software designed by Landmark Graphics) on its supercomputers under UNICOS, to make Cray systems more accessible to interpreters within petroleum companies.

March 1989

Sun Microsystems
Cray and Sun announced the signing of a strategic alliance under which Sun workstations will be integrated with Cray supercomputers.

August 1988

StorageTek
StorageTek and Cray have signed a cooperative development agreement to develop the interface needed for Cray supercomputers to access the StorageTek 4400 automated tape cartridge system.

December 1987

Digital Equipment
The two companies agreed to develop a high-speed interface between Digital's VAX 8200 computer and Cray's X-MP supercomputer.

KEY OFFICERS

John A. Rollwagen
Chairman and chief executive officer

Marcelo A. Gumucio
President, chief operating officer, and director

Andrew Scott
Vice chairman, counsel, and director

Lester T. Davis
Executive VP, Chippewa Falls Operations

John F. Carlson
Executive VP, chief financial officer, and treasurer

Robert Ewald
Executive VP, Software

Edward A. Masi
Senior vice president, Marketing

PRINCIPAL INVESTORS

The Equitable Life Assurance Society of the United States—7.7 percent

FOUNDERS

Seymour Cray

Table 4
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of U.S. Dollars, except Per Share Data)

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	$193	$249	$324	$470	$539
Cash	84	75	80	175	181
Receivables	23	27	50	97	117
Inventory	83	140	187	193	236
Other Current Assets	3	7	7	5	5
Net Property, Plants	$56	$93	$137	$152	$198
Other Assets	$81	$102	$239	$280	$255
Total Assets	$330	$444	$700	$902	$992
Total Current Liabilities	$76	$111	$118	$168	$200
Long-Term Debt	$16	$12	$123	$109	$110
Other Liabilities	$18	$15	$17	$15	$5
Total Liabilities	$110	$138	$258	$292	$315
Total Shareholders' Equity	$220	$306	$442	$610	$677
Converted Preferred Stock	0	0	0	0	0
Common Stock	29	30	30	31	31
Other Equity	62	71	82	103	13
Retained Earnings	129	205	330	476	633
Total Liabilities and Shareholders' Equity	$330	$444	$700	$902	$992

Income Statement	1984	1985	1986	1987	1988
Revenue	$229	$380	$596	$687	$756
U.S. Revenue	132	310	419	433	495
Non-U.S. Revenue	97	70	177	254	261
Cost of Sales	$82	$133	$203	$245	$289
R&D Expense	$38	$49	$88	$109	$118
SG&A Expense	$45	$65	$90	$112	$131
Capital Expense	$26	$50	$60	$40	$75
Pretax Income	$67	$136	$225	$232	$234
Pretax Margin (%)	29.26	35.79	37.75	33.77	30.95
Effective Tax Rate (%)	32.00	44.30	44.60	36.70	33.00
Net Income	$45	$76	$125	$147	$157
Shares Outstanding, Millions	29,700	30,400	32,000	32,400	32,100
Per Share Data					
Earnings	$1.53	$3.99	$3.99	$4.65	$4.99
Dividends	0	0	0	0	0
Book Value	$0.01	$0.01	$0.01	$0.02	$0.02

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending December 31
(Millions of U.S. Dollars, except Per Share Data)

Key Financial Ratios	1984	1985	1986	1987	1988
Liquidity					
Current (Times)	2.54	2.24	2.75	2.80	2.70
Quick (Times)	1.45	0.98	1.16	1.65	1.52
Fixed Assets/Equity (%)	25.45	30.39	31.00	24.92	29.25
Current Liabilities/Equity (%)	34.55	36.27	26.70	27.54	29.54
Total Liabilities/Equity (%)	50.00	45.10	58.37	47.87	46.53
Profitability (%)					
Return on Assets	-	19.64	21.85	18.35	16.58
Return on Equity	-	28.90	33.42	27.95	24.40
Profit Margin	19.65	20.00	20.97	21.40	20.77
Other Key Ratios					
R&D Spending % of Revenue	16.59	12.89	14.77	15.87	15.61
Capital Spending % of Revenue	11.35	13.16	10.07	5.82	9.92
Employees	2,203	3,180	3,999	4,308	5,237
Revenue ($K)/Employee	$103.85	$119.56	$149.21	$159.54	$144.41
Capital Spending % of Assets	7.88	11.26	8.57	4.43	7.56

Source: Cray Research
Annual Reports and
Forms 10-K
Dataquest
January 1990