

X

LSI Logic Corporation

1551 McCarthy Boulevard
Milpitas, California 95035
Telephone: (408) 433-8000
Fax: (408) 434-6457
Dun's Number: 01-244-4253

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Founded in 1981, LSI Logic Corporation designs, develops, manufactures, and markets integrated circuit (IC) products and provides computer-aided design (CAD) and technology services and tools based on application-specific integrated circuit (ASIC) technologies. The company's products and services are marketed primarily to manufacturers in the electronic data processing (EDP), military/aerospace, telecommunications, and consumer electronics industries. The company's key product lines are ASICs, which include gate arrays and cell-based circuits; 32-bit MIPS and SPARC reduced-instruction-set computing (RISC) microprocessors and peripherals; and application-specific standard products (ASSPs) consisting of chip sets and graphics products used in IBM-compatible personal computers. In addition, LSI Logic offers a growing line of video compression and digital signal processing (DSP) products. All product areas are supported by the company's Concurrent Modular Design Environment (C-MDE) software tools, submicron CMOS and BiCMOS processing technologies, and high-pin-count packaging and test capabilities.

LSI Logic's revenue growth in 1990 outpaced that of the semiconductor industry. The company's revenue increased nearly 20 percent to \$655.5 million*, while worldwide semiconductor industry revenue increased 2 percent, according to Dataquest. However, a net loss of \$33 million was also reported for fiscal 1990, primarily as a result of a \$44 million charge to cost of revenue during the fourth quarter of 1990. The primary elements of this charge were the writedown of certain manufacturing and production equipment at the company's United Kingdom wafer fab facility plus the write-off of goodwill in connection with LSI Logic's 1988 acquisition of Video Seven Inc., a graphics board company.

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

R&D expense increased over \$7 million to \$60.2 million in 1990. The company attributes the increase mainly to the development of advanced products. LSI Logic is committed to technological leadership in the ASIC, RISC, and chip set markets and anticipates investing approximately 9 to 11 percent of its revenue in R&D in future years.

LSI Logic operates in three major regions: North America, Europe, and the Far East, with the majority of its sales occurring in North America. The company markets its products and services through its worldwide direct sales and marketing organization and through independent sales representatives and distributors. LSI Logic employed approximately 4,400 people worldwide at the end of 1990.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information on revenue by distribution channel is not available. Tables 3 through 5 at the end of this backgrounder present comprehensive financial information.

BUSINESS SEGMENT STRATEGIC DIRECTION

ASICs

A metal programmable array, also known as a gate array, is a matrix of uncommitted logic functions contained on a single chip of silicon. The gate array remains uncommitted through most of its complex processing cycle and is programmed or customized only in the last steps of the wafer fabrication process. This enables the manufacturer to produce large quantities of uncommitted gate arrays, called base arrays, and benefit from the economies of volume chip production.

For the past several years, LSI Logic has consistently ranked among the top gate array suppliers in the world. According to Dataquest, LSI Logic ranked third in the total gate array market in 1990 with a 12.0 percent market share, based on estimated factory revenue of \$464 million. According to Dataquest, the company ranked first in the MOS gate array market with factory revenue of \$461 million and an 18.0 percent market share and sixth in the BiCMOS gate array market with factory revenue of \$3 million in 1990.

During 1991, LSI Logic introduced the LCA200K Compacted Array Turbo gate array family that boasts usable gate counts of up to 200,000. The company is introducing new libraries, proprietary tools, packaging options, and unique power management alternatives to support these products. The company also introduced the LEA200K Embedded Array series. Embedded arrays are masterslices containing customer-defined memory functions such as random-access memories (RAMs), read-only memories (ROMs), computer-aided manufacturing (CAMs), and first-in/first-outs (FIFOs) in addition to uncommitted gate logic. Both the LCA200K and LEA200K products are fabricated using advanced 0.7-micron drawn channel-length high-performance CMOS (HCMOS) technology.

The company's cell-based technology allows the customer to combine standard cells, memories such as static RAM, metal programmable ROM, static multiport RAM, and other dedicated very large scale integration (VLSI) building blocks called megacells onto a single chip. LSI Logic's cell-based products allow for up to 200,000 equivalent gates of integration on a single chip, which through combinations of these various structures can provide the user with optimal solutions to digital design problems.

Microprocessors

During 1990, the company further expanded emphasis on its microprocessor product families. LSI Logic's principal microprocessor product focus is on the two 32-bit RISC microprocessor architectures that have met with broad market acceptance. These are the MIPS and SPARC architectures, which were originally developed by MIPS Computer Systems Inc. and Sun Microsystems Inc., respectively. Both of these architectures are designed to facilitate an "open system" design.

LSI Logic has made a number of new product announcements in the microprocessor field recently.

In October 1990, LSI Logic's SPARC Division introduced its SparKIT, a chip set that enables systems designers to clone the SPARCstation 1 workstation from Sun Microsystems. The company also offers ASIC cores for SPARC embedded applications.

The MIPS Division at LSI Logic recently introduced a five-chip family for the MIPS architecture. Called the MipSET, this chip set can reduce the MIPS LR3000-based workstation design time and eliminate LR3000 noise and timing problems. The MipSET, which is available in 20- and 25-MHz speeds, can replace 40 or more standard logic circuits. In late 1990, the company introduced an embedded version of its 32-bit MIPS RISC microprocessor, called the LR33000 Self-Embedding processor. This processor was designed for use in highly integrated, performance-oriented applications such as laser printers, X Window terminals, disk controllers, protocol converters, and military/avionic products. LSI Logic also introduced the Ngin module, a high-performance subsystem that offers system designers a proven central processing unit (CPU) implementation and simplified interface, thus minimizing system development time and risk.

The company also offers 16-bit microprocessor products that implement the MIL-STD-1750A instruction set and a family of high-speed digital signal and image processing devices that perform a wide variety of common DSP operations. These components are designed to operate in standalone or multiprocessing configurations.

Software

LSI Logic also offers a proprietary software for the CAD market. The company's Modular Design Environment (MDE) software is a computer-aided engineering (CAE) design system consisting of a core design software module and a number of other software programs that improve the circuit designer's productivity. During 1990, the company debuted an advanced software methodology for ASIC design known as C-MDE. C-MDE software is a graphic and icon-based suite of design tools that are interactive and provide the designer with the capability of performing design activities based on a single unified database. LSI Logic expects to make C-MDE available during the second half of 1991. In addition, the company has coupled key elements of its software programs with software products offered by selected CAE companies, thereby increasing the potential customer base available to LSI Logic.

In mid-1990, LSI Logic demonstrated a prerelease version of a VHDL-based CAD software suite that is intended to expand the company's ASIC technology capabilities by further automation of the IC design process. Called "Silicon 1076," this software is intended to allow a chip designer to move from product concept to the layout of the final chip design and mask generation pursuant to a more automated and integrated procedure than is currently available from most other semiconductor design software products.

Headland Technology

During 1989, LSI Logic's subsidiaries, previously known as G2 Incorporated and Video Seven Inc., merged into one subsidiary company, which changed its name to Headland Technology Inc. Headland's products, which are based on the product lines of the two predecessor companies, are sold to manufacturers and in certain instances resellers, of IBM and IBM-compatible personal computers.

Headland's IC products consist primarily of highly integrated graphics chips and logic chip sets. Through use of LSI Logic's MDE software, these Headland

products can be tailored to a particular customer's specifications.

Headland Technology also develops and markets high-performance video graphics technology board-based products under its Video Seven label principally for business and professional PC users. According to Dataquest, Headland ranked fourth in the worldwide low-end PC graphics board market in 1990 with an estimated 7.3 percent market share, based on estimated revenue of \$45.6 million. Headland's graphic and video interface products enable IBM and IBM-compatible PC users to generate high-resolution monochrome or color text and graphics on the monitor screen. While supporting industry standards, the Video Seven lines of products offer customers the opportunity to take advantage of new levels of performance for existing IBM and IBM-compatible PC hardware and software.

Further Information

For further information about the company's business segments, please contact either Dataquest's Semiconductor industry service or Graphics and Displays industry service.

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

	1986	1987	1988	1989	1990
Five-Year Revenue	194,335	262,131	378,908	546,870	655,491
Percent Change	-	34.89	44.55	44.33	19.86
Capital Expenditure	63,398	138,993	100,961	114,494	61,998
Percent of Revenue	32.62	53.02	26.65	20.94	9.46
R&D Expenditure	21,558	28,919	36,964	52,457	60,196
Percent of Revenue	11.09	11.03	9.76	9.59	9.18
Number of Employees	1,821	2,322	3,329	3,700	4,400
Revenue (\$K)/Employee	106.72	112.89	113.82	147.80	148.98
Net Income	3,855	11,340	24,702	(24,892)	(32,995)
Percent Change	-	194.16	117.83	(200.77)	(32.55)
1990 Fiscal Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	139,072	159,698	172,471	184,250	
Quarterly Profit	2,096	6,203	4,189	(45,483)	

Source: LSI Logic
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	85.00	81.00	77.00	75.00	72.00
Europe	13.00	14.00	12.00	13.00	14.00
Japan	2.00	5.00	11.00	12.00	14.00

Source: LSI Logic
Annual Reports

1990 SALES OFFICE LOCATIONS

North America—31
Europe—9
Japan—2
ROW—3

MANUFACTURING LOCATIONS

North America

Edmonton, Alberta, Canada

Fremont, California

Milpitas, California

Sydney, Nova Scotia, Canada

Europe

Braunschweig, Germany

Japan

Tsukuba

SUBSIDIARIES

North America

Headland Technology Inc. (United States)
LSI Logic Corporation of Canada, Inc. (Canada)

Europe

LSI Logic (Europe) plc (United Kingdom)

Japan

LSI Logic K.K. (Japan)
Nihon Semiconductor Inc. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Synopsys Inc.

Synopsys granted a license to LSI Logic that will allow LSI to install Synopsys' software in its design centers and incorporate Synopsys' logic synthesis tools into its Silicon 1076 VHDL-based design environment.

Sun Microsystems Inc.

LSI Logic signed a licensing agreement with Sun permitting LSI to sell worldwide the ASIC devices developed for the original SPARCstation I workstation.

NHK

In an agreement with NHK, Japan's state broadcasting authority, LSI Logic's Japanese subsidiary, LSI Logic K.K., will license NHK's Muse decoder system. LSI Logic K.K. intends to use the system to enter the Japanese HDTV market in collaboration with a Japanese television manufacturer and further develop technology for use in U.S. and European markets when they are established.

Opus Systems

The two companies announced an agreement whereby Opus will design a SPARC-compatible workstation and port the Sun Microsystems operating system to it, using the LSI SparkIT chip set. LSI will then license the design to would-be SPARC cloners.

Vantage Analysis Systems Inc.

LSI Logic's proprietary Silicon 1076 product will incorporate VHDL simulation tools from Vantage. Under the terms of the agreement, Vantage's comprehensive simulation tools will be available in all of LSI's design centers worldwide.

1989

Synopsys Inc.

LSI and Synopsys entered into a cooperative agreement for LSI to develop and market certified logic synthesis libraries for the Synopsys Design Compiler. As part of the agreement, LSI will purchase Synopsys synthesis tools for internal use.

1988

CrossCheck Technology Corporation

Under terms of a technology license and development agreement, LSI will license patented test structures from CrossCheck that will embed into the base-silicon cell structure of high-density gate arrays. CrossCheck will also supply a test generation package running on Sun workstations that will be integrated into LSI's gate array layout software.

Imaging Technology Inc. (ITI)

The two companies signed a marketing and technology agreement under which ITI will design a new generation of imaging products using LSI's L64200 series of real-time image-processing chips.

Sun Microsystems Inc.

Sun gave LSI worldwide licensing rights to manufacture, market, modify, and enhance MPUs, related components, software, and systems using the SPARC architecture.

MERGERS AND ACQUISITIONS

1989

G-2 Incorporated and Video Seven Inc.

LSI merged the activities of G-2 and Video Seven to form Headland Technology, which will produce logic chip sets and graphics for PCs.

1988

Video Seven Inc.

LSI acquired Video Seven, a designer, manufacturer, and marketer of graphics boards.

KEY OFFICERS

Wilfred J. Corrigan

Chairman and chief executive officer

George D. Wells

President and chief operating officer

Cyril F. Hannon

Executive vice president, Worldwide Operations

Robert Blair

Senior vice president, ASIC Marketing

Brian L. Halla

Senior vice president, Microprocessor and DSP Products

James S. Koford

Senior vice president, ASIC Engineering, and chief technical officer

PRINCIPAL INVESTORS

Wilfred J. Corrigan—11.0 percent

FOUNDERS

Wilfred J. Corrigan

Robert Walker

William O'Meara

Mitchell D. Bohn

Table 3
Balance Sheet
Fiscal Year Ending in December
(Thousands of U.S. Dollars)

Balance Sheet	1986	1987	1988	1989	1990
Cash	197,451	195,583	187,975	120,035	140,270
Receivables	44,502	59,031	101,640	105,839	114,978
Marketable Securities	5,525	71,715	15,643	32,867	18,417
Inventory	26,636	51,195	112,225	114,918	124,831
Other Current Assets	6,432	5,006	7,245	18,193	40,385
Total Current Assets	280,546	382,530	424,728	391,852	438,881
Net Property, Plants	159,058	290,479	334,510	349,348	328,707
Other Assets	11,800	26,389	28,261	23,961	16,418
Total Assets	451,404	699,398	787,499	765,161	784,006
Total Current Liabilities	32,150	72,172	130,338	150,808	192,797
Long-Term Debt	106,908	187,909	191,857	204,443	189,795
Other Liabilities	11,680	14,862	21,730	17,826	27,092
Minority Interest	49,677	116,225	111,970	94,735	98,583
Total Liabilities	200,415	391,168	455,895	467,812	508,267
Converted Preferred Stock	0	0	0	0	0
Common Stock	196,380	401	405	411	421
Other Equity	18,310	260,190	258,858	249,489	260,864
Retained Earnings	36,299	47,639	72,341	47,449	14,454
Total Shareholders' Equity	250,989	308,230	331,604	297,349	275,739
Total Liabilities and Shareholders' Equity	451,404	699,398	787,499	765,161	784,006

Source: LSI Logic Corporation
 Annual Reports and Forms 10-K
 Dataquest (October 1991)

Table 4
Consolidated Income Statement
Fiscal Year Ending in December
(Thousands of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1986	1987	1988	1989	1990
Revenue	194,335	262,131	378,908	546,870	655,491
U.S. Revenue	172,372	223,859	332,644	499,308	579,564
Non-U.S. Revenue	21,963	38,272	46,264	47,562	75,927
Cost of Sales	129,150	168,403	235,671	424,544	487,759
R&D Expense	21,558	28,919	36,964	52,457	60,196
SG&A Expense	40,200	55,726	80,145	99,885	117,318
Capital Expense	63,398	138,993	100,961	114,494	61,998
Pretax Income	8,535	17,294	31,202	(34,863)	(18,521)
Pretax Margin (%)	4.39	6.60	8.23	(6.38)	(2.83)
Effective Tax Rate (%)	48.00	41.00	42.00	(14.00)	(89.00)
Net Income	3,855	11,340	24,702	(24,892)	(32,995)
Shares Outstanding, Millions	40,191	40,674	41,133	41,305	42,063
<i>Per Share Data</i>					
Earnings	0.10	0.28	0.60	(0.60)	(0.78)
Dividend	-	-	-	-	-
Book Value	6.24	7.58	8.06	7.20	6.56

Source: LSI Logic Corporation
 Annual Reports and Forms 10-K
 Dataquest (October 1991)

Table 5
Key Financial Ratios
Fiscal Year Ending in December

Key Financial Ratios	1986	1987	1988	1989	1990
<i>Liquidity</i>					
Current (Times)	8.73	5.30	3.26	2.60	2.28
Total Assets/Equity (%)	179.85	226.91	237.48	257.33	284.33
Current Liabilities/Equity (%)	12.81	23.41	39.31	50.72	69.92
Total Liabilities/Equity (%)	79.85	126.91	137.48	157.33	184.33
<i>Profitability (%)</i>					
Return on Assets	0.85	1.62	3.14	(3.25)	(4.21)
Return on Equity	1.54	3.68	7.45	(8.37)	(11.97)
Profit Margin	1.98	4.33	6.52	(4.55)	(5.03)
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	11.09	11.03	9.76	9.59	9.18
Capital Spending % of Revenue	32.62	53.02	26.65	20.94	9.46
Employees	1,821	2,322	3,329	3,700	4,400
Revenue (\$K)/Employee	106.72	112.89	113.82	147.80	148.98
Capital Spending % of Assets	14.04	19.87	12.82	14.96	7.91

Source: LSI Logic Corporation
 Annual Reports and Forms 10-K
 Dataquest (October 1991)

LSI Logic Corporation

1551 McCarthy Boulevard
Milpitas, California 95035
Telephone: (408) 433-8000
Fax: (408) 434-6457
Dun's Number: 01-244-4253

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Founded in 1981, LSI Logic Corporation designs, develops, manufactures, and markets integrated circuit products and provides computer-aided design and technology (CAT) services based on application-specific integrated circuit (ASIC) technologies. The Company's products and services are marketed primarily to manufacturers in the electronic data processing, military/aerospace, and telecommunications industries. The Company's key product lines are ASICs, including gate arrays and cell-based circuits; MIPS and SPARC 32-bit reduced-instruction-set computing (RISC) microprocessors; and application-specific standard products (ASSPs) consisting of chip sets and graphics boards for IBM and IBM-compatible personal computers. In addition, LSI Logic offers high-performance standard products in the digital signal processing (DSP) marketplace. These product areas are supported by the Company's Modular Design Environment (MDE) software tools, submicron CMOS and BiCMOS processing technologies, and high-pin-count packaging and test capabilities.

The Company's revenue increased 44 percent in 1989 to \$547 million.* However, net loss totaled \$25 million as opposed to a net profit of the same amount in the prior year. A sharp erosion in prices of graphics boards as well as a decline in board sales at retail stores caused a second half loss at Headland Technology, an LSI Logic affiliate formed by the merger of G-2 Incorporated and Video Seven Inc. LSI Logic took a \$43 million restructuring charge in 1989 to eliminate older, less efficient manufacturing capacity.

*All dollar amounts are in US dollars.

R&D spending increased to \$52.5 million, or 9.6 percent of revenue. During 1988 and the first half of 1989, LSI Logic increased its global manufacturing capacity through the completion or expansion of facilities in Germany, Japan, the United Kingdom, and Canada. Capital expenditure in these regions and the United States amounted to \$114.0 million.

LSI Logic operates in three major regions: North America, Asia/Pacific, and Europe, with the majority of its sales in North America. Europe and the Asia/Pacific region represented 16 and 12 percent of sales, respectively. The Company employed 3,700 people worldwide 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 backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

Semiconductors

LSI Logic has dominated the MOS market for the past five years, and Dataquest ranked the Company as the number three supplier of total gate arrays in 1989 with revenue of \$420 million. LSI Logic ranked first in MOS gate arrays with revenue of \$418 million and sixth in BiCMOS gate arrays with revenue of \$2 million in 1989, according to Dataquest. The Company's ASICs include metal programmable array

and cell-based custom products. The Company offers a wide variety of possible sizes and configurations for its ASIC products, which may include both logic and memory elements.

Microprocessors

During 1989, the Company further increased emphasis on its microprocessor product families. LSI Logic's principal microprocessor product focus is on the two 32-bit RISC microprocessor architectures that have met with broad market acceptance. These are the MIPS and SPARC architectures, which were originally developed by MIPS Computer Systems, Inc., and Sun Microsystems, Inc., respectively. Both of these architectures are designed to facilitate an "open systems" design. The Company also offers 16-bit microprocessor products that implement the Mil-STD-1750A instruction set. LSI Logic also offers a family of high-speed digital signal and image processing devices that perform a wide variety of common DSP operations. These components are designed to operate in standalone or multiprocessing configurations.

Software

LSI Logic also offers proprietary software for the CAD market. The MDE software is a computer-aided engineering (CAE) design system consisting of a core design software module and a number of other software programs that improve the circuit designer's productivity. The MDE software is used by the Company and its customers to design ASICs that meet the customer's specific functionality and performance requirements. The Company's MDE software supports and automatically performs key elements of the design process from circuit concept through physical layout of the circuit design and preparation of pattern generation tapes.

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	\$140.0	\$194.3	\$262.1	\$378.9	\$546.9
Percent Change	-	38.79	34.89	44.56	44.34
Capital Expenditure	\$39.7	\$60.8	\$167.6	\$101.0	\$114.0
Percent of Revenue	28.36	31.29	63.95	26.66	20.84
R&D Expenditure	\$14.3	\$21.6	\$28.9	\$37.0	\$52.5
Percent of Revenue	10.21	11.12	11.03	9.77	9.60
Number of Employees	1,380	1,821	2,322	3,329	3,700
Revenue (\$K)/Employee	\$101.45	\$106.70	\$112.88	\$113.82	\$147.81
Net Income	\$10.1	\$3.9	\$11.3	\$24.7	(\$24.9)
Percent Change	-	(61.39)	189.74	118.58	(200.81)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$133.9	\$140.89	\$133.71	\$138.3	
Quarterly Profit	\$8.04	\$4.48	(\$35.70)	(\$1.66)	

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

Table 2
Revenue by Geographical Region (Percent)

Region	1985	1986	1987	1988	1989
North America	89.00	85.00	81.00	77.00	72.30
International	12.00	15.00	19.00	23.00	27.70
Asia/Pacific	1.00	2.00	5.00	11.00	11.70
Japan	1.00	2.00	5.00	11.00	11.70
Europe	11.00	13.00	14.00	12.00	16.00

Source: LSI Logic Corporation
Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988*	1989*
Direct Sales	95.00	95.00
Indirect Sales	5.00	5.00
Distributors	5.00	5.00

*Dataquest estimate

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—25
Europe—7
Asia/Pacific—4
ROW—1

MANUFACTURING LOCATIONS

North America

Edmonton, Alberta, Canada
Fremont, California
Milpitas, California
Sydney, Nova Scotia, Canada

Europe

Braunschweig, Germany
Sidcup, United Kingdom

Asia/Pacific

Tsukuba, Japan

SUBSIDIARIES

North America

Headland Technology Inc. (Fremont, California)
LSI Logic Corporation of Canada, Inc. (Calgary,
Alberta Canada)

Europe

LSI Logic Europe plc (United Kingdom)

Asia/Pacific

LSI Logic K.K. (Japan)
Nihon Semiconductor Inc. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Sun Microsystems

LSI Logic signed a licensing agreement with Sun permitting LSI to sell worldwide the ASIC devices developed for the original SPARCstation 1 workstation.

Vantage Analysis Systems, Inc.

LSI Logic's proprietary Silicon 1076 product will incorporate VHDL simulation tools from Vantage. Under the terms of the agreement, Vantage's comprehensive simulation tools will be available in all of LSI Logic's design centers worldwide.

Synopsys

LSI Logic's proprietary Silicon 1076 product will incorporate VHDL synthesis tools from Synopsys.

1989

Synopsys

LSI and Synopsys entered into a cooperative agreement for LSI to develop and market certified logic synthesis libraries for the Synopsys Design Compiler. LSI will purchase Synopsys synthesis tools for internal use.

MERGERS AND ACQUISITIONS

1989

G-2 Incorporated and Video Seven Inc.

LSI merged the activities of G-2 and Video Seven to form Headland Technology. Headland produced logic chip sets and graphics for PCs.

1988

Video Seven Inc.

LSI acquired Video Seven, a designer, manufacturer, and marketer of adapter boards.

KEY OFFICERS

Wilfred J. Corrigan
Chairman, chief executive officer

George D. Wells
President, chief operating officer

James S. Koford
Chief technical officer, senior vice president, ASIC
Engineering

Robert N. Blair
Senior vice president, Marketing and Sales

Brian L. Halla
Vice president, Microprocessor Products

Bruce L. Entin
Vice president, Investor Relations and Corporate
Communications

D. Scott Mercer
Vice president, chief financial officer

Lewis C. Wallbridge
Vice president, Human Resources

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Wilfred J. Corrigan
Robert Walker
William O'Meara
Mitchell D. Bohn

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	\$244.8	\$280.5	\$382.5	\$424.7	\$391.8
Cash	0	0	0	188.0	120.0
Receivables	38.0	44.5	59.0	101.6	105.8
Marketable Securities*	167.7	203.0	267.3	15.6	32.9
Inventory	33.8	26.6	51.2	112.2	114.9
Other Current Assets	5.3	6.4	5.0	7.3	18.2
Net Property, Plants	\$124.4	\$159.1	\$290.5	\$334.5	\$349.3
Other Assets	\$3.3	\$11.8	\$26.4	\$28.3	\$24.0
Total Assets	\$372.5	\$451.4	\$699.4	\$787.5	\$765.1
Total Current Liabilities	\$32.8	\$32.2	\$72.2	\$130.3	\$150.8
Long-Term Debt	\$81.9	\$106.9	\$187.9	\$191.9	\$204.4
Other Liabilities	\$26.3	\$61.3	\$131.1	\$133.7	\$112.5
Total Liabilities	\$141.0	\$200.4	\$391.2	\$455.9	\$467.7
Total Shareholders' Equity	\$231.5	\$251.0	\$308.2	\$331.6	\$297.4
Converted Preferred Stock	0	0	0	0	0
Common Stock	191.8	196.4	0.4	0.4	0.4
Other Equity	7.3	18.3	260.2	258.9	249.5
Retained Earnings	32.4	36.3	47.6	72.3	47.5
Total Liabilities and Shareholders' Equity	\$372.5	\$451.4	\$699.4	\$787.5	\$765.1
Income Statement	1985	1986	1987	1988	1989
Revenue	\$140.0	\$194.3	\$262.1	\$378.9	\$546.9
US Revenue	123.9	172.4	223.8	332.6	499.3
Non-US Revenue	16.1	21.9	38.3	46.3	47.6
Cost of Sales	\$88.5	\$129.2	\$168.4	\$235.7	\$424.5
R&D Expense	\$14.3	\$21.6	\$28.9	\$37.0	\$52.5
SG&A Expense	\$27.3	\$40.2	\$55.7	\$80.1	\$99.9
Capital Expense	\$39.7	\$60.8	\$167.6	\$101.0	\$114.0
Pretax Income	\$14.9	\$8.5	\$17.3	\$31.2	(\$34.9)
Pretax Margin (%)	10.64	4.37	6.60	8.23	(6.38)
Effective Tax Rate (%)	32.00	48.00	41.00	42.00	(14.00)
Net Income	\$10.1	\$3.9	\$11.3	\$24.7	(\$24.9)
Shares Outstanding, Millions	39.4	40.2	40.7	41.1	41.3
Per Share Data					
Earnings	\$0.26	\$0.10	\$0.28	\$0.60	(\$0.60)
Dividend	0	0	0	0	0
Book Value	\$5.88	\$6.24	\$7.57	\$8.07	\$7.20

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

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	7.46	8.71	5.30	3.26	2.60
Quick (Times)	6.43	7.89	4.59	2.40	1.84
Fixed Assets/Equity (%)	53.74	63.39	94.26	100.87	117.45
Current Liabilities/Equity (%)	14.17	12.83	23.43	39.29	50.70
Total Liabilities/Equity (%)	60.91	79.84	126.93	137.48	157.26
<i>Profitability (%)</i>					
Return on Assets	5.42	0.95	1.96	3.32	(3.21)
Return on Equity	8.73	1.62	4.04	7.72	(7.92)
Profit Margin	7.21	2.01	4.31	6.52	(4.55)
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	10.21	11.12	11.03	9.77	9.60
Capital Spending % of Revenue	28.36	31.29	63.95	26.66	20.84
Employees	1,380	1,821	2,322	3,329	3,700
Revenue (\$K)/Employee	\$101.45	\$106.70	\$112.88	\$113.82	\$147.81
Capital Spending % of Assets	10.66	13.47	23.96	12.83	14.90

*For years 1986-1987, "Cash" is included in "Marketable Securities" total.

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

LSI Logic Corporation

790 Sycamore Drive
Milpitas, California 95035
Telephone: (408) 433-8000
Fax: (408) 434-6457
Dun's Number: 01-244-4253
Date Founded: January 1981

CORPORATE STRATEGIC DIRECTION

LSI Logic Corporation was founded in 1981 by Wilfred J. Corrigan, Robert Walker, William O'Meara, and Mitchell D. Bohn. The Company designs, develops, manufactures, and markets a full line of gate arrays and cell-based integrated circuits (CBICs), MIPS and SPARC 32-bit microprocessors, and chip sets and graphic adapter boards for desktop computers. Currently, LSI Logic is focusing on high-density/high-performance gate arrays and CBICs, providing computer-aided design (CAD) tools, multilayer metal interconnect, high pin count on ceramic packaging, and high-performance complementary metal-oxide semiconductor (CMOS) processing. LSI Logic is targeting the computer, telecommunications, and military/aerospace industries.

Dataquest ranks LSI Logic as the largest MOS gate array supplier in 1988, with worldwide revenue of \$418.0 million.* Dataquest believes that LSI Logic achieved this position as a result of strengths in CAD tools, management, and supplier credibility. Additionally, LSI Logic possesses one of the largest installed CAD customer bases in North America.

LSI Logic's fiscal 1989 revenue was its highest ever, up 44 percent over fiscal 1988 revenue. However, net income decreased to a \$24.8 million loss in fiscal 1989 from a \$24,702.0 million gain in fiscal 1988. Dataquest believes that this dramatic change in income is the result of LSI Logic's manufacturing operations, which are not being used to full capacity.

The Company invested in research and development in 1988 primarily for process development of the BiCMOS process and CAD tools. R&D spending increased to \$37.0 million, or 10 percent of revenue.

All dollar amounts are in U.S. dollars.

Because of the low margins on the low-density CMOS gate arrays (less than 5,000 gates), LSI Logic has shifted its emphasis toward products with more than 10,000 gates and as many as 100,000 gates, where there is less competition and higher margins.

Continuing to expand its manufacturing capabilities in 1988, the Company completed an assembly and test facility in Germany, expanded its manufacturing capacity in Japan, and invested in wafer fabrication facilities in the United Kingdom and Canada. Net capital expenditures in these regions and the United States amounted to \$101.0 million.

LSI Logic operates in three major regions: North America, Japan, and Europe with most of its sales in North America. Europe and Japan represented 12 and 11 percent of 1988 sales, respectively. The Company employed more than 3,300 people worldwide in 1988 as opposed to approximately 2,300 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.

BUSINESS SEGMENT STRATEGIC DIRECTION

Semiconductors

LSI Logic has dominated the MOS market for the past five years, and Dataquest ranked LSI Logic the number one supplier of gate arrays in 1988.

Although most ASIC suppliers are announcing CMOS ASIC products in the 1.2- to 1.5-micron range, LSI Logic is announcing products less than 1.0 micron. These submicron CMOS products have speeds comparable with the low-end ECL and GaAs gate arrays and are much less expensive. LSI Logic has leading-edge process capabilities in CMOS and is also investing in BiCMOS, which Dataquest believes to be one of the hot processes for the 1990s.

Dataquest believes that LSI Logic's major success factor in ASICs is its leadership in CAD tools, cell libraries, manufacturing, packaging, and testing.

Microprocessors

LSI Logic manufactures two of the leading reduced-instruction-set computing (RISC) architectures, MIPS, and SPARC, which provide more than four

times the price/performance than traditional microprocessors and have the benefit of integrating and customizing the processor onto an ASIC chip.

Software

LSI Logic also offers a proprietary software for the CAD market. The Modular Design Environment (MDE) software can either run on or integrate with leading workstations at the user's site. This software is an integrated package of more than 25 software modules that can design ICs with up to 200,000 gates and systems with millions of gates. Written in the C language in a UNIX environment, MDE software allows an engineer to fully design and test a circuit on a computer screen.

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	\$84.5	\$140.0	\$194.3	\$262.1	\$378.9
Percent Change	-	65.68	38.79	34.89	44.56
Capital Expenditure	\$81.9	\$39.7	\$60.8	\$167.6	\$101.0
Percent of Revenue	96.92	28.36	31.29	63.95	26.66
R&D Expenditure	\$11.9	\$14.3	\$21.6	\$28.9	\$37.0
Percent of Revenue	14.08	10.21	11.12	11.03	9.77
Number of Employees	1,077	1,380	1,821	2,322	3,329
Revenue (\$K)/Employee	\$78.46	\$101.45	\$106.70	\$112.88	\$113.82
Net Income	\$15.5	\$10.1	\$3.9	\$11.3	\$24.7
Percent Change	-	(34.84)	(61.39)	189.74	118.58
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$133.90	\$140.89	\$133.71	N/A	
Quarterly Profit	\$8.04	\$4.48	(\$35.70)	N/A	

N/A = Not Available

Source: LSI Logic
 Annual Reports
 Dataquest
 January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1984	1985	1986	1987	1988
North America	N/A	89.00	85.00	81.00	77.00
International	N/A	12.00	15.00	19.00	23.00
Japan	N/A	1.00	2.00	5.00	11.00
Europe	N/A	11.00	13.00	14.00	12.00

N/A = Not Available

Source: LSI Logic
 Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988
Direct Sales	95.00
Indirect Sales	5.00
Distributors	5.00

Source: Dataquest
 January 1990

1988 SALES OFFICE LOCATIONS

North America—31
Japan—3
Europe—15
Asia/Pacific—1

MANUFACTURING LOCATIONS

North America

Bellevue, Washington
Design center
Bethesda, Maryland
Design center
Boca Raton, Florida
Design center
Burnaby, British Columbia
Design center
Calgary, Alberta
Design Center
Dallas, Texas
Design center
Edison, New Jersey
Design center
Edmonton, Alberta
Design center
Fremont, California
Class 10 and 100 clean rooms (fab)
Irvine, California
Design center
Itasca, Illinois
Design center
Kanata, Ontario
Design center
Milpitas, California
Design center
Milpitas, California
Class 10 and 100 clean rooms (fab)
Minneapolis, Minnesota
Design center
Pointe Claire, Quebec
Design center
Santa Clara, California
Class 10 and 100 clean rooms (fab)
Sherman Oaks, California
Design center
Waltham, Massachusetts
Design center

Japan

Tsukuba
Class 1 and 10 clean rooms (fab)

Europe

Braunschweig, West Germany
Fab facility
Sidcup, United Kingdom
Class 10 clean room (fab)

SUBSIDIARIES

North America

G-2 Inc.
LSI Logic Corp. of Canada, Inc.

Europe

LSI Logic (Europe) Limited

Japan

Nihon LSI Logic K.K.
Nihon Semiconductor

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Swire Technologies, Ltd.

LSI licensed Swire Technologies, Hong Kong, as a supplier of its plastic surface-mount Tape Quad Flat Pack (TQFP) ASIC package family. Swire received a license to supply TQFP packaging to its customers for a two-year, renewable period.

CrossCheck Technology Corp.

LSI signed a technology license and development agreement with CrossCheck to ease the problems of testing high-density gate arrays. Under the agreement, LSI is to license patented test structures from CrossCheck that will embed into the base-silicon cell structure of high-density gate arrays. CrossCheck also is to supply a test generation package running on Sun workstations that will be integrated into LSI's gate array layout software.

Synopsys

LSI and Synopsys entered into a cooperative agreement that calls for LSI to develop and market certified logic synthesis libraries for the Synopsys Design Compiler. Part of the agreement is a volume purchase of Synopsys synthesis tools by LSI for internal use.

1988

Imaging Technology Inc. (ITI)

The two companies formed a marketing and technology agreement. ITI designed a new generation of imaging products using LSI's L64200 series of real-time image-processing chips.

Sun Microsystems

Sun gave LSI worldwide licensing rights to manufacture, market, modify, and enhance MPUs, related components, software, and systems using the SPARC architecture.

Interactive Solutions Ltd.

LSI took a share in Interactive Solutions, a firm that has developed software, named Minnie, that simplifies analog circuit design. LSI is using Minnie at its Sidcup plant for its analog-digital arrays. LSI purchased licenses to Minnie and made a significant investment, although it did not gain a controlling interest in Interactive Solutions.

Apollo Computer and Mentor Graphics

Apollo, LSI, and Mentor joined forces to offer Mentor graphics and LSI Logic design tools on Apollo workstations.

MERGERS AND ACQUISITIONS

1989

G-2 and Video Seven

LSI merged the activities of G-2 and Video Seven to form Headland Technology. Headland produces logic chip sets and graphics for PCs.

1988

Video Seven Inc.

LSI acquired Video Seven, which designs, manufactures, and markets adapter boards used to enhance graphics in IBM and IBM-compatible PCs.

KEY OFFICERS**Wilfred J. Corrigan**

Chairman, chief executive officer

George D. Wells

President, chief operating officer

Robert N. Blair

Vice president, U.S. Marketing and Sales

Conrad J. Dell'Oca

Vice president, Research and Development

Bruce L. Entin

Vice president, Investor Relations, Corporate Communications

Raymond F. Fritz

Vice president, U.S. Controller

D. Scott Mercer

Vice president, chief financial officer

PRINCIPAL INVESTORS

FOUNDERS**Wilfred J. Corrigan****Robert Walker****William O'Meara****Mitchell D. Bohn**

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	\$208.8	\$244.8	\$280.5	\$382.5	\$424.7
Cash	0	0	0	0	188.0
Receivables	23.1	38.0	44.5	59.0	101.6
Marketable Securities*	161.0	167.7	203.0	267.3	15.6
Inventory	21.7	33.8	26.6	51.2	112.2
Other Current Assets	3.0	5.3	6.4	5.0	7.3
Net Property, Plants	\$107.3	\$124.4	\$159.1	\$290.5	\$334.5
Other Assets	\$1.6	\$3.3	\$11.8	\$26.4	\$28.3
Total Assets	\$317.7	\$372.5	\$451.4	\$699.4	\$787.5
Total Current Liabilities	\$30.7	\$32.8	\$32.2	\$72.2	\$130.3
Long-Term Debt	\$67.2	\$81.9	\$106.9	\$187.9	\$191.9
Other Liabilities	\$14.3	\$26.3	\$61.3	\$131.1	\$133.7
Total Liabilities	\$112.2	\$141.0	\$200.4	\$391.2	\$455.9
Total Shareholders' Equity	\$205.5	\$231.5	\$251.0	\$308.2	\$331.6
Converted Preferred Stock	0	0	0	0	0
Common Stock	186.6	191.8	196.4	0.4	0.4
Other Equity	(3.4)	7.3	18.3	260.2	258.9
Retained Earnings	22.3	32.4	36.3	47.6	72.3
Total Liabilities and Shareholders' Equity	\$317.7	\$372.5	\$451.4	\$699.4	\$787.5
Income Statement	1984	1985	1986	1987	1988
Revenue	\$84.5	\$140.0	\$194.3	\$262.1	\$378.9
U.S. Revenue	N/A	123.9	172.4	223.8	332.6
Non-U.S. Revenue	N/A	16.1	21.9	38.3	46.3
Cost of Sales	\$47.5	\$88.5	\$129.2	\$168.4	\$235.7
R&D Expense	\$11.9	\$14.3	\$21.6	\$28.9	\$37.0
SG&A Expense	\$15.7	\$27.3	\$40.2	\$55.7	\$80.1
Capital Expense	\$81.9	\$39.7	\$60.8	\$167.6	\$101.0
Pretax Income	\$20.3	\$14.9	\$8.5	\$17.3	\$31.2
Pretax Margin (%)	24.02	10.64	4.37	6.60	8.23
Effective Tax Rate (%)	24.00	32.00	48.00	41.00	42.00
Net Income	\$15.5	\$10.1	\$3.9	\$11.3	\$24.7
Shares Outstanding, Millions	38.9	39.4	40.2	40.7	41.1
Per Share Data					
Earnings	\$0.40	\$0.26	\$0.10	\$0.28	\$0.60
Dividends	-	-	-	-	-
Book Value	\$5.28	\$5.88	\$6.24	\$7.57	\$8.07

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
<i>Liquidity</i>					
Current (Times)	6.80	7.46	8.71	5.30	3.26
Quick (Times)	6.09	6.43	7.89	4.59	2.40
Fixed Assets/Equity (%)	52.21	53.74	63.39	94.26	100.87
Current Liabilities/Equity (%)	14.94	14.17	12.83	23.43	39.29
Total Liabilities/Equity (%)	54.60	60.91	79.84	126.93	137.48
<i>Profitability (%)</i>					
Return on Assets	-	2.93	0.95	1.96	3.32
Return on Equity	-	4.62	1.62	4.04	7.72
Profit Margin	18.34	7.21	2.01	4.31	6.52
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	14.08	10.21	11.12	11.03	9.77
Capital Spending % of Revenue	96.92	28.36	31.29	63.95	26.66
Employees	1,077	1,380	1,821	2,322	3,329
Revenue (\$K)/Employee	\$78.46	\$101.45	\$106.70	\$112.88	\$113.82
Capital Spending % of Assets	25.78	10.66	13.47	23.96	12.83

*For 1986 and 1987, cash is included in Marketable Securities total.

Source: LSI Logic
 Annual Reports
 Dataquest
 January 1990

LSI Logic Corporation

Table 1

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

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
Total Semiconductor	32	84	140	197	262	375
Total Integrated Circuit	32	84	140	197	262	375
Bipolar Digital (Function)	3					
Bipolar Digital Memory						
Bipolar Digital Logic	3					
MOS (Function)	29	84	140	197	262	375
MOS Memory						
MOS Microdevices						18
MOS Logic	29	84	140	197	262	357
Analog						
Total Discrete						
Total Optoelectronic						

Table 2

LSI Logic Corporation 1988 Worldwide Ranking by Semiconductor Markets (Revenue in Millions of Dollars)

	<u>1988</u>	<u>1987</u>	<u>1988</u>	<u>Sales</u>	<u>Industry</u>
	<u>Rank</u>	<u>Rank</u>	<u>Revenue</u>	<u>% Change</u>	<u>% Change</u>
				<u>1987-1988</u>	<u>1987-1988</u>
Total Semiconductor	24	28	\$375	43.1%	33.0%
Total Integrated Circuit	22	24	\$375	43.1%	37.4%
MOS (Function)	18	17	\$375	43.1%	54.5%
MOS Microdevices	35	52	18	N/A	39.9%
MOS Logic	5	6	357	36.3%	29.2%

N/A = Not Applicable

Source: Dataquest
December 1989

LSI Logic Corporation

Table 3

LSI Logic Corporation
Estimated 1988 Semiconductor Revenue by Geographic Region
(Millions of Dollars)

	<u>U.S.</u>	<u>Japan</u>	<u>Europe</u>	<u>ROW</u>
Total Semiconductor	\$295	\$20	\$60	
Total Integrated Circuit	\$295	\$20	\$60	
Bipolar Digital (Function)				
Bipolar Digital Memory				
Bipolar Digital Logic				
MOS (Function)	\$295	\$20	\$60	
MOS Memory				
MOS Microdevices	18			
MOS Logic	277	20	60	
Analog				
Total Discrete				
Total Optoelectronic				

Source: Dataquest
December 1989

LSI Logic Corporation

THE COMPANY

Background and Overview

LSI Logic was founded in January 1981 with US\$6 million of venture capital from various concerns including Kliener Perkin and Tandem Computers of the U.S., and Technical Development Corporation of the United Kingdom. The Company was established in Milpitas, California, to supply logic array large scale integrated (LSI) circuits. These circuits are used in information processing applications (including mainframe and minicomputers) and high-performance communications equipment.

LSI Logic was founded by Wilfred Corrigan, former president and chief executive officer of Fairchild Camera and Instrument Corporation.

In March 1982, LSI Logic received \$16.35 million in additional financing, of which \$9.85 million was additional equity from the venture capital firms that participated in the first round of financing, plus a group of investment bankers in the United Kingdom. The remaining \$6.5 million was a lease line from the First Interstate Bank.

LSI Logic made its first public offering of stock in May 1983. The offering of 7.7 million shares raised \$152 million to fund manufacturing and design expansion.

In February 1982 LSI Logic and Advanced Micro Devices, Inc. (AMD), agreed to a licensing arrangement highlighted by a five-year cooperative program in logic array technology.

Under the agreement, AMD would be licensed by LSI Logic to manufacture, market, and sell the LCA 1200 series 10K-compatible ECL Macrocell arrays. AMD would also standardize on LSI Logic's LDS 1 Computer-Aided Design (CAD) system for the development of logic arrays that use bipolar and MOS technologies.

Prior to this agreement with AMD, LSI Logic joined with Toshiba to develop advanced HCMOS arrays.

On 7 December 1983 LSI Logic opened its first European Design Centre in Bracknell, United Kingdom. The 16,000 square-foot, three-story facility will provide customers with full capability to design their own HCMOS semicustom gate arrays.

LSI Logic Corporation

Products and Markets Served

LSI Logic is dedicated to producing advanced logic arrays in both ECL and CMOS technologies. Tables 1 and 2 summarize the Company's worldwide and European revenues, respectively, since the start of operations in 1981. While the majority of sales have been in the United States, LSI Logic is making a concerted effort to penetrate markets in Europe and Japan. Given LSI Logic's impending wafer fabrication facilities in Santa Clara for the production of 3.5-, 3.0-, and 2.0-micron HCMOS silicon gate logic arrays, and its strong capability in design, software, and hardware, DATAQUEST believes that the Company is ensuring its position as a leading supplier of gate arrays.

DATAQUEST believes that, consistent with general industry trends, LSI Logic will continue to promote CMOS as the primary technology.

Table 1

LSI Logic Corporation
ESTIMATED WORLDWIDE SEMICONDUCTOR REVENUES
BY PRODUCT LINE
(Millions of Dollars)

	<u>1981</u>	<u>1982</u>	<u>1983</u>
Total Semiconductor	\$ 2	\$ 5	\$ 32
Total IC	\$ 2	\$ 5	\$ 32
Bipolar Digital	1	2	3
MOS	1	3	29
Linear	0	0	0
Total Discrete	\$ 0	\$ 0	\$ 0
Transistor	0	0	0
Diode	0	0	0
Thyristor	0	0	0
Other	0	0	0
Total Optoelectronic	\$ 0	\$ 0	\$ 0

Source: DATAQUEST
September 1984

LSI Logic Corporation

Table 2

LSI Logic Corporation
ESTIMATED EUROPEAN SEMICONDUCTOR REVENUES
BY PRODUCT LINE
(Millions of Dollars)

	<u>1981</u>	<u>1982</u>	<u>1983</u>
Total Semiconductor	\$ 0	\$ 0	\$ 3
Total IC	\$ 0	\$ 0	\$ 3
Bipolar Digital	0	0	0
MOS	0	0	3
Linear	0	0	0
Total Discrete	\$ 0	\$ 0	\$ 0
Transistor	0	0	0
Diode	0	0	0
Thyristor	0	0	0
Other	0	0	0
Total Optoelectronic	\$ 0	\$ 0	\$ 0

Source: DATAQUEST
September 1984

Facilities

LSI Logic's present facilities include its 50,000 square-foot headquarters building in Milpitas, California; the company also leases a 23,000 square-foot design center next door. Other design centers are in Irvine, California, and Waltham, Massachusetts, in the United States, and Bracknell, in the United Kingdom. LSI Logic has just completed a new \$20 million wafer fab area in a 50,000 square-foot building that Fairchild previously occupied in Santa Clara, California.

Currently, LSI Logic depends upon wafers manufactured by a third-party silicon foundry, such as Toshiba. Wafers are processed up to, but excluding, the final metallization stage.

In late 1983, LSI Logic also started construction on a 48,000 square-foot development engineering and design automation facility in Milpitas to be completed in 1984.

LSI Logic Corporation

Outlook

In March 1984, Intersil, a subsidiary of General Electric and a major U.S. manufacturer of CMOS devices, signed an agreement with LSI Logic to manufacture and sell each other's array products. The five-year agreement gives LSI Logic its fourth alternate source for its LDS-II design system and its LL 50000 series of 3-micron CMOS two-layer metal arrays. The other sources are SGS-Ates, RCA, and Toshiba. LSI Logic will second source Intersil's IGC 10000 and IGC 20000 CMOS array families.

In April 1984, LSI Logic opened an affiliated gate array company in Tokyo, financed primarily by Japanese venture capitalists who put up \$18.8 million for a one-third share. LSI Logic put up an initial investment of \$1.5 million and will retain a two-thirds ownership position.

The new company, Nihon LSI Logic Corporation, will be a full-service, gate array design and manufacturing center. The first design center is expected to open in 1984. It will produce gate arrays, using HCMOS technology, for Japanese manufacturers of computers, office automation systems, robotics, and telecommunications products.

In August of this year, AMD and LSI Logic agreed to put each other into the standard cell IC business. This represents a fairly radical step for LSI Logic, which until recently was firmly committed to the gate array semicustom IC camp. DATAQUEST believes, however, that this is appropriate for LSI Logic's future growth in line with forecast blurring between the current gate array and standard cell IC solutions.

Through a complex agreement lasting until 1990, the two companies will jointly define and develop a comprehensive set of CMOS standard cells. AMD will provide the 1.6-micron CMOS process, which is now in development, to build the ICs, and LSI Logic will provide the design software tools. The agreement calls for "engineering value" exchanges as well as "financial agreements."

The cells to be developed include the functions that LSI Logic already offers as cells in its gate array programs and, at the higher levels, composable RAM, ROM, and PLA cells. A third level of complexity will also be developed to offer megacells with high-speed, mainly arithmetic, functions.

Although the cooperative effort will take place immediately, we believe that it will be at least two years before the first products appear in the market.

LSI Logic Corporation

THE COMPANY

Background

LSI Logic Corporation was founded in January 1981 by Wilfred J. Corrigan, former President, Chairman and CEO of Fairchild Camera and Instrument Corporation; Rob Walker, previously with Intel Corporation; William J. O'Meara and Mitchell D. Bohn, previously with Synertek, a subsidiary of Honeywell, Inc. LSI Logic Corporation was established to design, develop, manufacture, and market high-performance logic arrays. The Company uses advanced computer-aided design (CAD) techniques to customize the metal interconnect pattern, and mainstream HCMOS and ECL technology to manufacture the finished product.

The original \$6 million equity financing of the Company included six West Coast venture groups and United Kingdom investors. A second round of financing was completed in March 1982, which added institutional and corporate investors. The financing was \$10 million in equity, and \$11 million in lease line guarantees. The Company's products serve the computer, telecommunications, military, and industrial markets on a worldwide basis.

Operations

LSI Logic Corporation has its headquarters and first manufacturing facility in Milpitas, California. This 50,000 square-foot facility houses state-of-the-art CAD based on an Amdahl V6 mainframe computer, and advanced metallization, assembly, and test equipment for the production of high-performance ECL and HCMOS logic arrays up to 10,000 gates in density.

The Company currently produces logic arrays and has recently entered into joint design agreements with Advanced Micro Devices, Inc. on ECL array technology, and with Toshiba Corporation on HCMOS array technology.

LSI Logic plans to install customer design centers, both at key locations in the United States and in the major international markets, within the next two years. These design centers will allow customers to complete all phases of a logic array design locally, by interfacing with the local LSI Logic CAD tools and staff.

Marketing

LSI Logic markets and sells its products in the United States and Canada through direct sales offices and representatives. Internationally, LSI Logic has set up a network of representatives in major markets such as France, Germany, Italy, Japan, and the United Kingdom. In addition, the first direct international sales office has been established in the United Kingdom.

LSI Logic Corporation

The Company's marketing and sales headquarters are:

LSI Logic Corporation
1601 McCarthy Boulevard
Milpitas, CA 95035

Telephone: (408) 263-9494
Telex: 172153

Research and Development

LSI Logic Corporation has defined four technology areas for development that are key to logic arrays. The four areas are computer-aided design tools, multilayer metal interconnect, high pin-count ceramic packaging, and high performance CMOS and ECL processing. Of these key areas, LSI Logic has spent most of its initial time and resources on the first three technologies, and has positioned itself on the latter, via long-term agreements with Toshiba Corporation and American Micro Devices, Inc.

The LDS-I computer-aided design system was based on easy interface with established, standardized hardware and software, while incorporating the latest techniques for fast, accurate array design.

The multilayer metal interconnect technology was developed to provide reliable production processing on both ECL and HCMOS lines using state-of-the-art stepper photolithography.

Because the pin count for high density logic arrays approaches 200, new package and assembly techniques have been developed. These allow die up to 10mm (0.400") on a side to be reliably assembled on a production basis.

Employees

LSI Logic Corporation currently employs approximately 100 people, with about half that number in engineering and development.

Products

LSI Logic Corporation's product line is currently divided into three groups.

The LCA1200 series of ECL arrays has speeds of less than one nanosecond and densities up to 1200 gates. These arrays are primarily used for large computer and high-speed signal processing applications. LSI Logic has licensed AMD to produce the LCA1200 series using its advanced oxide isolated bipolar process.

LSI Logic Corporation

The LSI5000 and 7000 series of HCMOS arrays are based on 3 micron and 2 micron channel length HCMOS technology, respectively. They offer gate speeds of 2.5 and 1.2 nanoseconds with densities up to 10,000 gates. A license agreement has been signed whereby Toshiba Corporation may alternate source the series worldwide.

The LDS-I is a computer-aided design (CAD) system incorporating software and a color graphics workstation. LDS-I provides logic design entry, logic and circuit simulation, AC performance analysis, test tape generation, and placement and routing as a integrated package, which is transparent to the array technology. LDS-I was designed to operate on IBM compatible hardware and will be installed by both Toshiba and AMD as part of their agreements with LSI Logic.

LSI Logic Corporation

(Page intentionally left blank)

Lattice Semiconductor Corporation

Lattice Semiconductor Corporation
15400 N. W. Greenbriar Parkway
Beaverton, Oregon 97006
Telephone: (503) 629-2131
Fax: (503) 645-7921
Telex: 227338 LSC UR

(Lattice Semiconductor Corporation is a privately held company; therefore, balance sheet and income statement data are unavailable.)

Lattice Semiconductor Corporation

THE COMPANY

Overview

Lattice Semiconductor Corporation was founded in April 1983 to design, develop, manufacture, and market high-performance CMOS memory and logic integrated circuits using a proprietary 1.1-micron CMOS and EE CMOS technology. The Company is located in a 120,000-square-foot facility in Beaverton, Oregon. This facility is used for design, testing, some assembly, marketing, and administration. Lattice has pioneered a line of high-speed EE CMOS programmable logic devices (PLDs), called Generic Array Logic (GAL), as direct pin-for-pin replacements for bipolar PALs. (PAL is a registered trademark of Monolithic Memories, Inc. Generic Array Logic and GAL are trademarks of Lattice Semiconductor Corporation.) The next generation, which consists of ispGAL devices, includes in-system programmability that makes logic configurable "on the fly," under software control for robotics and artificial intelligence applications.

Lattice Semiconductor supplies high-speed CMOS SRAMs for commercial and military applications. The speed is achieved by using a proprietary 1.1-micron EE CMOS process, single-ended sense amplifiers, and substrate basing. Lattice has achieved first silicon of a 256Kx1 fast SRAM and will follow shortly with 64Kx4 and 32Kx8 versions. The targeted specification speed is 35ns.

Long-Term Outlook

There are several issues facing Lattice and other CMOS PLD suppliers. The first issue is emerging Japanese suppliers. With their wide experience in EPROM and EEPROM technology and with superb business skills, the Japanese could pose a threat to today's North American PLD suppliers. Another issue is that Monolithic Memories, Inc. (MMI), has brought suit against Lattice Semiconductor, charging Lattice with patent infringement. Lattice, in response, has charged MMI with intent to delay an equity financing package that Lattice was negotiating. Lattice claims that MMI's suit scared off potential equity financiers. Without the necessary funding, Lattice was forced to postpone payroll, lay off a number of employees, and close offices in Paris and Germany.

Rahul Sud—Lattice founder, president, and CEO—and three others recently announced their resignations from the Company. This caused Lattice to seek not only funding but also a new president.

More recently, Lattice has taken aggressive action to resolve the above issues. The Company has signed licensing and manufacturing agreements to put itself in a better cash position. In July 1987, Lattice filed for Chapter 11 protection to reorganize the Company and restructure its debt to ensure that new funding raised would be applied toward financing the Company's ongoing operations.

Lattice Semiconductor Corporation

Management and Employees

Lattice currently employs 72 people. The Company's management is listed in Table 1.

Table 1

Lattice Semiconductor Corporation Company Executives

<u>Position</u>	<u>Name</u>	<u>Prior Company</u>	<u>Prior Position</u>
Chairman/CEO	C. Norman Winningstad	Floating Point Systems, Inc.	Vice-Chairman (Current)
Executive VP	Raymond P. Capace	Touche-Ross International	Director Operations
VP Finance/Administration	Jan Johannessen	Investim Corporation	Financial Consultant
VP Sales/Marketing	Paul T. Kollar	Signetics	Director of National District Operations

Source: Lattice Semiconductor Corporation

Financial Information

Table 2 lists several sources that have supplied funding for Lattice. The Company anticipates another round of funding in the near future.

Table 2

Lattice Semiconductor Corporation Sources of Funding (Millions of Dollars)

<u>Date</u>	<u>Round</u>	<u>Sources</u>	<u>Amount</u>
December 1983	1	Floating Point Systems, Inc.; Louisiana-Pacific Corporation; C. Norman Winningstad; Harry A. Merlo; Datavekst A/S Norway; and other corporate stockholders	\$2.5
July 1984	Credit	Oregon Bank; U.S. National Bank	\$2.7
December 1986		Undisclosed source of financing	Undisclosed

Source: Dataquest
October 1987

Lattice Semiconductor Corporation

PRODUCTS AND MARKETS

Semiconductor Product Markets

Lattice targets rapidly expanding niche markets with high-performance EECMOS and CMOS, memory, and logic products for commercial and military applications.

Table 3 shows Lattice's estimated revenue for 1984, 1985, and 1986.

Table 3

**Lattice Semiconductor Corporation
Estimated Semiconductor Revenue
(Millions of Dollars)**

	<u>1984</u>	<u>1985</u>	<u>1986</u>
Total Semiconductor	\$4.0	\$3.0	\$10.0
Total IC	\$4.0	\$3.0	\$10.0
MOS Memory	4.0	2.5	8.0
MOS Logic	0	0.5	2.0

Source: Dataquest
October 1987

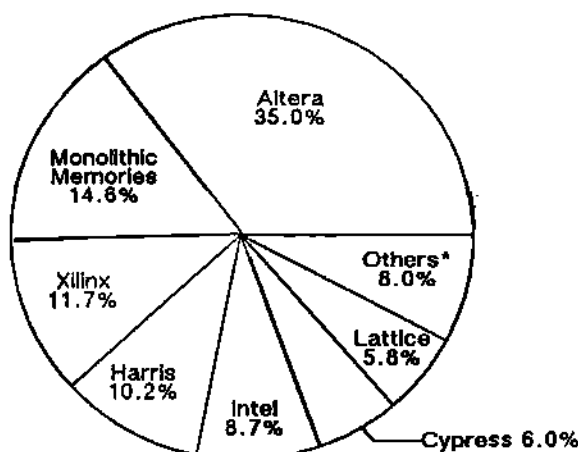
Lattice has positioned electrically erasable PLDs (EEPLDs) to compete with MMI's bipolar PALs. MMI, historically, has been the leading supplier of bipolar PLDs. Lattice, ultimately, would like GAL to be recognized as an industry standard, as is PAL.

Figure 1 shows the top 10 CMOS PLD suppliers in the market. Note that some of these suppliers are young start-up companies; market share for each company could change in the next three years. Success of the basic EEPLD approach has motivated many of the major bipolar PLD suppliers to consider including EEPLDs in their product portfolios. The entrance of major PLD suppliers into the EEPLD market will help expand the electrically erasable device market.

Lattice Semiconductor Corporation

Figure 1

Estimated 1986 Market Share—CMOS PLDs



1986 Total: \$34.3 Million

*Others category includes Panatech, Texas Instruments, and Gould/AMI

Source: Dataquest
October 1987

Applications and End Markets

EEPLDs are used in four market segments: electronic and data processing, communications, military, and industrial. Typical applications are as follows:

- **Graphic systems**—These are systems that include low power, high speed, and flexibility; glue logic and decoding are the primary uses.
- **Minicomputer workstations**—The PLD device count per system is high; GAL solves reliability and manufacturing problems while reducing cooling and power-supply requirements.
- **PC add-on boards**—They need low power to increase board density without exceeding the system power supply limits.
- **VME (or equivalent) "computer on the card"**—The GAL generic architecture offers superior ease of manufacturing in high-volume user applications where 100 percent yields are important; low power is also key to these applications.
- **Telecommunications**—Local area network (LAN) controllers use GAL devices for glue logic; they need high-speed decoders and encoders on each card, and low power is a plus.

Lattice Semiconductor Corporation

Semiconductor Products and Technology

Technology

Lattice Semiconductor uses a 1.1-micron CMOS process technology in its manufacturing. Lattice has established high-volume wafer fabrication sources in Japan and Europe; however, all final testing of wafers, including quality and reliability tests in conformance with MIL-STD 883C, is done in Lattice's Beaverton facility.

Product Lines

Programmable Logic Devices - Lattice is the first supplier of CMOS EEPLDs, also known as GAL. GAL has numerous advantages:

- EEPLD technology allows for 5-volt, in-system reconfigurability, which means that the user can change the logic, under software control in real time.
- One GAL replaces forty-two 20- to 24-pin bipolar PAL devices, simplifying inventory management and production control for the user.
- CMOS technology achieves low power consumption, while still reaching standard equivalent bipolar speeds of 20ns to 25ns.
- EEPLD is 100 percent factory tested, guaranteeing zero defects prior to shipping; this means a reduction in the number of part rejections, board failures, or system failures.

Table 4 lists the Company's products.

Table 4

Lattice Semiconductor Corporation GAL Product List

<u>CMOS EEPLD--GAL</u> <u>Programmable Logic Devices</u>	<u>Programming Tools</u>	
	<u>Vendor</u>	<u>Model</u>
GAL 16V8	Data I/O	29B, 60A
GAL 20V8	Stag	ZL30, ZL30A/ZL32
GAL 39V18	JMC	DRINAC P3
ispGAL 16V8	VARIX	Omni Programmer
ispGAL 20V8		

Source: Dataquest
October 1987

Lattice Semiconductor Corporation

Memory – Lattice focuses its fast SRAM business on military and niche commercial markets with its 64K line. The Company also plans to offer 256K SRAMs and a 64K EEPROM.

Memory products now available are listed in Table 5.

Table 5

Lattice Semiconductor Corporation SRAM Products

<u>Device</u>	<u>Organization</u>	<u>Speed</u>	<u>Comment</u>
SR64E4	16Kx4	35 to 55ns	With output enable
SR64K4	16Kx4	35 to 55ns	
SR64K8	8Kx8	35 to 45ns	

Source: Lattice Semiconductor
Corporation

Semiconductor Agreements

Agreements and Alliances – Lattice Semiconductor has entered into agreements and alliances with the following:

- **VLSI Technology**
 - September 1984—Lattice provided technology for CMOS EEPROMs and SRAMs to VLSI Technology in exchange for foundry services at VLSI.
- **Seiko-Epson and S-MOS Systems**
 - January 1986—Lattice announced a manufacturing and second-source agreement, whereby Seiko-Epson acquired the license to Lattice's chip design and process technology.
- **SGS**
 - February 1987—Lattice announced the signing of a manufacturing and second-source licensing agreement, under which SGS will manufacture GAL products for Lattice and cooperate in the design of future products.
- **National Semiconductor**
 - May 1987—Lattice announced the signing of a licensing, codevelopment, and manufacturing agreement for high-speed CMOS electrically erasable PLDs.

Linear Technology Corp.

THE COMPANY

Background

Linear Technology Corporation was founded in Mountain View, California, in 1981. Its founders were Robert Swanson, Robert Dobkin, Brian Hollins, and Brent C. Welling, all formerly of National Semiconductor Corporation, and Robert Widlar, formerly a design consultant to National Semiconductor Corporation. Initial financing totalling \$5 million was obtained in September 1981 from six venture capital companies: Hambrecht and Quist; The Mayfield Fund; Kleiner, Perkins, Caufield and Byers; Capitol Management Services; Sutter Hill Ventures; and Technology Venture Investors. A second round of financing totalling \$4.5 million was obtained in May 1982. Olivetti was among the second group of investors. At the same time, Linear Technology secured a \$9 million capital equipment lease line agreement with Greyhound Computer Corporation. Linear Technology recently completed a third round of financing totalling \$8 million.

The Company was established to focus on the linear integrated circuit market, and plans to develop a family of proprietary linear components. The Company also plans to develop a line of data-acquisition products in the future.

Operations

In September 1982 Linear Technology moved from its original, temporary headquarters in Mountain View, California, to a 40,600-square-foot factory in Milpitas, California. A future expansion plan includes a second 43,000-square-foot building to be constructed at the same site.

Marketing

Linear Technology markets its products through a network of representatives and distributors in the United States, Europe, and Japan. The Company has entered into a distribution agreement with Arrow Electronics.

The Company's marketing and sales headquarters are:

Linear Technology Corporation
1630 McCarthy Boulevard
Milpitas, CA 95035

Telephone: (408) 942-0810
Telex: 172110

Employees

Linear Technology currently employs approximately 100 people.

Linear Technology Corp.

Products

Linear Technology's initial product offering will focus on traditional linear circuits, including operational amplifiers, voltage regulators and references, and temperature sensors. The Company will also be a second source for products already available from companies such as National Semiconductor, Precision Monolithics, and Analog Devices.

The Company has a product exchange agreement with Silicon General. According to the agreement, the companies will exchange data base tapes enabling Linear Technology to second-source pulse width modulators currently manufactured by Silicon General, and allowing Silicon General to second-source high-current series pass regulators made by Linear Technology.

Linear Technology also has an agreement with Micro Circuit Engineering (MCE) of West Palm Beach, Florida, under which MCE acted as a silicon foundry for Linear Technology until Linear Technology completed its own fabrication facility. Under the terms of the agreement, Linear Technology will make its fabrication lines available if a second source is required for MCE's custom or semicustom products.

Financial Information

Linear Technology's first sales will be in 1983.

Linear Technology Corp.

THE COMPANY

Background

Linear Technology Corporation was founded in Mountain View, California, in 1981. Its founders were Robert Swanson, Robert Dobkin, Brian Hollins, and Brent C. Welling, all formerly of National Semiconductor Corporation, and Robert Widlar, formerly a design consultant to National Semiconductor Corporation. Initial financing totalling \$5 million was obtained in September 1981 from six venture capital companies: Hambrecht and Quist; The Mayfield Fund; Kleiner, Perkins, Caufield and Byers; Capitol Management Services; Sutter Hill Ventures; and Technology Venture Investors. A second round of financing totalling \$4.5 million was obtained in May 1982. Olivetti was among the second group of investors. At the same time, Linear Technology secured a \$9 million capital equipment lease line agreement with Greyhound Computer Corporation. Linear Technology recently completed a third round of financing totalling \$8 million.

The Company was established to focus on the linear integrated circuit market, and plans to develop a family of proprietary linear components. The Company also plans to develop a line of data-acquisition products in the future.

Operations

In September 1982 Linear Technology moved from its original, temporary headquarters in Mountain View, California, to a 40,600-square-foot factory in Milpitas, California. A future expansion plan includes a second 43,000-square-foot building to be constructed at the same site.

Marketing

Linear Technology markets its products through a network of representatives and distributors in the United States, Europe, and Japan. The Company has entered into a distribution agreement with Arrow Electronics.

The Company's marketing and sales headquarters are:

Linear Technology Corporation
1630 McCarthy Boulevard
Milpitas, CA 95035

Telephone: (408) 942-0810
Telex: 172110

Employees

Linear Technology currently employs approximately 100 people.

Linear Technology Corp.

Products

Linear Technology's initial product offering will focus on traditional linear circuits, including operational amplifiers, voltage regulators and references, and temperature sensors. The Company will also be a second source for products already available from companies such as National Semiconductor, Precision Monolithics, and Analog Devices.

The Company has a product exchange agreement with Silicon General. According to the agreement, the companies will exchange data base tapes enabling Linear Technology to second-source pulse width modulators currently manufactured by Silicon General, and allowing Silicon General to second-source high-current series pass regulators made by Linear Technology.

Linear Technology also has an agreement with Micro Circuit Engineering (MCE) of West Palm Beach, Florida, under which MCE acted as a silicon foundry for Linear Technology until Linear Technology completed its own fabrication facility. Under the terms of the agreement, Linear Technology will make its fabrication lines available if a second source is required for MCE's custom or semicustom products.

Financial Information

Linear Technology's first sales will be in 1983.

Lotus Development Corporation

55 Cambridge Parkway
Cambridge, Massachusetts 02142
Telephone: (617) 577-8500
Fax: (617) 225-1299
Dun's Number: 01-185-0484

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Lotus Development Corporation formed in 1982 and is one of the three largest independent makers of personal computer software. The company and its subsidiaries are engaged in the development, production, and marketing of applications software and information services, primarily for personal computers. Lotus' development strategy is to diversify its product portfolio through internal research and strategic acquisitions. In 1988, Lotus ranked second in PC software with 21.5 percent of the market share.

Lotus' total revenue increased 18 percent to \$468.5 million* in fiscal 1988 from \$395.6 million in fiscal 1987. Net income decreased 18 percent to \$58.9 million in fiscal 1988 from \$72.0 million in fiscal 1987. Lotus employs approximately 2,500 people worldwide.

The U.S. sales contribution to Lotus' total revenue increased to \$322.0 million in fiscal 1988. U.S. sales accounted for 69 percent of the total, down from 77 percent in fiscal 1987. Sixty percent of Lotus' sales offices are in North America.

Research and development expenditures totaled \$83.8 million in fiscal 1988, representing approximately 18 percent of revenue. Lotus' product development strategy is to diversify its business base by creating products that take advantage of both new technology and market opportunities, and protect and enhance the investment that customers have made in hardware, software, and training. Capital spending expenditures totaled \$55.2 million in fiscal 1988, representing approximately 12 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

Lotus' initial product, Lotus 1-2-3, is an integrated software product that combines spreadsheet, database, and graphing capabilities into a single program for use with most personal computers. 1-2-3 and Symphony are the Company's core products, providing analytical tools for decision makers and those who support them. Lotus also markets companion products for 1-2-3 and Symphony that are designed to extend the functionality of the core spreadsheet products.

Lotus also markets two major graphics products, Freelance Plus and Graphwriter II, designed to facilitate the creation and display of graphical information, including display of data generated or manipulated by the Company's core spreadsheet products.

The Company also offers Manuscript, a software program designed to integrate word processing text with spreadsheet data from the core spreadsheet products and graphs from the graphics software.

In addition to applications software, Lotus markets a number of information services and related software that provide personal computer users with the ability to access and manage data available from various external databases. The One Source product line comprises five principal offerings: CD/Investment, CD/Corporate, CD/Banking, CD/Private, and CD/International. Lotus plans to continue to expand the number of databases offered on CD-ROM, enhance the capabilities of its retrieval software, introduce network versions, and expand information service operations to Europe and Japan.

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

Further Information

For more information about the Company's business segment, 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	\$156,978	\$225,526	\$282,864	\$395,595	\$468,547
Percent Change	-	43.67	25.42	39.85	18.44
Capital Expenditure	\$24,456	\$21,362	\$15,532	\$26,583	\$55,161
Percent of Revenue	15.58	9.47	5.49	6.72	11.77
R&D Expenditure	\$14,752	\$22,324	\$39,167	\$58,420	\$83,837
Percent of Revenue	9.40	9.90	13.85	14.77	17.89
Number of Employees	741	1,068	1,421	2,100	2,500
Revenue (\$K)/Employee	\$211.85	\$211.17	\$199.06	\$188.38	\$187.42
Net Income	\$36,046	\$36,150	\$48,300	\$72,043	\$58,925
Percent Change	-	0.29	33.61	49.16	(18.21)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$119.97	\$132.20	\$153.91	N/A	
Quarterly Profit	\$5.30	\$10.27	\$22.98	N/A	

N/A = Not Available

Source: Lotus Development 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	97.97	90.30	81.97	76.19	68.74
International	2.03	9.70	18.03	23.81	31.26

Source: Dataquest
 January 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1987	1988
Direct Sales	3.00	5.00
Indirect Sales	97.00	95.00
Resellers	97.00	95.00

Source: Dataquest
 January 1990

1988 SALES OFFICE LOCATIONS

North America—23
Europe—9
Japan—1
Asia/Pacific—1
ROW—3

MANUFACTURING LOCATIONS

North America

Cambridge, Massachusetts
Duplication of diskettes

Europe

Dublin, Ireland
Duplication of diskettes

ROW

Caguas, Puerto Rico
Duplication of diskettes

SUBSIDIARIES

North America

Datext, Inc. (United States)
GNP Development Corp. (United States)
LDC III, Inc. (United States)
Lotus Development Canada Corp. (Canada)
Lotus Development Caribe Corp. (United States)
Lotus Development Distribution Ltd. (United States)
Lotus Development European Corp. (United States)
Lotus Development International Sales, Inc. (United States)
Lotus Development Security Corp. (United States)
Lotus Information Network Corp. (United States)
Lotus Publishing Corp. (United States)
PS Publishing, Inc. (United States)

Japan

Lotus Development Japan Ltd.

Europe

Lotus Development (Benelux) B.V. (Netherlands)
Lotus Development B.V. (Netherlands)

Lotus Development Foreign Sales Corp. Ltd. (United Kingdom)
Lotus Development GmbH (West Germany)
Lotus Development Holdings B.V. (Netherlands)
Lotus Development S.A. (France)
Lotus Development (Switzerland), A.G. (Switzerland)
Lotus Development (U.K.) Ltd. (England)

Asia/Pacific

Lotus Development (Hong Kong) Ltd. (Hong Kong)
Lotus Development Pty. Ltd. (Australia)

ROW

Lotus Desenvolvimento De Software Ltd. (Brazil)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

September 1989

Sybase Inc.

Lotus purchased a 15 percent stake in Sybase, a leader in manufacturing database software.

July 1989

Sun Microsystems

Sun announced a joint development and marketing agreement with Lotus that could one day put the 1-2-3 spreadsheet on Sun computers.

April 1987

IBM

Lotus announced a joint applications development and marketing agreement with IBM that will result in a series of applications software products, beginning with a mainframe version of 1-2-3.

MERGERS AND ACQUISITIONS

1987

Datext Inc.

Manufacturer of CD-ROM business products

KEY OFFICERS

Jim P. Manzi

Chairman of the board, president and chief executive officer

Stephen J. Crummey

Senior vice president, Worldwide Sales and Service

Robert P. Schechter

Senior vice president, Finance and Operations, and chief financial officer

W. Frank King III

Senior vice president, Software Products Group

John W. Martin

Vice president, Finance, and treasurer

PRINCIPAL INVESTORS

American Express Co. and IDS Financial Corporation—5.8 percent

Cigna Corporation—5.4 percent

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

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	\$96,369	\$139,049	\$144,191	\$225,325	\$309,986
Cash	58,800	91,053	93,157	164,909	192,433
Receivables	26,182	36,433	37,844	45,541	92,035
Marketable Securities	0	0	0	0	0
Inventory	10,176	9,147	6,794	9,210	18,088
Other Current Assets	1,211	2,416	6,396	5,665	7,430
Net Property, Plants	\$24,413	\$38,203	\$40,964	\$51,920	\$86,953
Other Assets	\$1,429	\$8,551	\$23,854	\$40,408	\$25,183
Total Assets	\$122,211	\$185,803	\$209,009	\$317,653	\$422,122
Total Current Liabilities	\$24,188	\$45,428	\$62,860	\$85,607	\$84,526
Long-Term Debt	0	0	\$30,000	\$30,000	\$95,000
Other Liabilities	\$1,724	\$1,833	\$1,556	0	\$10,400
Total Liabilities	\$25,912	\$47,261	\$94,416	\$115,607	\$189,926
Total Shareholders' Equity	\$96,299	\$138,542	\$114,593	\$202,046	\$232,196
Converted Preferred Stock	0	0	0	0	0
Common Stock	169	171	526	546	556
Other Equity	46,912	51,003	(21,250)	(5,860)	(34,645)
Retained Earnings	49,218	87,368	135,317	207,360	266,285
Total Liabilities and Shareholders' Equity	\$122,211	\$185,803	\$209,009	\$317,653	\$422,122
Income Statement	1984	1985	1986	1987	1988
Revenue	\$156,978	\$225,526	\$282,864	\$395,595	\$468,547
U.S. Revenue	153,787	203,654	231,875	301,406	322,089
Non-U.S. Revenue	3,191	21,872	50,989	94,189	146,458
Cost of Sales	\$24,459	\$43,706	\$54,724	\$68,676	\$90,825
R&D Expense	\$14,752	\$22,324	\$39,167	\$58,420	\$83,837
SG&A Expense	\$59,080	\$98,565	\$125,117	\$173,394	\$224,874
Capital Expense	\$24,456	\$21,362	\$15,532	\$26,583	\$55,161
Pretax Income	\$65,538	\$67,403	\$71,030	\$102,918	\$79,874
Pretax Margin (%)	41.75	29.89	25.11	26.02	17.05
Effective Tax Rate (%)	45.00	43.40	32.00	30.00	26.20
Net Income	\$36,046	\$36,150	\$48,300	\$72,043	\$58,925
Shares Outstanding, Millions	16,065	16,532	46,752	45,720	45,551
Per Share Data					
Earnings	\$0.75	\$0.77	\$1.03	\$1.58	\$1.29
Dividends	0	0	0	0	0
Book Value	\$5.99	\$8.38	\$2.45	\$4.42	\$5.10

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

Key Financial Ratios	1984	1985	1986	1987	1988
<i>Liquidity</i>					
Current (Times)	3.98	3.06	2.29	2.63	3.67
Quick (Times)	3.56	2.86	2.19	2.52	3.45
Fixed Assets/Equity (%)	25.35	27.58	35.75	25.70	37.45
Current Liabilities/Equity (%)	25.12	32.79	54.86	42.37	36.40
Total Liabilities/Equity (%)	26.91	34.11	82.39	57.22	81.80
<i>Profitability (%)</i>					
Return on Assets	-	23.47	24.47	27.36	15.93
Return on Equity	-	30.79	38.16	45.50	27.14
Profit Margin	22.96	16.03	17.08	18.21	12.58
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	9.40	9.90	13.85	14.77	17.89
Capital Spending % of Revenue	15.58	9.47	5.49	6.72	11.77
Employees	741	1,068	1,421	2,100	2,500
Revenue (\$K)/Employee	\$211.85	\$211.17	\$199.06	\$188.38	\$187.42
Capital Spending % of Assets	20.01	11.50	7.43	8.37	13.07

Source: Lotus Development Corporation
Annual Reports and
Forms 10-K
Dataquest
January 1990

LTX Corporation

BACKGROUND AND OVERVIEW

The LTX Corporation is a leading supplier of systems used for testing linear, digital, and mixed technology, linear/digital circuits. For the fiscal year ended July 31, 1987, LTX worldwide sales reported \$121 million.

The Company designs and manufactures three lines of semiconductor test systems as follows:

- The LTX 90 line (originally the LTX 77), which tests linear and linear/digital devices
- Trillium is a line of digital semiconductor test equipment, which is suited for testing CMOS gate arrays, microprocessors, complex logic, emitter-coupled logic (ECL) gate arrays, and application-specific integrated circuits (ASICs)
- Hi.T, the Company's latest line of linear test equipment, provides a completely new architecture specialized for high-throughput testing of linear devices

In 1984, LTX purchased an 80 per cent interest in Trillium Corporation for \$4.2 million. It became a wholly owned LTX subsidiary in 1986, with sales of \$22 million that year, which was nearly one quarter of the Company's total sales. Sales almost doubled again in 1987, giving the Company, through its Arraymaster system, a premium position as an ASIC tester manufacturer.

Operations

LTX maintains its headquarters and facilities for manufacturing, sales, engineering, and research and development (R&D) at LTX Park, Westwood, Massachusetts, in the United States.

The manufacturing operation consists of component parts assembly, final assembly, and testing. Standard components and prefabricated parts are manufactured to the Company's specification.

Trillium Corporation is housed in a 70,000-square-foot facility in Santa Clara, California, in the United States.

LTX maintains seven sales and customer support offices in the United States.

The European headquarters is located at LTX Europe Ltd., Woking, the United Kingdom, with sales and support activities throughout Europe.

The Company's Far East headquarters are in Tokyo, Japan, with offices in Korea, Singapore, and Taiwan.

LTX Corporation

As of July 31, 1986, the Company employed 989 persons of whom 417 were in manufacturing, 386 in engineering and technical support and 186 in general sales and administration.

Financial

Table 1 summarizes LTX Corporation's most recent financial information covering the fiscal years ended July 31 for 1985, through 1987 is shown in Table 1.

Table 1

LTX Corporation
Worldwide Consolidated Statement of Income
(Millions of U.S. Dollars)

	<u>1985</u>	<u>1986</u>	<u>1987</u>
Net Sales	\$133,416	\$95,400	\$120,600
Less Cost of Sales	<u>67,202</u>	<u>58,295</u>	<u>66,700</u>
Gross Profit	\$ 66,214	\$37,105	\$ 53,900
Less R&D Expenses	<u>23,819</u>	<u>21,546</u>	<u>23,200</u>
Total Gross Profit Less R&D Expenses	\$ 42,395	\$15,559	\$ 30,700
Less Selling and Administration Expenses	<u>30,586</u>	<u>31,612</u>	<u>33,600</u>
Total Income (loss) From Operations	\$ 11,809	(\$16,053)	(\$ 2,900)

Source: LTX Corporation
Annual Accounts 1987

The Company noted in its 1987 annual accounts that, following improved conditions in the semiconductor industry, its net sales had improved 37.4 percent over those of 1986.

Shipments from the Company's Trillium subsidiary amounted to \$22 million in 1986; its sales nearly doubled in 1987.

Table 1 also reveals that gross profit in 1987 increased to 45 percent of net sales versus 39 per cent in 1986, reflecting the extent of the impact of improved shipments.

R&D expenditure (including engineering) increased to US\$23.2 million in 1987 from US\$21.5 million in 1986. This increase reflects the Company's continuing commitment to new linear and digital products.

LTX Corporation

The table shows that there was a major sales decline in the United States in 1986. The effect on Europe was less severe, while Japan experienced an increase in sales turnover. Comparable figures for 1987 are not yet available.

Research and Development

LTX operates in a field characterized by rapid technological change, and its future success depends on a large and continuing commitment to R&D. This is underlined by the fact that in 1986 the Company reported that its expenditure on the development of new products and extending applications of existing products through new test techniques represented 22.6 percent of net sales. This compares with 17.9 per cent in 1985 and 15.4 percent in 1984.

PRODUCTS

LTX's three test systems—the LTX 90, Trillium, and Hi.T—all have the same fundamental design. A set of computer-controlled instruments sends signals to an integrated circuit, to test that circuit's responses.

LTX 90

- The LTX 90's central processing unit, called CP 90, includes a Data General Nova computer enhanced by LTX as the test controller. The CP 90 also supports a 160-megabyte disk drive, a magnetic tape unit, and other peripherals.

The LTX 90's computer system can be used with a wide array of LTX-developed instruments for testing. The instruments can be configured to provide a range of signals appropriate to many types of linear integrated circuits. The test signals covered include basic linear devices, consumer electronics devices, complex telecommunications devices that require linear and digital testing, and automotive devices that require special waveforms and voltage/current ranges.

The LTX 90 system can laser-trim thin- or thick-film hybrid circuits and silicon integrated circuits using suitable system extensions. In addition, the system can be linked through the PMC 2000 network. This significantly increases off-line computer power through the use of a Data General MV/4000 host computer.

Trillium Systems

The Trillium systems for testing digital devices use a new architecture that is based on the concept of providing a complete set of testing resources at each pin of the circuit being tested. This concept reduces test times. The Trillium systems use the Domain system of networked workstations made by Apollo Computers to provide facilities for high-level system control and program development.

LTX Corporation

The Trillium Arraymaster and Micromaster (under development) provide digital test patterns for up to 256-pin ICs. The Arraymaster generates patterns at a maximum rate of 30 MHz (256 pins) or 60 MHz (128 pins) for testing CMOS gate arrays and ASICs. The Micromaster has a higher pattern rate (40 or 80 MHz) and more-sophisticated timing control of patterns.

Hi.T linear test system also uses Apollo workstations and the DOMAIN network. The system also makes wide use of microprocessors to control signals and measurements to each pin of the device being tested and to improve test efficiency. Hi.T's present range of signals include basic voltage and current, sourcing and measurement, digital signal processing, and audio.

Product Features

Important features of the LTX test systems include:

- **Debugging**—This refers to removing the errors from and improving the efficiency of a test plan. In the LTX system, the test plan and debugging language are identical.
- **Modularity**—The modular design of the LTX systems facilitates the addition of an option without the need for an entirely new system.
- **Calibration**—All measurements and settings by LTX systems are software calibrated to specific references contained within each system and traceable to the National Bureau of Standards.
- **Software**—Within each product line, the Company's operating system software is compatible with all of the previous systems of the Company. The software produced by the Company is compatible only with test systems made by LTX.
- **Digital signal processing**—DSP software adds speed and flexibility to linear/digital IC testing (DSP was pioneered by LTX)
- **High-throughput architecture**—Time-sharing allows test programs to run concurrently, for the most part, at the LTX 90's four stations. The Trillium system uses new internal architecture for high speed.
- **An integral workstation network**—Hi.T and Trillium are both incorporated into the Apollo Domain network. Network Domain workstations provide a sophisticated program-development environment, which is a powerful, graphics-based user interface.

LTX Corporation

Customer Support and Warranty

Because of the highly technical nature of its systems, customer support is important to LTX's success. Customer support activities include training, field service, and applications assistance. The Company maintains support centers at Westwood, Massachusetts, and in 18 other locations around the world.

The Company's policy is to provide free unlimited training at LTX support centers in order to enable the customers to develop test plans for their particular products. The participants are instructed in system hardware and in software developed by LTX specifically for its test systems. The program also includes instruction in the maintenance of LTX systems.

The Company provides a ten-year warranty against defects in its linear products and a limited lifetime warranty against defects in digital products. Computer peripherals, laser trim equipment, and certain other components purchased from outside LTX are covered by a one-year warranty.

OUTLOOK

In the short term, LTX intends to take good care of its installed base in the linear market. For the longer term, the Company sees Hi.T as its base for expansion in linear testing. LTX's strategy is to be a major participant in the semiconductor test equipment market by moving beyond linear testing. This is the rationale behind the acquisition of Trillium, and its success (which is due to the qualities of the Arraymaster as an ASIC tester) supports the Company's strategy.

The Company, therefore, views the long-term prospects with cautious optimism, while continuing development of the two new product lines through Hi.T and Trillium from the LTX 90 base. This, together with its dedication to customer support and applications, will ensure that LTX will continue to enjoy a place at the forefront of the semiconductor test equipment market.

Lucky-Goldstar Group

20 Yoido-dong, Yongdungpo-gu

Seoul, 150-010, South Korea

Telephone: 787-1114

Fax: 787-2100, 2200

Dun's Number: Not Available

Date Founded: 1947

CORPORATE STRATEGIC DIRECTION

The Lucky-Goldstar Group began in 1947 as the Lucky Chemical Company, founded by In-Hwoi Koo. In 1958, Lucky Chemical organized a new company, Goldstar Co. Ltd., to handle the manufacturing of electric appliances. Since 1958, the Lucky-Goldstar Group has established manufacturing subsidiaries worldwide for the production of electric and electronic appliances. The group consists of 39 companies involved in the exporting of goods, technology, and investments worldwide.

During the past 44 years, Lucky-Goldstar has pursued a diversified growth strategy. The company offers products and services in the fields of chemistry, consumer and industrial electronics, engineering, finance, and trade. Lucky-Goldstar is grouped into two broad business categories: the electric- and electronics-related businesses are organized under the Goldstar name and the chemical, machinery, construction, and financial services are organized under the Lucky name.

Recently, Lucky-Goldstar has taken a strong interest in expanding its operations into the Eastern European market. In 1990, it secured a \$27 million* contract to supply 100,000 color TVs to the Rumanian government. Lucky-Goldstar has also formed partnerships with other leading companies such as Fuji Electric, Honeywell, Mitsubishi Electric, and Siemens. Lucky-Goldstar currently operates overseas offices in 95 countries that serve as a liaison network to facilitate operations in international markets.

In addition to expanding through alliances and joint ventures, the Goldstar group of companies has been placing increased emphasis on developing direct sales of its products under the Goldstar name. Previously,

the majority of the company's business came from sales of its products to OEMs for incorporation into larger systems or for resale. Since 1988, the Goldstar Group has been direct marketing its terminals and PC peripherals, and in 1989, began direct sales of the Goldstar PC products.

More detailed information is available in Table 1, which appears after "Business Segment Strategic Direction" and presents corporate highlights. Tables 2 through 4, at the end of this backgrounder, present comprehensive financial information.

BUSINESS SEGMENT STRATEGIC DIRECTION

The Goldstar companies include Goldstar Co., Goldstar Information and Communications, Goldstar Software, Goldstar Electron Co., Goldstar-Alps Electronics Co., Goldstar Precision Co., Goldstar Electronic Devices Co., Goldstar Industrial Systems Co., Goldstar Instrument & Electric Co., Goldstar Electric Machinery Co., Goldstar Telecommunications, Goldstar Electric Co., and Goldstar-Honeywell Co.

Goldstar Co. Ltd.

The first of the Lucky-Goldstar consumer electronics ventures, Goldstar Co. Ltd., was launched in 1958 as a radio manufacturer. The company currently produces a wide range of consumer electronics and appliances, including washing machines and microwave ovens, camcorders, and personal computers.

The Goldstar Company has two subsidiaries in the United States: Goldstar Electronics Co. Ltd. and Goldstar Technology Inc.

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

Goldstar Technology concentrates on manufacturing 80286- and 80386-based personal computers and SPARC workstations. It introduced its SPARCstation 1 clone, the Goldstar SPARC workstation, in 1990. The 20-MHz, 12.5-mips SPARC workstation is based on LSI Logic Corporation's chip set and the SBus architecture. It has 8MB of memory that is expandable to 64MB, a 1.44MB floppy disk drive, and a 400-byte SCSI hard drive. The company had planned to manufacture the SPARC workstations in Silicon Valley, but it is now considering sites in the United Kingdom.

In 1990, Goldstar introduced its first 80486-based tower system in Hannover, Germany. The GS-425 tower uses a 25-MHz 80486 processor, comes with 2MB of memory, and includes six EISA-compatible expansion slots and two ABus slots. Goldstar also introduced a new 386SX-based machine that offers a 40MB hard disk with a modest 16-MHz processor speed and a VGA LSC display.

Goldstar Information and Communications Ltd.

Goldstar Information and Communications was established as a joint-venture agreement with AT&T. The company currently is concentrating its efforts on the development of systems and equipment applicable to Integrated Services Digital Network (ISDN). In addition to semiconductor products, this group manufactures digital switching equipment and networking, fiber-optic, microwave, and satellite communications systems. In 1990, it started sales of PBS equipment to the United States and Italy.

Goldstar Electron Co. Ltd.

Goldstar Electron Co. was established on May 2, 1989, as a member of the Goldstar Information and Communications group. Goldstar Electron's semiconductor strategy is to become a leading supplier of dynamic RAM (DRAM) and application-specific IC (ASIC) semiconductor products. The company's main semiconductor products are memory devices including DRAMs and static RAMs (SRAMs); logic devices including TTLs, HC/HCTs, and S/LS devices; linear devices including bipolar linear devices used in consumer and telecom applications, and MOS linear products such as timers and op amps; microprocessor devices including MPUs, MPRs, and MCUs; and ASICs including gate arrays, standard cells, and chip sets for PCs.

DRAM sales represented 28 percent of Goldstar Electron Company's total semiconductor sales in 1990. The company's performance was minimally affected by DRAM price slides as it successfully implemented its diversified product development strategy. According to 1990 Dataquest worldwide semiconductor market share estimates, factory revenue totaled \$163 million, which represents 10.8 percent growth over last year's revenue of \$147 million.

Goldstar's strategy is to make DRAMs a larger share of its total semiconductor business. Dataquest believes that its alliance with Hitachi (see Alliances, Joint Ventures, and Licensing Agreements) will enable it to become a major South Korean supplier of 1Mb DRAMs in 1991. Its 4Mb DRAM business, however, is not expected to impact the company's growth until 1992.

Goldstar Telecommunications

Since producing the first South Korean-made telephone in 1960, Goldstar Telecommunications has been involved in the manufacture and supply of telecommunications equipment to both the public and private sectors. The company manufactures consumer telephone sets, key telephone systems for business, telex equipment, thermal printers, automated warehouse control systems, and precision medical instruments.

Goldstar is one of the four major telecommunications companies in South Korea. It participated in the development of the TDX, Korea's digital switching system and, according to Goldstar Telecommunications, it held 20 percent of the market share in subscriber lines in 1990.

Goldstar Software Ltd.

Goldstar Software develops and markets a variety of computer software, including office automation, factory automation, and management information systems software. The company is also expanding into new markets such as value-added network software and computer-integrated manufacturing (CIM). In the future, the company wants to develop advanced products in PC operating systems and artificial intelligence.

In the fall of 1990, Goldstar Software introduced Hana Publish, a desktop publishing program, to the United States. It runs on UNIX workstations from Sun (Sun3 and SPARCstation), MIPS, and Megatek and on 80386-based PC-compatible Xenix machines.

Goldstar Electric Co. Ltd.

The Goldstar Electric Co. supplies special equipment and electronic components to domestic (South Korean) utilities and private businesses worldwide. The company's business focuses on specialized telecommunications equipment and precision electronic components such as printed circuit boards, hybrid ICs, and electronic ceramic chips.

Goldstar-Alps Electronics Co. Ltd.

Established as a joint-venture company in 1970 between Alps Electric of Japan and Goldstar, Goldstar-Alps Electronics (GAE) is a manufacturer of a wide variety of electronic parts for use in industrial and consumer product applications. The company concentrates on developing new high-performance parts for use in audio/video, computer, office automation, and industrial equipment. Some of the products include switches, cassette and VCR deck mechanisms, tuners, and audio/video heads. GAE recently localized the production of a four-head video head and a CER tuner for TVs and VCRs. The company also developed a new process for producing Mn-Zn ferrite crystals, a vital material in the manufacture of VCE reflection heads.

Goldstar Precision Co. Ltd.

The Goldstar Precision Co. focuses on manufacturing electronic equipment for marine operations, test and measurement equipment, avionics equipment, and precision products for military markets.

Goldstar Electronic Devices Co. Ltd.

Founded in 1966, Goldstar Electronic Devices Co. currently produces precision motors, switching power supplies, magnetron anodes, and a variety of press stampings and injected plastic molding products. The

company recently established a new R&D center for production and market research of electronic devices.

Goldstar Industrial Systems Co. Ltd.

The Goldstar Industrial Systems Co. manufactures industrial electronic systems including breakers, switches, elevators and escalators, transportation systems, automatic warehouse systems, solar power systems, and optical and medical equipment.

Goldstar Instrument & Electric Co. Ltd.

The Goldstar Instrument & Electric Co. manufactures industrial electric and electronic equipment for various types of power receiving and distribution facilities for automatic control systems.

Goldstar Electric Machinery Co. Ltd.

A joint venture with Mitsubishi Electric of Japan, Goldstar Electric Machinery Co. manufactures industrial and pneumatic equipment including power tools, conveyers, control equipment, switchgears, and ground-fault circuit interrupters.

Goldstar-Honeywell Co. Ltd.

Established in 1984 as a joint venture with Honeywell and Yamatake Honeywell, Goldstar-Honeywell Co. produces plant management systems and precision control components.

Further Information

For further information regarding Lucky-Goldstar's business segments, please contact Dataquest's Semiconductors—Asia group.

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

	1989	1990
Two-Year Revenue	18,800	22,624
Percent Change	-	20.34
Capital Expenditure	2,268	1,967
Percent of Revenue	12.07	8.69
R&D Expenditure	NA	NA
Percent of Revenue	NA	NA
Number of Employees	269	223
Revenue (\$K)/Employee	-	(16.90)
Net Income		
Percent Change		

1990 Fiscal Year	Q1	Q2	Q3
Quarterly Revenue	NA	NA	NA
Quarterly Profit	NA	NA	NA

NA = Not available

Source: Lucky-Goldstar Group
 Annual Reports and Forms 10-K
 Dataquest (October 1991)

1990 SALES OFFICE LOCATIONS

North America—21
Europe—18
Japan—9
ROW—24

MANUFACTURING LOCATIONS

North America

San Jose, California
Semiconductors, terminals, and PCs

Europe

Ireland
Electronic components
Milan, Italy
Electric appliances
Portugal
Television components
Worms, Germany
Head components for VCRs

ROW

Chongju-city, South Korea
Electric and electronic components
Gumi-city, Kyungbu, South Korea
Semiconductors and electronic components
Seoul, South Korea
Consumer and industrial electronic systems and components
Ismaelia, Egypt
Color television components

SUBSIDIARIES

Chemistry and Energy

Lucky Ltd.
Honam Oil Refinery Co. Ltd.
Lucky Petrochemical Co. Ltd.

Lucky Advanced Materials Inc.
Lucky Polychemical Co. Ltd.
Yost Energy Co. Ltd.

Electric and Electronics

Goldstar Co. Ltd.
Goldstar Electronics Co. Ltd.
Goldstar Information & Communications Ltd.
Goldstar Technology Inc.
Goldstar Telecommunication Co. Ltd.
Goldstar Software Ltd.
Goldstar Electron Co. Ltd.
Goldstar Electric Co. Ltd.
Goldstar-Alps Electronics Co. Ltd.
Goldstar Electronic Devices Co.
Goldstar Industrial Systems Co. Ltd.
Goldstar Instruments & Electric Co. Ltd.
Goldstar Electric Machinery Co. Ltd.
Goldstar-Honeywell Co. Ltd.

Machinery and Metals

Goldstar Cable Co. Ltd.
Kukje Electric Wire Co. Ltd.
Lucky Metals Corp.

Trade and Finance

Lucky-Goldstar International Corp.
Lucky Securities Co. Ltd.
Lucky Insurance Co. Ltd.
Goldstar Investment & Finance Corp.
Pusan Investment & Finance Corp.
LG Credit Card Co. Ltd.

Construction and Services

Lucky Development Co. Ltd.
Lucky Engineering Co. Ltd.
Hee Sung Co. Ltd.
Hee Sung Tourism Development Co. Ltd.
LG Ad Inc.
Systems Technology Management Corp.
Lucky-Goldstar Economic Research Institute

Public Service and Sports

The Yonam Foundation
The Yonam Educational Institute
Lucky-Goldstar Sports Ltd.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1991

Hitachi Ltd.

Hitachi licensed Goldstar Electron Co. to fabricate 4Mb memory chips in Hitachi's design. Part of the output will be sold back to Hitachi, which licensed Goldstar to manufacture the 1Mb memory chips in 1989.

Stone India

Stone India has signed a memorandum of understanding with Luck-Goldstar International for transfer of technology to manufacture cooling fans used in computers and other office automation equipment at its factory in Calcutta.

1990

Bull HN Information Systems

Goldstar Company and Bull HN Information Systems signed an agreement to expand their marketing efforts in South Korea and other Asian countries. Goldstar will manufacture, market, and service an expanded range of Bull products, and Bull will provide technical and marketing support.

Chori

Lucky-Goldstar International Corp. concluded an agency contract with Chori of Japan to export color TV sets, VCRs, radios, and garments to the Soviet Union.

IDF

IDF, a member of the Setton Group, signed an agreement with Lucky-Goldstar to distribute a new line of computers in France.

Quantum Corporation

Quantum agreed to let Lucky-Goldstar International integrate its high-performance, 3.5-inch Pro-Drive Series drives in Lucky-Goldstar's line of 80286- and 80386-based personal computers.

1989

Sun Microsystems Inc.

Goldstar Co. Ltd. licensed Sun's SPARC processor and SunOS UNIX operating system for use in development of workstation products.

Hitachi

Goldstar Co. Ltd. was licensed by Hitachi to manufacture and market 1Mb DRAMs under the Lucky-Goldstar name. In addition, the two companies have entered into a joint agreement to develop a new semiconductor manufacturing plant in South Korea.

NHK

NHK, the Japanese public broadcasting network, has licensed the national high-definition television (HDTV) technology to Goldstar Co. Ltd. for use in development of HDTV decoders.

MERGERS AND ACQUISITIONS

Zenith Electronics Company

Lucky-Goldstar bought just under 5 percent of Zenith Electronics' stock for \$15 million and signed license agreements for Zenith's flat tension mask color picture tube for TV applications.

KEY OFFICERS

Cha-Kyung Koo

Chairman, Lucky-Goldstar

C. H. Moon

President, Goldstar Electronics Co. Ltd.

PRINCIPAL INVESTORS

The Lucky-Goldstar Group

FOUNDERS

In-Hwoi Koo

Table 2
Balance Sheet
Fiscal Year Ending in December
(Thousands of U.S. Dollars)

Balance Sheet	1989	1990
Cash	898.3	987.9
Receivables	3,196.3	4,496.0
Marketable Securities	2,640.8	2,220.7
Inventory	2,313.0	2,880.8
Other Current Assets	4,486.6	6,843.2
Total Current Assets	13,534.9	17,428.7
Net Property, Plants	5,749.2	7,382.6
Other Assets	2,187.0	3,108.8
Total Assets	21,471.1	27,920.1
Long-Term Debt	3,081.92	4,541.2
Other Liabilities	1,060.51	1,500.2
Total Current Liabilities	12,735.97	15,722.1
Total Liabilities	16,878.4	21,763.4
Converted Preferred Stock	NA	NA
Common Stock	NA	NA
Other Equity	NA	NA
Retained Earnings	NA	NA
Total Shareholders' Equity	4,592.7	6,156.7
Total Liabilities and Shareholders' Equity	21,471.1	27,920.1

NA = Not available

Source: Lucky-Goldstar Group
 Annual Reports and Forms 10-K
 Dataquest (October 1991)

Table 3
Consolidated Income Statement
Fiscal Year Ending in December
(Thousands of U.S. Dollars, except Per Share Data)

Consolidated Income Statement	1989	1990
Revenue	18,800.2	22,624.2
U.S. Revenue	12,014.5	13,576.6
Non-U.S. Revenue	6,785.7	9,047.6
Cost of Sales	15,611.3	18,511.1
R&D Expense	NA	NA
SG&A Expense	1,563.3	1,880.3
Capital Expense	2,268.3	1,967.1
Pretax Income	44.3	440.7
Pretax Margin (%)	NA	NA
Effective Tax Rate (%)	NA	NA
Net Income	268.9	223.4
Shares Outstanding, Millions	NA	NA
Per Share Data		
Earnings	NA	NA
Dividend	NA	NA
Book Value	NA	NA

NA = Not available

Source: Lucky-Goldstar Group
Annual Reports and Forms 10-K
Dataquest (October 1991)

Table 4
Key Financial Ratios
Fiscal Year Ending in December

Key Financial Ratios	1989	1990
Liquidity		
Current (Times)	1.06	1.11
Total Assets/Equity (%)	467.50	453.49
Current Liabilities/Equity (%)	277.31	255.36
Total Liabilities/Equity (%)	367.50	353.49
Profitability (%)		
Return on Assets	1.25	0.80
Return on Equity	5.85	3.63
Profit Margin	1.43	0.99
Other Key Ratios		
R&D Spending % of Revenue	-	-
Capital Spending % of Revenue	12.07	8.69
Employees	-	-
Revenue (\$K)/Employee	-	-
Capital Spending % of Assets	10.56	7.05

Source: Lucky-Goldstar Group
Annual Reports and Forms 10-K
Dataquest (October 1991)

Lucky-Goldstar Group

20 Yoido-dong, Yongdungpo-gu

Seoul, 150-010, South Korea

Telephone: 787-1114

Fax: 787-2100, 2200

Dun's Number: Not Available

Date Founded: 1947

CORPORATE SEGMENT STRATEGIC DIRECTION

The Lucky-Goldstar Group began in 1947 as the Lucky Chemical Company, founded by In-Hwoi Koo. In 1958, Lucky Chemical organized a new company, Goldstar Co., Ltd., to handle the manufacturing of electric appliances. Since 1958, the Lucky-Goldstar Group has established manufacturing subsidiaries worldwide for the production of electric and electronic appliances. The Group consists of 30 companies involved in the exporting of goods, technology, and investments worldwide.

During the past 43 years, Lucky-Goldstar has pursued a diversified growth strategy. The Company offers products and services in the fields of chemistry, consumer and industrial electronics, engineering, finance, and trade. Business in the electric and electronics markets is managed by the Goldstar companies. In the past year, the Company has added Goldstar Industrial Systems and Goldstar Vacuum Apparatus to expand growth into industrial equipment markets. The Goldstar Group has also added optical instruments and cameras to its list of precision electronic equipment products.

In 1988, the Goldstar Central Research Institute was established. R&D projects that have been targeted by Goldstar include development of materials for making gallium arsenide (GaAs) semiconductors, digital image processing systems, amorphous silicon solar cells, and laser printers. Estimated R&D expenditure by the Company for 1989 was \$400 million, approximately 4.5 percent of total sales for the year.

Expansion of Lucky-Goldstar's marketing network has also been a major focus, with the opening of a VCR and color television plant in Worms, Germany. Lucky-Goldstar also has formed partnerships with

other leading companies such as Fuji Electric, Honeywell, Mitsubishi Electric, and Siemens. Lucky-Goldstar currently operates overseas offices in 95 countries that serve as a liaison network to facilitate operations in international markets.

In addition to expanding through alliances and joint ventures, the Goldstar group of companies has been placing increased emphasis on developing direct sales of its products under the Goldstar name. Previously, the majority of the Company's business came from sales of its products to original equipment manufacturers (OEMs) for incorporation into larger systems or for resale. Since 1988, the Goldstar Group has been direct marketing its terminals and PC peripherals, and in 1989, began direct sales of the Goldstar PC products.

Current financial information was unavailable at time of printing and is not included in this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

As mentioned earlier, Lucky-Goldstar is grouped into two broad business categories with electric and electronic related businesses organized under the Goldstar name. Chemical, machinery, construction, and financial services are organized under the Lucky name.

The Goldstar companies include Goldstar Co., Goldstar Information and Communications, Goldstar Software, Goldstar Electron Co., Goldstar-Alps Electronics Co., Goldstar Precision Co., Goldstar Electronic Devices Co., Goldstar Industrial Systems Co., Goldstar Instrument & Electric Co., Goldstar Electric Machinery Co., Goldstar Telecommunications, Goldstar Electric Co., and Goldstar-Honeywell Co.

Goldstar Co., Ltd.

The first of the Lucky-Goldstar consumer electronics ventures, Goldstar Co., Ltd., was launched in 1958 as a radio manufacturer. The company currently produces a wide range of consumer electronics and appliances, from washing machines and microwave ovens to camcorders and personal computers.

During 1989, Goldstar Co., Ltd., launched a line of PCs in the United States through its subsidiary Goldstar Technology, Inc. Prior to this time, the company manufactured PCs for sale to OEMs. The new line of PCs consists of eight IBM-compatible systems using Intel 80286, 80386, and 8088 processors. The PCs range in size from the GS500 laptop model to the GS320 high-performance desktop system and file server. In addition to PCs, Goldstar Technology also manufactures and markets PC peripherals such as color and monochrome Video Graphics Array (VGA) terminals.

In November 1989, Goldstar Co., Ltd., announced a licensing agreement with Sun Microsystems for the SunOS UNIX operating system. Goldstar has committed to developing a line of workstations using Sun's Sparc microprocessors and SunOS. Goldstar also distributes Sun workstations in South Korea.

Goldstar Information and Communications, Ltd.

Goldstar Information and Communications was established as a joint venture agreement with AT&T. The company currently is concentrating its efforts on the development of systems and equipment applicable to Integrated Services Digital Network (ISDN). In addition to semiconductor products, this group manufactures digital switching equipment and networking, fiber-optic, microwave, and satellite communications systems.

Goldstar Electron Co., Ltd.

Goldstar Electron Co. was established on May 2, 1989, as a member of the Goldstar Information and Communications group. Goldstar Electron's semiconductor strategy is to become a leading supplier of dynamic RAM (DRAM) and application-specific IC (ASIC) semiconductor products. The company's main semiconductor products are memory devices including DRAMs and static RAMs (SRAMs); logic

devices including TTLs, HC/HCTs, and S/LS devices; linear devices including bipolar linear devices used in consumer and telecom applications, and MOS linear products such as timers and op amps; microprocessor devices including MPUs, MPRs, and MCUs; and ASICs including gate arrays, standard cells, and chip sets for PCs.

Goldstar Telecommunications

Since producing the first South Korean-made telephone in 1960, Goldstar Telecommunications has been involved in the manufacture and supply of telecommunications equipment to both the public and private sectors. The company manufactures consumer telephone sets, key telephone systems for business, telex equipment, thermal printers, automated warehouse control systems, and precision medical instruments.

Goldstar Software, Ltd.

Goldstar Software develops and markets a variety of computer software, including office automation, factory automation, and management information systems software. The company is also expanding into new markets such as value-added network software and computer-integrated manufacturing (CIM).

Goldstar Electric Co., Ltd.

The Goldstar Electric Co. supplies special equipment and electronic components to domestic (South Korean) utilities and private businesses worldwide. The main focus of the company's business is on telecommunications components. According to Goldstar, this company has experienced a 30 percent growth rate since 1980.

Goldstar-Alps Electronics Co., Ltd.

A joint venture between Alps Electric of Japan and Goldstar, Goldstar-Alps Electronics Co. is a manufacturer of a wide variety of electronic parts for use in industrial and consumer product applications. Products include TV tuners, variable resistors, switches, magnetic heads, and audio/video mechanisms.

Goldstar Precision Co., Ltd.

The Goldstar Precision Co. focuses on manufacturing electronic equipment for marine operations, test and measurement equipment, avionics equipment, and precision products for military markets.

Goldstar Electronic Devices Co., Ltd.

Founded in 1966, Goldstar Electronic Devices Co. currently produces precision motors, switching power supplies, magnetron anodes, and a variety of press stampings and injected plastic molding products.

Goldstar Industrial Systems Co., Ltd.

The Goldstar Industrial Systems Co. manufactures industrial electronic systems including breakers, switches, elevators and escalators, transportation systems, automatic warehouse systems, solar power systems, and optical and medical equipment.

Goldstar Instrument & Electric Co., Ltd.

The Goldstar Instrument & Electric Co. manufactures industrial electric and electronic equipment for various types of power receiving and distribution facilities for automatic control systems.

Goldstar Electric Machinery Co., Ltd.

A joint venture with Mitsubishi Electric of Japan, Goldstar Electric Machinery Co. manufactures industrial and pneumatic equipment including power tools, conveyers, control equipment, switchgears, and ground-fault circuit interrupters.

Goldstar-Honeywell Co., Ltd.

Established in 1984 as a joint venture with Honeywell and Yamatake Honeywell, Goldstar-Honeywell Co. produces plant management systems and precision control components.

Further Information

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

1989 SALES OFFICE LOCATIONS

North America—21
Europe—18
Asia/Pacific—24
ROW—16

SCA
0006890

MANUFACTURING LOCATIONS

North America

San Jose, California
Semiconductors, terminals, and PCs

Europe

Ireland
Electronic components
Milan, Italy
Electric appliances
Portugal
Television components
Worms, Germany
Head components for VCRs

Asia/Pacific

Chongju-city, South Korea
Electric and electronic components
Gumi-city, Kyungbu, South Korea
Semiconductors and electronic components
Seoul, South Korea
Consumer and industrial electronic systems and components

ROW

Ismaelia, Egypt
Color television components

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Sun Microsystems, Inc.
Goldstar Co., Ltd., licensed Sun's Sparc processor and SunOS UNIX operating system for use in development of workstation products.

Hitachi

Goldstar Co., Ltd., was licensed by Hitachi to manufacture and market 1-Mbyte DRAMs under the Lucky-Goldstar name. In addition, the two companies have entered into a joint agreement to develop a new semiconductor manufacturing plant in South Korea.

NHK

NHK, the Japanese public broadcasting network, has licensed the national high-definition television (HDTV) technology to Goldstar Co., Ltd., for use in development of HDTV decoders.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Cha-Kyung Koo
Chairman, Lucky-Goldstar

C. H. Moon
President, Goldstar Electronics Co., Ltd.

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

In-Hwoi Koo

Lytel

Lytel
61 Chubb Way
P.O. Box 1300
Somerville, NJ 08876
(201) 685-2000

Established 1983
No. of Employees: 145

BACKGROUND

Lytel was founded by Dr. Eugene Gordon and others to design, develop, and produce InGaAsP technology-based electro-optic components for the voice and data telecommunications market. Lytel has capitalization exceeding \$30 million. AMP, Inc., purchased all of the outstanding shares in early 1989; Lytel became a wholly owned subsidiary of AMP, Inc., at that time.

The Company's first products were InP high-power lasers for fiber-optics applications. Focus is on quality, reliability, delivery performance, and "speaking the customers' language." Lytel shipped approximately \$1 million per month in 1989.

COMPANY EXECUTIVES

- General Manager—Jerry Leehan
- Vice President of R&D—Ron Nelson
- Manager of Sales—Tom DeBerardine
- Manager of Production—Peter Ferlita
- Controller—Tim Bock

FINANCIAL BACKING AND STRATEGIC ALLIANCES

Lytel received its initial funding of \$20 million from AMP, Inc., in 1984; it became a wholly owned subsidiary of AMP, Inc., in 1989.

SERVICES

The Company provides design, fab, assembly, and test services.

Lytel

PROCESS TECHNOLOGY

Lytel's process technology is 1.3u InGaAsP wafers using LPE and MOCVD.

PRODUCTS

- InGaAsP high-power lasers
- LEDs
- PIN devices
- Optical data links—complete line of FDDI transmitters, receivers, and transceivers

Applications

Lytel's products are used in voice and data telecommunications.

FACILITIES

Lytel's Somerville, New Jersey, facility is now using 50,000 square feet of a 57,000-square-foot structure, including an 8,000-square-foot Class 10,000 packaging/test room and a 6,000-square-foot Class 1,000 fabrication clean room. Both packaging/test and fabrication clean rooms can be doubled in size within the existing structure.

Lytel

Lytel
61 Chubb Way
Somerville, NJ 08876
(201) 685-2000

Established 1983
No. of Employees: 160

BACKGROUND

Lytel was founded by Dr. Eugene Gordon and others to design, develop, and produce InGaAsP technology-based electro-optic components for the voice and data telecommunications market. Lytel has capitalization exceeding \$30 million. AMP, Inc., is the major stockholder.

The Company is now staffed at 160 and growing rapidly. First products are InP high-power lasers for fiber-optics applications. Focus is on quality, reliability, delivery performance, and "speaking the customers' language." Lytel is expected to ship more than \$1 million per month by 1988.

COMPANY EXECUTIVES

- **President—Bill Stape (formerly of AMP)**
- **Vice President of Marketing/Business Manager—Tom Lewis**

FINANCIAL BACKING

Lytel received its initial funding of \$20 million from AMP in 1984.

STRATEGIC ALLIANCES

AMP is Lytel's major stockholder.

SERVICES

The Company provides design, fab, assembly, and test services.

PROCESS TECHNOLOGY

Lytel's process technology is 1.3u InGaAsP using LPE.

Lytel

PRODUCTS

- InGaAsP high-power lasers
- LEDs
- PIN devices
- Optical data links

Applications

Its products are used in voice and data telecommunications.

FACILITIES

Lytel's Somerville, New Jersey, facility is now using 50,000 square feet, including an 8,000-square-foot class 10,000 packaging/test room and a 5,000-square-foot class 1,000 fabrication clean room; both packaging/test and fabrication clean rooms can be doubled in size within the existing structure.

X

MAI Basic Four, Inc.

14101 Myford Road
Tustin, California 92680
Telephone: (714) 730-2316
Fax: (714) 730-2737
Dun's Number: 12-084-8312

Date Founded: 1985

CORPORATE STRATEGIC DIRECTION

MAI Basic Four, Inc. (MBF), is a supplier of industry-specific, multiuser business information systems that employ advanced technology and easy-to-use software. MBF markets its products directly through independent business units, which also have total responsibility for developing and installing complete application software solutions for the following markets: manufacturing, wholesale distribution, health care, textiles and retail, hospitality, credit unions, construction and property management, transportation, and motor trades. In addition, MBF offers extensive software development and support services and a global maintenance organization.

Basic Four has been a division of Management Assistance, Inc. (MAI), since 1970. Since then, the current Company was incorporated as a wholly owned subsidiary of MAI Holdings, Inc. (MHI), on September 6, 1984, solely to acquire the Basic Four Information Systems Division of MAI. On March 31, 1986, MHI was merged with and into the Company to form MAI Basic Four, Inc. The Company commenced operations under its new name on January 29, 1985, when it acquired substantially all of the assets of the Basic Four division. MBF sold its Canadian subsidiary, MAI Canada, Ltd., to a subsidiary of Bell Atlantic Corporation, but retained MAI Canada's Australian operations. The Bell Atlantic Corporation subsidiary purchased the assets and business of MAI's Sorbus Service Division at the same time it acquired MAI Canada. On January 15, 1988, MBF acquired the domestic MBF maintenance service business from Sorbus and the Company's Canadian distributor, MAI Canada, from the Bell Atlantic subsidiary.

The Company's principal marketing strategy is to focus on the specific information processing needs of

a number of selected industries for which appropriate application software has been developed or obtained. The Company's US industry business units include manufacturing, sewn products and retail, hotels and hospitality, wholesale distribution, health care, credit unions and finance, construction and property management, and networking.

MAI's total revenue decreased 5.7 percent to \$396.9 million* in fiscal 1989 from \$420.8 million in fiscal 1988. This decrease reflects a \$37.2 million or 12.7 percent decline in net sales, which can be attributed primarily to the continuing midrange computer industry slowdown. Also affecting revenue are the divestitures of the Company's third-party maintenance business in Germany and foreign subsidiaries in Austria, Sweden, and Norway, and lower US dollar values of European currencies. Forty-four percent of the Company's revenue was derived from the United States, 9 percent from Canada, 43 percent from Western Europe, and 4 percent from other areas.

Net loss totaled \$39.9 million for fiscal 1989, a decrease of nearly 263 percent over the previous year's net income of \$24.5 million. Net income was affected primarily by the nonrecurring charges of \$40.2 million associated with the tender offer for Prime Computer and the restructuring charges incurred in 1989.

R&D expenditure totaled \$9.8 million, or 2.5 percent of total 1989 revenue. The Company entered into an agreement with Sequent Computer Systems in which Sequent conducts R&D activities for MBF relating to an architecturally new line of parallel processor computer systems. MBF introduced the first generation of these in mid-1990. The systems use the Intel 80386

*All dollar amounts are in US dollars.

microprocessor and its successors, with a UNIX-based operating system. Approximately 59 percent of MBF's R&D was for new products; the balance was to support and enhance existing products. From another angle, approximately 65 percent of the Company's 1989 R&D expenditure was for the development of operating system software and systems software, with the balance used for systems integration and equipment development.

Capital expenditure totaled \$12.6 million in 1989, representing 3.2 percent of revenue. This is a 4.5 percent decrease from the 1988 figure of \$13.2 million.

As of September 30, 1989, the Company had 3,698 employees, of which 1,832 were employed in the United States, 376 in Canada, and 1,490 in the Company's other foreign operations.

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

Business Computers

MBF provides a total solution, encompassing both computer hardware and application software, specialized for each specific industry targeted. The Company offers its systems with the proprietary BOSS operating system and the recently released BOSS/VX or Dual Universe architecture, which incorporates a derivative of the UNIX System V from AT&T with the BOSS operating system. Systems introduced in 1990 with the BOSS/VX operating systems include the GPx 40 Series, which includes the GPx 240, the GPx 340, and the GPx 440 supermicrocomputer multiuser systems. The GPx 40 Series is based on Acer technology. MBF recently began to ship the GPx 70 Series, which includes the GPx 5070 and the GPx 6070, based on the acquired Sequent technology. The GPx 5070 will accommodate up to 192 users,

whereas the GPx 6070 will accommodate up to 256 users with available expansion to over 500 users.

The MAI PSx 30 personal computer system has replaced the MAI 1200/1400 as the Company's personal computer market product.

Dataquest estimates that MBF shipped 3,438 units in 1989. Approximately 48 percent of the Company's shipments were in the United States and 35 percent in Western Europe. Canada accounted for 10 percent while the remaining 7 percent was shipped to Rest of World.

Dataquest ranks MBF 26th in the worldwide midrange market, with \$141.2 million in factory revenue for 1989. Dataquest estimates that MBF held less than 1 percent of the 1989 market.

Software

MBF has either developed or acquired industry-specific software to bundle with its hardware to enforce its total solution image. The Company has recently introduced a comprehensive business solution for retailers developed to support hardware from NCR Corporation. The MAI Retail System has ported its Power Retailer point-of-sale system to NCR's new 7052D Disk-Based Workstation.

Service and Maintenance

In 1988, MBF purchased the right to provide maintenance service to its customers in most of the United States from Sorbus. Together with the Company's international subsidiaries, the service and maintenance business unit accounted for 36 percent of total revenue, or \$143 million.

Further Information

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

Table 1
Corporate Highlights (Millions of US Dollars)*

	1986	1987	1988	1989
Four-Year Revenue	\$281.0	\$321.0	\$420.8	\$396.9
Percent Change	-	14.23	31.09	(5.68)
Capital Expenditure	\$7.6	\$13.2	\$13.2	\$12.6
Percent of Revenue	2.70	4.11	3.14	3.17
R&D Expenditure	\$15.3	\$12.9	\$11.1	\$9.8
Percent of Revenue	5.44	4.02	2.64	2.46
Number of Employees	2,924	3,252	4,473	3,698
Revenue (\$K)/Employee	\$96.10	\$98.71	\$94.08	\$107.33
Net Income	\$9.1	\$23.8	\$24.5	(\$39.9)
Percent Change	-	161.54	2.94	(262.98)
1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	\$107.70	\$104.70	\$86.00	\$98.50
Quarterly Profit	\$5.50	\$2.40	(\$46.20)	(\$1.60)

*1985 annual reports were unavailable.

Source: MAI Basic Four, Inc.
 Annual Reports
 Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)*

Region	1986	1987	1988	1989
North America	47.08	41.87	47.58	53.06
International	52.92	58.13	52.42	46.94
Europe	48.20	54.40	47.80	42.94
Other	4.72	3.73	4.62	4.00

*1985 annual reports were unavailable.

Source: MAI Basic Four, Inc.
 Annual Reports
 Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1989
Direct Sales	71
Indirect Sales	29

Source: MAI Basic Four, Inc.
 1990

1989 SALES OFFICE LOCATIONS

North America—53

Europe—37

Asia/Pacific—3

ROW—8

MANUFACTURING LOCATIONS

Information is not available.

SUBSIDIARIES

North America

MAI Canada, Ltd. (Canada)
MAI International Holdings, Inc. (United States)
MAI del Caribe, Inc. (United States)

Europe

AKB BVBA (Belgium)
Autosoft Gesellschaft Fur Systemberatung MbH
(Germany)
Basic Insoft Systems GmbH (Germany)
Compu Orga Gesellschaft Fur Computer Organization
MbH (Germany)
Computer Services Tekserv AG (Switzerland)
Lehnert & Fisher Quintus Dialog Software GmbH
(Germany)
MAI Belgium SA (Belgium)
MAI Computer Industrie BV (Netherlands)
MAI de Espana S.A. Sistemas de Information (Spain)
MAI Deutschland GmbH (Germany)
MAI France SA (France)
MAI Holdings BV (Netherlands)
MAI Nederland BV (Netherlands)
MAI Schweiz AG (Switzerland)
MAI Software Systeme GmbH (Germany)
MAI UK Holdings Ltd. (United Kingdom)
MAI United Kingdom Limited (United Kingdom)
ODR Systems GmbH (Germany)
Provence SA (France)
Romijn Software Bureau BV (Netherlands)

Tekserv Computer Services GmbH (Germany)
Tekserv Computer Services Ltd (United Kingdom)
Tekserv S.A. (Spain)
Weis Edv Beratung GmbH (Germany)

ROW

MAI de Mexico S.A. de C.V. (Mexico)
MAI de Venezuela S.A. (Venezuela)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Hewlett-Packard (HP)

MBF and HP signed a value-added reseller (VAR) agreement under which MBF will buy \$7.5 million worth of HP 9000 UNIX-based small computers and resell the machines bundled with Manbase, a proprietary software package for manufacturing and resource planning applications.

Brooke Partners

MBF has been 34.5 percent acquired by Brooke Partners for \$18.5 million.

NCR Corporation

MBF has signed a major agreement for the retail market with rival NCR to sell NCR's integrated point-of-sale systems bundled with MBF's retail software.

1988

C&S Research Corp.

The companies have a licensing agreement permitting MAI Basic Four to license and install application software for physicians' offices and clinics.

MERGERS AND ACQUISITIONS

1990

Computerized Lodging Systems Inc.

MBF acquired this reseller specializing in the hotel industry.

Bickley & Associates

MAI acquired Bickley & Associates, an independent vendor organization selling software packages to property developers, to form the core of the new industry business unit of construction/property management/membership.

1988

MAI Canada, Ltd.

MBF acquired its Canadian distributor.

MBF United States

MBF acquired this maintenance operation.

Valid Data, Inc.

MBF acquired Valid Data's application software package.

Compu-Orga GmbH

MBF acquired this supplier of software applications for hospitals and health care organizations.

Autosoft GmbH

MBF acquired this supplier of application software for auto dealers.

1987

Systems Specialists, Inc.

MBF acquired this software vendor.

KEY OFFICERS

William Weksel

Chairman of the board and chief executive officer

Fred D. Anderson, Jr.

President and chief operating officer

Robert L. Faulkner

Senior vice president, Marketing and Operations

Bertrand H. Weidberg

Senior vice president, general counsel, and secretary

Arthur A. Mancini

Senior vice president, Worldwide Sales and Service

PRINCIPAL INVESTORS

Bennett S. LeBow

Brooke Partners, L.P.

FOUNDERS

Bennett S. LeBow

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

Balance Sheet	1986	1987	1988	1989
Total Current Assets	\$160.0	\$173.2	\$178.5	\$168.2
Cash	50.0	45.2	8.7	15.1
Receivables	63.2	74.0	95.2	78.4
Marketable Securities	0	0	0	NA
Inventory	39.7	48.2	66.1	58.3
Other Current Assets	7.1	5.8	8.5	16.4
Net Property, Plants	\$15.6	\$20.9	\$34.8	\$28.8
Other Assets	\$6.5	\$19.8	\$189.1	\$196.2
Total Assets	\$182.1	\$213.9	\$402.4	\$393.2
Total Current Liabilities	\$73.9	\$76.0	\$117.8	\$125.4
Long-Term Debt	\$51.1	\$50.6	\$182.1	\$156.0
Other Liabilities	\$3.3	\$9.2	\$13.9	\$7.6
Total Liabilities	\$128.3	\$135.8	\$313.8	\$289.0
Total Shareholders' Equity	\$53.8	\$78.1	\$88.6	\$104.2
Converted Preferred Stock	0	0	0	54
Common Stock	3.5	3.7	3.7	3.7
Other Equity	47.2	47.5	48.2	49.6
Retained Earnings	3.1	26.9	36.7	(3.2)
Total Liabilities and Shareholders' Equity	\$182.1	\$213.9	\$402.4	\$393.2
Income Statement	1986	1987	1988	1989
Revenue	\$281.0	\$321.0	\$420.8	\$396.9
US Revenue	132.3	134.4	200.2	210.6
Non-US Revenue	148.7	186.6	220.6	186.3
Cost of Sales	\$135.2	\$148.0	\$212.0	\$228.0
R&D Expense	\$15.3	\$12.9	\$11.1	\$9.8
SG&A Expense	\$95.7	\$119.4	\$137.3	\$136.0
Capital Expense	\$7.6	\$13.2	\$13.2	\$12.6
Pretax Income	\$28.2	\$37.4	\$39.6	(\$49.3)
Pretax Margin (%)	10.04	11.65	9.41	(12.42)
Effective Tax Rate (%)	40.00	38.90	38.20	(13.90)
Net Income	\$9.1	\$23.8	\$24.5	(\$39.9)
Shares Outstanding, Millions	14.2	14.6	15.0	15.0
Per Share Data				
Earnings	\$0.52	\$1.59	\$1.61	(\$2.68)
Dividend	0	0	0	0
Book Value	\$3.79	\$5.35	\$5.91	\$6.95

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

Key Financial Ratios	1986	1987	1988	1989
<i>Liquidity</i>				
Current (Times)	2.17	2.28	1.52	1.34
Quick (Times)	1.63	1.64	0.95	0.88
Fixed Assets/Equity (%)	29.00	26.76	39.28	27.61
Current Liabilities/Equity (%)	137.36	97.31	132.96	120.35
Total Liabilities/Equity (%)	238.48	173.88	354.18	277.35
<i>Profitability (%)</i>				
Return on Assets	-	12.02	7.95	(10.04)
Return on Equity	-	36.09	29.39	(41.42)
Profit Margin	3.24	7.41	5.82	(10.06)
<i>Other Key Ratios</i>				
R&D Spending % of Revenue	5.44	4.02	2.64	2.46
Capital Spending % of Revenue	2.70	4.11	3.14	3.17
Employees	2,924	3,252	4,473	3,698
Revenue (\$K)/Employee	\$96.10	\$98.71	\$94.08	\$107.33
Capital Spending % of Assets	4.17	6.17	3.28	3.20

*1985 annual reports were unavailable.
 NA = Not available

Source: MAI Basic Four, Inc.
 Annual Reports
 Dataquest (1990)

M/A-COM

M/A-COM Advanced Semiconductor Operations
100 Chelmsford Street
Lowell, MA 01851
(508)453-3100

Established 1984
No. of Employees: 170

BACKGROUND

M/A-COM Advanced Semiconductor Operations (ASO) was set up to supply GaAs wafers, FETs, standard MMICs, custom MMICs, and foundry services for both internal and external requirements. Except for GaAs wafers, the market segment targeted is essentially microwave and defense related. M/A-COM is heavily involved in the DARPA-funded MIMIC program and is a member of the Hughes/GE team on Phase I.

M/A-COM ASO relies on M/A-COM Inc.'s worldwide network of field sales offices and representatives to market its products.

In mid-1989, M/A-COM acquired Adams Russell Inc., which includes the Adams-Russell Semiconductor Center. Consolidation of the two operations was under way at press time and is expected to be completed early in 1990.

DIVISION EXECUTIVES

- Group Vice President, Semiconductors—Dr. Richard Soshea
- Vice President, Advanced Semiconductor Division—Douglas Maki
- Vice President, Manufacturing—Peter Ledger (formerly vice president, Semiconductor Products, M/A-COM)
- Vice President, Sales and Marketing—Larry Ward (formerly of M/A-COM OmniSpectra)

FINANCIAL BACKING

M/A-COM ASD (formerly ASO) has received capital investment of approximately \$50 million to date from M/A-COM Inc.

M/A-COM

SERVICES

- Design
- CAD
- Foundry-0.8u, 0.5u, and 0.25u D-MESFETs
- Assembly
- Test
- Packaging

PROCESS TECHNOLOGY

- 0.8u, 0.5u, and 0.25u GaAs D-MESFETs
- 0.8u GaAs E-MESFETs
- 0.5u optical lithography, 0.25u E-beam lithography

PRODUCTS

- 2-inch, 3-inch, and 4-inch semi-insulating GaAs wafers
- 0.8u FETs: 8W to S-band, 4W to C-band, 1W to Ku-band
- 0.25u FETs: Low noise up to K-band
- MMICs: DC-18-GHz switches, DC-20-GHz attenuators, custom L- to X-band phase shifters
- Broad- and narrow-band power and low-noise amplifiers

APPLICATIONS

- Military radar, EW, and communications
- Instrumentation
- Commercial communications

M/A-COM

FACILITIES

- M/A-COM facilities total more than 183,000 square feet. Included are 58,000 square feet of Class 10 clean room facilities. The ASD facilities are in Lowell and Burlington, MA.

M/A-COM

(Page intentionally left blank)

M/A-COM

M/A-COM Advanced Semiconductor Operations
100 Chelmsford Street
Lowell, MA 01851
(617) 937-2800

Established 1984
No. of Employees: 170

BACKGROUND

M/A-COM Advanced Semiconductor Operations (ASO) was set up to supply GaAs wafers, FETs, standard MMICs, custom MMICs, and foundry services for both internal and external requirements. Except for GaAs wafers, the market segment targeted is essentially microwave and defense related. M/A-COM is heavily involved in the MIMIC program.

M/A-COM ASO relies on M/A-COM Inc.'s worldwide network of field sales offices and representatives to market its products.

DIVISION EXECUTIVES

- Vice President and General Manager—D. Gallagher (formerly president, M/A-COM Computer Marketing)
- Vice President, Engineering—G. DiPiazza (formerly of Bell Labs)
- Vice President, Processing—R. Walline (formerly vice president, Semiconductor Products, M/A-COM)
- Vice President, Manufacturing—P. Ledger (formerly vice president, Semiconductor Products, M/A-COM)
- Director of Marketing—L. Ward (formerly of M/A-COM OmniSpectra)

FINANCIAL BACKING

M/A-COM ASO has received capital investment of approximately \$50 million to date from M/A-COM Inc.

SERVICES

- Design
- CAD
- Foundry—0.8u, 0.5u, and 0.25u D-MESFETs

M/A-COM

- Assembly
- Test
- Packaging

PROCESS TECHNOLOGY

- 0.8u, 0.5u, and 0.25u GaAs D-MESFETs
- 0.8u GaAs E-MESFETs
- 0.5u optical lithography, 0.25u E-beam lithography

PRODUCTS

- 2-inch and 3-inch semi-insulating GaAs wafers
- 0.8u FETs: 8W to S-band, 4W to C-band, 1W to Ku-band
- 0.25u FETs: Low noise up to K-band
- MMICs: DC-18-GHz switches, DC-20-GHz attenuators, custom L- to X-band phase shifters

1988 Products

- 4-inch semi-insulating GaAs wafers
- Broad- and narrow-band power and low-noise amplifiers

Applications

- Military radar, EW, and communications
- Instrumentation
- Commercial communications

FACILITIES

M/A-COM facilities total 175,000 square feet. Included in this configuration is 35,000 square feet of class 10 clean room facilities. The ASO facilities are in Lowell, Massachusetts.

The MacNeal-Schwendler Corporation

815 Colorado Boulevard
Los Angeles, California 90041
Telephone: (213) 258-9111
Fax: (213) 259-3838
Dun's Number: 00-965-3148

Date Founded: 1963

CORPORATE STRATEGIC DIRECTION

The MacNeal-Schwendler Corporation (MSC) designs, produces, and markets applications software for use in computer-aided engineering (CAE). MacNeal-Schwendler's primary software product is the MSC/NASTRAN, which can be used with a wide variety of computers, ranging from large to minicomputers and microcomputers. MacNeal-Schwendler also develops and markets educational tools designed to train users of MSC/NASTRAN.

Total revenue increased 12.9 percent to \$45.0 million* in fiscal year 1990, up from \$39.9 million in fiscal 1989. MacNeal-Schwendler attributed the growth to increased use of MSC/NASTRAN and revenue generated from the Engineering/Electromagnetics Applications Department. Net income totaled \$9.8 million in fiscal year 1990, representing an increase of 11.1 percent over fiscal 1989. MacNeal-Schwendler employed 306 people during fiscal 1990.

MacNeal-Schwendler sells its products primarily through its own direct sales force. The Company targets its products at major industrial concerns, data center networks, government agencies, and universities. The majority of sales are made domestically; however, international sales have risen slowly from 11.2 percent of total revenue in fiscal year 1986 to 19.9 percent in fiscal 1988, 19.1 percent in fiscal 1989, and 21.8 percent in fiscal 1990. International sales are generated principally from the European market.

Currently, MacNeal-Schwendler is positioning itself to meet the needs of the European Community (EC) in 1992. During 1989, MacNeal-Schwendler established offices in Hamburg and Rome and increased its staffs in Munich and London. It also added a distributor for the Benelux countries and further solidified its distributor relationships in Scandinavia, Israel, France, and Spain.

MacNeal-Schwendler also has been strengthening itself in the Far East through making staff additions to its Tokyo office and establishing an office in Kyoto. The Company opened a Hong Kong office to serve the Taiwanese, South Korean, and Indonesian markets, as well as to help prepare for the anticipated business growth in the People's Republic of China.

During fiscal years 1990, 1989, and 1988, R&D expenditure equaled \$8.6 million, \$7.0 million, and \$5.4 million, respectively. These figures respectively amounted to 19.1, 17.6, and 15.6 percent of total revenue. R&D activities primarily are directed toward enhancing MSC/NASTRAN software or converting it for use on additional computers. Maintenance of MSC/NASTRAN includes systems integration, quality assurance testing, error correction, and modifications to accommodate changes to computer system software.

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

*All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

Software

MSC/NASTRAN

MSC/NASTRAN is a computer software program consisting of over 600,000 source statements. Approximately 98 percent is written in FORTRAN and 2 percent in assembly language. MSC/NASTRAN offers a wide variety of analysis types including statics, buckling, heat transfer, cyclic symmetry, normal modes, transient response, frequency response, response spectrum, random response, and nonlinear statics and dynamics. Advanced analysis features consist of component mode synthesis, design sensitivity, and design optimization. The MSC/NASTRAN program is operational on more than 45 operating system/hardware platform combinations, including those manufactured by Data General, Digital Equipment Corporation (DEC), Hewlett-Packard (HP), IBM, Sun Microsystems, and Unisys. NASTRAN, a computer program owned by the US government and leased to the public, is the predecessor of MSC/NASTRAN. MacNeal-Schwendler acquired the perpetual right to commercial use of those elements of NASTRAN embodied in MSC/NASTRAN.

MSC/NASTRAN is based upon the finite element method (FEM) of analysis. Using FEM, complex structures are divided into small elements that form a finite element model, which then is subjected to computerized analysis. MSC/NASTRAN analyzes structures in order to determine their strength, safety, and performance characteristics. It can be used to improve the design of aircraft, jet, rocket, and other engines, automobiles, trucks, tires, ships, farm equipment, heavy industrial equipment, nuclear containment vessels, helicopters, spacecraft, and various other products and structures. MSC/NASTRAN can also conduct analyses of vibration characteristics, dynamic responses, transient heat transfer, elastic stability, and aeroelastic responses, including flutter. The sequence of calculations required for each analysis is prearranged. The user need provide only a physical description of the problem and the desired output.

New features can be added and obsolete features replaced without disrupting the other modules of the system since MSC/NASTRAN has a modular design. Thus, major changes in computer hardware can be

accommodated systematically. For example, the program has been adapted to minicomputers and microcomputers, and the number of computer program source statements has increased from 180,000 to over 600,000, as mentioned above.

In January 1989, MacNeal-Schwendler unveiled version 66 of MSC/NASTRAN, which introduced more than 40 new features, the largest increment of enhancements in the program's history. Version 66's New Executive system offers advanced techniques for managing analysis data and executing program functions. The system utilizes parallel processing and expanded random access memory. An Automatic Restart capability has been added to provide a mechanism for restarting MSC/NASTRAN analyses using different design criteria.

MSC/EMAS

MSC/EMAS is a general-purpose 2-D and 3-D electromagnetic analysis system for electrical engineers that require capabilities for comprehensive analysis. MSC/EMAS solves electronic and magnetic field problems involving linear, nonlinear, and anisotropic materials. With MSC/EMAS, users can analyze the entire range of electromagnetic behavior, from electrostatics and nonlinear magnetostatics to eddy currents and wave propagation. Varied applications can be simulated under one program. MSC/EMAS is built around the MSC/NASTRAN analytical engine. It replicates the processing efficiencies of MSC/NASTRAN while incorporating a formulation of Maxwell's equations for use in electromagnetic applications. MSC/EMAS is available on a wide range of computer platforms ranging from engineering workstations to supercomputers.

MSC/XL

Introduced in February 1989, MSC/XL, which is closely integrated with MSC's analysis products, is an interactive pre- and postprocessor that enables users to build and refine models and display analysis results in a variety of formats. Through MSC/XL, engineers can construct three-dimensional finite element models, simulate their physical characteristics, and analyze them using MSC/NASTRAN without ever leaving the program. Once the MSC/NASTRAN analysis is completed, MSC/XL can graphically display or postprocess the results in a variety of formats. MSC/XL includes menus and commands, a mouse interface, a built-in calculator, and many other features.

MSC/NASTRAN-WS

In October 1989, MacNeal-Schwendler released MSC/NASTRAN-WS, an integrated analytical system designed for engineering workstations. MSC/NASTRAN-WS connects MSC/XL with a subset of MSC/NASTRAN, supplying stress and vibration analysis and graphics. MSC/NASTRAN-WS runs on 386 PCs (Compaq, IBM, PS/2, and compatibles) and Sun 4 (and SPARCstation) workstations.

MSC/DYNA

MSC/DYNA is designed for the simulation and analysis of transient nonlinear structural response. It provides analytical capabilities including geometric and material nonlinear behavior of metals, plastics, composites, and concrete with single and multiple contact surfaces. These features allow engineers to analyze the effect of material breakage and the interaction of individual components as they contact each other. MSC/DYNA is used for vehicle crash analysis, plant component safety analysis, aircraft and helicopter crashworthiness, the seismic response of structures, the performance of munitions and armor, metal forming, and the safety tolerances of nuclear and chemical plant components.

MSC/PISCES

MSC/PISCES is a coupled finite element-finite difference program that analyzes high-speed impact and fluid-structure interactions. The program is suitable for processes such as the ingestion of objects by jet engines, hypervelocity particle impacts on spacecraft, the deployment of airbags in vehicle crashes, accident containment in petrochemical and nuclear facilities, and ballistic armament penetration. MSC/PISCES is based on original research in numerical simulation of high-speed, coupled elastoplastic and hydrodynamic phenomena conducted at several high-energy physics laboratories.

MSC/PROBE

MSC/PROBE offers capabilities in component analysis utilizing the p-version of the finite element method. Hierarchic basis functions, up to polynomial degree 8, enable MSC/PROBE to deliver feedback on the quality of each finite element analysis (FEA) result. MSC/PROBE is fully functional on a wide range of computers from engineering workstations to supercomputers.

PC Products for Engineering Analysis**MSC/pal 2**

MSC/pal 2 is an FEA package for the Apple Macintosh and IBM PC. It can analyze 2-D and 3-D models with as many as 2,000 grid points (12,000 degrees of freedom). MSC/pal 2 offers statics, normal modes, transient response, frequency response, and thermal stress analysis. The element library includes beams, plates and membranes, solids, axisymmetric elements, and scalar springs, masses, and dampers. Color graphics output consists of deformed shapes, hidden lines, shrunken elements, and shaded stress contours.

MSC/mod

MSC/mod is a graphics modeling program for use on the IBM PC that enables engineers to create and edit models that can be analyzed on either PCs or mainframes. MSC/mod files can be used directly by MSC/pal 2, MSC/cal, and MSC/NASTRAN. It includes a CAD translator that accepts drawing files from most popular PC computer-aided design (CAD) packages. Features for creating and editing geometric models include 2-D and 3-D meshing, node replication, node mesh smoothing, and merging. MSC/mod also allows users to enter loads, material and element properties, and constraints. It displays hidden elements, shrunken elements, element orientation, and load and constraint directions.

MSC/cal

MSC/cal is a heat transfer program for IBM PCs that performs linear and nonlinear steady-state and transient analyses using the finite element method. The element library includes bars, perfect conductors, and planar, plate, solid, and axisymmetric quadrilateral and triangular elements. MSC/cal models with up to 2,000 nodes can be analyzed and can transmit files directly to MSC/pal 2.

Educational Tools

MacNeal-Schwendler markets several educational tools designed to teach the entry-level user how to use MSC/NASTRAN in structural analysis. PRENASHTRAN is an introductory interactive computer program designed for training as a refresher course in the use of MSC/NASTRAN.

PRENASHTRAN is available for Apollo Domain, IBM, and VAX computers. MacNeal-Schwendler also markets an interactive computer program, a video cassette lecture series, and numerous instruction manuals. The Company provides training seminars worldwide in the use of MSC/NASTRAN for a variety of engineering applications.

Further Information

For more information about The MacNeal-Schwendler Corporation's business segments, please contact Dataquest's CAD/CAM/CAE Industry Service.

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

	1986	1987	1988	1989	1990
Five-Year Revenue	\$21,101.0	\$27,078.0	\$34,530.0	\$39,873.0	\$45,016.0
Percent Change	-	28.33	27.52	15.47	12.90
Capital Expenditure	NA	NA	NA	NA	NA
Percent of Revenue	NA	NA	NA	NA	NA
R&D Expenditure	\$3,032.0	\$3,979.0	\$5,390.0	\$7,006.0	\$8,588.0
Percent of Revenue	14.37	14.69	15.61	17.57	19.08
Number of Employees	NA	NA	NA	245	306
Revenue (\$K)/Employee	NA	NA	NA	\$162.75	\$147.11
Net Income	\$2,530.0	\$7,005.0	\$9,069.0	\$8,854.0	\$9,832.0
Percent Change	-	176.88	29.46	(2.37)	11.05
1990 Calendar Year*	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$10,690.00	\$11,259.00	\$11,116.00	\$11,951.00	
Quarterly Profit	\$2,284.00	\$2,579.00	\$2,283.00	\$2,686.00	

*Based upon fiscal year
 NA = Not available

Source: The MacNeal-Schwendler Corporation
 Annual Reports and Forms 10-K
 Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	88.80	85.36	80.08	80.92	78.21
International	11.20	14.64	19.92	19.08	21.79
Europe	11.20	14.64	19.92	19.08	21.79

Source: The MacNeal-Schwendler Corporation
 Annual Reports and Forms 10-K
 Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1989	1990
Direct Sales	100.00	100.00
Indirect Sales	0	0

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—13
Europe—7
Asia/Pacific—6
Japan—2
ROW—2

MANUFACTURING LOCATIONS

North America
Los Angeles, California
All products

SUBSIDIARIES

North America
Noetic Technologies (United States)

Europe
MacNeal-Schwendler GmbH (Germany)
PISCES International B.V. (Netherlands)

Asia/Pacific
MSC Japan Ltd. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Stardent Computer Corporation

MacNeal-Schwendler and Stardent completed joint marketing agreements that call for the conversion and joint marketing of MSC/NASTRAN on the Stellar GS Series and Ardent Titan Series computers.

Matra Datavision

MacNeal-Schwendler and Matra Datavision signed an agreement for MacNeal-Schwendler to provide Matra Datavision with an FEA module to be integrated into Matra Division's Euclid-IS

CAD/CAM product. Distributed under the name QuickSolver, this module will be marketed in conjunction with Matra Datavision's Euclid-IS.

Digital Equipment Corporation (DEC)

MacNeal-Schwendler and DEC formed a joint research study exploring the feasibility and performance characteristics of converting its MSC/NASTRAN finite element analysis program to Digital's VAX line of computers supporting vector processing.

Apollo Computer Inc.

MacNeal-Schwendler and Apollo Computer signed a joint marketing agreement to make MSC/NASTRAN finite element analysis software available on Apollo's Series 1000 Personal Supercomputer.

1988

Silicon Graphics Computer Systems

MacNeal-Schwendler and Silicon Graphics signed a joint marketing agreement to sell MSC/NASTRAN on Silicon Graphics' IRIS 4D Series of graphics workstations.

Alliant Computer Systems Corporation

MacNeal-Schwendler and Alliant Computer Systems introduced a parallel version of the MSC/NASTRAN finite element analysis program for Alliant's FX/Series minisupercomputers.

1987

Sun Microsystems, Inc.

MacNeal-Schwendler and Sun Microsystems signed an agreement to convert the MSC/NASTRAN finite element software package to run on Sun-4 technical workstations.

CADAM, Inc.

MacNeal-Schwendler and CADAM announced the availability of an interface linking the CADAM systems to MacNeal-Schwendler's MSC/NASTRAN engineering analysis software.

Alliant Computer Systems Corporation

MacNeal-Schwendler and Alliant Computer Systems will develop a new version of MSC/NASTRAN software for Alliant's FX/Series computers. Under the terms of the agreement, MacNeal-Schwendler will convert its MSC/NASTRAN finite element analysis software for use on Alliant's high-performance parallel processing minisupercomputers.

MERGERS AND ACQUISITIONS

1989

Noetic Technologies

MacNeal-Schwendler acquired Noetic Technologies, which is located in St. Louis, Missouri. Noetic's primary product is PROBE, a computer program used by engineers to perform detailed stress analysis of manufactured parts.

PISCES International B.V.

MacNeal-Schwendler acquired PISCES International of Gouda, the Netherlands, and the related PISCES software product, from Physics International, Inc., of San Leandro, California. PISCES International develops the PISCES software and provides related engineering consulting services in the analysis of high-speed elastoplastic and hydrodynamic phenomena.

Dr. Joseph F. Gloudeman
Chief executive officer and president

Alan R. Curtis
Chief technical officer

Dr. Dennis A. Nagy
Chief marketing officer

Donald M. McLean
Director, Programs Management

PRINCIPAL INVESTORS

Dr. Richard H. MacNeal—9.6 percent
Dr. Joseph F. Gloudeman—3.6 percent

KEY OFFICERS

Dr. Richard H. MacNeal
Chairman

FOUNDERS

Information is not available.

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

Balance Sheet	1986	1987	1988	1989	1990
Total Current Assets	\$18,609.0	\$23,776.0	\$28,697.0	\$30,174.0	\$27,826.0
Cash	1,926.0	1,596.0	2,234.0	3,833.0	2,174.0
Receivables	5,271.0	6,894.0	8,565.0	10,129.0	13,482.0
Marketable Securities	10,770.0	14,341.0	16,602.0	14,561.0	9,202.0
Inventory	NA	NA	NA	NA	NA
Other Current Assets	642.0	945.0	1,296.0	1,651.0	2,968.0
Net Property, Plants	\$3,611.0	\$4,317.0	\$5,968.0	\$8,311.0	\$10,319.0
Other Assets	\$1,978.0	\$4,234.0	\$8,260.0	\$11,970.0	\$21,482.0
Total Assets	\$24,198.0	\$32,327.0	\$42,925.0	\$50,455.0	\$59,627.0
Total Current Liabilities	\$2,864.0	\$4,002.0	\$6,540.0	\$8,837.0	\$10,682.0
Long-Term Debt	\$33.0	\$1,108.0	\$1,937.0	\$3,457.0	\$5,724.0
Other Liabilities	NA	NA	NA	NA	NA
Total Liabilities	\$2,897.0	\$5,110.0	\$8,477.0	\$12,294.0	\$16,406.0
Total Shareholders' Equity	\$21,301.0	\$27,217.0	\$34,448.0	\$38,161.0	\$43,221.0
Common Stock	11,684.0	11,686.0	12,122.0	10,505.0	9,740.0
Other Equity	(100.0)	27.0	196.0	82.0	(77.0)
Retained Earnings	9,717.0	15,504.0	22,130.0	27,574.0	33,558.0
Total Liabilities and Shareholders' Equity	\$24,198.0	\$32,327.0	\$42,925.0	\$50,455.0	\$59,627.0
Income Statement	1986	1987	1988	1989	1990
Revenue	\$21,101.0	\$27,078.0	\$34,530.0	\$39,873.0	\$45,016.0
US Revenue	18,738.0	23,113.0	27,653.0	32,265.0	35,208.0
Non-US Revenue	2,363.0	3,965.0	6,877.0	7,608.0	9,808.0
Cost of Sales	\$4,361.0	\$5,454.0	\$7,055.0	\$8,235.0	\$92,020.0
R&D Expense	\$3,032.0	\$3,979.0	\$5,390.0	\$7,006.0	\$8,588.0
SG&A Expense	\$5,864.0	\$7,976.0	\$10,732.0	\$15,039.0	\$17,862.0
Capital Expense	NA	NA	NA	NA	NA
Pretax Income	\$8,388.0	\$12,692.0	\$15,115.0	\$13,576.0	\$14,897.0
Pretax Margin (%)	39.75	46.87	43.77	34.05	33.09
Effective Tax Rate (%)	46.00	46.00	39.00	34.00	34.00
Net Income	\$2,530.0	\$7,005.0	\$9,069.0	\$8,854.0	\$9,832.0
Shares Outstanding, Thousands	12,181.0	12,181.0	12,222.0	12,024.0	11,993.0
Per Share Data					
Earnings	\$0.21	\$0.58	\$0.74	\$0.73	\$0.82
Dividend	NA	NA	NA	NA	NA
Book Value	\$1.75	\$2.23	\$2.82	\$3.17	\$3.60

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

Key Financial Ratios	1986	1987	1988	1989	1990
<i>Liquidity</i>					
Current (Times)	6.50	5.94	4.39	3.41	2.60
Quick (Times)	6.50	5.94	4.39	3.41	2.60
Fixed Assets/Equity (%)	16.95	15.86	17.32	21.78	23.87
Current Liabilities/Equity (%)	13.45	14.70	18.99	23.16	24.71
Total Liabilities/Equity (%)	13.60	18.78	24.61	32.22	37.96
<i>Profitability (%)</i>					
Return on Assets	-	24.79	24.10	18.96	17.86
Return on Equity	-	28.88	29.41	24.39	24.16
Profit Margin	11.99	25.87	26.26	22.21	21.84
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	14.37	14.69	15.61	17.57	19.08
Capital Spending % of Revenue	NA	NA	NA	NA	NA
Employees	NA	NA	NA	245	306
Revenue (\$K)/Employee	NA	NA	NA	\$162.75	\$147.11
Capital Spending % of Assets	NA	NA	NA	NA	NA

NA = Not available

Source: The MacNeal-Schwendler Corporation
 Annual Reports and Forms 10-K
 Dataquest (1990)

MAI Basic Four, Inc.
14101 Myford Road
Tustin, California 92680
Telephone: (714) 730-2316
Fax: (714) 730-2737
Dun's Number: 12-084-8312
Date Founded: 1985

CORPORATE STRATEGIC DIRECTION

MAI Basic Four, Inc., designs, manufactures, and markets business information management systems for small and medium-size companies. The Company specializes in industry-specific solutions for manufacturing, health care, retail, hospitality, construction, and other industries.

MAI's total revenue increased 31 percent to \$420.8 million* in fiscal 1988 from \$321.0 million in fiscal 1987. Its net income increased 3 percent to \$24.5 million in fiscal 1988 from \$23.8 million the previous year. The Company employs more than 4,400 people worldwide.

The non-U.S. sales contribution to the Company's total revenue grew to \$220.6 million in fiscal 1988. Non-U.S. sales accounted for 52 percent of the total, down from 58 percent in fiscal 1987. The Company's sales were particularly strong in Europe and Latin America, where it made several recent acquisitions in software development and maintenance companies. Fifty-eight percent of the Company's 101 sales offices are outside the United States.

Research and development expenditures totaled \$11 million in fiscal 1988, representing approximately 3 percent of the Company's revenue. Capital expenditures totaled \$13 million in fiscal 1988, also approximately 3 percent of revenue.

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

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

BUSINESS SEGMENT STRATEGIC DIRECTION

Business Computers

MAI Basic Four provides a total solution, encompassing both computer hardware and application software, specialized for each specific industry targeted. The Company's systems are offered with the proprietary BOSS operating system. Some multiuser systems are offered with BOSS/IX, a proprietary operating system that is a derivative of UNIX. The MAI 1800 is a multiuser system that runs BOSS/IX and MS/DOS, giving it the ability to run a wide variety of applications, including popular PC programs. MAI Basic Four also offers systems that range from larger machines for large departments and business units to smaller systems for small department and small business needs. Dataquest estimates that MAI had less than 1 percent of the worldwide business computer market share in 1988. However, the Company increased its percentage of its 1988 share in this market 64 percent over 1987. Within the United States, MAI is estimated to have held 4 percent of the 1988 market share for small department business computers. It ranks seventh among the top 10 vendors that make up 80 percent of the market segment. Dataquest estimates that MAI held 2 percent of the 1988 U.S. work group market share.

MAI Basic Four offers a broad product line, featuring price-competitive, high-performance, transaction-oriented, 32-bit computer systems that are designed to be highly reliable, easy to use, and responsive to user needs.

Further Information

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

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

	1986	1987	1988
Three-Year Revenue	\$281.0	\$321.0	\$420.8
Percent Change	-	14.23	31.09
Capital Expenditure	\$7.6	\$13.2	\$13.2
Percent of Revenue	2.70	4.11	3.14
R&D Expenditure	\$15.3	\$12.9	\$11.1
Percent of Revenue	5.44	4.02	2.64
Number of Employees	2,924	3,252	4,473
Revenue (\$K)/Employee	\$96.10	\$98.71	\$94.08
Net Income	\$9.1	\$23.8	\$24.5
Percent Change	-	161.54	2.94

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	\$104.68	\$84.04	\$86.04	N/A
Quarterly Profit	\$2.40	(\$46.22)	(\$46.22)	N/A

N/A = Not Available

*1984 and 1985 annual reports were unavailable.

Source: MAI Basic Four
Annual Reports
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988
North America	47.08	41.87	47.58
International	52.92	58.13	52.42
Europe	48.20	54.40	47.80
All Others	4.72	3.73	4.62

Source: MAI Basic Four
Annual Reports
Dataquest
January 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1987	1988
Direct Sales	90.00	90.00
Indirect Sales	10.00	10.00
Dealers	10.00	10.00

Source: Dataquest
January 1990

1988 SALES OFFICE LOCATIONS

North America—53
Europe—37
Asia/Pacific—3
ROW—8

SUBSIDIARIES

North America

Choice Corp., United States
MAI Canada Inc., Canada
MAI Canada, Ltd., Canada
MAI International Holdings Inc., United States

Europe

AKB BVBA, Belgium
Autosoft Gesellschaft Fur Systemberatung mbH,
West Germany
Basic Insoft Systems GmbH, West Germany
Compu Orga Gesellschaft Fur Computer Organization
mbH, West Germany
Computer Services Tekserv AG, Switzerland
ISS Inmentic AS, Denmark
Lehnert & Fisher Quintus Dialog Software GmbH,
West Germany
MAI Basic Four Norge A/S, Norway
MAI Belgium SA, Belgium
MAI Computer Industrie BV, Netherlands
MAI de Espana S.A., Spain
MAI Deutschland GmbH, West Germany
MAI Foreign Sales Corp BV, Netherlands
MAI France SA, France
MAI Holdings BV, Netherlands
MAI Information Systems AB, Sweden
MAI Nederland BV, Netherlands
MAI Schweiz AG, Switzerland
MAI Software Systeme GmbH, West Germany
MAI UK Holdings Ltd., United Kingdom
MAI United Kingdom Limited, United Kingdom
ODR Systems GmbH, West Germany
Provence SA, France
Romijn Software Bureau BV, Netherlands
Tekserv AB, Sweden
Tekserv BV, Netherlands
Tekserv Computer Services GmbH, West Germany
Tekserv Computer Services Ltd, United Kingdom
Tekserv SA, Belgium

Tekserv SA, France
Weis Edv Beratung GmbH, West Germany

Asia/Pacific

MAI Basic Four Australia Pty. Ltd., Australia
MAI Basic Four Holding Pty. Ltd., Australia
Tekserv Pty. Ltd., Australia

ROW

MAI de Costa Rica, S.A., Costa Rica
MAI Del Caribe Inc., Puerto Rico
MAI de Mexico SA de CV, Mexico
MAI de Venezuela SA, Venezuela

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1988

C&S Research Corp.

Licensing agreement permitting MAI Basic Four
to license and install application software for phy-
sician's offices and clinics

MERGERS AND ACQUISITIONS

1988

MAI Canada, Ltd.

Acquisition of Canadian distributor

MBF United States

Acquisition of maintenance operation

Valid Data, Inc.

Acquired application software package

Compu-Orga GmbH

Acquired supplier of software applications for
hospitals and health care organizations

Autosoft GmbH

Acquired a supplier of application software for
auto dealers

1987

Systems Specialists, Inc.

Software vendor acquisition

KEY OFFICERS

William B. Patton, Jr.

President and chief executive officer

Fred D. Anderson, Jr.

Senior vice president and chief financial officer

Robert L. Faulkner

Senior vice president, Marketing and Operations

Bertrand H. Weidberg

Senior vice president, general counsel, and secretary

Robert A. Garbutt

Senior vice president, North American Sales and Service

Arthur A. Mancini

Senior vice president, International Sales and Service

PRINCIPAL INVESTORS

Bennett S. LeBow (founder)—34.61 percent

Stephanie D. LeBow—8.37 percent

Karen L. Holzberg—8.37 percent

Drexel Burnham Lambert Inc.—6.96 percent

William Weksel—5.34 percent

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

Balance Sheet	1986	1987	1988
Total Current Assets	\$160.0	\$173.2	\$178.5
Cash	50.0	45.2	8.7
Receivables	63.2	74.0	95.2
Marketable Securities	0	0	0
Inventory	39.7	48.2	66.1
Other Current Assets	7.1	5.8	8.5
Net Property, Plants	\$15.6	\$20.9	\$34.8
Other Assets	\$6.5	\$19.8	\$189.1
Total Assets	\$182.1	\$213.9	\$402.4
Total Current Liabilities	\$73.9	\$76.0	\$117.8
Long-Term Debt	\$51.1	\$50.6	\$182.1
Other Liabilities	\$3.3	\$9.2	\$13.9
Total Liabilities	\$128.3	\$135.8	\$313.8
Total Shareholders' Equity	\$53.8	\$78.1	\$88.6
Converted Preferred Stock	0	0	0
Common Stock	3.5	3.7	3.7
Other Equity	47.2	47.5	48.2
Retained Earnings	3.1	26.9	36.7
Total Liabilities and Shareholders' Equity	\$182.1	\$213.9	\$402.4
Income Statement	1986	1987	1988
Revenue	\$281.0	\$321.0	\$420.8
U.S. Revenue	132.3	134.4	200.2
Non-U.S. Revenue	148.7	186.6	220.6
Cost of Sales	\$135.2	\$148.0	\$212.0
R&D Expense	\$15.3	\$12.9	\$11.1
SG&A Expense	\$95.7	\$119.4	\$137.3
Capital Expense	\$7.6	\$13.2	\$13.2
Pretax Income	\$28.2	\$37.4	\$39.6
Pretax Margin (%)	10.04	11.65	9.41
Effective Tax Rate (%)	40.00	38.90	38.20
Net Income	\$9.1	\$23.8	\$24.5
Shares Outstanding, Millions	14.2	14.6	15.0
Per Share Data			
Earnings	\$0.52	\$1.59	\$1.61
Dividends	0	0	0
Book Value	\$3.79	\$5.35	\$5.91

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

Key Financial Ratios	1986	1987	1988
<i>Liquidity</i>			
Current (Times)	2.17	2.28	1.52
Quick (Times)	1.63	1.64	0.95
Fixed Assets/Equity (%)	29.00	26.76	39.28
Current Liabilities/Equity (%)	137.36	97.31	132.96
Total Liabilities/Equity (%)	238.48	173.88	354.18
<i>Profitability (%)</i>			
Return on Assets	-	12.02	7.95
Return on Equity	-	36.09	29.39
Profit Margin	3.24	7.41	5.82
<i>Other Key Ratios</i>			
R&D Spending % of Revenue	5.44	4.02	2.64
Capital Spending % of Revenue	2.70	4.11	3.14
Employees	2,924	3,252	4,473
Revenue (\$K)/Employee	\$96.10	\$98.71	\$94.08
Capital Spending % of Assets	4.17	6.17	3.28

*1984 and 1985 annual reports were unavailable.

Source: MAI Basic Four
 Annual Reports
 Dataquest
 January 1990

Marconi Electronic Devices Limited (MEDL)

Marconi Electronic Devices Limited (MEDL)
Lincoln Industrial Park, Doddington Road
Lincoln LN6 3LF England
0522-688121

Established 1980
No. of Employees: 2,475

BACKGROUND

MEDL's Microwave Division specializes in designing, developing, and manufacturing a broad range of RF to millimeter-wave products for the worldwide EW, radar, and communications markets. The MEDL organization was formed in 1980 as a part of a major change within the GEC/Marconi Group. MEDL's microwave sales were approximately \$48 million in 1988.

SERVICES

- Screening to NATO AQAP-1, USA MIL Q-9858, U.K./European BS 5750, BS 9300, and CECC 50000 specifications

PROCESS TECHNOLOGY

- GaAs MESFET submicron processing to support operation to 100 GHz

PRODUCTS

- GaAs FET amplifiers
- 94-GHz transceiver hybrids
- GaAs discrete transistors, diodes, and other discretes
- Mixers, PIN switches, and other RF to millimeter-wave components

Marconi Electronic Devices Limited (MEDL)

FACILITIES

- Doddington Road, Lincoln, United Kingdom--Production of RF to millimeter-wave chips, subsystems
- Swindon, United Kingdom--Thick-film circuits for telecom and industrial markets
- Farmingdale, New York--Hi-rd thick-film microelectronics for defense applications

Martin Marietta Corporation

6801 Rockledge Drive
Bethesda, Maryland
Telephone: (301) 897-6000
Fax: (301) 897-6083
Dun's Number: 00-133-9217

Date Founded: 1961

CORPORATE STRATEGIC DIRECTION

Martin Marietta Corporation is a consolidation of The Martin Company and American-Marietta Company founded in 1909 and 1913, respectively. Martin Marietta is a diversified enterprise principally engaged in the business of aerospace, electronics, and information technology. The Company designs, manufactures, and integrates systems and products in the fields of space, defense, aviation, communication, information management, and energy. It also conducts various other activities through certain consolidated subsidiaries and nonconsolidated associated companies or joint ventures.

Martin Marietta, through its Astronautics Group, Electronics Missiles Group, and Information Systems Group, is in direct competition with numerous other contractors for work in the design, development, and production of systems and products within its field. Its business is highly competitive on the basis of both price and technical capability, involves rapidly advancing technologies, and is subject to many uncertainties.

Total revenue increased 1.2 percent to approximately \$5.79 billion* in fiscal 1989 from approximately \$5.73 billion in fiscal 1988. Net earnings decreased 14.5 percent to \$306.9 million in fiscal 1989 from \$358.9 million in fiscal 1988. Martin Marietta employs 65,500 people worldwide.

Research and development expenditures totaled \$192 million in fiscal 1989, representing 3.3 percent of revenue.

Martin Marietta Advanced Development and Technology Operations was established in early 1989 in

San Diego, California, to pursue advanced technology developments in defense electronics, missiles, astronautics, and information systems. One of its units is Martin Marietta Laboratories, the central research and development facility of the Corporation. This unit conducts scientific and engineering projects in support of Martin Marietta's operating businesses. It also conducts research and development under contract with governmental agencies and industries in the fields of advanced materials, artificial intelligence, microelectronics, information processing, and optoelectronics, as well as in process engineering, energy conversion, and occupational health matters.

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 is not available on revenue by region. Table 3, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Astronautics

Martin Marietta Astronautics Group designs, develops, tests, and manufactures systems for space and defense. Among its products are civil and military space systems, space launch systems for both government and commercial applications, and strategic systems for the Department of Defense. The Group comprises four companies: Martin Marietta Space Launch Systems; Martin Marietta Commercial Titan, Inc.; Martin Marietta Space Systems; and Martin Marietta Strategic Systems.

* All dollar amounts are in US dollars.

Martin Marietta Space Launch Systems is the prime integration, systems, production, and launch contractor for the Titan series of space launch vehicles. Its products include three Titan launch systems—the Titan II, III, and IV.

The Company has air force contracts and options for 41 Titan IVs, the largest expendable launch vehicle being developed by the air force.

The Corporation also is under contract to the air force to modify deactivated Titan II ICBMs as space boosters. The current contract calls for refurbishing 14 Titan IIs. There are 41 more Titan II ICBMs available for conversion into launch vehicles.

Martin Marietta Commercial Titan, Inc., formed in 1987 by Martin Marietta Corporation to employ a version of the Titan II to launch commercial and government satellites, signed an agreement with the air force enabling it to use government launch facilities at Cape Canaveral, Florida. The Company has a contract with NASA to launch the Mars Observer Space Vehicle in 1992.

Martin Marietta Space Systems produces planetary spacecraft, instruments and experiments, and other space systems for NASA, as well as military space systems. It is also responsible for the group's Strategic Defense Initiative (SDI) work. Space Systems' SDI work consists of two major programs. Under one, the Company completed conceptual design studies for the Zenith Star space-based laser experiment and is preparing to begin the hardware design stage. The other program involves definitions of concepts for an experimental space-based interceptor system. The Company is continuing work on SDI-related contracts to develop acquisition, tracking, and pointing designs for an X-ray laser system and a hypervelocity projectile weapon.

Martin Marietta Strategic Systems is a leading contractor to the air force for development of the Peacekeeper (MX) ICBM system. The Company is responsible for assembly, test, and system support, which includes the flight test program at Vandenberg Air Force Base, California. The Company's other Peacekeeper responsibilities include design, development, and fabrication of the emplacer system used for installation of missiles in existing Minutemen silos and production of the instrumentation and flight safety system (IFSS),

carried in the flight test missiles, which obtains in-flight data measurements and permits safe destruction of a missile if a serious malfunction occurs.

Strategic Systems plays a similar assembly, test, and system support role for the Small ICBM and also builds the Post Boost Vehicle for the Small ICBM. Strategic Systems also builds upper stages for space launch vehicles, including the Transfer Orbit Stage, to place satellites in higher orbits.

Martin Marietta Manned Space Systems is a separate operation, even though its financial information and results are included under the Astronautics Group for segment reporting purposes. The Company's primary activities are on the Space Shuttle Program, which includes the design, development, assembly, and testing of disposable external fuel tanks at the Michoud Assembly Facility in Louisiana.

Electronics and Missiles

Martin Marietta Electronic and Missiles Group is engaged in the design, development, and production of missiles and electronic systems, antisubmarine warfare systems, and military ordnance. The Group comprises Missile Systems, Electronic Systems, Aero and Naval Systems, and Martin Marietta Ordnance Systems. Dataquest estimates Martin Marietta to be in the top 15 of the military/aerospace electronics systems market.

Missile Systems is producing the army's Patriot missile and launcher for the air defense of field armies. Initial operational capability was achieved in 1985 with US Army Air Defense units deployed in Europe. In 1987, Patriot missiles were deployed with Air Defense units in Germany and the Netherlands.

Electronic Systems produces LANTIRN, an advanced navigation and targeting fire control system consisting of two electro-optical systems, a navigation pod and a targeting pod. LANTIRN provides the air force's Tactical Air Command with the ability to locate and attack targets at night and in poor visibility weather using low-level, high-speed tactics. The system will be deployed initially on the F-15E dual-role fighter, followed by installation on the F-16C/D. It also is being reviewed for use on a variety of aircraft. PATH-FINDER, a LANTIRN navigation pod derivative that also has attack capability, was developed using Company funds and is being proposed for

international use on tactical aircraft as well as in various new US Air Force applications. To date, contracts have been received covering procurement of 685 Target Acquisition and Designation Systems/Pilot Night Vision Systems (TADS/PNVS) for the army's Apache helicopter. Martin Marietta also is under contract for development work on three air-to-air electro-optical sensor systems, one for the F-15 Navy Fighter and two different versions for the Air Force Advanced Tactical Fighter. These systems passively detect aircraft at long range.

Aero and Naval Systems currently is under contract with the Naval Sea Systems Commander for the MK 41 Vertical Launching System (VLS) for the navy's Aegis-equipped Ticonderoga class cruisers and Spruance and Arleigh class destroyers. The VLS is a shipboard multimissile storage and firing unit for various types of navy missiles. The acquisition of Gould Inc.'s Ocean Systems Division at Glen Burnie, Maryland, in 1988 added significantly to Aero and Naval Systems' capability to develop and produce undersea surveillance systems, especially passive sonar arrays towed behind ships and submarines.

Martin Marietta Ordnance Systems, Inc., a wholly owned subsidiary of the Corporation, manages the operation of the US Ordnance plant at Milan, Tennessee, which loads, assembles, and packs a variety of ordnance items for the US Military and for US Government-approved foreign customers. In 1988, Ordnance Systems was awarded a development contract for the 120 MM mortar.

Information Systems

Martin Marietta Information Systems Group consists of four operating entities: Martin Marietta Information and Communications Systems, Martin Marietta Data Systems, the Air Traffic Control division, and the National Test Bed Division.

Information and Communications Systems designs, builds, and integrates advanced information systems utilizing sophisticated technologies in electronics, communication, signal processing, and data processing.

Under a contract originally awarded in 1984 and extended in 1988 for an additional three years, Martin Marietta is providing systems engineering and overall integration of the many systems, technologies, and programs necessary for the Federal Aviation Administration's 10-year, National Airspace Systems

Plan (NAS PLAN). The NAS PLAN objective is to modernize the nation's air traffic control, navigation, and communications network to handle levels of traffic that could double by the end of the century. In 1988, Martin Marietta Canada Ltd. was selected by the Canadian government to perform a similar systems engineering and integration role in the Canadian Aerospace Systems Plan to modernize Canada's air traffic control system.

In January 1988, Martin Marietta was awarded a five-year \$508 million contract to develop and operate the National Test Bed simulation and evaluation facility for the Strategic Defense Initiative. The contract covers design, installation, and operation of the computer-driven facility that will be used to simulate, test, and evaluate strategic defense concepts, architectures, battle management, and hardware applications. The central test facility is under construction at Falcon Air Force Station in Colorado, and operation of certain interim linkages has commenced, permitting completion of more than 400 strategic defense experiments, exercises, and architectural simulations during 1988.

Martin Marietta Data Systems provides information systems integration services, remote data processing and facilities management services, custom software solutions, and installation, operation, and maintenance of data centers for industry and government. Data Systems also provides data processing services to other segments of the Corporation, primarily in the aerospace business areas. Data Systems operates six data centers domestically, which provide computing services to commercial customers as well as to the Corporation.

Data Systems is the systems integrator for the US Navy's worldwide automated payroll and personnel system. As part of the 10-year contract, the Corporation is providing hardware, software, communications networks, training, and maintenance to link 400 sites in the 50 states and 18 foreign countries. Sixty processing sites have been installed, including those at major sites in Hawaii, San Diego, Orlando, and the Great Lakes Naval Training Station.

Other Activities

Energy Systems

Martin Marietta Energy Systems, Inc., a wholly owned subsidiary of the Corporation, manages the

Department of Energy facilities at Oak Ridge, Tennessee; Paducah, Kentucky; and Portsmouth, Ohio. These facilities are as follows: Oak Ridge National Laboratory, one of the nation's largest multipurpose research centers whose major mission is the development of safe, economic, and environmentally acceptable technologies for the efficient production and use of energy; Oak Ridge Gaseous Diffusion Plant, currently maintained in a safe-storage mode, and Paducah and Portsmouth Gaseous Diffusion Plants, which produce uranium enriched in the U-235 isotope for use as a fuel in nuclear power plants, both in this country and abroad; and the Oak Ridge Y-12 Plant, a highly sophisticated manufacturing and developmental engineering organization engaged primarily in programs vital to national defense.

Metal Fabrication

International Light Metals Corporation, a joint venture 60 percent owned by the Corporation and 49 percent by NKK Corporation of Japan, is engaged in the production and worldwide marketing of fabricated metal products, primarily aluminum and titanium.

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 US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$4,410.0	\$4,762.9	\$5,172.9	\$5,727.5	\$5,796.2
Percent Change	-	8.00	8.61	10.72	1.20
Capital Expenditure	-	-	-	-	-
Percent of Revenue	-	-	-	-	-
R&D Expenditure	\$176.2	\$218.9	\$220.1	\$194.9	\$191.6
Percent of Revenue	4.00	4.60	4.25	3.40	3.31
Number of Employees	67,000	68,500	70,000	67,500	65,500
Revenue (\$K)/Employee	\$65.82	\$69.53	\$73.90	\$84.85	\$88.49
Net Earnings	\$249.4	\$202.3	\$230.7	\$358.9	\$306.9
Percent Change	-	(18.89)	14.04	55.57	(14.49)

1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	\$1,316.35	\$1,433.45	\$1,423.11	\$1,623.30
Quarterly Profit	\$59.21	\$86.92	\$87.29	\$73.52

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

Table 2
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	85.00	85.00
Indirect Sales	15.00	15.00
VARs	-	-
Distributors	-	-
Dealers	-	-
Mass Merchandisers	-	-
Manufacturers' Representatives	-	-

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

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

North America

Denver, Colorado; Vandenberg Air Force Base, California; Cocoa Beach, Florida

Activities of the Astronautics Group include the following: production of Titan IV space launch vehicles; converting deactivated Titan IIs to space boosters for smaller payloads; production of the Titan 34D; production of commercial Titan space launch vehicles; production of the Transfer Orbit Stage (TOS), an upper stage vehicle to boost spacecraft into higher orbits; assembly, test, and system support for the Peacekeeper; assembly, test, and system support for the Small ICBM; studies for the Strategic Defense Initiative (SDI), including a launch platform and interceptor for a nuclear-driven X-ray laser and hypervelocity pellet systems; National Test Bed for Advanced Computer Architectures; design for the Advanced Launch System for the army; definition of Space Station Flight Telerobotic Services (FTS); Zenith Star space-based laser project

Ocala, Orlando, Florida; Baltimore, Glen Burnie, Maryland; Milan, Tennessee

Activities of the Electronics and Missiles Group include the following: Target Acquisition and Designation Systems/Pilot Night Vision Systems (TADS/PNVS) for the AH-64 Apache helicopter; production of the laser-guided Hellfire missile used on the AH-64; production of Low Altitude Navigation and Infrared System for Night (LANTIRN) pods and support systems; a laser fire-control system, LST/SCAM, for carrier-based F-18 aircraft; production of Copperhead, the laser-guided 155mm artillery shell; subcontract for components of the Patriot missile; an air-launched supersonic drone, SLAT, for navy missile defense training; production of the Mk 41 Vertical Launching System for the navy; development of an experimental robot to handle ammunition for the army; thrust reversers for General Electric engines; Deadeye 5-inch laser-guided projectile for the navy; development of an electro-optic sensor system for the ATF; a second source for the navy's infrared search and track system (IRSTS), with

General Electric; operation of the Milan, Tennessee, ammunition plant; wide-aperture array acoustic listening device for the navy's Seawolf submarine; advanced sensor system for the F-14; development of remote-controlled anti-armor robot vehicle for the army; development work on submarine torpedo defense system; prototype of anti-armor system, under subcontract to Sandia, for the army; air defense anti-tank system (ADATS) for the US Army, in conjunction with Oerlikon Aerospace, a Canadian unit of the Swiss company; passive thermal forward-looking infrared airborne system for navigation, detection, and enhanced resolution; development of design requirements for an unmanned surveillance and target-identification vehicle for the navy; the design and building of a prototype composite hull for amphibious vehicles; development and demonstration of "smart weapons" technology; communications nodal control elements systems; and operation of the Y-12 Plant in Oak Ridge, Tennessee, which produces nuclear weapons components and for the US government

Colorado Springs, Englewood, Falcon Air Force Base, Littleton, Colorado; Washington, D.C.; Orlando, Florida; Lanham, Maryland; Albuquerque, New Mexico; Chantilly, Virginia
Activities of the Information Systems Group include the following: design, development, production, and integration of advanced information systems

SUBSIDIARIES

Chesapeake Park Inc. (United States)
Martin Marietta Commercial Titan Inc. (United States)
Martin Marietta Energy Systems Inc. (United States)
Martin Marietta Ordnance Systems (United States)
Orlando Central Park Inc. (United States)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Reynolds Metals

Martin Marietta and Reynolds Metals entered into a licensing agreement. Under the agreement, only

Reynolds Metals will manufacture and sell Martin Marietta's proprietary family of weldable aluminum-lithium sheet and plate products.

GAMA Endursi A.S.

Martin Marietta Overseas Corporation and GAMA Endursi A.S. agreed to establish a joint venture company in Turkey. The new Martin Marietta-GAMA electronics, information technology, and trading company will be 60 percent owned by Martin Marietta. The company will provide a variety of technology-based services, initially in the information management field.

1988

AVX

Martin Marietta and AVX entered into a licensing agreement. Under the agreement, AVX will produce Martin Marietta's new electrostrictive ceramics, which accurately expand and contract when electric current is administered.

Rafael

Martin Marietta and Rafael (Israel) entered into a licensing agreement. Under the agreement, Martin Marietta will produce the Popeye standoff missile for the US Air Force. Popeye is a TV-guided missile with a large warhead. Martin Marietta also will market the missile and provide support services.

MERGERS AND ACQUISITIONS

1988

Gould's Ocean Systems Division

Martin Marietta acquired Gould's Ocean Systems Division for \$117 million. The Ocean Systems Division produces undersea listening devices for the navy.

1987

Orbital Sciences

Martin Marietta acquired 20 percent of Orbital Sciences for \$6 million.

KEY OFFICERS

Norman R. Augustine

Chairman of the board and chief executive officer

Caleb B. Hurtt

President and chief operating officer

David C. Dressler

Senior vice president

Dan A. Peterson

Senior vice president

Robert J. Polutchko

Senior vice president

Peter B. Teets

Senior vice president

A. Thomas Young

Senior vice president

Marcus C. Bennett

Vice president and chief financial officer

PRINCIPAL INVESTORS

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	\$969.0	\$1,005.2	\$1,130.7	\$1,291.3	\$1,440.5
Cash	138.2	194.9	153.5	76.6	67.6
Receivables	459.8	421.6	555.6	735.7	779.7
Marketable Securities	-	-	-	-	-
Inventory	317.7	363.9	369.4	443.3	539.7
Other Current Assets	53.3	24.8	52.2	35.7	53.5
Net Property, Plants	\$949.3	\$1,059.0	\$1,185.5	\$1,297.5	\$1,300.9
Other Assets	\$494.0	\$400.0	\$497.3	\$730.2	\$763.8
Total Assets	\$2,412.3	\$2,464.2	\$2,813.5	\$3,319.0	\$3,505.2
Total Current Liabilities	\$771.0	\$829.6	\$815.9	\$908.6	\$926.3
Long-Term Debt	\$220.4	\$227.7	\$294.6	\$483.8	\$477.5
Other Liabilities	\$558.7	\$570.0	\$541.0	\$473.0	\$746.6
Total Liabilities	\$1,550.1	\$1,627.3	\$1,651.5	\$1,865.4	\$2,150.4
Total Shareholders' Equity	\$885.6	\$843.3	\$907.7	\$1,200.6	\$1,354.8
Converted Preferred Stock	-	-	-	-	-
Common Stock	109.4	109.4	109.4	52.8	50.8
Other Equity	687.4	690.8	697.0	343.9	257.8
Retained Earnings	88.8	43.1	101.3	803.9	1,046.2
Total Liabilities and Shareholders' Equity	\$2,435.7	\$2,470.6	\$2,559.2	\$3,066.0	\$3,505.2
Income Statement	1985	1986	1987	1988	1989
Revenue	\$4,410.0	\$4,762.9	\$5,172.9	\$5,727.5	\$5,796.2
US Revenue	-	-	-	-	-
Non-US Revenue	-	-	-	-	-
Cost of Sales*	\$41,196.4	\$4,430.4	\$4,766.5	\$5,330.8	\$5,331.5
R&D Expense	\$176.2	\$218.9	\$220.1	\$194.9	\$191.6
SG&A Expense	\$380.9	\$408.4	\$420.5	\$425.4	\$447.8
Capital Expense	-	-	-	-	-
Pretax Earnings	\$418.3	\$327.4	\$380.0	\$475.2	\$429.3
Pretax Margin (%)	9.49	6.87	7.35	8.30	7.41
Effective Tax Rate (%)	40.40	38.20	39.30	32.70	28.50
Net Earnings	\$249.4	\$202.3	\$230.7	\$358.9	\$306.9
Shares Outstanding, Millions	56.6	55.1	52.9	52.8	50.8
Per Share Data					
Earnings	\$4.36	\$3.67	\$4.25	\$6.75	\$5.82
Dividend	\$0.97	\$1.00	\$1.05	\$1.10	\$1.22
Book Value	\$15.65	\$15.30	\$17.16	\$22.74	\$26.67

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

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.26	1.21	1.39	1.42	1.56
Quick (Times)	0.84	0.77	0.93	0.93	0.97
Fixed Assets/Equity (%)	107.19	125.58	130.60	108.07	96.02
Current Liabilities/Equity (%)	87.06	98.38	89.89	75.68	68.37
Total Liabilities/Equity (%)	175.03	192.97	181.94	155.37	158.73
<i>Profitability (%)</i>					
Return on Assets	-	8.30	8.74	11.70	8.99
Return on Equity	-	23.40	26.35	34.05	24.02
Profit Margin	5.66	4.25	4.46	6.27	5.29
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	4.00	4.60	4.25	3.40	3.31
Capital Spending % of Revenue	-	-	-	-	-
Employees	67,000	68,500	70,000	67,500	65,500
Revenue (\$K)/Employee	\$65.82	\$69.53	\$73.90	\$84.85	\$88.49
Capital Spending % of Assets	-	-	-	-	-

* Cost of Sales includes expense amounts.

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

Matra-Harris Semiconducteurs

BACKGROUND AND OVERVIEW

Matra-Harris Semiconducteurs (MHS) was formed in 1979 as a joint venture company between Matra of France and Harris Corporation of the United States. The venture was supported by the then French government, which was keen to develop high technology in France. The Company built a 12,000-square-meter factory near Nantes, France, an area designated for industrial development. This allowed MHS to gain government financial assistance for the scheme.

Prior to this formal link, Matra and Harris had made agreements for CMOS technology transfer. Initial wafer production at the Nantes plant began in December 1980; in the same month, the technology agreement was extended to include bipolar products.

In March 1981, MHS signed an agreement with Intel Corporation covering the manufacture of NMOS circuits in Nantes and the establishment of a joint design facility called Cimatel. The MHS/Intel/Harris links can be summarized as follows: MHS is the second source for a number of Intel's MPU/MCU NMOS devices such as 8086, 8088, 8051, and 8052. The agreement also extends to cover CMOS devices. In this case, MHS redesigns Intel's NMOS devices in CMOS and returns the resulting CMOS designs. In addition, Harris and MHS have the right to exchange the CMOS versions of Intel's MPU/MCU family with each other. The design facility, Cimatel, designs standard products common both to MHS and to Intel (e.g., the 82716 video controller).

MHS has become increasingly involved in joint ventures; in 1985, MHS and SGS Microelettronica collaborated to research and develop submicron technologies and to develop a fully automated assembly line for integrated circuits. In a deal with Cypress, MHS received licensing rights to manufacture Cypress CMOS RAMs and sales and marketing rights for Cypress RAMs in Europe. MHS and Intel have continued their past cooperation to jointly develop a graphics chip. In 1986, MHS and Plessey agreed to some second-sourcing arrangements and to develop a cell library. Also, MHS and Silicon Compilers have announced an agreement under which they will develop quick response ASIC IC fabrication capabilities.

In 1986, Harris and MHS announced that they would separate their European sales force and distributor network to permit both companies to have direct and independent access to European customers.

As shown in Table 1, Dataquest estimates that Matra-Harris' 1986 European revenue was \$40 million, an 11 percent increase from 1985 revenue. However, as shown in Table 2, Dataquest estimates that MHS's 1986 worldwide revenue was \$47 million, an increase of almost 12 percent from 1985.

Matra-Harris Semiconducteurs

Table 1

Matra-Harris Semiconducteurs
ESTIMATED EUROPEAN SEMICONDUCTOR REVENUE BY PRODUCT LINE
(Millions of U.S. Dollars)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Total Semiconductor	\$12	\$12	\$37	\$36	\$40
Total Integrated Circuit	\$12	\$12	\$37	\$36	\$40
Bipolar Digital	0	0	4	4	1
MOS	12	12	29	30	37
Linear	0	0	4	2	2
Total Discrete	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Transistor	0	0	0	0	0
Diode	0	0	0	0	0
Thyristor	0	0	0	0	0
Other	0	0	0	0	0
Total Optoelectronic	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0

Source: Dataquest
February 1987
Ref. 0187-05

Matra-Harris Semiconducteurs

Table 2

Matra-Harris Semiconducteurs
ESTIMATED WORLDWIDE SEMICONDUCTOR REVENUE BY PRODUCT LINE
(Millions of U.S. Dollars)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Total Semiconductor	\$15	\$13	\$41	\$42	\$47
Total Integrated Circuit	\$15	\$13	\$41	\$42	\$47
Bipolar Digital	0	0	4	4	1
MOS	15	13	33	36	44
Linear	0	0	4	2	2
Total Discrete	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Transistor	0	0	0	0	0
Diode	0	0	0	0	0
Thyristor	0	0	0	0	0
Other	0	0	0	0	0
Total Optoelectronic	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0

Source: Dataquest
February 1987
Ref. 0187-05

PRODUCTS AND MARKETS SERVED

MHS is an established Intel second source with volume production of NMOS devices such as 8086 and 8088 microprocessors, as well as 8051 and 8052 microcontrollers. Production of the 8048 was discontinued in 1985.

The CMOS line's main product categories are as follows:

- Fast static RAMs, such as the HM55681 4Kx4 55ns and HM-6514 JAN 4Kx1
- Gate arrays of from 250 to 5,000 gates, with proprietary software development tools running on VAX and a cell library usable on turnkey systems such as Daisy, Mentor, and Valid (MHS has invested heavily to support the CMOS ASIC marketplace.)

Matra-Harris Semiconducteurs

- Microprocessors 80C86, 80C88, and a number of CMOS peripherals
- Dedicated telecom products (MHS is actively pursuing the telecom market, particularly in the PABX area at the subscriber board level.)
 - The present range includes the Combo HM5557 compatible with NSC and Eurotechnique combos.
 - MHS is actively engaged in the development of new circuits for ISDN applications.

New products include the HM-6415 JAN-qualified 4K CMOS RAM and the video storage and display device 82716.

In 1982, MHS and Harris merged their European marketing operations outside of France (Harris-MHS). This operation was financed equally by the two partners. Although the merger was discontinued in 1986, MHS continues to have exclusive sales rights in France for the Harris range of semiconductors. Harris represents MHS exclusively for sales in North America.

Matra-Harris remains the only independent French semiconductor operation not absorbed into the Thomson group.

OUTLOOK

The MHS strategy of providing performance products for specific markets, coupled with its activity in gate arrays, has established a sound platform from which to move forward. Dataquest believes that the key to success for MHS in the future will lie as much in opening up new markets for advanced products as in the development of the products themselves. We further believe that positive marketing and market support in the drive to widen the MHS customer base and improve the company image will be critical.

Matra GCA

OVERVIEW

The origins of Matra GCA SA can be traced back some fifteen years to 1970 when the Geophysical Corporation of America, now known as GCA Corporation, set up a presence in Europe through GCA AG in Switzerland.

In 1983, GCA set up joint venture companies in Western Europe with the French company Matra to form Matra GCA SA, and in the Far East with the Japanese company Sumitomo to form Sumitomo GCA Corporation. Both of these companies, in which the participants have equal shareholdings, were created to exploit the growing microlithographic market. Concurrent with these developments, the Company established other new companies in West Germany and the United Kingdom.

Further expansion of the Company's product base has taken place over the past two years with GCA Corporation's acquisition of Tropel, a world leader in the design and manufacture of lenses. This acquisition has enabled Matra GCA to extend its range of products to include flatness analyzers for wafers, photomasks, and reticles.

In May 1985, Matra GCA entered into an exclusive distribution agreement with Verateq Inc. of Anaheim, California, in the United States. This agreement covers the marketing of rinsers, driers, and cleaning units in the United Kingdom and Scandinavia.

As a result of these strategies, Matra GCA is well placed to offer the European semiconductor manufacturer a complete range of equipment embracing the major wafer and reticle fabrication sequences of photolithography, etching, wet processing, and flatness analysis.

OPERATIONS

The corporate headquarters of Matra GCA SA is at Malville, near Nantes in the northwestern part of France. In addition to housing corporate finance and marketing groups, it also houses the manufacturing facility for Europe. The headquarters facility covers some 7,000 square meters and employs 130 persons, of whom 40 are engaged in research and development. In addition to manufacturing and R&D at Malville, there is also an applications and demonstration laboratory and a section undertaking advanced research.

Matra GCA

Elsewhere in Europe, the Company has the following sales and servicing companies:

- France
 - Matra GCA SA
 - Ferney-Voltaire
- Switzerland
 - Matra GCA AG
 - Kreuzlingen
- United Kingdom
 - Matra GCA (U.K.) Ltd.
 - Southampton--Sales
 - Livingston (Scotland)--Service
- West Germany
 - Matra GCA GmbH
 - Donauwörth--Training center and spare parts warehouse

Each company has its own manager, service personnel, and stock of spare parts. Some 90 highly trained specialists are employed throughout Western Europe in servicing the Company's accounts. Here they are involved in installing the Company's systems and working with customers on problems concerning product/process relationships.

The Company believes that a thorough knowledge of the customer's equipment is vital to both supplier and user. To further this, regular maintenance and training programs are held for operators at the Company's well-equipped training center at Donauwörth in West Germany.

FINANCIAL

The ultimate parent company, GCA Corporation, reported a revenue loss in 1985. As a result, it underwent management changes and rationalization of the business. The Company reported a return to profitability in the first quarter of 1986 after three quarters of losses; subsequently, however, it has not recovered its pre-1985 stability.

Matra GCA

The joint venture company operating in Europe, Matra GCA, has not been affected by these problems in any way; fiscal years 1984 and 1985 have both been profitable. Matra GCA continues to obtain active financial backing from Matra, and major investment continues to be made in Western Europe.

The Company has seen very considerable growth over the past two to three years. This is illustrated by Matra GCA (U.K.) Ltd., where turnover in 1983 was just under US\$1 million. Currently, it is many times that figure, thus accounting for 20 to 25 percent of the West European business. The Company is confident of continuing growth for its products in Europe and is backing this view by adding to its already considerable investment.

RESEARCH AND DEVELOPMENT

Matra GCA derives considerable benefit from the R&D being carried out by GCA Corporation in the United States. Much R&D effort has been expended in the area of mask making because of the challenge posed by ASICs. This has resulted in the Company being first in the world with its new 4600 L Laser Pattern Generator and with an installation in the United Kingdom. In addition, the Company has developed its 6696 photorepeater for masks of 0.4-micron line widths.

R&D in Europe, which is centered at Malville, concentrates on engineering specific features for the custom market.

PRODUCTS

The Company markets a range of equipment for reticle and wafer photolithography, etching, flatness analysis, and wet processing.

Wafer-Stepper Systems

The Model 6700 DSW wafer-stepper system features digitized video alignment technology providing a high-precision backside wafer handler that is field upgradable.

The Model 8000 DSW is the very latest wafer stepper system and provides line resolutions of 1-micron or better, achieved through a family of new g-line or i-line submicron lenses. It is the Company's most advanced reduction stepper for use in volume production of leading-edge IC devices, including high-intensity MOS memory and GaAs circuits.

Matra GCA

Alignment accuracy of ± 0.2 micron at high throughput rates is obtainable with a new digitized global alignment system that also maximizes overlay.

High wafer throughput is obtained by a very high-intensity illuminator, which offers improvements in exposure energy at the wafer plane. High-efficiency particulate filtration, consistent with submicron imaging, plus easy machine access and visibility are provided by a new Class 10 environmental chamber.

Reduced particulate generation results from a new, backside wafer handler and low-contact design wafer transport mechanism. These features also provide consistent, high-precision wafer prealignment for maintaining high throughput.

The Model 8000 DSW has the following specifications:

- Resolution--down to 0.7 micron
- Field Size (diameter)--20mm
- Registration (single machine, 95 percent)-- ± 0.20 micron
- Overlay (matched machines, 95 percent)-- ± 0.30 micron or better
- Throughput:
 - 100mm wafer--59 wafers per hour
 - 125mm wafer--46 wafers per hour
 - 150mm wafer--37 wafers per hour

A recent addition to enhance the Model 6700 DSW performance is the Smart Set workstation, which is available as an optional extra, being a standard part of the Model 8000 DSW. Smart Set software analyzes pattern placement within an exposure field (intrafield) and pattern placement from field to field (interfield) and then rapidly calculates the required adjustments to achieve optimum image placement.

Mask Systems

The 4600 L Laser Pattern Generator has an XeCl excimer laser light source and produces more than 100,000 flashes per hour on chrome. It is capable of exposing features ranging from 2 to 1,500 microns with a resolution increment of 0.5 micron. The Model 4600 L provides a

Matra GCA

cost/performance advantage over E-beam systems; being a fraction of the price, it occupies about one-tenth of the space and gives superior image quality.

In addition to the laser light source, other system enhancements include a more powerful computer, which accepts input directly from CAD/CAM systems, and a new robotic handler for up to 8 x 8-inch plates, which can interface with other equipment.

The 6696 Photorepeater is a state-of-the-art system for reticle generation, giving excellent results with masks of 0.4-micron line widths using i-line.

Wafer-Processing Systems

The Wafertrac 1006 is the third generation in GCA's line of automated in-line wafer processors. Basically, the Wafertrac 1006 comprises an advanced system controller, universal hotplate module, and universal spinner module with an optional automatic process controller. Using a series of modifications, this system can be adapted to meet individual solutions for specific situations (e.g., to accommodate different wafer series).

A recent major development has been the new European vapor prime modules, which will guarantee uniformity of adhesion of the photoresist. In this type of system HMDS gas is dispensed onto a heated wafer in a vacuum-enclosed plasma reactor.

Wafer-Etch Systems

The Waferetch 606 and Waferetch 616 are the Company's wafer-etch system products. The 616 system is a new dry system for chlorine-related chemistries, providing a cost-effective way of etching aluminum. It alloys with uniform, repeatable results while controlling and tailoring a process to specific requirements. The 616 system complements the Waferetch 606 system and is also designed for etching using fluorine-based chemistries.

Both Waferetch models feature the triode etcher, which allows plasma etching, reactive ion etching, or any combination of the two. Power can be varied between electrodes in any desired proportion to adjust the anisotropy and selectivity of an etch. This feature provides the control necessary to allow an IC manufacturer to tailor a specific process. The Waferetch systems, which are designed for high productivity and flexibility, also feature an advanced end-point detection system for process monitoring and control.

Matra GCA

Flatness Analysis Systems

AutoSort Mark 11 and AutoSelect are both digital flatness analyzers for wafers, photomasks, and reticles, manufactured by the Tropel Division of GCA Corporation. The AutoSelect measures the flatness of all of these materials from 2 to 8 inches in diameter with a high degree of accuracy, repeatability, and throughput.

These analyzers are suitable for silicon, silicon on sapphire, and GaAs, as well as low-expansion glass and quartz for masks and reticles.

Wet Processing Equipment

In the United Kingdom and Scandinavia, Matra GCA is distributing the following Vertec products:

- Superclean 1600--This is a particle-free direct-drive rinser dryer for processing semiconductor wafers. This machine features static elimination, cleanoil heating, 0.05-micron point-of-use nitrogen filter with teflon wafer lines, and valving.
- Megasonic MCS 2600-3 Cleaning System--This is designed specifically for the cleaning of semiconductor wafers, substrates, and disks; it handles up to fifty 6-inch-diameter wafers at a time, removing statically charged airborne particles and organisms down to 0.2 micron without damage to the product surface.
- Laserscan inspection system

FUTURE PROSPECTS

With its diverse range of equipment, Matra GCA is well placed to meet the challenge of the submicron age. Finer geometries will mean increasing use of lasers, and the Company has a leading position in this field.

The Company sees increasing importance being attached to remote facility design, thus allowing maintenance and almost all servicing of equipment to be performed outside the clean room as offered by its Wafertrac systems.

Matra GCA

Matra GCA has an important presence in Western Europe and, with its strong links with GCA Corporation, will continue to bring to its customers in Europe the latest systems available to meet their technological needs, particularly in the ASIC sector.

Matra SA

4, rue de Presbourg
75116 Paris, France
Telephone: (33-1) 40.69.16.00
Fax: Not Available
Dun's Number: 38-003-1849

Date Founded: 1963

CORPORATE STRATEGIC DIRECTION

Matra SA designs, manufactures, and produces products for the defense, space, and electronic markets. Nineteen eighty-nine marked a major event for Matra; the Company was privatized by the French government. This resulted in the acquisition of holdings in Matra by MMB (the largest stockholder), three European manufacturing groups (Daimler-Benz, GEC, and Wallenberg), and three European financial institutions (BNP, Credit Lyonnais, and Gan). Matra managers believe the privatization will strengthen its position. Matra managers believe new joint projects will mean an end to duplicating R&D, and its semiconductor subsidiary, Matra Harris, will gain from new relationships with big systems makers.

Due to French accounting principals and policies, a financial analysis for the 1989 fiscal year is not available. However, Matra expected strong profit growth in 1989 and 1990. The French electronics group had forecast that 1989 net income would increase between 31 and 44 percent, totaling between FFr 100 million and FFr 110 million (US\$15 million to US\$17 million) for fiscal 1989. The Company expects net income for 1990 to increase between 18 and 20 percent, or FFr 120 million to FFr 120 million (US\$18.0 million to US\$19.5 million).

Currently, Matra Group is organized around three major groups—Aerospace, Telecommunications and Information Technology, and Automobile and Transit Systems—representing respectively 40 percent, 29 percent, and 31 percent of its total consolidated revenue.

As a result of evaluating which operations would be suitable for Matra's long-term growth, the Matra Datasysteme of the Telecommunications and Information Technology group and other operations were

closed. Additionally, Matra sold a 50 percent stake in its semiconductor subsidiary, Matra Harris Semiconducteur (MHS), to Telefunken Electronic.

Matra reported consolidated revenue for fiscal 1988 of US\$3.2 billion, an increase of 12.3 percent over fiscal 1987. Net income rose 47.5 percent to US\$56.4 million in fiscal 1988, up from US\$38.2 million in fiscal 1987.

R&D expenditure totaled US\$232.6 million in fiscal 1988, or 7.2 percent of revenue. Capital expenditure totaled US\$223.6 million in fiscal 1988, or 7.0 percent of total revenue.

The French sales contribution to Matra's total revenue grew to US\$1.7 billion in 1988, which represents 54.0 percent of the total.

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. Table 3, a comprehensive financial statement, is at the end of this backgrounder. Information on revenue by distribution channel is not available.

BUSINESS SEGMENT STRATEGIC DIRECTION

Aerospace

The Aerospace group comprises parent company operations including Matra Defense and Matra Espace, the subsidiaries Matra Electronique, Matra Manurhin Defense, and since January 1, 1989, MS21.

This group concentrates on four areas: guided weapons, nonguidance weapons, control systems, and space systems.

Matra Defense designs, develops, and manufactures weapons systems including air-to-air, ground-to-air, air-to-ground, and antiship systems. Matra weaponry is supplied to all branches of armed forces to meet air defense, air support, ground attack, and antitank requirements.

Matra Manurhin Defense's expertise is in pyrotechnics. It designs, develops, and manufactures ammunition and unguided antiarmor weapons.

Matra Electronique designs and manufactures hybrid circuits and professional electronics.

Matra Espace, a major player in the French and European space markets, operates in four main areas: telecommunications, earth observation satellites, scientific programs, and space transport and manned space flight.

MS21, a joint subsidiary of Matra and SEP, was formed when Matra's T21 and SEPIMAGE's SEP divisions were incorporated. MS21 develops stations that receive and process images from nonmilitary satellites, ground-based operating air reconnaissance systems, tactical mission planning systems, and high-resolution analytic stereo plotters.

Telecommunications and Information Technology

The Telecommunications and Information Technology group comprises companies that focus on telecommunications, robotics and CAD/CAM, and microelectronics. In this group, most of the revenue comes from telecommunications operations. The companies that make up this group are Matra Communication, Matra Datavision, Sormel, and Matra MHS.

Telecommunications

Matra Communication focuses on four areas: telephone sets, print and visual communication, radiotelephone systems, and corporate communications. Additionally, Matra Communication offers high-performance fax machines. The telephone division offers cordless telephones, multifunction telephones,

and telephones for Integrated Services Digital Network (ISDN). Matra Communication is the French leader in radiotelephone systems. In corporate communications, Matra Communication offers a wide range of PABXs, the AXE digital telephone exchange, and a switching network, MATRACOM 6500.

CAD/CAM

Matra Datavision is a leading supplier of solids-based computer-aided design/manufacturing/engineering (CAD/CAM/CAE) systems. Its flagship product, EUCLID-IS, is an integrated set of advanced software programs that help engineers conceive, design, analyze, document, and manufacture complex mechanical and electromechanical products. This division also offers training, implementation, and consulting.

Sormel designs and manufactures automatic, semiautomatic, or manual assembling equipment for small or medium-size production.

Semiconductors

Matra's microelectronics operations are handled by Matra MHS, which designs, develops, and manufactures high-performance CMOS integrated circuits. Matra MHS was formed in 1979 as a joint-venture company between Matra and Harris Corporation. By September 1989, Harris had withdrawn from the joint venture and Telefunken Electronic had purchased a 50 percent stake in the company from Matra. The alliance with Telefunken Electronic is expected to give Matra MHS new outlets for its integrated circuits in the car industry, in addition to its existing markets in defense, space, and telecommunications. The Company will continue to specialize in CMOS and BiCMOS technologies. Although Matra MHS had an operating loss of US\$13.8 million in 1988, the Company was expected to break even in 1989.

Matra MHS' strategy is to develop its position as a specialist in CMOS system integration, a toolbox methodology that uses all basic functions (i.e., microcontrollers, memories, digital signal processing (DSP), etc.) with the best-suited design tools and the Super-CMOS process to offer semiconductor solutions for specific applications.

Dataquest estimates that Matra MHS held the number 57 market share position in the 1988 worldwide semiconductor market based on revenue of US\$71.0 million.

Automobile and Transit Systems

The Automobile and Transit Systems group comprises the following companies: Matra Automobile, Matra Transport, and a minority interest in Ufima.

Matra Automobile designs, manufactures, and markets the Renault Espace, an automobile with single-body construction, in cooperation with Renault. Matra Transport focuses on three areas: automated urban

transit systems, automated subsystems, and remote supervision systems. Ufima is a joint agreement between Matra and Fiat. Its operations consist of fuel-feed systems and dashboard instruments.

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)

	1987	1988		
Two-Year Revenue	\$2,860.1	\$3,211.0		
Percent Change	-	12.27		
Capital Expense	\$170.2	\$223.6		
Percent of Revenue	6.00	7.00		
R&D Expense	\$206.3	\$232.6		
Percent of Revenue	7.20	7.20		
Number of Employees	19,032	19,479		
Revenue (\$K)/Employee	\$150.28	\$164.84		
Net Income	\$38.2	\$56.4		
Percent Change	-	47.49		
1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	NA	NA	NA	NA
Quarterly Profit	NA	NA	NA	NA

*Financials for 1984 through 1986 were not available at time of publication.
 NA = Not available

Source: Matra SA
 Annual Reports
 Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1987	1988
France	55.00	54.00
International	45.00	46.00

Source: Matra SA
 Annual Reports

1988 SALES OFFICE LOCATIONS

North America—8
Japan—1
Europe—10

MANUFACTURING LOCATIONS

Europe

Defense Division—Velizy, Guyancourt, Cazaux, Le Chesnay, Val de Reuil, Salbris, Selles-St-Denis, and Signes, France
Air-to-air, air-to-ground, ground-to-air, sea-to-sea missiles

Defense Division—Compiègne, France
Electronic systems and components

Defense Division—Velizy, Cusset, Mulhouse, and St-Martin-de-Crau, France
Medium-caliber antitank ammunition, military engineering, light weapons

Space Division—Velizy and Toulouse, France
Satellites, launching systems, aerospace computer systems

Space Division—St-Quentin-en-Yvelines and Val de Reuil, France
Data control and image processing systems

Telecommunications Division—Quimper, Bois d'Arch, Pont de Buis, Chateaudun, Boulogne, Rennes, Massy, and Douarnenex, France
Telephone sets, videotex terminals, multiservice networks, mobile radiotelephone sets, digital communication systems, PABXs

CAD/CAM/CAE Division—Villebon-sur-Yvette and Besançon, France
EUCLID-IS, CAD/CAM/CAE software, industrial robots

Microelectronics Division—Saint-Quentin-en-Yvelines and Nantes, France
CMOS, NMOS ICs; ASICs

Automobile Division—Romorantin, Le Theillay, and Les Clayes/bois, France
Espace cars

Transit Division—Montrouge and Lille, France
VAL urban transit systems, automatic rail systems, remote supervision

Automotive Electronics Division, France and Italy
Fuel systems, dashboard instruments

SUBSIDIARIES

North America

Matra Datavision US (United States)
Matra Transit Inc. (United States)

Europe

Cofimatel (France)
Compagnie Versaillaise de Transports (France)
DFG (Germany)
EGT (Belgium)
Francephone (France)
LCT des Telecommunications (France)
M2S (France)
Manurhin SA (France)
Matcom (France)
Matec (France)
Matra Automobile (France)
Matra Communication (France)
Matra Communication GmbH (Germany)
Matra Datavision (France)
Matra Datavision Belgique (Belgium)
Matra Datavision Germany (Germany)
Matra Datavision Italy (Italy)
Matra Datavision UK (United Kingdom)
Matra Electronique (France)
Matra Harris Semiconducteurs (France)
Matra Manurhin Defense (France)
Matra Nokia Radiomobiles (France)
Matra Participations (France)
Matra Systeme (France)
Matra Telecommunications Ile-de-France (France)
Matra Telecommunications Mediterranee (France)
Matra Telecommunications Nord-Est (France)
Matra Telecommunications Ouest-Normandie (France)
Matra Telecommunications Paris-Loire (France)
Matra Telecommunications Rhone-Alpes (France)
Matra Telecommunications Sud-Ouest (France)
Matra Transfinex (France)
Matra Transport (France)
Matrel (France)
Met (France)
SCI Matra Toulouse (France)
SFMRA (France)
SNC Sofrimat 4 (France)
SNC Sofrimo et Cie (France)
Sofimatrans (France)
Sofrimo (France)

Sogemat Participations (France)
Sormel (France)
Telephonie du Sud-Ouest (France)

AsialPacific

Matra Datavision Japan (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Telefunken Electronic

Matra sold a 50 percent stake in MHS to
Telefunken Electronic.

1988

Digital Equipment Corporation (DEC)

The companies made a marketing and technological
alliance under which DEC supplies Matra with
workstations.

MERGERS AND ACQUISITIONS

1989

Fairchild Industries

Matra purchased three divisions of Fairchild
Industries from Banner Industries for
US\$425 million.

KEY OFFICERS

Jean-Luc Lagardere
Chairman of the board

Rene Thomas
Member of the board

Phillippe Camus
Member of the board

Jean Yves Haberer
Member of the board

Pierre Leroy
Secretary

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

Table 3
Comprehensive Financial Statement*
Fiscal Year Ending December 31
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1987	1988
Long-Term Assets	\$806.4	\$975.4
Intangible Assets	68.6	82.6
Tangible Assets	537.4	586.3
Goodwill	106.7	92.2
Financial Assets	93.8	214.2
Current Assets	\$2,557.1	\$3,282.2
Inventory	687.5	707.9
Accounts Receivable	1,140.4	1,500.6
Deferred Taxes	8.3	17.2
Marketable Securities	604.6	906.7
Cash	116.4	149.9
Deferred Expenses	\$19.3	\$40.7
Total Assets	\$3,382.8	\$4,298.2
Total Stockholders' Equity	\$240.4	\$382.2
Capital Stock	27.6	192.6
Other Equity	151.0	84.9
Retained Earnings	23.5	48.3
Consolidated Net Income	38.2	56.4
Minority Interests	\$55.9	\$328.0
Total Stockholders' Equity and Minority Interest	\$296.2	\$710.1
Liabilities	\$1,992.8	\$2,269.1
Operating Payables	\$996.8	\$1,203.9
Miscellaneous Payables	\$84.5	\$85.3
Deferred Income	\$12.6	\$29.7
Total Liabilities	\$3,086.6	\$3,588.1
Total Liabilities and Stockholders' Equity	\$3,382.8	\$4,298.2
Income Statement	1987	1988
Revenue	\$2,860.1	\$3,211.0
France	1,569.1	1,718.9
International	1,291.0	1,492.0
Cost of Sales	\$1,701.7	\$1,973.7
SG&A Expense	\$831.8	\$898.3
R&D Expense	\$206.3	\$232.6
Capital Expense	\$170.2	\$223.6
Operating Profit	\$158.5	\$179.9
Pretax Income	\$61.0	\$89.3
Pretax Margin (%)	2.13	2.78
Effective Tax Rate (%)	NA	NA
Net Income	\$38.2	\$56.4
Shares Outstanding, Millions	NA	3.3

Table 3 (Continued)
Comprehensive Financial Statement*
Fiscal Year Ending December 31
(Millions of US Dollars, except Per Share Data)

Income Statement	1987	1988
<i>Per Share Data</i>		
Earnings	NA	NA
Dividend	\$1.37	\$14.78
Book Value	NA	NA
Exchange Rate (US\$1/FFr)	FFr 6.01	FFr 6.02

*Financials for 1984 through 1986 were not available at time of publication.
 NA = Not available

Source: Matra SA
 Annual Reports
 Dataquest (1990)

Matra SA

4, rue de Presbourg
75116 Paris, France
Telephone: (33-1) 40.69.16.00
Dun's Number: 38-003-1849

Date Founded: 1963

CORPORATE STRATEGIC DIRECTION

Matra SA designs, manufactures, and produces products for the defense, space, and electronic markets. Nineteen eighty-nine marked a major event for Matra; the Company was privatized by the French government. This resulted in the acquisition of holdings in Matra by MMB (the largest stockholder), three European manufacturing groups (Daimler-Benz, GEC, and Wallenberg), and three European financial institutions (BNP, Credit Lyonnais, and Gan). Matra managers believe the privatization will strengthen its position. Matra managers believe new joint projects will mean an end to duplicating R&D, and its semiconductor subsidiary, Matra Harris, will gain from new relationships with big systems makers.

Currently, Matra Group is organized around three major groups—Aerospace, Telecommunications and Information Technology, and Automobile and Transit Systems—representing respectively 40 percent, 29 percent, and 31 percent of its total consolidated revenue.

As a result of evaluating which operations would be suitable for Matra's long-term growth, the Matra Datasysteme of the Telecommunications and Information Technology group and other operations were closed. Additionally, Matra sold a 50 percent stake in its semiconductor subsidiary, Matra Harris Semiconducteur (MHS), to Telefunken Electronic.

Matra reported consolidated revenue for fiscal 1988 of \$3.2 billion,* an increase of 12.3 percent over fiscal 1987. Net income rose 47.5 percent to \$56.4 million in fiscal 1988, up from \$38.2 million in fiscal 1987.

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

Research and development expenditures totaled \$232.6 million in fiscal 1988, or 7.2 percent of revenue. Capital expenditures totaled \$223.6 million in fiscal 1988, or 7.0 percent of total revenue.

The French sales contribution to Matra's total revenue grew to \$1.7 billion in 1988, which represents 54.0 percent of the total.

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. Due to the Company's accounting methods, a financial ratio analysis is not available.

BUSINESS SEGMENT STRATEGIC DIRECTION

Aerospace

The Aerospace group comprises parent company operations including Matra Defense and Matra Espace, the subsidiaries Matra Electronique, Matra Manurhin Defense, and since January 1, 1989, MS21. This group concentrates on four areas: guided weapons, nonguidance weapons, control systems, and space systems.

Matra Defense designs, develops, and manufactures weapons systems including air-to-air, ground-to-air, air-to-ground, and antiship systems. Matra weaponry is supplied to all branches of armed forces to meet air defense, air support, ground attack, and antitank requirements.

Matra Manurhin Defense's expertise is in pyrotechnics. It designs, develops, and manufactures ammunition and unguided antiarmor weapons.

Matra Electronique designs and manufactures hybrid circuits and professional electronics.

Matra Espace, a major player in the French and European space markets, operates in four main areas: telecommunications, earth observation satellites, scientific programs, and space transport and manned space flight.

MS21, a joint subsidiary of Matra and SEP, was formed when Matra's T21 and SEPIMAGE's SEP divisions were incorporated. MS21 develops stations that receive and process images from nonmilitary satellites, ground-based operating air reconnaissance systems, tactical mission planning systems, and high-resolution analytic stereo plotters.

Telecommunications and Information Technology

The Telecommunications and Information Technology group comprises companies that focus on telecommunications, robotics and CAD/CAM, and microelectronics. In this group, most of the revenue comes from telecommunications operations. The companies that make up this group are Matra Communication, Matra Datavision, Sormel, and Matra MHS.

Telecommunications

Matra Communication focuses on four areas: telephone sets, print and visual communication, radiotelephone systems, and corporate communications. Additionally, Matra Communication offers high-performance fax machines. The telephone division offers cordless telephones, multifunction telephones, and telephones for ISDN. Matra Communication is the French leader in radiotelephone systems. In corporate communications, Matra Communication offers a wide range of PABXs, the AXE digital telephone exchange, and a switching network, MATRACOM 6500.

CAD/CAM

Matra Datavision is a leading supplier of solids-based CAD/CAM/CAE systems. Its flagship product, EUCLID-IS, is an integrated set of advanced software

programs that help engineers conceive, design, analyze, document, and manufacture complex mechanical and electromechanical products. This division also offers training, implementation, and consulting.

Sormel designs and manufactures automatic, semiautomatic, or manual assembling equipment for small or medium-size production.

Semiconductors

Matra's microelectronics operations are handled by Matra MHS, which designs, develops, and manufactures high-performance CMOS integrated circuits. Matra MHS was formed in 1979 as a joint-venture company between Matra and Harris Corporation. By September 1989, Harris had withdrawn from the joint venture and Telefunken Electronic had purchased a 50 percent stake in the company from Matra. The alliance with Telefunken Electronic is expected to give Matra MHS new outlets for its integrated circuits in the car industry, in addition to its existing markets in defense, space, and telecommunications. The Company will continue to specialize in CMOS and BiCMOS technologies. Although Matra MHS had an operating loss of \$13.8 million in 1988, the Company was expected to break even in 1989.

Matra MHS' strategy is to develop its position as a specialist in CMOS system integration, a toolbox methodology that uses all basic functions (i.e., microcontrollers, memories, digital signal processing (DSP), etc.) with the best-suited design tools and the Super-CMOS process to offer semiconductor solutions for specific applications.

Dataquest estimates that Matra MHS held the number 57 market share position in the 1988 worldwide semiconductor market based on revenue of \$71.0 million.

Automobile and Transit Systems

The Automobile and Transit Systems group comprises the following companies: Matra Automobile, Matra Transport, and a minority interest in Ufima.

Matra Automobile designs, manufactures, and markets the Renault Espace, an automobile with single-body construction, in cooperation with

Renault. Matra Transport focuses on three areas: automated urban transit systems, automated sub-systems, and remote supervision systems. Ufima is a joint agreement between Matra and Fiat. Its operations consist of fuel-feed systems and dashboard instruments.

Further Information

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

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

	1987	1988		
Five-Year Revenue	\$2,860.1	\$3,211.0		
Percent Change	\$2,860.1	12.27		
Capital Expense	\$170.2	\$223.6		
Percent of Revenue	6.00	7.00		
R&D Expense	\$206.3	\$232.6		
Percent of Revenue	7.20	7.20		
Number of Employees	19,032	19,479		
Revenue (\$K)/Employee	\$150.28	\$164.84		
Net Income	\$38.2	\$56.4		
Percent Change	-	47.49		
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

*Financials for 1984 through 1986 were not available at time of publication.
N/A = Not Available

Source: Matra SA
Annual Reports
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1987	1988
France	55.00	54.00
International	45.00	46.00

Source: Matra SA
Annual Reports

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988
Direct Sales	N/A
Indirect Sales	N/A

N/A = Not Available

Source: Matra SA
Annual Reports

1988 SALES OFFICE LOCATIONS

North America—8

Japan—1

Europe—10

MANUFACTURING LOCATIONS

Europe

Defense Division (France)—Velizy, Guyancourt, Cazaux, Le Chesnay, Val de Reuil, Salbris, Selles-St-Denis, and Signes

Air-to-air, air-to-ground, ground-to-air, sea-to-sea missiles

Defense Division (France)—Compiègne

Electronic systems and components

Defense Division (France)—Velizy, Cusset, Mulhouse, and St-Martin-de-Crau

Medium-caliber antitank ammunition, military engineering, light weapons

Space Division (France)—Velizy and Toulouse

Satellites, launching systems, aerospace computer systems

Space Division (France)—St-Quentin-en-Yvelines and Val de Reuil

Data control and image processing systems

Telecommunications Division (France)—Quimper, Bois d'Arch, Pont de Buis, Chateaudun, Boulogne, Rennes, Massy, and Douarnenex

Telephone sets, videotex terminals, multiservice networks, mobile radiotelephone sets, digital communication systems, PABXs

CAD/CAM/CAE Division (France)—Villebon-sur-Yvette and Besancon

EUCLID-IS, CAD/CAM/CAE software, industrial robots

Microelectronics Division (France)—Saint-Quentin-en-Yvelines and Nantes

CMOS, NMOS ICs; ASICs

Automobile Division (France)—Romorantin, Le Theillay, and Les Clayes/bois

Espace cars

Transit Division (France)—Montrouge and Lille

VAL urban transit systems, automatic rail systems, remote supervision

Automotive Electronics Division (France and Italy)

Fuel systems, dashboard instruments

SUBSIDIARIES

France

Cofimatel

Compagnie Versaillaise de Transports

Francephone

LCT des Telecommunications

M2S

Manurhin SA

Matcom

Matec

Matra Automobile

Matra Communication

Matra Datavision

Matra Electronique

Matra Harris Semiconducteurs

Matra Manurhin Defense

Matra Nokia Radiomobiles

Matra Participations

Matra Systeme

Matra Telecommunications Ile-de-France

Matra Telecommunications Mediterranee

Matra Telecommunications Nord-Est

Matra Telecommunications Ouest-Normandie

Matra Telecommunications Paris-Loire

Matra Telecommunications Rhone-Alpes

Matra Telecommunications Sud-Ouest

Matra Transfinex

Matra Transport

Matrel

Met

SCI Matra Toulouse

SFMRA

SNC Sofrimat 4

SNC Sofrimo et Cie

Sofimatrans

Sofrimo

Sogemat Participations

Sormel

Telephonie du Sud-Ouest

North America

Matra Datavision US

Matra Transit Inc. (Chicago)

Japan

Matra Datavision Japan

Europe

DFG (Germany)
EGT (Belgium)
Matra Communication GmbH (Germany)
Matra Datavision Belgique
Matra Datavision Germany
Matra Datavision Italy
Matra Datavision UK

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

1989

Telefunken Electronic

Matra sold a 50 percent stake in MHS to
Telefunken Electronic.

1988

Digital Equipment

The companies made a marketing and technological
alliance under which Digital supplies Matra
with workstations.

MERGERS AND ACQUISITIONS

1989

Fairchild Industries

Matra purchased three divisions of Fairchild Industries
from Banner Industries for \$425 million.

KEY OFFICERS

Jean-Luc Lagardere

Chairman, president, chief executive officer

Thierry Funck-Brentano

Senior vice president, Communication and Human
Resources

Emile Durand

Executive vice president

Philippe Chassagny

Corporate vice president, Communication

Yves de Galzain

Corporate vice president, International Finance,
and treasurer

Jean-Louis Gergorin

Senior vice president, Strategy and International
Development

Roland Sanguinetti

Vice president, Public Relations

Philippe Camus

Senior vice president, chief financial officer

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

Balance Sheet	1987	1988
Long-Term Assets	\$806.4	\$975.4
Intangible Assets	68.6	82.6
Tangible Assets	537.4	586.3
Goodwill	106.7	92.2
Financial Assets	93.8	214.2
Current Assets	\$2,557.1	\$3,282.2
Inventory	687.5	707.9
Accounts Receivable	1,140.4	1,500.6
Deferred Taxes	8.3	17.2
Marketable Securities	604.6	906.7
Cash	116.4	149.9
Deferred Expenses	\$19.3	\$40.7
Total Assets	\$3,382.8	\$4,298.2
Total Stockholders' Equity	\$240.4	\$382.2
Capital Stock	27.6	192.6
Other Equity	151.0	84.9
Retained Earnings	23.5	48.3
Consolidated Net Income	38.2	56.4
Minority Interests	\$55.9	\$328.0
Total Stockholders' Equity and Minority Interest	\$296.2	\$710.1
Liabilities	\$1,992.8	\$2,269.1
Operating Payables	\$996.8	\$1,203.9
Miscellaneous Payables	\$84.5	\$85.3
Deferred Income	\$12.6	\$29.7
Total Liabilities	\$3,086.6	\$3,588.1
Total Liabilities and Stockholders' Equity	\$3,382.8	\$4,298.2
Income Statement	1987	1988
Revenue	\$2,860.1	\$3,211.0
France	1,569.1	1,718.9
International	1,291.0	1,492.0
Cost of Sales	\$1,701.7	\$1,973.7
SG&A Expense	\$831.8	\$898.3
R&D Expense	\$206.3	\$232.6
Capital Expense	\$170.2	\$223.6
Operating Profit	\$158.5	\$179.9
Pretax Income	\$61.0	\$89.3
Pretax Margin (%)	2.13	2.78
Effective Tax Rate (%)	N/A	N/A
Net Income	\$38.2	\$56.4
Shares Outstanding, Millions	N/A	3.3

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

Balance Sheet	1987	1988
<i>Per Share Data</i>		
Earnings	N/A	N/A
Dividends	\$1.37	\$14.78
Book Value	N/A	N/A
Exchange Rate: US\$1/FFr	FFr 6.01	FFr 6.02

*Financials for 1984 through 1986 were not available at time of publication.
 N/A = Not Available

Source: Matra SA
 Annual Reports
 Dataquest
 January 1990



Matsushita Electric Industrial Co., Ltd.

1006 Kadoma, Kadoma City

Osaka 571, Japan

Telephone: (06) 908-1121

Fax: (06) 906-1762

Dun's Number: 69-053-6552

Date Founded: 1918

CORPORATE STRATEGIC DIRECTION

Matsushita Electric Industrial Co., Ltd., was founded as a family business in 1918 by Konosuke Matsushita to produce and market an electric adapter plug for consumer products. Today, Matsushita is a worldwide electric and electronic manufacturer with thousands of products that range from consumer electronic equipment, home appliances, and housing-related products through sophisticated industrial and communications equipment, as well as electronic components.

Matsushita is divided into seven product groups. The groups and examples of products within each are listed below:

- Video equipment—VCRs, camcorders, televisions
- Audio equipment—CDs, radios, digital tapes, recorders, electronic musical instruments, speaker systems
- Home appliances—Air-conditioners, refrigerators, microwave ovens, vacuum cleaners, bread-baking machines, dishwashers, laundry equipment
- Communications and industrial equipment—Office automation, communications, and information equipment; traffic control and post office sorting systems; industrial robots; electric motors; welding equipment
- Batteries and kitchen-related products—Batteries, kitchen fixtures, gas equipment, solar energy equipment
- Electronic components—Semiconductors, electronic tubes and lamps, general components
- Others—Musical tapes, records, bicycles, photographic equipment, electronic pencil sharpeners, water purifiers

Matsushita's products are sold in more than 130 countries under the brand names National, Panasonic, Technics, and Quasar, and under other trade names including JVC.

Matsushita has targeted six growth areas for the 1990s: information/communication, factory automation (FA), semiconductors, new audiovisual (AV) equipment, automotive electronics, and housing-related products, which include integrated air-conditioning systems. These areas accounted for approximately 28 percent of total sales in 1985 and 35 percent in 1989. The Company's target by 1992 is more than 40 percent.

The Company reported consolidated sales of ¥6,002.8 billion (US\$42.1 billion) for the fiscal year ended March 31, 1990. Net income for the year increased over 10 percent, to ¥235.6 billion (US\$1.7 billion), versus ¥213.5 billion (US\$1.7 billion) in fiscal 1989. (Percentage changes refer only to ¥ amounts; US\$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) International sales accounted for 44 percent of revenues in fiscal 1990.

During the past year, Matsushita launched its "Action Plan for International Cooperation" to promote globalization of Matsushita activities, and to help correct trade imbalances. By fiscal 1994, the Company plans to increase the ratio of internationally produced goods to total international business to 50 percent. Total production by international subsidiaries and affiliates in fiscal 1990 accounted for 36 percent of total international business.

A third step in Matsushita's globalization plan is to establish and expand R&D facilities in North America, Europe, and Asia to serve the needs of each region. The Company is also localizing planning, manufacturing, marketing, and management functions internationally. Total R&D expenditure for fiscal 1990 amounted to 5.8 percent of revenue, or ¥345.7 billion (US\$2.43 billion). Capital expenditure totaled ¥354.8 billion (US\$2.49 billion), or 5.9 percent of revenue.

Matsushita's international operations include 117 companies in 38 countries. The Company has 79 manufacturing plants and 39 sales offices overseas (11 combined sales and manufacturing locations). Matsushita has established regional headquarters in Europe, Singapore, and the United States. Total employees at the end of fiscal year 1990 were 198,299, of which 30 percent (59,216) were in international operations.

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

Video Equipment

The video equipment segment remains Matsushita's largest revenue producer, accounting for 27 percent of fiscal 1990 revenue. This segment includes VCRs, camcorders and related equipment; color, projection, and LCD televisions; video disc players, and satellite broadcast receivers. Total sales for this segment during the period were ¥1,598 billion (US\$11.2 billion).

Communications and Industrial Equipment

The second largest revenue producer for the Company is communications and industrial equipment. This segment accounted for 23 percent of fiscal 1990 revenue. Total sales increased 24 percent over the previous period, to ¥1,374.9 billion (US\$9.6 billion). This segment includes Matsushita's targeted growth areas of information/communication and factory automation. Products in this segment include facsimile and copier equipment, PCs and workstations, printers, telephones and PBX systems, industrial robots, electronic parts mounting equipment, welding machines, air conditioners, and compressors.

Computers

Matsushita has made considerable progress in the PC and workstation markets during the past year. The Company has expanded its desktop and laptop PC lines, resuming exports to Europe and North America, which were curtailed in 1987. The Company is

manufacturing 8-, 16-, and 32-bit IBM-compatible laptops in Japan, under the Panasonic label, for sale in Europe. In the US market, the Company is selling 16- and 32-bit models made by Tandy Corporation on an OEM basis. Dataquest estimates that Matsushita sold more than 86,000 units worldwide during calendar year 1989.

In October 1989, Matsushita began selling 32-bit engineering workstations developed by its majority owned company, Solbourne Computer of Colorado. Dataquest estimated sales of the Solbourne systems at over 300 for the period that ended December 31, 1989. Matsushita also introduced a 32-bit UNIX-based business workstation in Japan during 1989, targeted at the growing office automation market.

Matsushita has established the Matsushita Computer Co. (MAC) in Tokyo to improve its penetration into the high-end PC and workstation markets. MAC will specialize in workstation sales, support, and systems integration.

Facsimiles

During 1989, Matsushita merged its Panafax Corporation into the larger Office Automation Group of Panasonic Communications & Systems Company. The Company intends to expand its presence across the entire spectrum of facsimile product markets through the merger of the two groups. Dataquest estimates Panasonic facsimile sales in the North American market to be more than 120,000 units for the year that ended December 31, 1989, placing Panasonic/Matsushita among the top five vendors in the market with an 8.5 percent market share.

In addition to sales by its Panasonic subsidiary, Matsushita manufactures facsimile equipment sold by Pitney Bowes, and several models sold by Fujitsu, Tandy, and Telautograph. In April 1990, Matsushita's Quasar subsidiary announced a facsimile model for sale in the US market, manufactured by Matsushita in Japan.

Copiers

Selling copiers under the Panasonic label, Matsushita continued to gain market share during 1989. Panasonic copiers compete in Segments 1 through 4 of the six Dataquest copier segments. Based on plain paper copier placements, Dataquest ranked Panasonic eleventh in market share in 1989, up from twelfth place in 1988. In the Western European copier market, Panasonic's 1989 sales rose to 47,500 units, up from 36,000 units for 1988, Dataquest estimates.

In addition to copier sales under the Panasonic label, Matsushita manufactures several models sold under the Lanier label in the United States and under the Adler-Royal label in Europe.

Printers

Matsushita also manufactures and markets its printers under the Panasonic label. Its product line focus is primarily on the serial printer market. Dataquest ranks Panasonic third among page printer vendors in the 11- to 15-ppm category, and within the top five vendors for all types of serial printers in the North American market in 1989.

Panasonic also ranks among the top ten serial printer vendors in Western Europe, based on 1989 shipments. The Company's most popular products in Europe were the 9-pin serial impact dot matrix (SIDM) printers, followed closely by its 24-pin SIDM products.

Electronic Components

The electronic components group accounted for 13 percent of Matsushita's fiscal 1990 revenue, with sales of ¥781.2 billion (US\$5.5 billion). This represents an increase of over 7 percent from sales of ¥726.5 billion (US\$5.7 billion) for the previous period. Sales of components for industrial uses accounted for nearly 50 percent of the Company's general components market. Domestic sales of components for automotive use and office automation equipment were particularly active, whereas sales to consumer products markets remained stable.

Semiconductors

Matsushita's 1989 worldwide semiconductor ranking remained unchanged from 1988. Dataquest ranked Matsushita ninth in worldwide semiconductor sales, based on revenue of \$1.9 billion. The Company's strongest semiconductor product area is MOS, which accounts for 45 percent of its semiconductor revenue. Analog devices account for 20 percent, followed by discrete devices at 18 percent, optoelectronics at 16 percent, and bipolar digital at 1 percent.

The Company's strongest gains were in the MOS memory device markets, including the DRAM, mask ROM, and optoelectronic device markets. In worldwide markets, Matsushita's 1989 DRAM

market share was 3.0 percent, up from 1988's 2.4 percent, Dataquest estimates, yet Matsushita slipped from tenth to eleventh place among the top DRAM vendors. The Company also moved from eighth to tenth place in sales of analog devices, based on estimated revenue of \$376 million in 1989.

Home Appliances

The home appliances segment posted slight gains in revenue during fiscal 1990. Sales for the period were ¥802.4 billion (US\$5.6 billion), up from ¥776.8 billion (US\$6 billion) for the previous period. Home appliance sales were 13 percent of total revenue in fiscal 1990, a decrease from 14 percent in the previous year.

Products in the home appliance category include refrigerators, room air conditioners, laundry equipment, vacuum cleaners, electric irons, microwave ovens, electric fans, electric blankets, and cooking appliances.

Audio Equipment

Matsushita's audio equipment group accounted for 9 percent of the Company's revenue, with sales of ¥561 billion (US\$3.9 billion) for the period ended March 31, 1990. CDs, radio/cassette recorders, and portable headphone cassette players continued as sales leaders in this segment.

Other products included under the audio equipment segment are radios, tape recorders, stereo hi-fi and related equipment, car audio products, and electronic musical instruments.

Batteries and Kitchen-Related Products

The batteries and kitchen-related products segment accounted for 5 percent of Matsushita's revenue, ¥312 billion (US\$2.2 billion) for the fiscal year 1990. Sales leaders in this group include nickel-cadmium and lithium batteries, and alkaline-manganese cells used for portable audio equipment. A strong housing construction and renovation market also boosted sales of the Company's integrated kitchen systems.

As part of its human amenity life systems (HALS) campaign, Matsushita introduced new AV-equipped bathroom units and other enhanced lifestyle products to expand housing-related business.

Other

The balance of Matsushita's business includes sales of bicycles, cameras and flash units, prerecorded tapes and discs, water purifiers, and imported materials and products such as nonferrous metals, lumber, paper, medical equipment, and cabin cruisers. This segment accounted for 10 percent of the Company's total revenue, with total sales of ¥572.9 billion (US\$4 billion).

Further Information

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

Table 1
Corporate Highlights (Millions of US Dollars)

	1988*	1989	1990	
Three-Year Revenue	\$36,718.8	\$43,002.0	\$42,124.8	
Percent Change	-	17.11	(2.04)	
Capital Expenditure	\$1,680.2	\$2,542.5	\$2,489.5	
Percent of Revenue	4.58	5.91	5.91	
R&D Expenditure	\$2,023.2	\$2,493.0	\$2,425.8	
Percent of Revenue	5.51	5.80	5.76	
Number of Employees	134,186	193,088	198,299	
Revenue (\$K)/Employee	\$273.64	\$222.71	\$212.43	
Net Income	\$1,192.9	\$1,667.7	\$1,653.1	
Percent Change	-	39.80	(0.88)	
Exchange Rate (US\$1=¥)	¥138.0	¥128.0	¥142.5	
1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	\$9.38	\$10.15	\$10.43	\$11.43
Quarterly Profit	\$0.25	\$0.38	\$0.40	\$0.53

*Matsushita changed its fiscal year-end from November to March 31. Fiscal 1987 represents only four months from November 1986 to March 31, 1987. Because of these changes, no information is included for 1986 and 1987.

Source: Matsushita Electric Industrial Co., Ltd.
 Annual Reports
 Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1988*	1989	1990
Asia/Pacific	58.00	58.00	56.00
Japan	58.00	58.00	56.00
International	42.00	42.00	44.00

*Matsushita changed its fiscal year-end from November to March 31. Fiscal 1987 represents only four months from November 1986 to March 31, 1987. Because of these changes, no information is included for 1986 and 1987.

Source: Matsushita Electric Industrial Co., Ltd.

1989 SALES OFFICE LOCATIONS

North America—9 (includes sales companies)
Europe—15 (includes sales companies)
Asia/Pacific—142 (includes sales companies)
Japan—132
ROW—12 (includes sales companies)

MANUFACTURING LOCATIONS

North America

America Kotobuki Electronics Industries (United States)
VCRs
American Matsushita Electric Corp. of America (United States)
Electric products
Kyushu Matsushita Electric Corporation of America (United States)
TVs, microwave ovens, PCs
Matsushita Communication Industrial Corp. of America (United States)
Car telephones, pagers, car audio systems
Matsushita Compressor Corp. of America (United States)
Compressors
Matsushita Electronic Components Corp. of America (United States)
Electronic parts
Matsushita Industrial Canada (Canada)
Color TVs
Matsushita Refrigeration Co. of America (United States)
Refrigerators
Matsushita-Ultra Tech. Battery Corp. (United States)
Batteries
Panasonic Technologies (United States)
R&D

Europe

Kyushu Matsushita Electric (United Kingdom)
Electronic typewriters, printers
Matsushita Business Machine (Germany)
PPC copiers
Matsushita Communication Deutschland (Germany)
Car radios/stereos
Matsushita Communication Industrial (United Kingdom)
Car telephones

Matsushita Electric (United Kingdom)
Color TVs, microwave ovens
Matsushita Electric Motor (Germany)
Motors
Matsushita Electronic Components (Germany)
Electronic parts, materials
Matsushita Electronic Components (United Kingdom)
Transformers, LC filters
Matsushita Electronic Magnetron Corp. (United Kingdom)
Magnetrons for microwave ovens
Matsushita Graphic Communication Systems Ltd. (United Kingdom)
Fax machines
Matsushita Video Manufacturing (Germany)
VCR mechanisms
MB Video (Germany)
VCRs, CD players
Panasonic Espana (Spain)
Electric equipment
Panasonic France S.A. (France)
Consumer electronics

Asia/Pacific

A.P. National (Thailand)
Home electrical appliances
Asahi Kogyo (Japan)
Tape recorders
Beijing-Matsushita Color CRT (China)
Color CRTs
International Fan Manufacturing (Hong Kong)
Electric fans
Katano Matsushita (Japan)
Audio equipment
Kibi Matsushita (Japan)
Video equipment
Kyushu Matsushita Electric (Japan)
Data processing, business machines, magnetic heads
Matsue Matsushita Denki (Japan)
Capacitors
Matsusaka Seimitsu (Japan)
Assembly of motors
Matsushita Air-Conditioning Corporation (Malaysia)
Air conditioners
Matsushita Communication Industrial (Japan)
Data processing, communication, control, video equipment
Matsushita Communication Industrial Corp. of the Philippines (Philippines)
FDDs, ECM
Matsushita Compressor & Motor (Malaysia)
Compressors, fan motors
Matsushita Denshi (Singapore)
IC production, LSI design

Matsushita Electric Works (Japan)
 Electrical housing equipment
 Matsushita Electric (Australia)
 TVs, audio equipment
 Matsushita Electric (Malaysia)
 Home electrical appliances
 Matsushita Electric (Taiwan)
 Electrical appliances
 Matsushita Electric Institute of Technology (Taiwan)
 R&D
 Matsushita Electronic Motor (Singapore)
 Precision motors, applied equipment
 Matsushita Electronic Components (Japan)
 Electronic equipment parts
 Matsushita Electronic Components (Malaysia)
 Electronic parts
 Matsushita Electronic Components (Singapore)
 Electronic parts
 Matsushita Electronics (Singapore)
 Audio equipment
 Matsushita Electronic Motor (Malaysia)
 Electronic motors
 Matsushita Electronics (Japan)
 Semiconductors, electron tubes, lighting equipment
 Matsushita Graphic Communications Systems
 (Singapore)
 Fax machines
 Matsushita Graphic Communication Systems (Japan)
 Facsimiles, graphics equipment
 Matsushita Industrial Equipment (Japan)
 Industrial equipment
 Matsushita Industrial (Malaysia)
 Air conditioners, compressors
 Matsushita Precision Industrial (Malaysia)
 Flyback transformers, coils
 Matsushita Refrigeration Industries (Malaysia)
 Refrigerator/freezers
 Matsushita Refrigeration Industries (Thailand)
 Refrigerator/freezers
 Matsushita Refrigeration (Japan)
 Refrigerators, air conditioners
 Matsushita Refrigeration Industries (Singapore)
 Compressors
 Matsushita Research Institute (Japan)
 Electronics research
 Matsushita Seiko (Japan)
 Electric fans, ventilators, air conditioners
 Matsushita Seiko Hong Kong International
 Manufacturing Co., Ltd. (Hong Kong)
 Air conditioners
 Matsushita Technical Center (Singapore)
 Production equipment
 Matsushita Television (Malaysia)
 Color TVs

Matsushita-Kotobuki Electronics (Japan)
 Video equipment, TVs, tape recorders
 Miyazaki Matsushita Denki (Japan)
 Ceramics, magnetic materials, resistant materials
 P.T. National Gobel (Indonesia)
 Home electrical appliances
 National Micromotor (Japan)
 Microprecision motors
 National Thai (Thailand)
 Home electrical appliances
 P.T. Matsushita Gobel Battery Industry (Indonesia)
 Batteries
 PFU Ltd. (Japan)
 Minicomputers
 Precision Electronics (Philippines)
 Home electrical appliances
 Takefu Matsushita Electric (Japan)
 Micromotors
 Victor Company of Japan (Japan)
 Video/audio equipment, TVs
 Wakayama Precision (Japan)
 Refrigerators, air conditioners

ROW

Matsushita Electric (East Africa)
 Radios, radio cassette recorders, dry batteries
 Matsushita Electrica de Guatemala (Guatemala)
 Audio equipment
 Matsushita Electric de El Salvador (El Salvador)
 Audio equipment
 Matsushita Industrial de Baja California (Mexico)
 Color TV chassis
 National Centroamericana
 Dry batteries, audio equipment
 National Componentes Electronicos do Brazil (Brazil)
 Electronic parts
 National do Brazil (Brazil)
 Matsushita group products
 National Electric Cote d'Ivoire (Ivory Coast)
 TVs, radio cassette recorders
 National Panasonic Fuegoina
 Color TVs, radio cassette recorders
 National Peruana (Peru)
 Home electrical appliances
 Panasonic de Mexico (Mexico)
 Audio equipment, electronic parts
 Panasonic Industrial de Venezuela, C.A. (Venezuela)
 Consumer electronic products
 Springer National Componentes (Brazil)
 Assembly of micromotors, CRT sockets, PC
 boards
 Springer National da Amazonia (Brazil)
 Color TVs, audio equipment

SUBSIDIARIES

North America

Matsushita Electric Corporation of America (United States)
Solbourne Computer (United States)

Europe

Matsushita Electric (U.K.) Ltd. (United Kingdom)
Matsushita Electronic Magnetron Corp. (United Kingdom)
Matsushita Graphic Communication Systems U.K. Ltd. (United Kingdom)
Panasonic Espana S.A. (Spain)
Panasonic France S.A. (France)

Asia/Pacific

Kyushu Matsushita Electric Co., Ltd. (Japan)
Matsushita Battery Industrial Co., Ltd. (Japan)
Matsushita Communications Industrial Co., Ltd. (Japan)
Matsushita Electric (Taiwan) Co., Ltd. (Taiwan)
Matsushita Electronic Components Co., Ltd. (Japan)
Matsushita Electronics Corporation (Japan)
Matsushita Electronics (S) Pte. Ltd. (Singapore)
Matsushita Graphic Communications Systems, Inc. (Japan)
Matsushita Housing Products Co., Ltd. (Japan)
Matsushita Industrial Equipment Co., Ltd. (Japan)
Matsushita Industrial Corporation Sdn. Bhd. (Malaysia)
Matsushita Kotobuki Electronics Industries, Ltd. (Japan)
Matsushita Refrigeration Company (Japan)
Matsushita Refrigeration Industries (S) Pte. Ltd. (Singapore)
Matsushita Seiko Co., Ltd. (Japan)
Victor Company of Japan, Ltd. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Signetics

The companies entered a sales agency agreement for memory products.

Weitek

The companies are jointly developing a microprocessor product.

Siemens

Matsushita and Siemens formed a joint venture for producing passive electronic components.

Office Workstations Ltd.

Matsushita and Office Workstations of Scotland formed a joint venture for development of office automation software products.

1988

Hewlett-Packard, IBM Corp., Intel

Matsushita agreed to supply these companies with a total of more than 1 million 1M DRAMs per month.

Intel

Matsushita agreed to subcontract production of Intel's 8-bit microcontrollers for the Japanese market. The companies agreed to jointly develop sub-0.5-micron 16M DRAM process.

Sun Microsystems

The SPARC RISC chip was licensed for use in workstations being developed by Solbourne Computer, a Matsushita subsidiary.

Tosoh

The companies agreed to jointly develop conductive electron-beam resist that completely solves the electrification problem occurring with direct-write e-beams.

Motorola

Matsushita agreed to purchase Motorola semiconductors for use in video cassette recorders.

1987

NEC

The companies agreed to develop the next generation of steppers for VLSI manufacturing.

SAE Inc.

The companies agreed to jointly develop a 64-bit microprocessor with plans for a 64-bit engineering workstation in 1989.

Philips

The companies renewed a business cooperation agreement for the next ten years in which Matsushita Electric will continue to own 65 percent of

Matsushita Electronics and Philips will own 35 percent. Matsushita agreed to supply LSIs for compact disks to Philips, and the companies made a second-source agreement for 8-bit CMOS microcontrollers.

Intel

Matsushita obtained a license from Intel for the 8051 and three other 8-bit microcontrollers.

TRW

The companies agreed to jointly develop an 0.8-micron-wavelength GaAlAs semiconductor laser for space communications.

Nikon

The companies jointly developed advanced i-line steppers and excimer lasers for next-generation VLSIs.

Technology Imports--Licensor, Patents, and Contract Term

Allen Organ

Electronic organs (7/82 until expires)

AT&T and Sun Microsystems

Computer architecture license (9/88-undetermined)

AT&T Technologies

Electronic equipment (2/71 until expires)

Blaupunkt Werke

Car radios (5/82 until expires)

BSR North America

Noise reduction devices for tape recorders (8/80 until expires)

Design & Manufacturing

Electronic digital control systems (8/85 until expires)

Energy Conversion

Devices, Optical information recorders (12/83 until expires)

Hewlett-Packard

Data/word processors (4/85 until expires)

IBM Corp.

Data processing equipment (5/71 until expires)

RCA Licensing

Video cameras (7/87 through 6/92)

RCA Licensing

Color TV sets (1/88 through 12/92)

Saunier Duval

Gas water boilers of electronic control (1/79 until expires)

Telefunken Fernseh and Rundfunk GmbH

PAL color TV receivers (7/72 until expires)

Texas Instruments

Semiconductors (5/87 through 12/90)

Thorn EMI Patents

PAL color TV receivers (6/73 until expires)

Xerox Corp.

Plain paper copiers (9/81 until expires)

Technology Exports--Licensor, Patents, and Contract Term

Digital Equipment

Reel motors (5/86 until expires)

Grundig

VCR heads (3/88-undetermined)

SECI S.p.A.

Piezoelectric elements (8/80 through 8/90)

OEM Contracts--Licensing Partner

IBM Corp.

OEM supply of optical disk drives by Matsushita

Westinghouse Electric

Matsushita to sell Westinghouse's robot control equipment under Matsushita/Panasonic brand in North America

MERGERS AND ACQUISITIONS

1988

Matsushita Electric Trading Co., Ltd. (MET)

MET, a 51.24 percent owned consolidated subsidiary, was merged into the Company in exchange for 73.4 million shares of Matsushita common stock having a fair value of ¥1.5 billion (US\$1.1 billion).

KEY OFFICERS

Masaharu Matsushita
Chairman of the board

Akio Tanii
President

Shoji Sakuma
Executive vice president

Masahiko Hirata
Executive vice president

Keiya Toyonaga
Senior managing director

Hiroyuki Mizuno
Senior managing director

Tsuzo Murase
Senior managing director

PRINCIPAL INVESTORS

Sumitomo Bank—4.4 percent
Sumitomo Life Insurance—4.4 percent
Nippon Life Insurance—4.0 percent
Matsushita Investment and Development—
3.2 percent
Mitsubishi Trust—3.0 percent
Sumitomo Trust—2.9 percent
Konosuke Matsushita—2.6 percent
Toyo Trust—2.0 percent
Kyowa Bank—2.0 percent

FOUNDERS

Konosuke Matsushita

Table 3
Comprehensive Financial Statement
Fiscal Year Ending March 31
(Millions of US Dollars, except Per Share Data)

Balance Sheet	1988*	1989	1990
Total Current Assets	\$24,324.9	\$27,587.1	\$32,371.7
Cash	10,018.6	11,251.1	14,111.2
Receivables	4,916.6	6,149.8	7,805.9
Marketable Securities	2,563.1	1,656.0	2,353.7
Inventory	4,859.0	6,222.7	5,936.9
Other Current Assets	1,967.6	2,307.5	2,164.0
Net Property, Plants	\$5,057.1	\$6,439.2	\$6,720.3
Investments	\$8,973.7	\$11,851.4	\$11,561.9
Other Assets	\$3,150.5	\$4,137.0	\$4,442.3
Total Assets	\$41,506.2	\$50,014.8	\$55,096.2
Total Current Liabilities	\$13,362.0	\$16,750.2	\$18,263.1
Long-Term Debt	\$4,094.5	\$4,858.6	\$8,400.6
Other Liabilities	\$6,006.7	\$6,011.3	\$5,970.0
Total Liabilities	\$23,463.2	\$27,620.1	\$32,633.7
Total Shareholders' Equity	\$18,043.0	\$22,394.7	\$22,462.5
Common Stock	1,048.4	1,283.2	1,297.8
Other Equity	1,816.2	3,273.1	3,711.4
Retained Earnings	15,178.4	17,838.4	17,453.3
Total Liabilities and Shareholders' Equity	\$41,506.2	\$50,014.8	\$55,096.2
Income Statement	1988*	1989	1990
Revenue	\$36,718.8	\$43,002.0	\$42,124.8
Cost of Sales	\$24,228.4	\$28,678.8	\$28,137.5
R&D Expense	\$2,023.2	\$2,493.0	\$2,425.8
SG&A Expense	\$9,882.6	\$11,063.9	\$10,810.4
Capital Expense	\$1,680.2	\$2,542.5	\$2,489.5
Pretax Income	\$3,284.3	\$4,136.3	\$4,012.1
Pretax Margin (%)	8.94	9.62	9.52
Effective Tax Rate (%)	55.50	54.20	54.20
Net Income	\$1,192.9	\$1,667.7	\$1,653.1
Shares Outstanding, Millions	1,861.8	1,955.6	2,080.2
Per Share Data			
Earnings	0.67	0.76	0.68
Dividend	0.80	0.90	0.63
Book Value	9.69	11.45	10.80
Exchange Rate (US\$1=¥)	¥138.0	¥128.0	¥142.5

*Matsushita changed its fiscal year-end from November to March 31. Fiscal 1987 represents only four months from 11/86 to 3/31/87. Because of these changes, information is not included for 1986 and 1987.

Source: Matsushita Electric Industrial 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	1988*	1989	1990
Total Current Assets	¥3,356.8	¥3,531.2	¥4,612.9
Cash	1,382.6	1,440.1	2,010.8
Receivables	678.5	787.2	1,112.3
Marketable Securities	353.7	212.0	335.4
Inventory	670.5	796.5	846.0
Other Current Assets	271.5	295.4	308.4
Net Property, Plants	¥697.9	¥824.2	¥957.6
Investments	¥1238.4	¥1516.9	¥1647.6
Other Assets	¥434.8	¥529.6	¥633.0
Total Assets	¥5,727.9	¥6,401.9	¥7,851.1
Total Current Liabilities	¥1,843.9	¥2,144.0	¥2,602.5
Long-Term Debt	¥565.0	¥621.9	¥1,197.1
Other Liabilities	¥828.9	¥769.4	¥850.7
Total Liabilities	¥3,237.8	¥3,535.3	¥4,650.3
Total Shareholders' Equity	¥2,490.0	¥2,866.6	¥3,200.9
Common Stock	144.7	164.3	184.9
Other Equity	250.7	419.0	528.9
Retained Earnings	2,094.6	2,283.3	2,487.1
Total Liabilities and Shareholders' Equity	¥5,727.8	¥6,401.9	¥7,851.2
Income Statement	1988*	1989	1990
Revenue	¥5,067.2	¥5,504.3	¥6,002.8
Cost of Sales	¥3,343.5	¥3,670.9	¥4,009.6
R&D Expense	¥279.2	¥319.1	¥345.7
SG&A Expense	¥1,363.8	¥1,416.2	¥1,540.5
Capital Expense	¥231.9	¥325.4	¥354.8
Pretax Income	¥453.2	¥529.4	¥571.7
Pretax Margin (%)	8.94	9.62	9.52
Effective Tax Rate (%)	55.50	54.20	52.60
Net Income	¥164.6	¥213.5	¥235.6
Shares Outstanding, Millions	1,861.8	1,955.6	2,080.2
Per Share Data			
Earnings	¥80.34	¥99.94	¥108.34
Dividend	¥9.52	¥11.90	¥10.00
Book Value	¥1.34	¥1.47	¥1.54

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending March 31
(Billions of Yen, except Per Share Data)

Key Financial Ratios	1988	1989	1990
<i>Liquidity</i>			
Current (Times)	1.82	1.65	1.77
Quick (Times)	1.46	1.28	1.45
Fixed Assets/Equity (%)	28.03	28.75	29.92
Current Liabilities/Equity (%)	74.05	74.79	81.31
Total Liabilities/Equity (%)	130.03	123.33	145.28
<i>Profitability (%)</i>			
Return on Assets	5.75	3.52	3.31
Return on Equity	13.22	7.97	7.77
Profit Margin	3.25	3.88	3.92
<i>Other Key Ratios</i>			
R&D Spending % of Revenue	5.51	5.80	5.76
Capital Spending % of Revenue	4.58	5.91	5.91
Employees	134,186	193,088	198,299
Revenue (¥M)/Employee	¥37.76	¥28.51	¥30.27
Capital Spending % of Assets	4.05	5.08	-
Exchange Rate (US\$1=¥)	¥138.0	¥128.0	¥142.5

*Matsushita changed its fiscal year-end from November to March 31.
 Fiscal 1987 represents only four months from November 1986 to
 March 31, 1987. Because of these changes, no information is included
 for 1986 and 1987.

Source: Matsushita Electric Industrial Co., Ltd.
 Annual Reports
 Dataquest (1990)

Matsushita Electric Industrial Co., Ltd.

1006 Kadoma, Kadoma City

Osaka 571, Japan

Telephone: (06) 908-1121

Fax: (06) 906-1762

Dun's Number: 69-053-6552

Date Founded: 1935

CORPORATE STRATEGIC DIRECTION

Matsushita Electric Industrial Co., Ltd., was founded as a family business in 1918 by Konosuke Matsushita to produce and market an electric adapter plug for consumer products. Today, Matsushita is a worldwide electric and electronic manufacturer with thousands of products that range from consumer electronic equipment, home appliances, and housing-related products, through sophisticated industrial and communications equipment, as well as electronic components.

Matsushita is divided into seven product groups. The groups and examples of products within each are listed below:

- Video equipment—VCRs, camcorders, televisions
- Audio equipment—CD radios, digital tapes, recorders, electronic musical instruments, speaker systems
- Home appliances—Air conditioners, refrigerators, microwave ovens, vacuum cleaners, bread-baking machines, dishwashers, laundry equipment
- Communication and industrial equipment—Office automation, communication, and information equipment; traffic control and post office sorting systems; industrial robots; electric motors; welding equipment
- Energy and kitchen-related products—Batteries, kitchen fixtures, gas equipment, solar energy equipment
- Electronic components—Semiconductors, electronic tubes and lamps, general components
- Others—Musical tapes, records, bicycles, photographic equipment, electronic pencil sharpeners, water purifiers

Matsushita is targeting seven new growth areas for the 1990s: information/communication, factory automation (FA), semiconductors, new audiovisual equipment (new AV), automotive electronics, housing-related products, and integrated air-

conditioning systems. These areas accounted for about 28 percent of total sales in 1985 and 35 percent in 1989. The Company's target by 1992 is more than 40 percent.

The Company reported revenue for fiscal 1989 of \$41.7 billion,* an 8 percent increase over fiscal 1988. Net income increased 24 percent from fiscal 1988's \$1.3 billion to \$1.6 billion in fiscal 1989.

Research and development expenditures for fiscal 1989 amounted to 6 percent of revenue, or \$2.4 million. Capital expenditures totaled \$2.5 million, or 6 percent of revenue.

The Company has manufacturing plants worldwide, 22 located in Japan and 52 elsewhere. Matsushita also has 132 sales offices throughout Japan and 28 sales companies overseas. The Americas represented 42 percent of total overseas sales; Europe and Africa, 30 percent; and Asia, 28 percent.

Matsushita's products are sold in more than 130 countries under the brand names National, Panasonic, Technics, and Quasar, and under other trade names including JVC. Matsushita's product areas include office automation, factory automation, audiovisual, semiconductors, housing-related equipment, and automotive electronics.

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

Video Equipment

Matsushita experienced 5 percent growth in video equipment due to better picture and sound quality of products, as well as increased demand for camcorders. This segment represented 29 percent of the Company's fiscal 1989 total revenue.

Audio Equipment

Audio equipment represented 9 percent of the Company's total sales. This product segment increased 2 percent from the previous year due to strong domestic sales of compact disc radio cassette units and personal use, compact stereo cassette players.

Home Appliances

Matsushita's home appliances segment increased 3 percent during fiscal 1989 and represented 14 percent of total revenue. Air conditioners, fully automatic washing machines, and cordless steam irons experienced sales increases, whereas refrigerators and microwave ovens experienced slower domestic demand.

Communication and Industrial Equipment

Communication and industrial equipment represented 20 percent of the Company's fiscal 1989 sales. This segment experienced a 15 percent increase due to the private capital investment expansion and increased overseas demand. Sales of facsimile equipment, multifunction telephones, PCs, printers, word processors, and factory automation all experienced increases.

Copiers

Matsushita markets copiers under the Panasonic brand name in the United States. Panasonic competes in four of the six Dataquest copier segments: Segments 1, 2, 3, and 4. Based on 1988 U.S. plain paper copier placements, Dataquest estimates that Panasonic holds the twelfth market share position.

Printers

Matsushita also markets printers under the Panasonic brand name in the United States. Dataquest estimates that Panasonic is 1 of 10 companies that represented 72 percent of the serial printer market in 1988.

Facsimiles

Dataquest estimates that Matsushita held the second market share position in the Japanese facsimile market in 1988 with 19.8 percent, behind Ricoh's 20.3 percent.

A joint venture between Matsushita Graphics in Japan and a U.S. company called Visual Sciences resulted in the establishment of Panafax Corporation in 1977 to handle facsimile sales in the United States. Panafax maintained its reporting relationship with Matsushita Graphics until its merger into the Office Automation Group of Panasonic Communications & Systems Company (PCSC) in 1989.

According to the Company, its primary product strength has been concentrated in the midrange of the product spectrum. It now plans to leverage that position and take a broader outlook. The Company intends to expand its presence throughout the entire spectrum of facsimile products through the Panafax-Panasonic merger.

Energy and Kitchen-Related Products

Matsushita's energy and kitchen-related products segment represented 5 percent of fiscal 1989 total revenue, an increase of 10 percent over fiscal 1988. Alkaline, lithium, and other compact, high-performance batteries had strong sales growth, as did kitchen fixture systems.

Electronic Components

Electronic components accounted for 13 percent of the Company's total fiscal 1989 revenue. This segment experienced a 14 percent growth rate over the previous year. Semiconductor sales were up as a result of strong domestic demand, as well as increased demand for picture tubes and other electronic components.

Semiconductors

Matsushita's 1988 worldwide semiconductor ranking moved up two places, from eleventh in 1987 to ninth in 1988 based on revenue of \$1.9 billion. The Company's strongest semiconductor product area is MOS, which accounts for 46 percent of its semiconductor revenue. Analog accounts for 22 percent, followed by discrete devices at 20 percent, optoelectronic at 10 percent, and bipolar digital with the remaining 2 percent.

In the worldwide marketplace, Matsushita ranked fourth with 5 percent of the MOS logic market, based on 1988 revenue of \$404 million. Matsushita also

ranked in the worldwide optoelectronic market, holding the number five position with 8.5 percent of the market based on 1988 revenue of \$182 million. In total MOS microdevices, Matsushita ranked eighth among worldwide vendors, based on 1988 revenue of \$230 million. Matsushita also held the number eight market share position in the analog market, based on 1988 revenue of \$423 million.

Further Information

For further information on 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	\$24,890.3	\$28,066.9	\$10,153.6	\$38,522.1	\$41,698.9
Percent Change	-	12.76	(63.82)	279.39	8.25
Capital Expenditure	\$1,257.0	\$938.0	\$340.0	\$1,402.0	\$2,465.0
Percent of Revenue	5.05	3.34	3.35	3.64	5.91
R&D Expenditure	\$1,186.0	\$1,535.0	\$633.0	\$2,171.0	\$2,418.0
Percent of Revenue	4.76	5.47	6.23	5.64	5.80
Number of Employees	133,963	135,881	134,764	134,186	193,088
Revenue (\$K)/Employee	\$185.80	\$206.56	\$75.34	\$287.08	\$215.96
Net Income	\$1,214.0	\$1,004.1	\$324.5	\$1,302.7	\$1,617.1
Percent Change	-	(17.29)	(67.68)	301.45	24.13
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: Matsushita Electric
Annual Reports
Dataquest
January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
Japan	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: Matsushita Electric

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	N/A	N/A
Indirect Sales	N/A	N/A

N/A = Not Available

Source: Dataquest
January 1990

1988 SALES OFFICE LOCATIONS

North America—2 (Includes sales companies)
 Japan—132
 Europe—12 (Includes sales companies)
 Asia/Pacific—10 (Includes sales companies)
 ROW—4 (Includes sales companies)

MANUFACTURING LOCATIONS

Japan

Asahi Kogyo
 Tape recorders
 Katano Matsushita
 Audio equipment
 Kibi Matsushita
 Video equipment
 Kyushu Matsushita Electric
 Data processing, business machines, magnetic heads
 Matsue Matsushita Denki
 Capacitors
 Matsusaka Seimitsu
 Assembly of motors
 Matsushita Communication Industrial
 Data processing, communication, control, video equipment
 Matsushita Electric Works
 Electric housing equipment
 Matsushita Electronic Components
 Electronic equipment parts
 Matsushita Electronics
 Semiconductors, electron tubes, lighting equipment
 Matsushita Graphic Communication Systems
 Facsimiles, graphics equipment
 Matsushita Industrial Equipment
 Industrial equipment
 Matsushita-Kotobuki Electronics
 Video equipment, TVs, tape recorders
 Matsushita Refrigeration
 Refrigerators, air conditioners
 Matsushita Research Institute
 Electronics research
 Matsushita Seiko
 Electric fans, ventilators, air conditioners
 Miyazaki Matsushita Denki
 Ceramics, magnetic materials, resistant materials
 National Micromotor
 Microprecision motors

PFU Ltd.
 Minicomputers
 Takefu Matsushita Electric
 Micromotors
 Victor Company of Japan
 Video/audio equipment, TVs
 Wakayama Precision
 Refrigerators, air conditioners

North America

America Kotobuki Electronics Industries (United States)
 VCRs
 Matsushita Communication Industrial Corp. of America (United States)
 Car telephones, pagers, car audio systems
 Matsushita Electric Corp. of America (United States)
 Electric products
 Matsushita Electronic Components Corp. of America (United States)
 Electronic parts
 Matsushita Industrial Canada
 Color TVs
 Matsushita Industrial Company (United States)
 TVs, microwave ovens, PCs
 Panasonic Technologies (United States)
 R&D

Europe

Kyushu Matsushita Electric (United Kingdom)
 Electronic typewriters, printers
 Matsushita Business Machine (West Germany)
 PPC copiers
 Matsushita Communication Deutschland (West Germany)
 Car radios/stereos
 Matsushita Communication Industrial (United Kingdom)
 Car telephones
 Matsushita Electric (United Kingdom)
 Color TVs, microwave ovens
 Matsushita Electric Motor (West Germany)
 Motors
 Matsushita Electronic Components (United Kingdom)
 Transformers, LC filters
 Matsushita Electronic Components (West Germany)
 Electronic parts, materials
 Matsushita Video Manufacturing (West Germany)
 VCR mechanisms
 MB Video (West Germany)
 VCRs, CD players
 Panasonic Espana (Spain)
 Electric equipment

Asia/Pacific

A.P. National (Thailand)
Home electrical appliances
Beijing-Matsushita Color CRT (China)
Color CRTs
International Fan Manufacturing (Hong Kong)
Electric fans
Matsushita Communication Industrial Corp. of the Philippines (Philippines)
FDDs, ECM
Matsushita Compressor & Motor (Malaysia)
Compressors, fan motors
Matsushita Denshi (Singapore)
IC production, LSI design
Matsushita Electric (Australia)
TVs, audio equipment
Matsushita Electric (Malaysia)
Home electrical appliances
Matsushita Electric (Singapore)
Audio equipment
Matsushita Electric (Taiwan)
Electrical appliances
Matsushita Electric Institute of Technology (Taiwan)
R&D
Matsushita Electric Motor (Singapore)
Precision motors, applied equipment
Matsushita Electronic Components (Malaysia)
Electronic parts
Matsushita Electronic Components (Singapore)
Electronic parts
Matsushita Industrial (Malaysia)
Air conditioners, compressors
Matsushita Precision Industrial (Malaysia)
Flyback transformers, coils
Matsushita Refrigeration Industries (Singapore)
Compressors
Matsushita Technical Center (Singapore)
Production equipment
Matsushita Television (Malaysia)
Color TVs
National Gobel (Indonesia)
Home electrical appliances
National Thai (Thailand)
Home electrical appliances
Precision Electronics (Philippines)
Home electrical appliances

ROW

Matsushita Electric (East Africa)
Radios, radio cassette recorders, dry batteries
Matsushita Electrica de Guatemala (Guatemala)
Audio equipment

Matsushita Electric de El Salvador (El Salvador)
Audio equipment
Matsushita Industrial de Baja California (Mexico)
Color TV chassis
National Centroamericana
Dry batteries, audio equipment
National Componentes Electronicos do Brazil (Brazil)
Electronic parts
National do Brazil (Brazil)
Matsushita group products
National Electric Cote d'Ivoire (Ivory Coast)
TVs, radio cassette recorders
National Panasonic Fuegoína
Color TVs, radio cassette recorders
National Peruana (Peru)
Home electrical appliances
Panasonic de Mexico (Mexico)
Audio equipment, electronic parts
Springer National Componentes (Brazil)
Assembly of micromotors, CRT sockets, PC boards
Springer National da Amazonia (Brazil)
Color TVs, audio equipment

SUBSIDIARIES

Japan

Kyushu Matsushita Electric Co., Ltd.
Matsushita Battery Industrial Co., Ltd.
Matsushita Communications Industrial Co., Ltd.
Matsushita Electronic Components Co., Ltd.
Matsushita Electronics Corporation
Matsushita Graphic Communications Systems, Inc.
Matsushita Housing Products Co., Ltd.
Matsushita Industrial Equipment Co., Ltd.
Matsushita Kotobuki Electronics Industries, Ltd.
Matsushita Refrigeration Company
Matsushita Seiko Co., Ltd.
Victor Company of Japan, Ltd.

North America

Matsushita Electric Corporation of America (United States)
Solbourne Computer (United States)

Europe

Matsushita Electric (U.K.) Ltd. (United Kingdom)
Panasonic Espana S.A. (Spain)

Asia/Pacific

Matsushita Electric (Taiwan) Co., Ltd. (Taiwan)
 Matsushita Electronics (S) Pte. Ltd. (Singapore)
 Matsushita Industrial Corporation Sdn. Bhd.
 (Malaysia)
 Matsushita Refrigeration Industries (S) Pte. Ltd.
 (Singapore)

**ALLIANCES, JOINT VENTURES, AND
 LICENSING AGREEMENTS**
*1989***Signetics**

The two companies entered a sales agency agreement for memory products.

Weitek

The two companies are jointly developing a microprocessor product.

*1988***Hewlett-Packard, IBM, Intel**

Matsushita agreed to supply these companies with a total of more than 1 million 1M DRAMs per month.

Intel

Matsushita agreed to subcontract production of Intel's 8-bit microcontrollers for the Japanese market. The companies agreed to jointly develop sub-0.5-micron 16M DRAM process.

Sun Microsystems

The SPARC RISC chip was licensed for use in workstations being developed by Solbourne Computer, a Matsushita subsidiary.

Tosoh

The companies agreed to jointly develop conductive electron-beam resist that completely solves the electrification problem occurring with direct-write e-beams.

Motorola

Matsushita agreed to purchase Motorola semiconductors for use in video cassette recorders. Matsushita will buy ¥10 billion worth for an indefinite period of time.

*1987***NEC**

The companies agreed to develop the next generation of steppers for VLSI manufacturing.

SAE Inc.

The companies agreed to jointly develop a 64-bit microprocessor with plans for a 64-bit engineering workstation in 1989.

Philips

The companies renewed a business cooperation agreement for the next 10 years in which Matsushita Electric will continue to own 65 percent of Matsushita Electronics and Philips will own 35 percent. Matsushita agreed to supply LSIs for compact discs to Philips, and the companies made a second-source agreement for 8-bit CMOS microcontrollers.

Intel

Matsushita obtained licensing from Intel for the 8051 and three other 8-bit microcontrollers.

TRW

The companies agreed to jointly develop a 0.8-micron-wavelength GaAlAs semiconductor laser for space communications.

Nikon

The companies jointly developed advanced i-line steppers and excimer lasers for next-generation VLSIs.

Technology Imports--Licensor, Patents, and Contract Term

Allen Organ

Electronic organs (7/82 until expires)

AT&T and Sun Microsystems

Computer architecture license (9/88-undetermined)

AT&T Technologies

Electronic equipment (2/71 until expires)

Blaupunkt Werke

Car radios (5/82 until expires)

BSR North America

Noise reduction devices for tape recorders (8/80 until expires)

Design & Manufacturing

Electronic digital control systems (8/85 until expires)

Energy Conversion

Devices, optical information recorders (12/83 until expires)

Hewlett-Packard

Data/word processors (4/85 until expires)

IBM

Data processing equipment (5/71 until expires)

RCA Licensing

Video cameras (7/87 through 6/92)

RCA Licensing

Color TV sets (1/88 through 12/92)

Saunier Duval

Gas water boilers for electronic control (1/79 until expires)

Telefunken Fernseh and Rundfunk GmbH

PAL color TV receivers (7/72 until expires)

Texas Instruments

Semiconductors (5/87 through 12/90)

Thorn EMI Patents

PAL color TV receivers (6/73 until expires)

Xerox Corp.

Plain paper copiers (9/81 until expires)

Technology Exports--Licensor, Patents, and Contract Term

Digital Equipment

Reel motors (5/86 until expires)

Grundig

VCR heads (3/88-undetermined)

SECI S.p.A.

Piezoelectric elements, (8/80 through 8/90)

OEM Contracts--Licensing Partner

IBM Corp.

OEM supply of optical disk drives by Matsushita

Westinghouse Electric

Matsushita selling Westinghouse's robot control equipment under Matsushita/Panasonic brand in North America

MERGERS AND ACQUISITIONS

1988

Matsushita Electric Trading Co., Ltd. (MET)

MET, a 51.24 percent owned consolidated subsidiary, was merged into the Company in exchange for 73.4 million shares of Matsushita common stock having a fair value of ¥1.5 billion (\$1.1 billion).

KEY OFFICERS

Masaharu Matsushita

Chairman of the board

Akio Tanii

President

Shoji Sakuma

Executive vice president

Masahiko Hirata

Executive vice president

Keiya Toyonaga

Senior managing director

Hiroyuki Mizuno

Senior managing director

Tsuzo Murase

Senior managing director

PRINCIPAL INVESTORS

Sumitomo Bank—4.4 percent

Sumitomo Life Insurance—4.4 percent

Nippon Life Insurance—4.0 percent

Matsushita Investment and Development—3.2 percent

Mitsubishi Trust—3.0 percent

Sumitomo Trust—2.9 percent

Konosuke Matsushita—2.6 percent

Toyo Trust—2.0 percent

Kyowa Bank—2.0 percent

FOUNDERS

Konosuke Matsushita

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	\$12,306.0	\$14,999.4	\$15,761.3	\$22,100.6	\$26,751.2
Cash	3,766.1	5,388.3	5,907.3	9,008.7	10,910.2
Receivables	2,975.0	3,399.7	2,544.9	3,378.5	5,963.5
Marketable Securities	1,307.9	1,249.0	2,080.6	3,278.4	1,605.8
Inventory	3,083.1	3,599.9	3,792.2	4,547.7	6,034.2
Other Current Assets	1,173.9	1,362.5	1,436.3	1,887.3	2,237.5
Net Property, Plants	\$2,934.8	\$3,440.2	\$3,763.7	\$4,350.8	\$6,244.0
Investments	\$5,397.4	\$7,200.9	\$7,674.2	\$10,544.9	\$11,492.3
Other Assets	\$861.2	\$1,185.9	\$1,351.2	\$1,734.2	\$4,011.6
Total Assets	\$21,499.4	\$26,826.4	\$28,550.4	\$38,730.5	\$48,499.1
Total Current Liabilities	\$7,325.6	\$8,369.9	\$7,490.4	\$10,277.9	\$16,242.6
Long-Term Debt	\$769.7	\$866.6	\$1,020.5	\$2,389.2	\$4,711.4
Other Liabilities	\$3,251.3	\$4,268.7	\$4,884.1	\$6,245.7	\$5,829.1
Total Liabilities	\$11,346.6	\$13,505.2	\$13,395.0	\$18,912.8	\$26,783.1
Total Shareholders' Equity	\$10,152.9	\$13,321.2	\$15,155.4	\$19,817.7	\$21,716.0
Common Stock	439.5	549.2	613.3	1,157.4	1,244.3
Other Equity	1,211.2	1,314.3	1,465.2	2,257.9	3,173.9
Retained Earnings	8,502.2	11,457.7	13,076.9	16,402.4	17,297.8
Total Liabilities and Shareholders' Equity	\$21,499.5	\$26,826.4	\$28,550.4	\$38,730.5	\$48,499.1
Income Statement	1985*	1986*	1987**	1988*	1989*
Revenue	\$24,890.3	\$28,066.9	\$10,153.6	\$38,522.1	\$41,698.9
Cost of Sales	\$16,197.7	\$19,191.4	\$6,974.9	\$26,508.3	\$27,809.7
R&D Expense	\$1,186.0	\$1,535.0	\$633.0	\$2,171.0	\$2,418.0
SG&A Expense	\$5,928.3	\$6,962.9	\$2,671.3	\$9,745.9	\$10,728.6
Capital Expense	\$1,257.0	\$938.0	\$340.0	\$1,402.0	\$2,465.0
Pretax Income	\$3,396.2	\$2,705.9	\$889.1	\$3,449.7	\$4,010.9
Pretax Margin (%)	13.64	9.64	8.76	8.96	9.62
Effective Tax Rate (%)	54.70	54.10	54.70	52.60	54.20
Net Income	\$1,214.0	\$1,004.1	\$324.5	\$1,302.7	\$1,617.1
Shares Outstanding, Millions	1,784.2	1,790.5	1,790.5	1,861.8	1,955.6
Per Share Data					
Earnings	\$6.63	\$5.51	\$1.78	\$6.73	\$7.57
Dividends	\$0.49	\$0.61	\$0.27	\$0.80	\$0.90
Book Value	\$5.69	\$7.44	\$8.46	\$10.64	\$11.10

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 ^a	1989 ^a
<i>Liquidity</i>					
Current (Times)	1.68	1.79	2.10	2.15	1.65
Quick (Times)	1.26	1.36	1.60	1.71	1.28
Fixed Assets/Equity (%)	28.91	25.83	24.83	21.95	28.75
Current Liabilities/Equity (%)	72.15	62.83	49.42	51.86	74.80
Total Liabilities/Equity (%)	111.76	101.38	88.38	95.43	123.33
<i>Profitability (%)</i>					
Return on Assets	-	4.16	1.17	3.87	3.71
Return on Equity	-	8.55	2.28	7.45	7.79
Profit Margin	4.88	3.58	3.20	3.38	3.88
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	4.76	5.47	6.23	5.64	5.80
Capital Spending % of Revenue	5.05	3.34	3.35	3.64	5.91
Employees	133,963	135,881	134,764	134,186	193,088
Revenue (\$K)/Employee	\$185.80	\$206.56	\$75.34	\$287.08	\$215.96
Capital Spending % of Assets	5.85	3.50	1.19	3.62	5.08

* Fiscal years 1985 and 1986 consist of 12 months ended November 20.

** Fiscal year 1987 represents operations for the 4 months and 11 days ended March 31, 1987.

^a The Company changed its fiscal year from November to March 31. Fiscal years 1988 and 1989 end March 31.

Source: Matsushita Electric
 Annual Reports
 Dataquest
 January 1990

Matsushita Electric Industrial Co., Ltd.

Matsushita Electric Industrial Co., Ltd.
1006 Kadoma, Kadoma City
Osaka 571, Japan
Telephone: 06-908-1121 Telex: J63426
(Billions of Yen except Per Share Data)

Balance Sheet	1984	1985	1986	Mar. 31, 1987*	1988
Total Current Assets	¥2,455	¥4,944	¥2,446	¥2,301	¥2,763
Cash	¥ 687	¥ 765	¥ 878	¥ 862	¥1,126
Receivables	¥ 623	¥ 604	¥ 555	¥ 372	¥ 422
Inventory	¥ 623	¥ 626	¥ 587	¥ 554	¥ 569
Other Current Assets	¥ 522	¥ 503	¥ 426	¥ 513	¥ 646
Net Property, Plant, and Equipment	¥ 546	¥ 596	¥ 561	¥ 550	¥ 544
Depreciation	¥ 723	¥ 863	¥ 979	¥1,034	¥1,127
Other Assets	¥1,140	¥1,270	¥1,366	¥1,317	¥1,535
Total Assets	¥4,141	¥6,810	¥4,373	¥4,168	¥4,841
Total Current Liabilities	¥1,544	¥1,487	¥1,364	¥1,094	¥1,285
Long-Term Debt	¥ 160	¥ 156	¥ 141	¥ 149	¥ 299
Other Liabilities	¥ 607	¥ 660	¥ 696	¥ 713	¥ 781
Total Liabilities	¥2,311	¥2,303	¥2,201	¥1,956	¥2,364
Total Shareholders' Equity	¥1,830	¥2,061	¥2,172	¥2,212	¥2,477
Conv. Preferred Stock					0
Common Stock	¥ 88	¥ 89	¥ 90	¥ 90	¥ 145
Other Equity	¥ 242	¥ 246	¥ 214	¥ 213	¥ 282
Retained Earnings	¥1,500	¥1,726	¥1,868	¥1,909	¥2,050
Total Liability and Total Equity	¥4,141	¥4,364	¥4,373	¥4,168	¥4,841
Revenue	¥4,721	¥5,053	¥4,575	¥1,482	¥4,819
Domestic Sales	¥2,431	¥2,549	¥2,567	¥ 824	¥2,889
Overseas Sales	¥2,289	¥2,504	¥2,008	¥ 658	¥1,930
Cost of Sales	¥3,038	¥3,288	¥3,128	¥1,018	¥3,314
Gross Margin (%)	36	35	32	31	31
R&D Expense	¥ 200	¥ 241	¥ 250	¥ 92	¥ 271
SG&A Expense	¥1,107	¥1,204	¥1,135	¥ 390	¥1,218
Other Operating Expenses	0	0	0	0	0
Total Operating Expenses	¥4,145	¥4,492	¥4,263	¥1,408	¥4,532
Operating Income (Loss)	¥ 576	¥ 561	¥ 312	¥ 74	¥ 287
Interest, Net	¥ 93	¥ 128	¥ 129	¥ 56	¥ 144
Pretax Income	¥ 669	¥ 689	¥ 441	¥ 130	¥ 431
Provision for Taxes (Credit)	¥ 366	¥ 377	¥ 239	¥ 72	¥ 227
Effective Tax Rate (%)	55	55	54	55	53
Extraordinary Items	(¥ 64)	(¥ 66)	(¥ 38)	(¥ 11)	(¥ 42)
Net Income	¥ 239	¥ 246	¥ 164	¥ 47	¥ 162
Avg. Shares Outstanding (Millions)	1,753	1,768	1,780	1,791	1,826
Employees	132,814	133,963	135,881	134,764	134,186
Capital Expenditures	¥ 248	¥ 255	¥ 153	¥ 50	¥ 175
Exchange Rate (Yen per US\$)	237	242	172	155	138

*Effective in 1987, Matsushita changed its fiscal year end to March 1987, and issued a financial report for the one-time fiscal period of November 21, 1986 to March 31, 1987.

Source: Matsushita Electric Industrial
Annual Report
Dataquest
September 1989

Matsushita Electric Industrial Co., Ltd.

Matsushita Electric Industrial Co., Ltd.
1006 Kadoma, Kadoma City
Osaka 571, Japan
Telephone: 06-908-1121 Telex: J63426
(Millions of Dollars except Per Share Data)

Balance Sheet	1984	1985	1986	Mar. 31, 1987*	1988
Total Current Assets	\$10,341	\$10,331	\$14,246	\$14,826	\$20,019
Cash	\$ 2,894	\$ 3,164	\$ 5,114	\$ 5,554	\$ 8,159
Receivables	\$ 2,624	\$ 2,498	\$ 3,232	\$ 2,397	\$ 3,060
Inventory	\$ 2,624	\$ 2,589	\$ 3,419	\$ 3,570	\$ 4,120
Other Current Assets	\$ 2,199	\$ 2,080	\$ 2,481	\$ 3,305	\$ 4,680
Net Property, Plant, and Equipment	\$ 2,300	\$ 2,465	\$ 3,267	\$ 3,544	\$ 3,941
Depreciation	\$ 3,045	\$ 3,569	\$ 5,702	\$ 6,662	\$ 8,165
Other Assets	\$ 4,802	\$ 5,252	\$ 7,956	\$ 8,486	\$11,122
Total Assets	\$17,443	\$18,048	\$25,469	\$26,856	\$35,082
Total Current Liabilities	\$ 6,504	\$ 6,150	\$ 7,944	\$ 7,049	\$ 9,309
Long-Term Debt	\$ 674	\$ 645	\$ 821	\$ 960	\$ 2,164
Other Liabilities	\$ 2,557	\$ 2,730	\$ 4,054	\$ 4,594	\$ 5,657
Total Liabilities	\$ 9,735	\$ 9,524	\$12,819	\$12,603	\$17,131
Total Shareholders' Equity	\$ 7,709	\$ 8,524	\$12,650	\$14,253	\$17,951
Conv. Preferred Stock	0	0	0	0	0
Common Stock	\$ 371	\$ 368	\$ 524	\$ 580	\$ 1,049
Other Equity	\$ 1,019	\$ 1,017	\$ 1,246	\$ 1,372	\$ 2,045
Retained Earnings	\$ 6,318	\$ 7,138	\$10,879	\$12,300	\$14,857
Total Liability and Total Equity	\$17,443	\$18,048	\$25,469	\$26,856	\$35,082
Revenue	\$19,885	\$20,897	\$26,645	\$9,552	\$34,920
Domestic Sales	\$10,241	\$10,542	\$14,950	\$5,312	\$20,933
Overseas Sales	\$ 9,644	\$10,355	\$11,695	\$4,240	\$13,987
Cost of Sales	\$12,797	\$13,598	\$18,218	\$6,562	\$24,014
Gross Margin (%)	36	35	32	31	31
R&D Expense	\$ 842	\$ 997	\$ 1,456	\$ 593	\$ 1,964
SG&A Expense	\$ 4,663	\$ 4,979	\$ 6,610	\$2,513	\$ 8,826
Other Operating Expenses	0	0	0	0	0
Total Operating Expenses	\$17,460	\$18,577	\$24,828	\$9,075	\$32,841
Operating Income (Loss)	\$ 2,425	\$ 2,320	\$ 1,817	\$ 477	\$ 2,080
Interest, Net	\$ 392	\$ 529	\$ 751	\$ 361	\$ 1,040
Pretax Income	\$ 2,817	\$ 2,849	\$ 2,568	\$ 838	\$ 3,120
Provision for Taxes (Credit)	\$ 1,542	\$ 1,559	\$ 1,392	\$ 464	\$ 1,644
Effective Tax Rate (%)	55	55	54	55	53
Extraordinary Items	(\$ 270)	(\$ 273)	(\$ 221)	(\$ 71)	(\$ 301)
Net Income	\$ 1,005	\$ 1,017	\$ 955	\$ 303	\$1,174
Avg. Shares Outstanding (Millions)	1,753	1,768	1,780	1,791	1,826
Employees	132,814	133,963	135,881	134,764	134,186
Capital Expenditures	\$ 1,045	\$ 1,055	\$ 891	\$ 322	\$ 1,270
Exchange Rate (Yen per US\$1)	237	242	172	135	138

*Effective in 1987, Matsushita changed its fiscal year end to March 1987, and issued a financial report for the one-time fiscal period of November 21, 1986 to March 31, 1987.

Source: Matsushita Electric Industrial
Annual Report
Dataquest
September 1989

Matsushita Electric Industrial Co., Ltd.

The following tables are included in this section:

Table 1—Sales by Product Segment (Billions of Yen)

Table 2—Estimated Worldwide Semiconductor Revenue by Calendar Year
(Billions of Yen)

Table 3—Estimated Worldwide Semiconductor Revenue by Calendar Year
(Millions of Dollars)

Table 4—1988 Estimated Semiconductor Revenue Percent by Region (Millions
of Dollars)

Table 5—1988 Percent Change in Worldwide Semiconductor Revenue (Millions
of Dollars)

Table 1

Sales by Product Segment (Billions of Yen)

	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>Nov. 21, 1986- Mar. 31, 1987</u>	<u>1988</u>
Video Equipment	¥1,726.4	¥1,890.2	¥1,502.8	¥ 510.0	¥1,438.0
Audio Equipment	478.9	452.8	391.3	119.3	385.0
Home Appliances	683.3	731.5	707.0	201.5	721.7
Communication and Industrial Equipment	783.9	880.2	859.0	290.0	990.5
Energy and Kitchen- Related Products	193.3	192.9	207.5	73.1	232.4
Electronic Components	542.7	538.1	529.0	182.7	601.3
Other Products	<u>312.2</u>	<u>367.0</u>	<u>378.3</u>	<u>105.8</u>	<u>450.1</u>
Total	¥4,720.7	¥5,052.7	¥4,574.9	¥1,482.4	¥4,819.0
Exchange Rate	237	242	172	155	138

Note: Columns may not add to totals because of rounding.

Source: Matsushita Electric Annual Report
Dataquest
September 1989

Matsushita Electric Industrial Co., Ltd.

Table 2

**Estimated Worldwide Semiconductor Revenue by Calendar Year
(Billions of Yen)**

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
Total Semiconductor	108	106	141	220	216	197	210	245
Total IC	61	62	86	140	142	133	143	173
Bipolar Digital (Technology)	2	2	3	5	5	5	4	4
MOS (Technology)	20	22	38	67	64	65	85	114
NMOS	12	12	24	44	41	40	45	48
PMOS	4	4	3	1	1	1	0	0
CMOS	4	6	11	22	23	24	40	66
BiCMOS								
MOS (Function)	20	22	38	67	64	65	85	114
MOS Memory	2	2	7	19	14	12	13	30
MOS Microdevices	10	12	21	28	27	28	29	30
MOS Logic	8	8	10	20	24	25	44	54
Analog	39	38	46	68	73	63	54	55
Total Discrete	40	36	44	59	54	45	46	49
Transistor	24	23	29	37	33	32	35	37
Diode	12	9	12	16	14	12	11	12
Thyristor	1	1	1	1	1	0	0	0
Other Discrete	2	3	2	4	5	1	0	0
Total Optoelectronic	6	8	11	21	20	19	21	23
Exchange Rate (Yen per US\$1)	221	248	235	237	238	167	144	130

Source: Dataquest
September 1989

Matsushita Electric Industrial Co., Ltd.

Table 3

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

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
Total Semiconductor	487	427	600	928	906	1,176	1,457	1,883
Total IC	277	250	367	592	595	795	994	1,328
Bipolar Digital (Technology)	10	7	13	22	21	28	26	30
MOS (Technology)	91	89	160	283	269	388	592	875
NMOS	53	50	103	184	170	239	310	368
PMOS	18	15	12	5	4	4	2	3
CMOS	20	24	45	94	95	145	280	504
BiCMOS	0	0	0	0	0	0	0	0
MOS (Function)	91	89	160	283	269	388	592	875
MOS Memory	9	9	29	80	58	71	91	230
MOS Microdevices	45	48	88	119	111	167	199	230
MOS Logic	37	32	43	84	100	150	302	415
Analog	176	154	194	287	305	379	376	423
Total Discrete	181	146	188	247	226	266	318	377
Transistor	110	94	122	157	139	191	240	285
Diode	55	38	52	68	60	71	78	92
Thyristor	5	4	4	5	4	0	0	0
Other Discrete	11	10	10	17	23	4	0	0
Total Optoelectronic	29	31	45	89	84	115	145	178
Exchange Rate (Yen per US\$1)	221	249	237	237	238	168	144	130

Source: Dataquest
September 1989

Matsushita Electric Industrial Co., Ltd.

Table 4

1988 Estimated Semiconductor Revenue Percent by Region (Millions of Dollars)

<u>Product</u>	<u>United States</u>	<u>Japan</u>	<u>Europe</u>	<u>ROW</u>
Semiconductor	3%	86.0%	2.0%	8.0%
IC	4%	85.0%	2.0%	9.0%
Bipolar Digital	0	90.0%	10.0%	0
MOS (Technology)	6%	85.0%	3.0%	6.0%
MOS Memory	17%	65.5%	9.5%	8.0%
MOS Micro	3%	93.5%	0	3.5%
MOS Logic	2%	91.0%	0	7.0%
Analog	0	84.0%	1.0%	15.0%
Discrete	2%	85.0%	3.0%	10.0%
Optoelectronics	0	99.0%	1.0%	0
Exchange Rate (Yen per US\$1)				130

Source: Dataquest
September 1989

Table 5

1988 Percent Change in Worldwide Semiconductor Revenue (Millions of Dollars)

	<u>1987</u>	<u>1988</u>	<u>% Change</u>	<u>World Market % Change</u>
Semiconductor	\$1,457	\$1,883	29.2%	33.0%
IC	\$ 994	\$1,328	33.6%	37.4%
Bipolar Digital	\$ 26	\$ 30	15.4%	9.2%
MOS (Technology)	\$ 592	\$ 875	47.8%	54.5%
MOS Memory	\$ 91	\$ 230	152.7%	93.1%
MOS Micro	\$ 199	\$ 230	15.6%	39.9%
MOS Logic	\$ 302	\$ 415	37.4%	29.2%
Analog	\$ 376	\$ 423	12.5%	16.0%
Discrete	\$ 318	\$ 377	18.6%	14.4%
Optoelectronics	\$ 145	\$ 178	22.8%	27.5%
Exchange Rate (Yen per US\$1)	144	130		

Source: Dataquest
September 1989

Matsushita Electric Industrial Co., Ltd.

Matsushita Electric Industrial Co., Ltd.
1006 Kadoma, Kadoma City
Osaka 571, Japan
(06) 908-1121

Established 1918
No. of Employees: 134,186

Matsushita Electronics Corporation
1-1 Saiwai-cho, Takatsui City
Osaka 569, Japan
(0726) 82-5521

BACKGROUND

Matsushita was founded in 1918 by Konosuke Matsushita. It has become the largest consumer electronics company in Japan, the ninth largest worldwide semiconductor manufacturer, and one of the world's 50 largest industrial corporations. The Company's semiconductors are produced by a subsidiary, Matsushita Electronics Corporation (MEC), 65 percent owned by Matsushita and 35 percent owned by N.V. Philips (of the Netherlands).

The top five shareholders in Matsushita are Sumitomo Bank (4.4 percent), Sumitomo Life Insurance (4.4 percent), Nippon Life Insurance (4.0 percent), Matsushita Investment and Development (3.2 percent), and Mitsubishi Trust (3.0 percent). Konosuke Matsushita, founder, owns 2.6 percent of the company.

Matsushita started its GaAs activity in 1971. In 1982, Matsushita developed GaAlAs LEDs and announced a GaAs FET frequency divider (master-slave flip-flop) with a toggle rate of 2.5 GHz and P_d of 25mW. Matsushita also has developed a three-stage GaAs FET amplifier with a small-signal gain of 25dB and an operating range of 30 MHz to 1.7 GHz. The Company is a large-volume producer of lasers for CD players.

Matsushita and TRW are jointly developing 0.8-micron AlGaAs lasers for space communications.

COMPANY EXECUTIVES (GaAs operations)

- Chairman—Masaharu Matsushita
- Head of Marketing—Kazuo Fujimoto
- President, Matsushita Electronics Corporation—Fumio Kanazawa

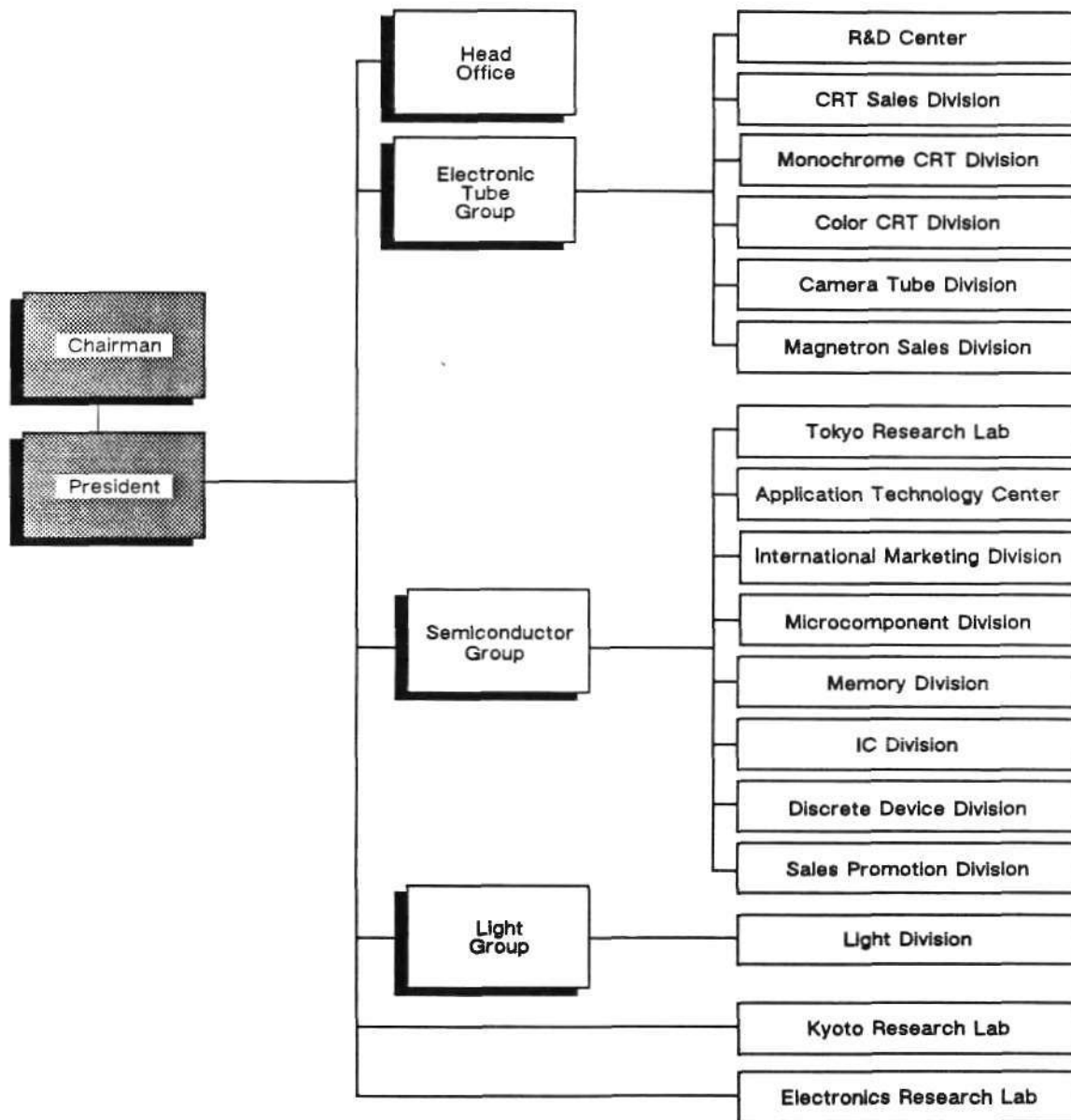
COMPANY ORGANIZATION

Figure 1 shows Matsushita Electric's company organization.

Matsushita Electric Industrial Co., Ltd.

Figure 1

Matsushita Electric Industrial Co., Ltd. Company Organization



0005362-1

Source: Matsushita Electronics Corporation
Dataquest
November 1989

Matsushita Electric Industrial Co., Ltd.

STRATEGIC ALLIANCES

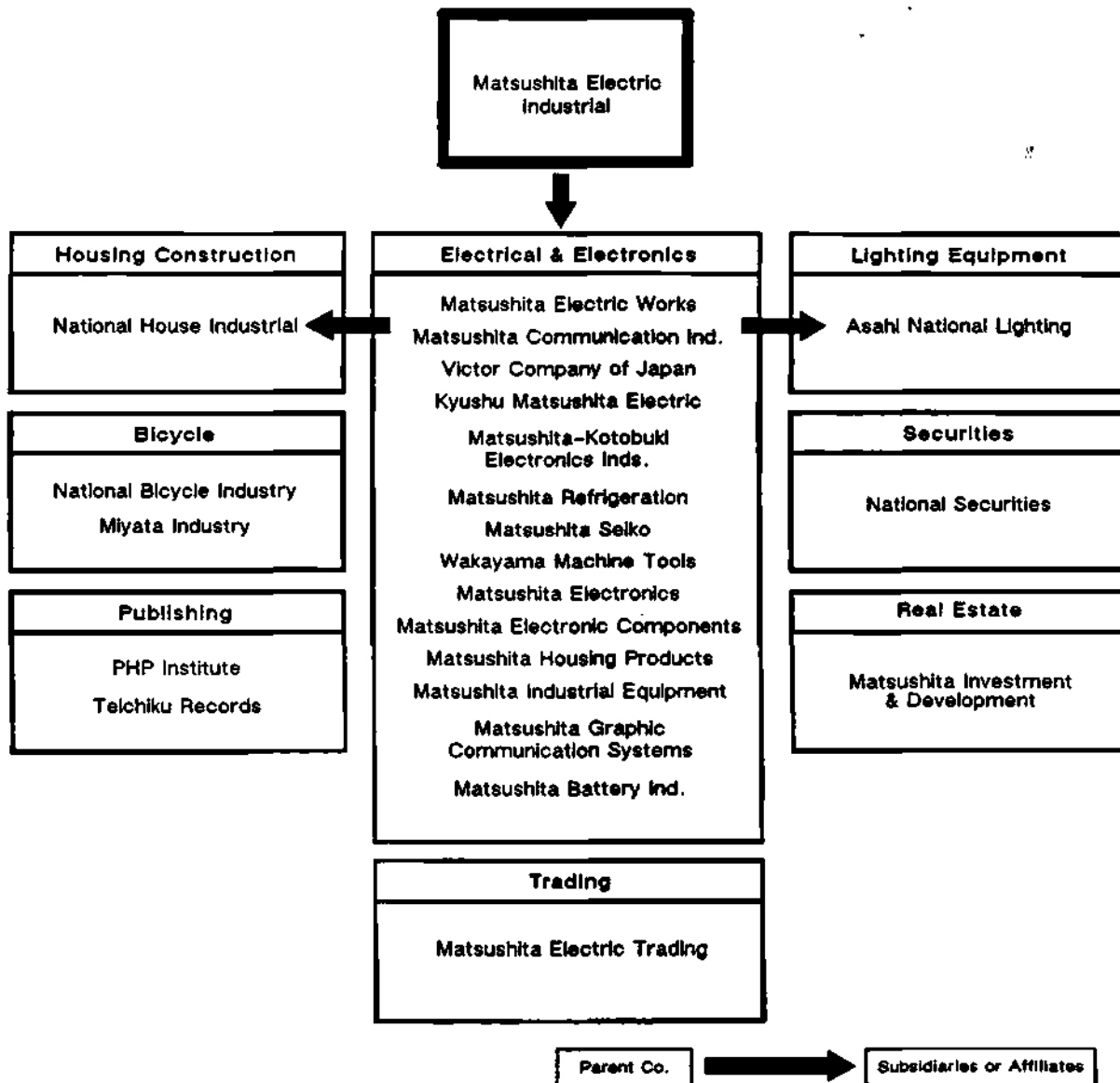
The company has major licensing and second-sourcing agreements with Hewlett-Packard, IBM, 3M Company, Mitsubishi, NTT, Philips, Sanyo, Sharp, and TRW.

Figure 2 is a diagram of the Matsushita Group's structure.

Matsushita Electric Industrial Co., Ltd.

Figure 2

Matsushita Group



0005362-2

Source: Dodwell Marketing Consultants
Industrial Groupings in Japan

Matsushita Electric Industrial Co., Ltd.

PROCESS TECHNOLOGY

The Company uses GaAs MESFET and GaP technology.

PRODUCTS

- GaAs Analog ICs
- GaAs DigICs
- GaAs MMIC amps and other microwave ICs
- Standard logic
- Optoelectronic devices
- LEDs
- GaAs and AlGaAs lasers
- Detectors
- Small-signal and power GaAs transistors

Applications

- Fiber-optic communications
- High-speed instrumentation
- Military/aerospace
- UHF and microwave communications
- Consumer and automotive electronics

Matsushita Electric Industrial Co., Ltd.

FACILITIES

- Kagoshima plant—includes opto production
- Takatsuki plant
- Okayama plant—includes transistor production
- Nagaoka plant—includes opto and discrete production
- Moriguchi City plant—GaAs discrete, GaAs IC, and opto R&D

Matsushita Electric Industrial Co., Ltd.

Matsushita Electric Industrial Co., Ltd.
1006 Kadoma, Kadoma City
Osaka 571, Japan
Telephone: 06-908-1121 Telex: J63426
(Millions of Dollars except Per Share Data)

Balance Sheet (November 20)

	1982	1983	1984	1985	1986
Working Capital	¥ 676.4	¥ 767.6	¥ 911.8	¥1,011.0	¥1,080.6
Long-Term Debt	¥ 49.2	¥ 40.4	¥ 160.0	¥ 156.2	¥ 141.3
Shareholders' Equity	¥1,435.3	¥1,602.1	¥1,830.7	¥2,061.0	¥2,171.4
After-Tax Return on Average Equity (%)	9.2	11.4	13.0	6.3	7.7

Operating Performance (Fiscal Year Ending November 20)

	1982	1983	1984	1985	1986
Revenue	¥3,649.6	¥3,988.5	¥4,720.7	¥5,052.7	¥4,574.9
Japanese Revenue	¥1,964.8	¥2,127.9	¥2,431.3	¥2,549.3	¥2,566.8
Non-Japanese Revenue	¥1,684.8	¥1,860.6	¥2,289.4	¥2,503.4	¥2,008.1
Cost of Revenue	¥2,354.2	¥2,571.0	¥3,038.1	¥3,288.1	¥3,128.2
R&D Expense	¥ 151.2	¥ 174.2	¥ 200.1	¥ 240.7	¥ 250.1
SG&A Expense	¥ 917.6	¥ 991.0	¥1,106.8	¥1,203.4	¥1,134.9
Pretax Income	¥ 428.9	¥ 498.1	¥ 668.4	¥ 689.4	¥ 441.1
Pretax Margin (%)	11.8	12.5	14.2	13.6	9.6
Effective Tax Rate (%)	53.1	53.9	54.7	54.7	54.1
Net Income	¥ 157.1	¥ 182.7	¥ 238.4	¥ 246.4	¥ 163.7
Average Shares Outstanding (Millions)	1,604	1,583	1,753	1,768	1,780
Per Share					
Earnings	¥ 97.92	¥ 103.44	¥ 132.20	¥ 135.08	¥ 89.74
Dividends	¥ 10.00	¥ 9.88	¥ 11.29	¥ 10.00	¥ 10.00
Book Value	¥ 895	¥ 1,012	¥ 1,044	¥ 1,165	¥ 1,220
Price Range*	¥ 900- 1,425	¥ 1,200- 1,800	¥ 1,400- 2,050	¥ 1,050- 1,750	¥ 1,200- 1,950
Total Employees	121,254	124,825	132,814	133,963	135,881
Capital Expenditures	¥ 161.0	¥ 144.5	¥ 247.8	¥ 255.1	¥ 152.8
Exchange Rate (Yen per US\$)	241.5	238.1	237.4	241.8	171.7

*Price ranges are expressed in yen per common share on the Tokyo Stock Exchange. Price ranges for 1982, 1983, 1984, 1985, and 1986 are estimated by Dataquest from bar charts in the Matsushita Annual Reports.

Source: Matsushita Electric
Industrial Co., Ltd.,
Annual Reports
Dataquest
March 1988

Matsushita Electric Industrial Co., Ltd.

Matsushita Electric Industrial Co., Ltd.
1006 Kadoma, Kadoma City
Osaka 571, Japan

Telephone: 06-908-1121 Telex: J63426
(Millions of Dollars except Per Share Data)

Balance Sheet (November 20)

	1982	1983	1984	1985	1986
Working Capital	\$ 2,800.8	\$ 3,223.9	\$ 3,840.8	\$ 4,181.1	\$ 6,293.5
Long-Term Debt	\$ 203.7	\$ 169.7	\$ 674.0	\$ 646.0	\$ 822.9
Shareholders' Equity	\$ 5,943.3	\$ 6,728.7	\$ 7,711.5	\$ 8,523.6	\$12,646.5
After-Tax Return on Average Equity (%)	9.2	11.4	13.0	6.3	7.7

Operating Performance (Fiscal Year Ending November 20)

	1982	1983	1984	1985	1986
Revenue	\$15,112.2	\$16,751.4	\$19,885.0	\$20,896.2	\$26,644.7
Japanese Revenue	\$ 8,135.8	\$ 8,937.0	\$10,241.4	\$10,543.0	\$14,949.3
Non-Japanese Revenue	\$ 6,976.4	\$ 7,814.4	\$ 9,643.6	\$10,353.2	\$11,695.4
Cost of Revenue	\$ 9,748.2	\$10,798.0	\$12,797.4	\$13,598.4	\$18,219.0
R&D Expense	\$ 626.1	\$ 731.6	\$ 842.9	\$ 995.5	\$ 1,456.6
SG&A Expense	\$ 3,799.6	\$ 4,162.1	\$ 4,662.2	\$ 4,976.8	\$ 6,609.8
Pretax Income	\$ 1,776.0	\$ 2,092.0	\$ 2,815.5	\$ 2,851.1	\$ 2,569.0
Pretax Margin (%)	11.8	12.5	14.2	13.6	9.6
Effective Tax Rate (%)	53.1	53.9	54.7	54.7	54.1
Net Income	\$ 650.5	\$ 767.3	\$ 1,004.2	\$ 1,019.0	\$ 953.4
Average Shares Outstanding (Millions)	1,604	1,583	1,753	1,768	1,780
Per Share					
Earnings	\$ 0.41	\$ 0.48	\$ 0.57	\$ 0.56	\$ 0.52
Dividends	\$ 0.04	\$ 0.04	\$ 0.05	\$ 0.04	\$ 0.06
Book Value	\$ 3.71	\$ 4.25	\$ 4.40	\$ 4.82	\$ 7.11
Price Range*	\$ 3.73- 5.90	\$ 5.04- 7.56	\$ 5.90- 8.64	\$ 4.34- 7.24	\$ 6.99- 11.36

Total Employees	121,254	124,825	132,814	133,963	135,881
Capital Expenditures	\$ 666.7	\$ 606.9	\$ 1,043.8	\$ 1,055.0	\$ 889.9

Exchange Rate (Yen per US\$)	241.5	238.1	237.4	241.8	171.7
---------------------------------	-------	-------	-------	-------	-------

*Price ranges are expressed as U.S. dollar conversions of yen per common share on the Tokyo Stock Exchange. Price ranges for 1982, 1983, 1984, 1985, and 1986 are estimated by Dataquest from bar charts in the Matsushita Annual Reports, and converted to U.S. dollars according to the exchange rates given in this table.

Source: Matsushita Electric
Industrial Co., Ltd.,
Annual Reports
Dataquest
March 1988

Matsushita Electric Industrial Co., Ltd.

Table 1

**Matsushita Electric Industrial Co., Ltd.
Sales by Product Group
(Billions of Yen)**

<u>Product Group</u>	<u>Fiscal Year Ending November 20</u>				
	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Video Equipment	¥1,341.4	¥1,443.4	¥1,726.4	¥1,890.2	¥1,502.8
Audio Equipment	484.5	480.7	478.9	452.8	391.3
Home Appliances	590.5	596.4	683.3	731.5	707.0
Communications and Industrial Equipment	452.3	588.4	783.9	880.2	859.0
Energy- and Kitchen- Related Products	180.6	187.0	193.3	192.9	207.6
Electronic Components	309.6	385.4	542.7	538.1	529.0
Other Products	<u>290.7</u>	<u>307.2</u>	<u>312.2</u>	<u>367.0</u>	<u>378.3</u>
Total	¥3,649.6	¥3,988.5	¥4,720.7	¥5,052.7	¥4,575.0
Exchange Rate (Yen per US\$)	241.5	238.1	237.4	241.8	171.7

Columns may not add to totals shown because of rounding.

Source: Matsushita Electric
Industrial Co., Ltd.,
Annual Reports
Dataquest
March 1988

Matsushita Electric Industrial Co., Ltd.

Table 2

**Matsushita Electric Industrial Co., Ltd.
Estimated Semiconductor Revenue
(Millions of Dollars)**

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Total Semiconductor	\$427	\$600	\$928	\$906	\$1,204
Total Integrated Circuit	\$250	\$367	\$592	\$595	\$ 801
Bipolar Digital (Technology)	\$ 7	\$ 13	\$ 22	\$ 21	\$ 28
TTL	-	-	18	17	21
ECL	-	-	4	4	7
Bipolar Digital (Function)	\$ 7	\$ 13	\$ 22	\$ 21	\$ 28
Bipolar Digital Logic	7	13	22	21	28
MOS (Technology)	\$ 89	\$160	\$283	\$269	\$ 386
NMOS	50	103	184	170	238
PMOS	15	12	5	4	3
CMOS	24	45	94	95	144
MOS (Function)	\$ 89	\$160	\$283	\$269	\$ 386
MOS Memory	9	29	80	58	70
MOS Microdevices	48	88	119	111	167
MOS Logic	32	43	84	100	150
Linear	\$154	\$194	\$287	\$305	\$ 387
Total Discrete	\$146	\$188	\$247	\$227	\$ 277
Transistor	\$ 94	\$122	\$157	\$140	\$ 204
Small Signal Transistor	-	-	95	87	129
Power Transistor	-	-	62	53	74
Diode	\$ 38	\$ 52	\$ 68	\$ 60	\$ 70
Small Signal Diode	-	-	68	60	70
Thyristor	\$ 4	\$ 4	\$ 5	\$ 4	-
Other Discrete	\$ 10	\$ 10	\$ 17	\$ 23	\$ 4
Total Optoelectronic	\$ 31	45	\$ 89	\$ 84	\$ 126
LED Lamps	-	-	40	38	\$ 76
Other Optoelectronic	-	-	49	46	\$ 50
Exchange Rate (Yen/US\$)	\$248	\$235	\$237	\$238	\$ 167

Note: Columns may not add to totals shown due to rounding.

Source: Dataquest
March 1988

Matsushita

Matsushita Electric Industrial Co., Ltd.
1006 Kadoma, Kadoma City
Osaka 571, Japan
Telephone: 06-908-1121 Telex: J63426
(Billions of Yen except Per Share Data)

Balance Sheet (November 20)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>Mar. 31, 1987*</u>
Working Capital	¥ 676.4	¥ 767.6	¥ 911.8	¥1,011.0	¥1,080.6	¥1,207.5
Long-Term Debt	¥ 49.2	¥ 40.4	¥ 160.0	¥ 156.2	¥ 141.3	¥ 149.0
Shareholders' Equity	¥1,435.3	¥1,602.1	¥1,830.7	¥2,061.0	¥2,171.4	¥2,212.7
After-Tax Return on Average Equity (%)	9.2	11.4	13.0	6.3	7.7	6.4*

Operating Performance (Fiscal Year Ending November 20)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>Nov. 21, 1986- Mar. 31, 1987**</u>
Revenue	¥3,649.6	¥3,988.5	¥4,720.7	¥5,052.7	¥4,574.9	¥1,482.4
Japanese Revenue	¥1,964.8	¥2,127.9	¥2,431.3	¥2,549.3	¥2,566.8	¥ 824.4
Non-Japanese Revenue	¥1,684.8	¥1,860.6	¥2,289.4	¥2,503.4	¥2,008.1	¥ 658.0
Cost of Revenue	¥2,354.2	¥2,571.0	¥3,038.1	¥3,288.1	¥3,128.2	¥1,018.4
R&D Expense	¥ 151.2	¥ 174.2	¥ 200.1	¥ 240.7	¥ 250.1	¥ 92.4
SG&A Expense	¥ 917.6	¥ 991.0	¥1,106.8	¥1,203.4	¥1,134.9	¥ 390.0
Pretax Income	¥ 428.9	¥ 498.1	¥ 668.4	¥ 689.4	¥ 441.1	¥ 129.8
Pretax Margin (%)	11.8	12.5	14.2	13.6	9.6	8.8
Effective Tax Rate (%)	53.1	53.9	54.7	54.7	54.1	54.7
Net Income	¥ 157.1	¥ 182.7	¥ 238.4	¥ 246.4	¥ 163.7	¥ 47.4
Average Shares Outstanding (Millions)	1,604	1,583	1,753	1,768	1,780	1,791
Per Share						
Earnings	¥ 97.92	¥ 103.44	¥ 132.20	¥ 135.08	¥ 89.74	¥ 25.97
Dividends	¥ 10.00	¥ 9.88	¥ 11.29	¥ 10.00	¥ 10.00	¥ 4.00
Book Value	¥ 895	¥ 1,012	¥ 1,044	¥ 1,165	¥ 1,220	¥ 1,235
Price Range†	¥ 900- 1,425	¥ 1,200- 1,800	¥ 1,400- 2,050	¥ 1,050- 1,750	¥ 1,200- 1,950	N/A
Total Employees	121,254	124,825	132,814	133,963	135,881	134,764
Capital Expenditures	¥ 161.0	¥ 144.5	¥ 247.8	¥ 255.1	¥ 152.8	¥ 49.7
Exchange Rate (Yen per US\$)	241.5	238.1	237.4	241.8	171.7	155.2

*Annualized

**Effective in 1987, Matsushita changed its fiscal year end to March 1987, and issued a financial report for the one-time fiscal period of November 21, 1986, to March 31, 1987.

†Price ranges are expressed in yen per common share on the Tokyo Stock Exchange. Price ranges for 1982, 1983, 1984, 1985, and 1986 are estimated by Dataquest from bar charts in the Matsushita Annual Reports.

Source: Matsushita Electric
Industrial Co., Ltd.,
Annual Reports
Dataquest
December 1987

Matsushita

Matsushita Electric Industrial Co., Ltd.
1006 Kadoma, Kadoma City
Osaka 571, Japan
Telephone: 06-908-1121 Telex: J63426
(Millions of Dollars except Per Share Data)

Balance Sheet (November 20)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>Mar. 31, 1987*</u>
Working Capital	\$ 2,800.8	\$ 3,223.9	\$ 3,840.8	\$ 4,181.1	\$ 6,293.5	\$ 7,780.3
Long-Term Debt	\$ 203.7	\$ 169.7	\$ 674.0	\$ 646.0	\$ 822.9	\$ 960.1
Shareholders' Equity	\$ 5,943.3	\$ 6,728.7	\$ 7,711.5	\$ 8,523.6	\$12,646.5	\$14,257.1
After-Tax Return on Average Equity (%)	9.2	11.4	13.0	6.3	7.7	6.4*

Operating Performance (Fiscal Year Ending November 20)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>Nov. 21, 1986-</u> <u>Mar. 31, 1987**</u>
Revenue	\$15,112.2	\$16,751.4	\$19,885.0	\$20,896.2	\$26,644.7	\$ 9,551.5
Japanese Revenue	\$ 8,135.8	\$ 8,937.0	\$10,241.4	\$10,543.0	\$14,949.3	\$ 5,311.9
Non-Japanese Revenue	\$ 6,976.4	\$ 7,814.4	\$ 9,643.6	\$10,353.2	\$11,695.4	\$ 4,239.6
Cost of Revenue	\$ 9,748.2	\$10,798.0	\$12,797.4	\$13,598.4	\$18,219.0	\$ 6,561.9
R&D Expense	\$ 626.1	\$ 731.6	\$ 842.9	\$ 995.5	\$ 1,456.6	\$ 595.4
SG&A Expense	\$ 3,799.6	\$ 4,162.1	\$ 4,662.2	\$ 4,976.8	\$ 6,609.8	\$ 2,512.9
Pretax Income	\$ 1,776.0	\$ 2,092.0	\$ 2,815.5	\$ 2,851.1	\$ 2,569.0	\$ 836.3
Pretax Margin (%)	11.8	12.5	14.2	13.6	9.6	8.8
Effective Tax Rate (%)	53.1	53.9	54.7	54.7	54.1	54.7
Net Income	\$ 650.5	\$ 767.3	\$ 1,004.2	\$ 1,019.0	\$ 953.4	\$ 305.4
Average Shares Outstanding (Millions) Per Share	1,604	1,583	1,753	1,768	1,780	1,791
Earnings	\$ 0.41	\$ 0.48	\$ 0.57	\$ 0.56	\$ 0.52	\$ 0.17
Dividends	\$ 0.04	\$ 0.04	\$ 0.05	\$ 0.04	\$ 0.06	\$ 0.03
Book Value	\$ 3.71	\$ 4.25	\$ 4.40	\$ 4.82	\$ 7.11	\$ 7.96
Price Range†	\$ 3.73-	\$ 5.04-	\$ 5.90-	\$ 4.34-	\$ 6.99-	N/A
	5.90	7.56	8.64	7.24	11.36	
Total Employees	121,254	124,825	132,814	133,963	135,881	134,764
Capital Expenditures	\$ 666.7	\$ 606.9	\$ 1,043.8	\$ 1,055.0	\$ 889.9	\$ 320.2
Exchange Rate (Yen per US\$)	241.5	238.1	237.4	241.8	171.7	155.2

*Annualized

**Effective in 1987, Matsushita changed its fiscal year end to March 1987, and issued a financial report for the one-time fiscal period of November 21, 1986, to March 31, 1987.

†Price ranges are expressed in U.S. dollar per common share on the Tokyo Stock Exchange. Price ranges for 1982, 1983, 1984, 1985, and 1986 are estimated by Dataquest from bar charts in the Matsushita Annual Reports.

N/A = Not Available

Source: Matsushita Electric
Industrial Co., Ltd.,
Annual Reports
Dataquest
December 1987

Matsushita

THE COMPANY

Executive Summary

Matsushita Electric Industrial Co., Ltd., is the largest electronics company in Japan and one of the 50 largest industrial corporations worldwide, with fiscal 1986 sales of ¥4,574.9 billion (\$26.6 billion). Matsushita's products range from consumer electronic equipment, home appliances and related products, to industrial and communications equipment, and electronic components.

Since 1983, Matsushita has instituted several programs to increase its presence as a multinational company and diversify its product line from primarily consumer electronics to include additional industrial electronic products.

Overview

Matsushita was founded as a family business in 1918 by Konosuke Matsushita, to produce and market an electric adapter plug for consumer products. The company's growth has its roots in the founding principle of Konosuke Matsushita: "To serve society by producing high-quality, high-performance goods and services that meet consumers' needs." Today Matsushita consists of more than 50 non-Japanese manufacturing subsidiaries and 36 sales companies the world over. Products are sold in more than 130 countries under well-known brand names that include National, Panasonic, Technics, and Quasar.

Long-Term Outlook

Matsushita's growth has been based largely on consumer electric and electronic products. However, sales of consumer products have been affected by increasing competition from Southeast Asian manufacturers, and by the effects of the strong yen and trade frictions on exports.

The Company's long-term goal is to maintain its leadership position in its consumer markets while expanding into the industrial electronic product market—preparing for what it believes is the coming home-information/home-automation age.

Matsushita plans to accomplish this by:

- Emphasizing developments in industrial areas that it believes are the new high-growth areas, such as—office automation (OA), new audiovisual (new AV), factory automation (FA), and semiconductors. Since 1984, the areas of industrial and components sales have increased from 25 percent in 1983 to 30 percent in 1986. These actions meet midrange goals, which the company believes will lead into the "next generation of home automation," offering a new base for future growth.

Matsushita

- Restructuring the Company to make the most of the integrated capabilities of the Matsushita group of companies. One step in 1987 was to change the fiscal year end of most of the Matsushita Group companies to March 31, the same as most of the major Japanese companies and the Japanese government.
- Increasing its presence as a multinational company by increasing overseas production.
- Reducing operating and materials-purchase costs.

Company Organization

Matsushita Electric is the parent company of the Matsushita Group, as shown in Figure 1. The group consists of more than 25 companies, involved mostly in electrical and electronics products. The Matsushita Group, formerly a small collection of family businesses, expanded as the home electrical appliance market boomed after World War II.

Matsushita's semiconductors are produced by a subsidiary, Matsushita Electronics Corporation (MEC), which is 65 percent owned by Matsushita Electric and 35 percent owned by N.V. Philips of the Netherlands. MEC was established in 1952. The Semiconductor Group was established in 1957, and semiconductors currently represent 45 percent of MEC's production. Figure 2 shows Matsushita Electronics Corporation's organization chart, including the Semiconductor Group.

Employees

At the end of the 1986 fiscal year, Matsushita Electric employed 135,881 workers. The Company is still headed by a member of the Matsushita family—Chairman Masaharu Matsushita.

Financial Information

Major Shareholders. Matsushita Electric's major shareholders are shown in Table 1.

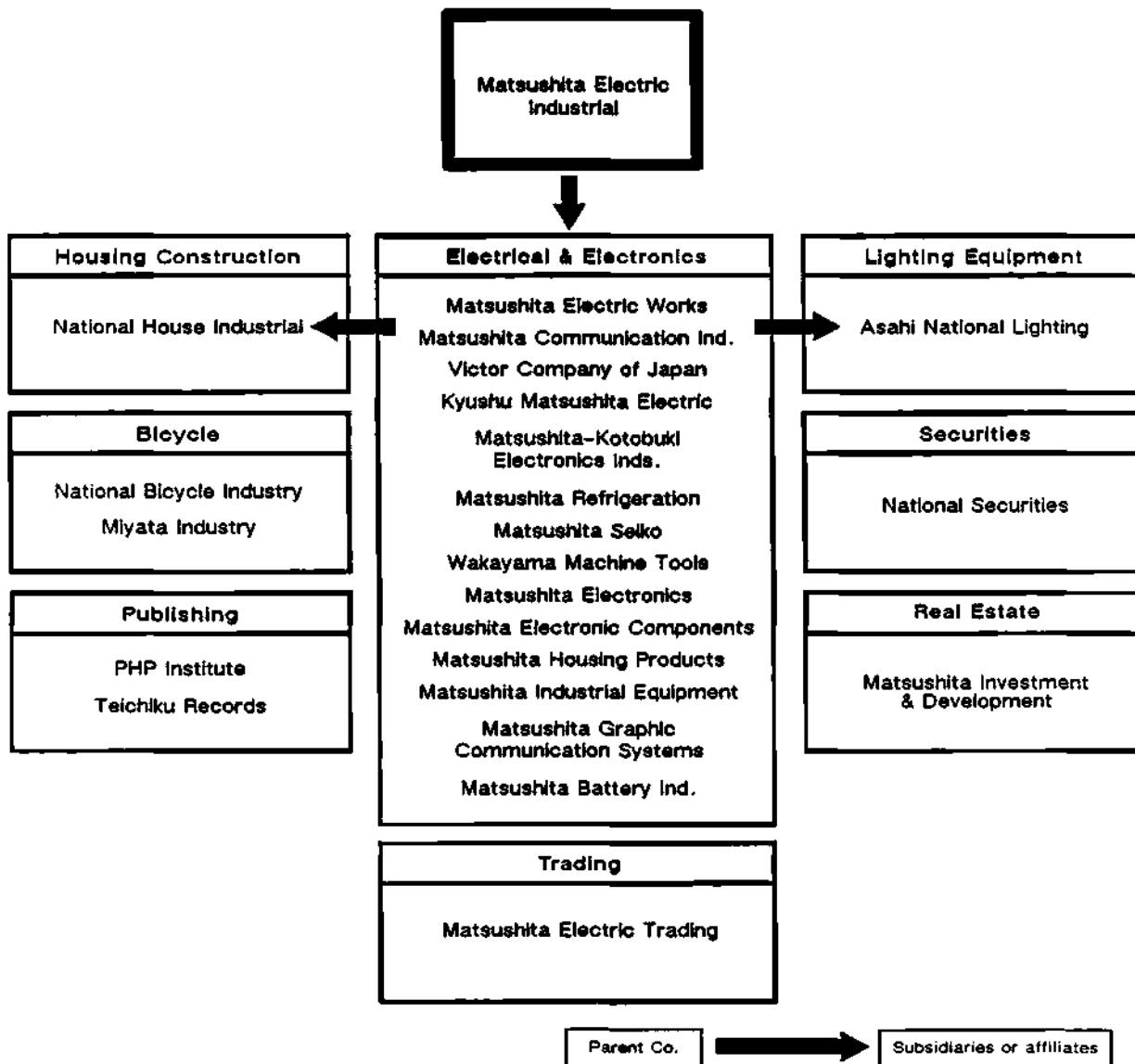
Non-Japanese ownership is 18.6 percent. Matsushita is listed on the three major Japanese stock exchanges, as well as on the Amsterdam, Dusseldorf, Frankfurt, Hong Kong, New York, Pacific, and Paris stock exchanges.

Matsushita reported consolidated net earnings of ¥163.7 billion (\$953.4 million) on sales of ¥4,574.9 billion for the fiscal year ending November 20, 1986. This represents a decline of 34 percent in earnings from fiscal 1985 and a 9 percent decrease in sales.

Matsushita announced that it will unify the fiscal years of most Matsushita Group companies to a March 31 closing—the date used by the Japanese government and many major Japanese companies. Matsushita's fiscal year end was formerly November 20. The period from November 31, 1986, through March 31, 1987, was a one-time, irregular fiscal year. A new 12-month fiscal year began on April 1, 1987.

Matsushita

Figure 1

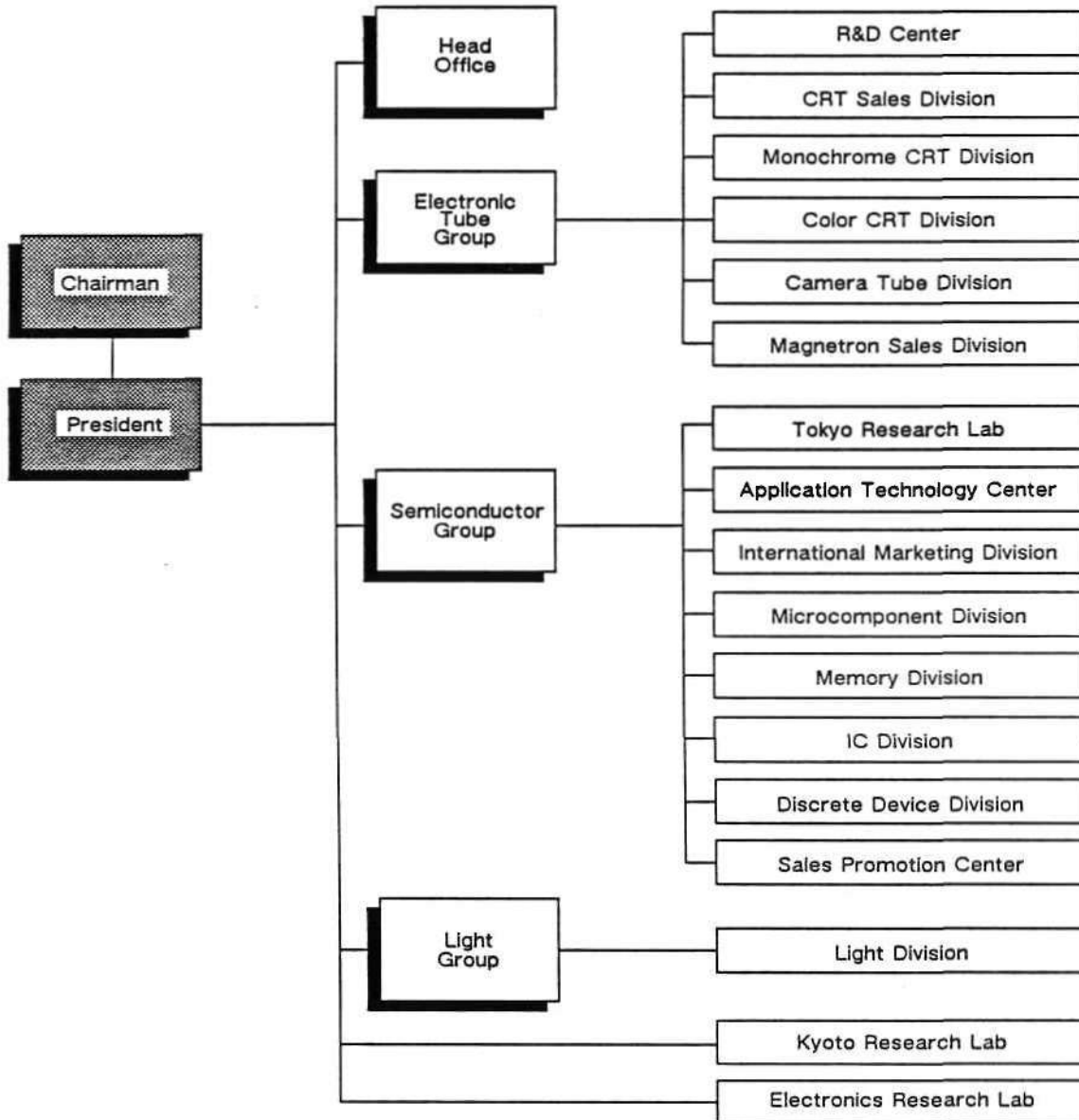
Matsushita Group

Source: Dodwell Marketing Consultants
Industrial Groupings in Japan
1986/87 Tokyo: 1986

Matsushita

Figure 2

Matsushita Electronics Corporation



Source: Matsushita Electronics Corporation
Dataquest
December 1987

Matsushita

Table 1

**Matsushita Electric Industrial Co., Ltd.
Major Shareholders
1986**

<u>Shareholders</u>	<u>Percentage of Ownership</u>
Sumitomo Bank	4.6%
Sumitomo Life Insurance	4.6%
Moxley and Company	4.3%
Nippon Life Insurance	4.1%
Investment and Development	3.8%
Konosuke Matsushita	2.7%
Kyowa Bank	2.0%

Source: Japan Company Handbook

Lines of Business

Matsushita's business operations are divided into the following six major product groups:

- Video equipment
- Audio equipment
- Home appliances
- Communications and industrial equipment
- Energy and kitchen-related products
- Electronic components

Matsushita showed a sales decline in nearly all product groups in 1986. Video equipment, the largest product group, reported that sales grew in Japan due to TV and VTR shipments; however, overall sales fell 20 percent, due to low non-Japanese sales. Communications and industrial equipment, the second largest group, showed a 2 percent decrease from 1985, due to a reduced demand for office-automation and factory-automation products. Electronic components showed a 2 percent decrease; however, semiconductor sales, which are included in electronic components, increased by 33 percent.

Matsushita

Table 2 shows Matsushita sales by product group from 1982 to 1986. Figure 3 graphically illustrates the changing makeup of the Company's lines of business by product group.

Table 2

**Matsushita Electric Industrial Co., Ltd.
Sales by Product Group
(Billions of Yen)**

<u>Product Group</u>	<u>Fiscal Year Ending November 20</u>					<u>Nov. 21, 1986- Mar. 31, 1987</u>
	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	
Video Equipment	¥1,341.4	¥1,443.4	¥1,726.4	¥1,890.2	¥1,502.8	¥ 510.0
Audio Equipment	484.5	480.7	478.9	452.8	391.3	119.3
Home Appliances	590.5	596.4	683.3	731.5	707.0	201.5
Communications and Industrial Equipment	452.3	588.4	783.9	880.2	859.0	290.0
Energy- and Kitchen-Related Products	180.6	187.0	193.3	192.9	207.6	73.1
Electronic Components	309.6	385.4	542.7	538.1	529.0	182.7
Other Products	290.7	307.2	312.2	367.0	378.3	105.8
Total	¥3,649.6	¥3,988.5	¥4,720.7	¥5,052.7	¥4,575.0	¥1,482.4
 Exchange Rate (Yen per US\$)	 241.5	 238.1	 237.4	 241.8	 171.7	 155.2

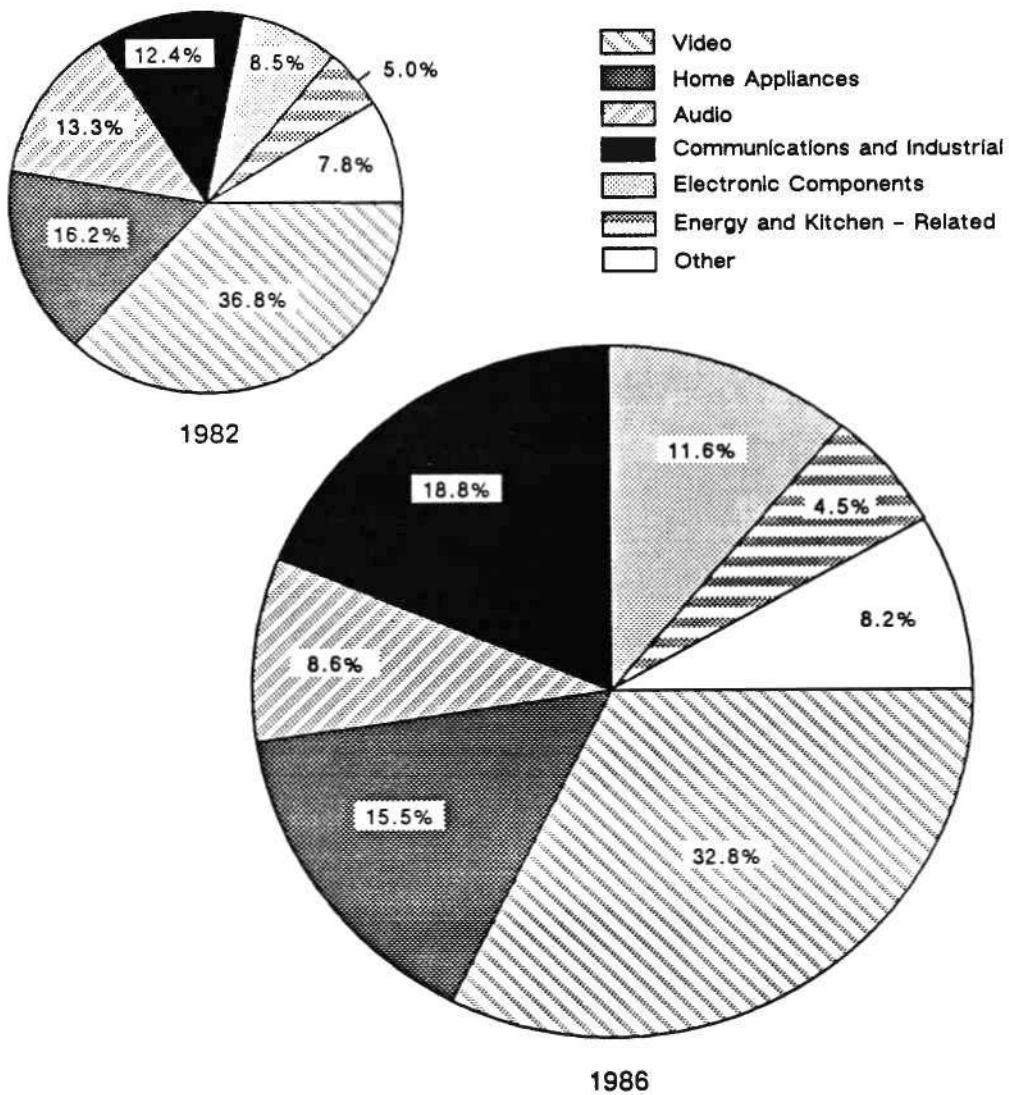
Columns may not add to totals shown because of rounding.

Source: Matsushita Electric
Industrial Co., Ltd.,
Annual Reports
Dataquest
December 1987

Matsushita

Figure 3

Matsushita Electric Industrial Co., Ltd.
Revenue by Product Line



Source: Matsushita Electric Industrial Co., Ltd.
Dataquest
December 1987

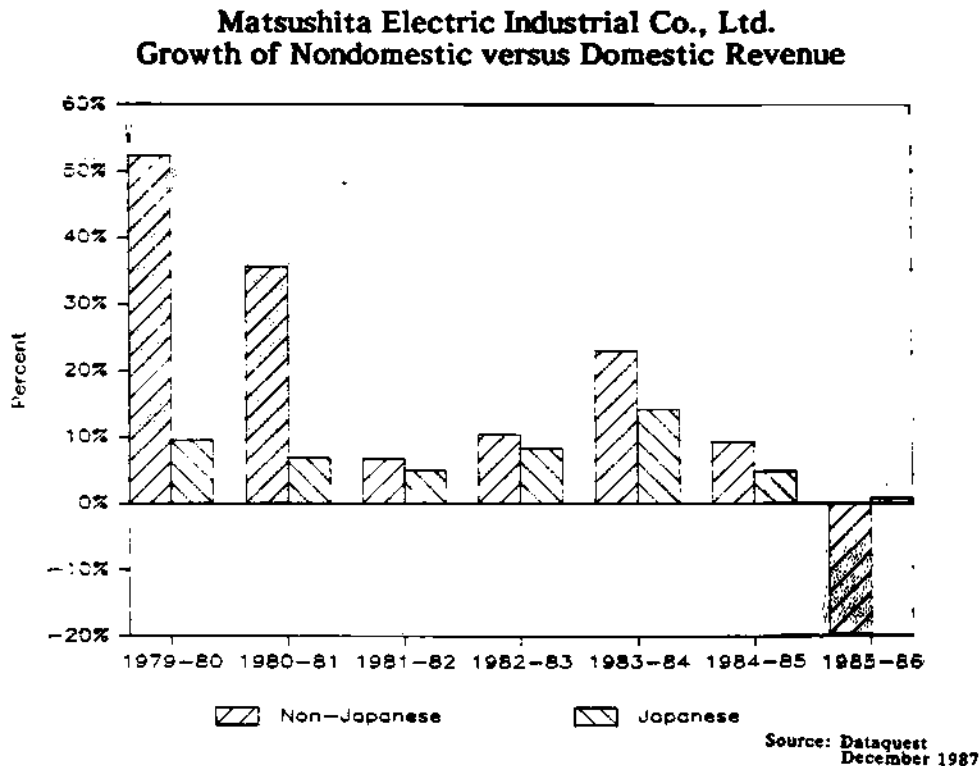
Matsushita

International Activities

Non-Japanese sales in 1986 decreased 20 percent to ¥2,008.1 billion. The decline was affected by the yen's escalation, a decrease in exports to the People's Republic of China, the trade friction, and competition from newly industrialized countries. In response, Matsushita stressed exports of high-value-added products and accelerated expansion of production facilities overseas.

Non-Japanese sales in 1986 accounted for 44 percent of revenue, compared with 50 percent in fiscal 1985. These percentages are significantly higher than comparable figures for Fujitsu, Hitachi, Mitsubishi, NEC, and Toshiba; but they are not surprising if one realizes that most of Matsushita's products are consumer products and that the Company's audio and video equipment is a dominating force in international markets. Figure 4 shows the year-to-year growth of Matsushita's non-Japanese and Japanese sales from 1980 through 1986.

Figure 4



Facilities

Companywide, Matsushita has more than 50 manufacturing companies outside Japan. These companies are located in North, Central, and South America; the Far East; Oceania; Africa; and Europe. The Company also has 35 sales companies worldwide.

Matsushita

Matsushita Electronics Corporation has 10 semiconductor manufacturing facilities: 8 in Japan, 1 in the United States, and 1 in Singapore. These are listed in Table 3. The Company also plans to build a new U.S. semiconductor plant in the midwest sometime in 1987, although no details are available yet. Currently, hybrid assembly is performed at Matsushita Electronic Components Company in Santa Clara, California.

Table 3

Matsushita Electronics Corporation Semiconductor Manufacturing Facilities

<u>Map Code*</u>	<u>Facility</u>	<u>Location</u>	<u>Function and Products</u>
A	Arai Works	Niigata Prefecture	Fab, assembly, test--ICs
B	Kagoshima Matsushita Denshi	Kagoshima Prefecture	Assembly--optoelectronics, germanium transistors
C	Nagaoka Factory	Kyoto Prefecture	Fab, assembly, and test--ICs, discretes, and optoelectronics; VLSI R&D
D	Okayama Factory	Okayama Prefecture	Assembly--transistors
E	Utsunomiya Factory	Tochigi Prefecture	Assembly--silicon transistors and diodes
F	Toyo Dempa (Affiliate)	Kyoto Prefecture	Assembly--silicon diodes
G	West Denki (Affiliate)	Osaka Prefecture	Assembly--germanium diodes
H	Uozu Factory	Toyama Prefecture	Fab, assembly--MOS logic and MPU
N/A	Matsushita Denshi Pte.	Singapore	Assembly--silicon transistors, ICs
N/A	Matsushita Electronic Components Company	Santa Clara, CA	Assembly--custom hybrid ICs

N/A = Not Applicable

*Map code refers to map in Figure 5, which shows Matsushita semiconductor factory locations in Japan.

Source: Dataquest
December 1987

Matsushita

Two plants, built recently at Uozu, came on-line in February and April of 1985, respectively. Figure 5 is a map of Japan showing the Japanese factory locations.

Figure 5

Matsushita Electronics Corporation Japanese Semiconductor Manufacturing Facilities



Source: Dataquest
December 1987

Matsushita

Capital and R&D Spending

Slow demand growth held 1986 capital spending to 40 percent below the 1985 level. Still, Matsushita's capital spending totaled ¥152.8 billion (\$889.9 million). In 1986, R&D spending increased 4 percent to ¥250.1 billion (\$1,456.6 million), equal to 5.5 percent of sales.

Capital and R&D spending in 1986 totaled ¥402.9 billion, or 9 percent of revenue. The Company invested about one-half of its R&D and capital expenditures budget in its four areas of emphasis—office automation, new audiovisual (new AV), factory automation, and semiconductors. Capital investments included investments in R&D facilities aimed at future growth, operational facilities in the Company's new areas, and modernization/rationalization programs.

Table 4 shows Matsushita's capital and R&D spending from 1982 through 1986 in yen. Table 5 shows Matsushita's capital and R&D spending in dollars.

Table 4
Matsushita Electronics Corporation
Capital and R&D Spending as a Percentage of Sales
(Billions of Yen)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Revenue	¥3,649.6	¥3,988.5	¥4,720.7	¥5,052.7	¥4,574.9
Capital Spending	¥ 161.0	¥ 144.5	¥ 247.8	¥ 255.1	¥ 152.8
Percentage of Revenue	4.4%	3.6%	5.3%	5.1%	3.3%
R&D Spending	¥ 151.2	¥ 174.2	¥ 200.1	¥ 240.7	¥ 250.1
Percentage of Revenue	4.1%	4.3%	4.2%	4.8%	5.5%
Combined Capital and R&D Spending	¥ 312.2	¥ 318.7	¥ 447.9	¥ 495.8	¥ 402.9
Percentage of Revenue	8.5%	7.9%	9.5%	9.9%	8.8%
Percentage of Increase (Decrease)	(5.4%)	2.1%	40.5%	10.7%	(18.7%)
Exchange Rate (Yen per US\$)	241.5	238.1	237.4	241.8	171.7

Source: Matsushita Electric
Industrial Co., Ltd.,
Annual Reports
Dataquest
December 1987

Matsushita

Table 5

**Matsushita Electronics Corporation
Capital and R&D Spending in Dollars
(Millions of Dollars)**

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Revenue	\$15,112.2	\$16,751.4	\$19,885.0	\$20,896.2	\$26,644.7
Capital Expenditures	\$ 666.7	\$ 606.9	\$ 1,043.8	\$ 1,055.0	\$ 889.9
R&D Expense	\$ 626.1	\$ 731.6	\$ 842.9	\$ 995.5	\$ 1,456.6

Source: Matsushita Electric
Industrial Co., Ltd.,
Annual Reports
Dataquest
December 1987

Several Japanese companies cut back their capital spending for calendar year 1986 by amounts greater than 30 percent, Matsushita among them. Table 6 shows Matsushita Electronics Corporation's semiconductor capital spending for the last five years.

Table 6

**Matsushita Electronics Corporation
Semiconductor Capital Spending by Calendar Year
(Millions of Dollars)**

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Semiconductor Revenue	\$427	\$600	\$928	\$906	\$1,204
Semiconductor Capital Spending	\$ 36	\$ 89	\$371	\$366	\$ 144
Percentage of Semiconductor Revenue	8.4%	14.8%	40.0%	40.4%	12.0%

Source: Dataquest
December 1987

Matsushita

Research and Development

Matsushita has a strong ongoing commitment to R&D, focused on technologies that fulfill the needs of the coming information-oriented society.

Semiconductor R&D is conducted with the cooperation of Matsushita's various research laboratories and its semiconductor subsidiary, Matsushita Electronics Corporation. Matsushita has five semiconductor R&D laboratories. They are as follows:

- **Materials Research Laboratory**—Performs research and development of materials used in electronic components
- **Matsushita Electronics Corporation Research Laboratory**—Performs semiconductor research and development
- **Matsushita Technology Research Corporation** (Kanagawa prefecture), a subsidiary of Matsushita Electric Industrial Co., Ltd.
- **Matsushita Electric and Matsushita Electronics** have both built new VLSI laboratories; the first is at Kadoma, Osaka prefecture, and the second is at Kyoto.

VLSI research and development is also carried out at the Nagaoka Factory in Kyoto prefecture.

Matsushita's recent R&D achievements include the following:

- **Development of an Integrated Work Processor (IWP)** that includes a word processor, personal computer, facsimile, and copier in one workstation
- **Development with NTT of a large-scale optical fiber LAN system** that can transmit 100 Mbits per second
- **Development of a biaspheric molded glass lens for CD player pickup**, replacing the four or five ground lenses used in conventional systems

PRODUCTS AND MARKETS

Semiconductor Products and Markets

Matsushita is the largest worldwide supplier of linear ICs and the eighth largest worldwide semiconductor supplier. Estimated semiconductor revenue in 1986 was \$1,204 million, as shown in Table 7. This amount represents a 33 percent increase, compared to \$906 million in 1985.

Matsushita

Table 7

Matsushita Electric Industrial Co., Ltd.
Estimated Semiconductor Revenue
(Millions of Dollars)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Total Semiconductor	\$427	\$600	\$928	\$906	\$1,204
Total Integrated Circuit	\$250	\$367	\$592	\$595	\$ 801
Bipolar Digital (Technology)	\$ 7	\$ 13	\$ 22	\$ 21	\$ 28
TTL	-	-	18	17	21
ECL	-	-	4	4	7
Bipolar Digital (Function)	\$ 7	\$ 13	\$ 22	\$ 21	\$ 28
Bipolar Digital Logic	7	13	22	21	28
MOS (Technology)	\$ 89	\$160	\$283	\$269	\$ 386
NMOS	50	103	184	170	238
PMOS	15	12	5	4	3
CMOS	24	45	94	95	144
MOS (Function)	\$ 89	\$160	\$283	\$269	\$ 386
MOS Memory	9	29	80	58	70
MOS Microdevices	48	88	119	111	167
MOS Logic	32	43	84	100	150
Linear	\$154	\$194	\$287	\$305	\$ 387
Total Discrete	\$146	188	247	227	277
Transistor	\$ 94	\$122	\$157	\$140	\$ 204
Small Signal Transistor	-	-	95	87	129
Power Transistor	-	-	62	53	74
Diode	\$ 38	\$ 52	\$ 68	\$ 60	\$ 70
Small Signal Diode	-	-	68	60	70
Thyristor	\$ 4	\$ 4	\$ 5	\$ 4	-
Other Discrete	\$ 10	\$ 10	\$ 17	\$ 23	\$ 4
Total Optoelectronic	\$ 31	45	\$ 89	\$ 84	\$ 126
LED Lamps	-	-	40	38	\$ 76
Other Optoelectronic	-	-	49	46	\$ 50
Exchange Rate (Yen/US\$)	\$248	\$235	\$237	\$238	\$ 167

Note: Columns may not add to totals shown due to rounding.

Source: Dataquest
December 1987

Matsushita

Linear product revenue in 1986 was \$387 million, an increase of 27 percent over \$305 million in 1985. The increase was less than the industry growth of 30 percent. However, Matsushita grew steadily over the last five years, overtaking National Semiconductor in 1986.

Table 8 shows the top five suppliers of linear products and their revenue for five years.

Table 8
Top Five Suppliers of Linear Products
(Millions of Dollars)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1986 Percentage of Market</u>
Matsushita	\$154	\$194	\$287	\$305	\$387	6.4%
National Semiconductor	\$255	\$374	\$433	\$370	\$384	6.3%
Toshiba	\$101	\$134	\$228	\$235	\$375	6.2%
NEC	\$156	\$192	\$290	\$300	\$363	6.0%
Texas Instruments	\$235	\$296	\$409	\$335	\$352	5.8%

Source: Dataquest
December 1987

The Company also grew faster than the industry growth rate for bipolar logic devices and optoelectronic devices, as shown in Table 9. In addition, Matsushita showed increases in NMOS devices (53 percent), CMOS devices (52 percent), MOS memory (21 percent), MOS microdevices (50 percent), and MOS logic (50 percent). The rate of change in total discrete revenue was less than the industry growth rate; however, transistors, the Company's largest discrete product line, showed a 46 percent change from 1985.

Dataquest believes that, in 1986, approximately 2 percent of Matsushita's semiconductor sales were to the United States, 3 percent were to Europe, 6 percent were to the ROW countries, and the largest segment (88 percent) were domestic sales. Table 10 shows the estimated geographic distribution of Matsushita's semiconductor sales.

Matsushita

Table 9

**Matsushita Electric Industrial Co., Ltd.
Worldwide Ranking by Semiconductor Markets**

(Millions of Dollars)

	<u>1986 Rank</u>	<u>1985 Rank</u>	<u>1986 Semi. Revenue</u>	<u>Revenue % Change 1985-1986</u>	<u>Industry % Change 1985-1986</u>
Total Semiconductor	8	10	\$1,204	33%	25%
Total IC	11	11	801	35%	24%
Bipolar Digital	17	24	28	33%	14%
MOS Digital	9	11	386	43%	25%
Linear	1	3	387	27%	30%
Total Discrete	5	6	277	22%	25%
Total Optoelectronic	3	4	126	50%	37%

Source: Dataquest
December 1987

Table 10

**Matsushita Electric Industrial Co., Ltd.
Estimated 1986 Semiconductor Revenue
by Geographic Region
(Millions of Dollars)**

	<u>United States</u>	<u>Japan</u>	<u>Europe</u>	<u>ROW</u>	<u>Total</u>
Total Semiconductor	\$27	\$1,060	\$ 39	\$ 77	\$1,204
Total Integrated Circuit	\$21	735	12	33	801
Bipolar Digital	-	28	-	-	28
MOS	17	368	-	-	386
Linear	4	338	12	33	387
Total Discrete	\$ 6	213	14	44	277
Total Optoelectronic	\$ -	113	13	-	126

Source: Dataquest
December 1987

Matsushita

Semiconductor Products and Technologies

Matsushita's semiconductor product line includes the following:

- Bipolar digital logic—LSTTL and ECL
- MOS memory—CMOS and NMOS SRAMs, DRAMs, ROMs and EPROMs, MNOS nonvolatile memory
- MOS microdevice—4-, 8-, 16-, and 32-bit MPUs, MCUs, and microperipherals
- MOS logic—Standard CMOS logic, CMOS gate arrays, and standard cells
- Linear—Op amps, comparators, industrial linear ICs, D/A and A/D converters
- Discrete—Small signal and power transistors, junction FETs, thyristors, diodes, GaAs FETs
- Optoelectronic—LEDs, GaAs semiconductor lasers, microwave ICs

Table 11 lists Matsushita's semiconductor developments chronologically.

Table 11

MATSUSHITA SEMICONDUCTOR DEVELOPMENTS

<u>Year</u>	<u>Development</u>
1957	Semiconductor division formed First products: germanium transistors and diodes
1957-1967	Developed discrete products, especially power and optoelectronic products
1967	Developed linear ICs for internal use
1971	Developed PMOS 4-bit MPU
1975	Developed 16-bit MPU (MN1610) Developed CMOS watch and calculator chips
1977	Developed 4-bit MCU (MN1400) in PMOS, NMOS, and CMOS, with 2K of ROM on board, for consumer applications

(Continued)

Matsushita

Table 11 (Continued)

MATSUSHITA SEMICONDUCTOR DEVELOPMENTS

<u>Year</u>	<u>Development</u>
1979	Developed higher-speed version of MN1400 (MN1500), with 4K of ROM on board
1982	Developed GaAlAs LED Developed GaAs monolithic frequency divider using source-coupled FET logic
1983	Developed 4 GHz, 25mW GaAs IC using source-coupled FET logic
1984	Developed semiconductor laser with continuous oscillation of 200mW
1985	Developed 3-dimensional CMOS devices on an experimental basis
1985	Developed world's first 4Mb mask ROM

Source: Matsushita Electronics Corporation
Dataquest
December 1987

Other activities in the semiconductor area include the following:

- Development of dual laser-beam recrystallization technology and stacked-layer construction incorporating planarized heat dispersal for fabrication of three-dimensional LSIs
- Development of a halftone image-processing LSI
- A new bipolar-device-manufacturing process technology (SDD-1) that prevents damage during ion implantation and dry etching, with a maximum cutoff frequency of 14 GHz; 72ps propagation-delay time, unique dummy pattern process and self-matching double diffusion (SDD) process for polysilicon
- Successful manufacture of an N-channel power MOSFET at microwave length, with an operation frequency of 2.45 GHz. The MOSFET has power output of 7W and withstands voltage of 75V.

Matsushita

Matsushita is a leader in GaAs technology and is involved in the Japanese government-sponsored optoelectronics project. Some of the Company's recent developments in this area include the following:

- 1982—GaAlAs LED
- 1982—GaAs monolithic frequency divider using source-coupled FET logic
- 1983—4-GHz, 25mW, GaAs IC using source-coupled FET logic
- 1984—GaAs low-noise transistors for satellite broadcast reception
- 1985—A highly sensitive GaAs Hall device with 300mV Hall output voltage
- 1986—An ultrahigh-speed GaAs IC for optical transmission using an E-type FET; operation speed is 1.6 Gbps with less than 0.5W of power consumption

The following are some announcements Matsushita made in 1986 and 1987:

- GaAs
 - A GaAs wideband, low-loss, double-balanced mixer IC for operation from 50 MHz to 2 GHz
 - A GaAs laser noise canceler IC, the MEL5005
 - A GaAlAs laser that achieved 28-mW output through improvements to its buried twin ridge substrate (BTRS) structure. The Company will produce the chip in volume as a 50mW device.
 - A GaAs op amp IC, claimed to be 100 times faster than Si op amps, for high-frequency applications, including those pertaining to video amplifiers
 - An experimentally manufactured 1.0-micron stripe GaAlAs laser, which has a 15mA threshold current and 1.05 ellipticity, with a new semiconductor laser process using MOCVD
- Optoelectronics
 - The development of a second harmonic generation (SHG) device for operation at a 0.4-micron wavelength. The niobic acid lithium crystal device will be combined with YAG lasers and semiconductor lasers to implement practical hardware.
 - A new semiconductor laser, called a monolithic two-beam GaAlAs laser array, for read/write optical disk applications. The laser is capable of generating two kinds of laser optical output—one for writing and the other for reading—on a single chip.

Matsushita

- A prototypical optoelectronic IC (OEIC) that combines an AlGaAs semiconductor laser with 30mW of output and a high-frequency oscillator for laser noise reduction. Forty-four elements are integrated in the device, including one semiconductor laser, 25 MESFETs, and 18 diodes, onto a chip measuring 0.35 x 1.2mm.
- Digital signal processing
 - A high-speed, high-efficiency DSP, 2-micron, double-layer-aluminum and double-layer-polysilicon CMOS process, 7.52 x 7.24mm chip, 160,000 elements, 100ns cycle times, two 4K (256x16) of RAM and 2,048x32 of instruction ROM, 100mW of power consumption
- ASICs
 - An analog cell library, including D/A and A/D converters, op amps, comparator, and analog switch
 - A megacell library, 2-micron-rule, double-aluminum CMOS process featuring 4-bit CPU and 4- and 8-bit peripherals; 1,000 transistors on a 4mm square 4-bit CPU; 2,500 to 10,000 transistors on a 4 x 8mm, 8-bit CPU peripheral
 - A GaAs gate array series of 200 to 1,000 gates

Emerging Areas

At the 1987 ISSCC, Matsushita delivered several papers on the following topics:

- A 16Mb trench-capacitor-method memory cell with error checking
- A CMOS 4Mb DRAM with 100ns access time and 250mW to 300mW of power consumption
- A 3-D 8K SRAM utilizing multilayer monocrystal technology and heat-resistant interconnect wiring, 120ns access time, 7.5 x 8mm, 50,000 elements, 2Kx4 structure
- Four 256K CMOS SRAMs (MN23258), 32Kx8, 70/85/100/120ns, 9.18 x 5.67mm chip, maximum power consumption of 375mW, and 40mW at 1 MHz
- A small outline package version of 256K SRAM (M5M5256P series), 100/120/150ns access times, 2mA of standby current
- Two 4Mb mask ROMs (MN234000/01), one in NMOS (250ns) and one in CMOS (200ns)

Matsushita

- Two 1Mb mask ROMs, 131Kx8, 250ns CMOS (MN231000) and 150ns NMOS (MN231001)
- Two 256K mask ROMs, 32Kx8, 200ns CMOS and NMOS
- A 200ns, 128K NMOS ROM
- A 150ns, 64K NMOS mask ROM
- A CMOS 32-bit MPU with on-chip cache memory

Semiconductor Agreements

Matsushita, Sharp, Sanyo, and Mitsubishi are involved in a project to develop microprocessors for parallel-processing computers that run multiple processes at the same time.

In addition, Matsushita has formed agreements with the following companies:

- **Denko Company:** In September 1985, Matsushita developed vertical CVD equipment for thin-film ULSIs jointly with Denko, a semiconductor equipment maker.
- **Japan Compound Gum (Hayashibara):** In February 1986, Matsushita Denso and Biochemical signed a production contract to have Japan Compound Gum produce water-soluble photoresist (WSP), a new material for submicron (0.6- to 0.7-micron) patterns required for 4Mb DRAMs and above. The photoresist can be used with i-line and g-line steppers. Japan Compound Gum will supply the photoresist for Matsushita Electronics. Matsushita Denso and Hayashibara, which will jointly develop WSP, will supply production technology.
- **Nikon:** In the first quarter of 1987, Matsushita and Nikon agreed to develop an i-line stepper and excimer laser capable of 0.8-micron geometries for 16Mb DRAMs
- **NTT:** In January 1986, Matsushita and NTT signed a technical cooperation agreement to jointly develop 4Mb and higher DRAMs for computer and consumer applications. The two companies will share patents and R&D facilities, and will exchange engineers.
- **Philips:** Matsushita Electric and Philips formed Matsushita Electronics Corporation (MEC) in 1952. The Matsushita subsidiary produces electronic components and lighting products in Japan. MEC is 35 percent owned by Philips, with the remainder held by Matsushita.

Matsushita

In August 1986, Philips entrusted MEC to produce LSIs for Philips' compact disk players.

In December 1986, Philips and Matsushita agreed to join forces to launch a new family of 8-bit CMOS microcontrollers. Under the agreement, Matsushita will manufacture and market the PCF84CXX family designed by Philips.

- SAE Corp.: In the first quarter of 1987, Matsushita and SAE (Dover, Delaware) announced that they will develop a 64-bit MPU that will operate at 10 mips, with a 50-MHz clock frequency and a 2.5cm square chip.

Product Portfolio Analysis

Figure 6 is a graphic analysis of Matsushita's 1986 semiconductor product portfolio compared with worldwide competition. Figure 7 presents the same analysis applied only to the Company's Japanese competition. These figures show which product areas the Company has chosen to focus on.

The y axis is the historical product CAGR from 1982 to 1986. Matsushita's CAGR for each product is marked by a small square. In Figure 6, the worldwide product CAGR is marked by a dot surrounded by a circle that represents the total world market for the product. In Figure 7, the total Japanese company CAGR for each product is marked by a dot surrounded by a circle that represents total Japanese company sales for the products.

The locations of graph points can be interpreted as follows:

- Upper Right Quadrant—These are the "developing products." The Company is not the leading supplier in these products, but the products exhibit positive growth.
- Upper Left Quadrant—These are the "stars." The Company is the leading supplier of these products, and the products exhibit positive growth.
- Lower Left Quadrant—These are the "cash cows." The Company is the leading supplier in a declining product segment, but there is generally a high profit margin on these products.
- Lower Right Quadrant—These are the "dogs." The TAM for this product area is declining and the Company is not the leading supplier.

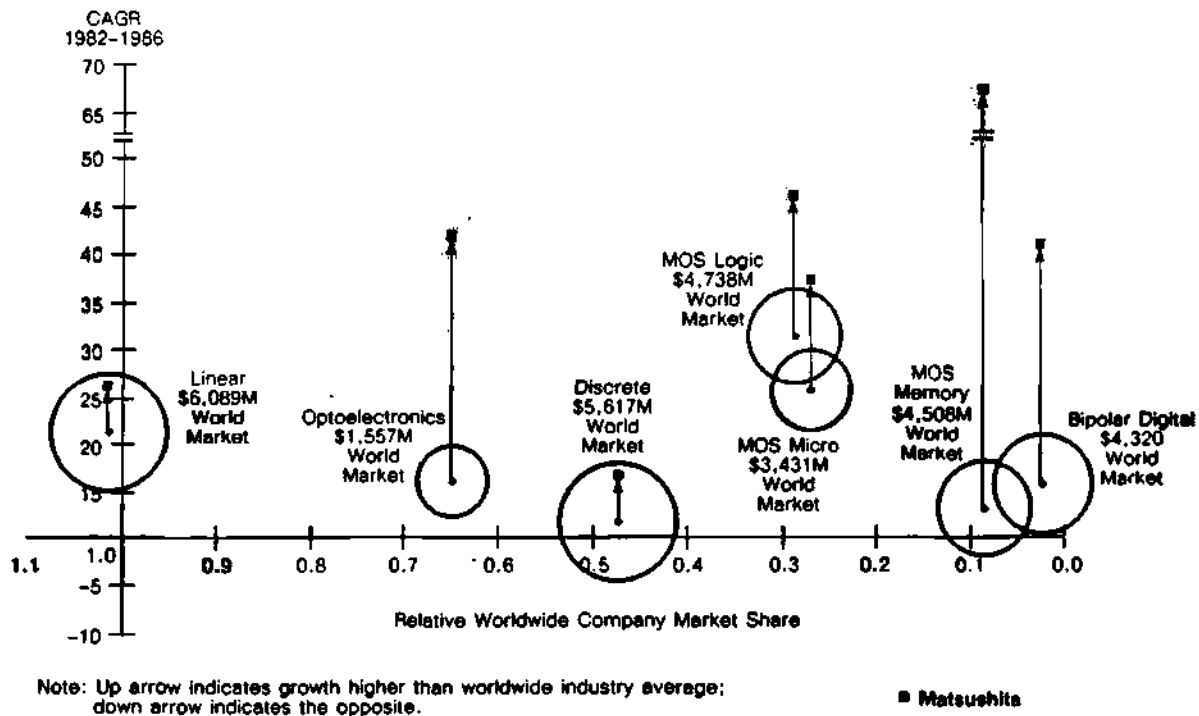
Viewed against its worldwide competitors, Matsushita's growth rates are higher than the industry average in every major product family. Matsushita is the world leader in linear IC sales, and has strong relative market share in optoelectronics and discrete semiconductors.

Viewed against Japanese companies only, Matsushita has growth rates higher than the Japanese company average in every product family except discretes. Matsushita's relative market share is fairly high in optoelectronics and discretes. Matsushita is the leader in linear IC sales.

Matsushita

Figure 6

Matsushita Product Portfolio Compared to Worldwide Competition

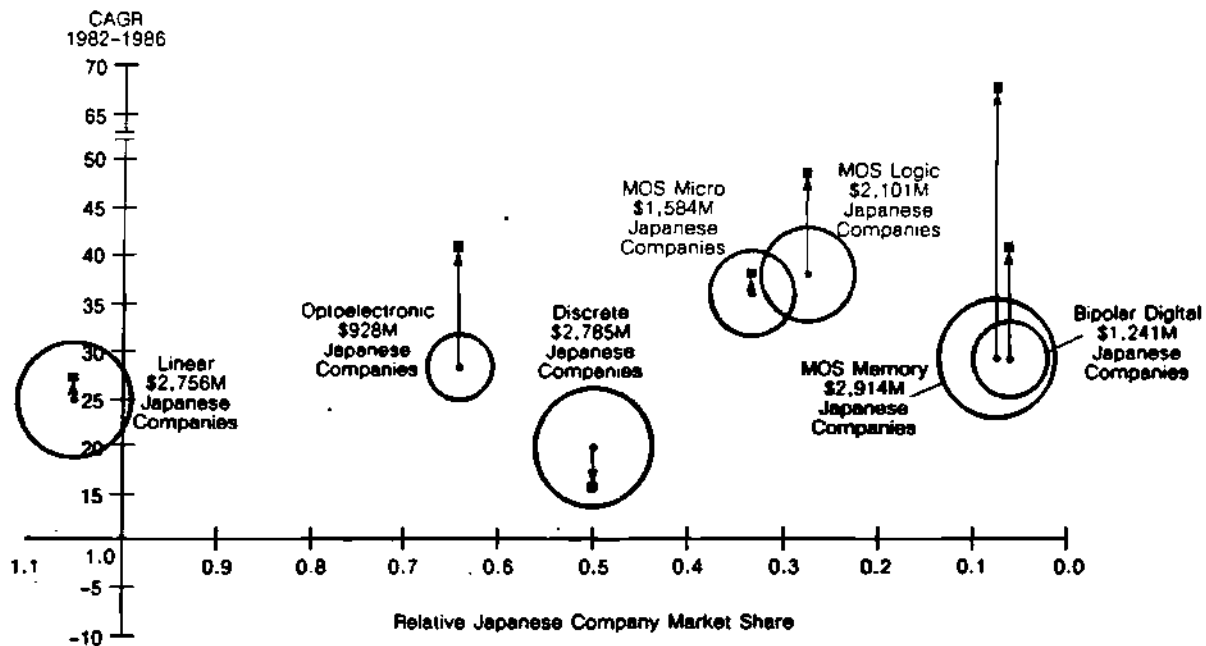


Source: Dataquest
December 1987

Matsushita

Figure 7

Matsushita Product Portfolio Compared to Japanese Competition



Note: Up arrow indicates growth higher than Japanese companies' average;
down arrow indicates the opposite.

■ Matsushita

Source: Dataquest
December 1987

Matsushita

NONSEMICONDUCTOR PRODUCTS SUMMARY

Electronic Components

Sales in the Electronic Components Department (including semiconductors) were ¥529.0 billion (\$3,081.0 million) in fiscal 1986, a 2 percent decrease from fiscal 1985. This department accounted for 12 percent of total Matsushita sales. Main products of this department include semiconductors, tubes, passive components, printed circuit boards, and lighting equipment.

Video Equipment

Sales in the Video Equipment Department were ¥1,502.8 billion (\$8,752.5 million) in fiscal 1986, a decrease of 20 percent from fiscal 1985. The video equipment product group is by far Matsushita's leading product line, accounting for 33 percent of total Company sales. Major products of this department include television sets, video projection systems, VTRs, and related equipment.

Audio Equipment

Sales in the Audio Equipment Department were ¥391.3 billion (\$2,279.0 million) in fiscal 1986, a decrease of 14 percent from fiscal 1985. This product group accounts for 9 percent of total Company revenue. Major products of this department include compact disk players, radios, cassette recorders, stereo equipment, tape recorders, and electronic organs.

Home Appliances

Sales in the Home Appliances Department decreased 3 percent in fiscal 1986 to ¥707.0 billion (\$4,117.6 million). This product group accounts for 15 percent of total Company sales. The major products of this department include refrigerators, washers and dryers, cooking equipment, air conditioners, fans, heaters, and vacuum cleaners.

Communications and Industrial Equipment

Fiscal 1986 sales in the Communications and Industrial Equipment Department were ¥859.0 billion (\$5,002.9 million), a 2 percent decrease from fiscal 1985. This department accounts for 19 percent of total Company sales. Major products include communications, measuring, and office automation equipment; industrial robots; welding equipment; and air-conditioning equipment. Matsushita has Japan's largest market share in facsimile equipment.

Matsushita

Energy- and Kitchen-Related Products

Sales of energy- and kitchen-related products increased 8 percent in fiscal 1986 to ¥207.6 billion (\$1,209.1 million). This department represents 5 percent of Matsushita's total revenue. Main products include batteries, gas appliances, kitchen sinks and cabinets, solar cells, and solar energy equipment.

Matsushita Electric Industrial Co., Ltd.

Matsushita Electric Industrial Co., Ltd.
1006, Kadoma, Kadoma City
Osaka 571, Japan
Telephone: 06-908-1121 Telex: J63426
(Billions of Yen Except Per Share Data)

Balance Sheet (November 20)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Working Capital	¥ 418.8	¥ 495.4	¥ 548.4	¥ 615.4	¥ 676.4
Long-Term Debt	¥ 20.1	¥ 68.1	¥ 58.8	¥ 35.5	¥ 49.2
Shareholders' Equity	¥ 828.0	¥ 921.6	¥1,092.4	¥1,275.2	¥1,435.3
After-Tax Return on Average Equity (%)	11.4	11.2	12.3	13.2	9.2

Operating Performance (Fiscal Year Ending November 20)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Revenue	¥2,145.7	¥2,362.6	¥2,916.0	¥3,451.3	¥3,649.6
Japanese Revenue	¥1,424.3	¥1,598.7	¥1,752.1	¥1,872.3	¥1,964.8
Non-Japanese Revenue	¥ 721.4	¥ 763.9	¥1,163.9	¥1,579.0	¥1,684.8
Cost of Revenue	¥1,368.3	¥1,492.6	¥1,868.1	¥2,230.1	¥2,354.2
R&D Expense	¥ 77.0	¥ 84.9	¥ 101.5	¥ 127.5	¥ 151.2
SG&A Expense	¥ 598.3	¥ 657.2	¥ 770.8	¥ 848.5	¥ 917.6
Pretax Income	¥ 225.5	¥ 251.2	¥ 323.7	¥ 431.9	¥ 428.9
Pretax Margin (%)	10.6	10.6	11.1	12.5	11.8
Effective Tax Rate (%)	52.1	50.8	51.2	53.7	53.1
Net Income	¥ 89.2	¥ 98.3	¥ 124.6	¥ 156.7	¥ 157.1
Average Shares Outstanding (Millions)	1,443	1,481	1,519	1,595	1,604
Per Share					
Earnings	¥ 61.82	¥ 66.39	¥ 82.05	¥ 98.24	¥ 97.92
Dividends	¥ 9.42	¥ 8.26	¥ 8.26	¥ 9.09	¥ 10.00
Book Value	¥ 574	¥ 622	¥ 719	¥ 799	¥ 895
Price Range*	¥ 541- 795	¥ 622- 763	¥ 643- 979	¥ 800- 1,940	¥ 900- 1,425
Total Employees	95,487	98,292	107,57	117,888	121,254
Capital Expenditures	¥ 70.0	¥ 72.7	¥ 130.0	¥ 202.6	¥ 161.0
Exchange Rate (Yen per US\$)	209.2	217.9	228.3	221.1	241.5

*Price ranges are expressed in yen per common share on Tokyo Stock Exchange.
Price ranges for 1981 and 1982 are estimated by DATAQUEST from bar charts
in the Matsushita Annual Reports.

Source: Matsushita Electric Industrial Co., Ltd.
Annual Reports
DATAQUEST

Matsushita Electric Industrial Co., Ltd.

Table 1

Matsushita Electric Industrial Co., Ltd.
SALES BY PRODUCT GROUP
(Billions of Yen)

	Fiscal Year Ending November 20				
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Video Equipment	¥ 485.4	¥ 567.3	¥ 805.1	¥1,116.0	¥1,341.4
Audio Equipment	367.1	361.4	477.4	543.4	484.5
Home Appliances	513.4	544.8	544.4	590.7	590.5
Communication and Industrial Equipment	280.2	326.3	380.7	422.7	452.3
Energy and Kitchen- Related Products	123.5	144.8	163.0	165.9	180.6
Electronic Components	187.3	206.3	277.3	312.8	309.6
Other	<u>188.8</u>	<u>211.7</u>	<u>268.1</u>	<u>299.8</u>	<u>290.7</u>
Total	¥2,145.7	¥2,362.6	¥2,916.0	¥3,451.3	¥3,649.6
Exchange Rate (Yen per US\$)	209.2	217.9	228.3	221.1	241.5

Source: DATAQUEST

Matsushita Electric Industrial Co., Ltd.

Table 2

Matsushita Electric Industrial Co., Ltd.
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

	1975	1976	1977	1978	1979	1980	1981	1982
	*****	*****	*****	*****	*****	*****	*****	*****
Total Semiconductor	108	177	192	254	237	319	487	426
Total Integrated Circuit	22	40	60	86	103	149	277	249
Bipolar Digital (Technology)	1	2	6	10	11	13	10	7
TTL	-	-	-	-	-	-	-	-
DTL	-	-	-	-	-	-	-	-
ECL	-	-	-	-	-	-	-	-
Other Bipolar Digital	-	-	-	-	-	-	-	-
Bipolar Digital (Function)	1	2	6	10	11	13	10	7
Bipolar Digital Memory	-	-	-	-	-	-	1	-
Bipolar Digital Logic	-	-	-	-	11	13	9	7
MOS (Technology)	5	7	10	21	35	57	91	89
NMOS	-	-	-	-	-	27	53	50
PMOS	-	-	-	-	-	15	18	15
CMOS	-	-	-	-	-	15	20	24
MOS (Function)	5	7	10	21	35	57	91	89
MOS Memory	-	-	-	-	2	4	9	9
MOS Microprocessor	-	-	-	-	14	15	45	48
MOS Logic	-	-	-	-	19	38	37	32
Linear	16	31	44	55	57	79	176	153
Total Discrete	82	131	130	157	124	152	181	146
Transistor	52	93	92	105	80	90	110	94
Small Signal Transistor	-	-	-	-	-	-	-	-
Power Transistor	-	-	-	-	-	-	-	-
Diode	25	30	30	44	36	47	55	38
Small Signal Diode	-	-	-	-	-	-	-	-
Power Diode	-	-	-	-	-	-	-	-
Zener Diode	-	-	-	-	-	-	-	-
Thyristor	2	4	3	3	3	4	5	4
Other Discrete	3	4	5	5	5	11	11	10
Total Optoelectronic	4	6	2	11	10	18	29	31
LED Lamps	-	-	-	-	-	-	-	-
LED Displays	-	-	-	-	-	-	-	-
Optical Couplers	-	-	-	-	-	-	-	-
Other Optoelectronics	-	-	-	-	-	-	-	-

Source: DATAQUEST

10.04 Matsushita Electronics

Table 10.04-1
Matsushita Electronics
ESTIMATED SEMICONDUCTOR REVENUES
(Dollars in Millions)

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
TOTAL SEMICONDUCTOR		124	164	138	108	177	192	254
TOTAL I C	12	20	29	25	22	40	60	86
BIPOLAR DIGITAL	1	1	2	2	1	2	6	10
TTL								
DTL								
ECL								
OTHER								
MOS	2	3	5	4	5	7	10	21
PMOS								
NMOS								
CMOS								
LINEAR	9	16	22	19	16	31	44	55
INTERFACE								
CONTROL								
ENTERTAINMENT								
OTHER								
HYBRID								
TOTAL DISCRETE		103	133	111	82	131	130	157
TRANSISTOR							92	105
SMALL SIGNAL								
POWER								
DIODE							30	44
SMALL SIGNAL								
POWER								
ZENER								
THYRISTOR							3	3
OTHER							5	5
OPTOELECTRONIC		1	2	2	4	6	2	11
LED LAMPS								
LED DISPLAYS								
COUPLERS								
OTHER								

Note: The following exchange rates were used to convert yen to dollars:
1971: 343 yen = \$1.00; 1972: 302 yen = \$1.00; 1973: 269 yen = \$1.00;
1974: 292 yen = \$1.00; 1975: 297 yen = \$1.00; 1976: 296 yen = \$1.00;
1977: 266 yen = \$1.00; 1978: 207 yen = \$1.00

Source: DATAQUEST, Inc.

Matsushita Electric Industrial Co., Ltd.

Matsushita Electric Industrial Co., Ltd.
1006 Kadoma, Kadoma City
Osaka 571, Japan
Telephone: 06-908-1121 Telex: J63426
(Millions of Dollars Except Per Share Data)

Balance Sheet (November 20)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Working Capital	\$ 2,783.4	\$ 2,800.8	\$ 3,223.9	\$3,840.8	\$ 4,181.1
Long-Term Debt	\$ 160.6	\$ 203.7	\$ 169.7	\$ 674.0	\$ 646.0
Shareholders' Equity	\$ 5,767.5	\$ 5,943.3	\$ 6,728.7	\$7,711.5	\$ 8,523.6
After-Tax Return on Average Equity (%)	13.2	9.2	11.4	13.0	6.3

Operating Performance (Fiscal Year Ending November 20)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Revenue	\$15,609.7	\$15,112.2	\$16,751.4	\$19,885.0	\$20,896.2
Japanese Revenue	\$ 8,468.1	\$ 8,135.8	\$ 8,937.0	\$10,241.4	\$10,543.0
Non-Japanese Revenue	\$ 7,141.6	\$ 6,976.4	\$ 7,814.4	\$ 9,643.6	\$10,353.2
Cost of Revenue	\$10,086.4	\$ 9,748.2	\$10,798.0	\$12,797.4	\$13,598.4
R&D Expense	\$ 576.7	\$ 626.1	\$ 731.6	\$ 842.9	\$ 995.5
SG&A Expense	\$ 3,837.6	\$ 3,799.6	\$ 4,162.1	\$ 4,662.2	\$ 4,976.8
Pretax Income	\$ 1,953.4	\$ 1,776.0	\$ 2,092.0	\$ 2,815.5	\$ 2,851.1
Pretax Margin (%)	12.5	11.8	12.5	14.2	13.6
Effective Tax Rate (%)	53.7	53.1	53.9	54.7	54.6
Net Income	\$ 708.7	\$ 650.5	\$ 767.3	\$ 1,004.2	\$ 1,019.0
Average Shares Outstanding (Millions)	1,595	1,604	1,583	1,753	1,768
Per Share					
Earnings	\$ 0.44	\$ 0.41	\$ 0.48	\$ 0.57	\$ 0.56
Dividend	\$ 0.04	\$ 0.04	\$ 0.04	\$ 0.05	\$ 0.04
Book Value	\$ 3.61	\$ 3.71	\$ 4.25	\$ 4.40	\$ 4.82
Price Range*	\$ 3.62- 8.77	\$ 3.73- 5.90	\$ 5.04- 7.56	\$ 8.64- 5.90	\$ 4.34- 7.24
Total Employees	117,888	121,254	124,825	132,814	133,963
Capital Expenditures	\$ 916.3	\$ 666.7	\$ 606.9	\$ 1,043.8	\$ 1,055.0
Exchange Rate (Yen per US\$)	221.1	241.5	238.1	237.4	241.8

*Price ranges are expressed as U.S. dollar conversions of yen per common share on the Tokyo Stock Exchange. Price ranges for 1981, 1982, 1983, 1984, and 1985 are estimated by Dataquest from bar charts in the Matsushita Annual Reports, and converted to U.S. dollars according to the exchange rates given in this table.

Source: Matsushita Electric Industrial Co., Ltd.,
Annual Reports
Dataquest
April 1987

Matsushita Electric Industrial Co., Ltd.

Table 1

Matsushita Electric Industrial Co., Ltd.
SALES BY PRODUCT GROUP
(Billions of Yen)

<u>Product Group</u>	<u>Fiscal Year Ending November 20</u>				
	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Video Equipment	¥1,116.0	¥1,341.4	¥1,443.4	¥1,726.4	¥1,890.2
Audio Equipment	543.4	484.5	480.7	478.9	452.8
Home Appliances	590.7	590.5	596.4	683.3	731.5
Communication and Industrial Equipment	422.7	452.3	588.4	783.9	880.2
Energy and Kitchen- Related Products	165.9	180.6	187.0	193.3	192.9
Electronic Components	312.8	309.6	385.4	542.7	538.1
Other	<u>299.8</u>	<u>290.7</u>	<u>307.2</u>	<u>312.2</u>	<u>367.0</u>
Total	¥3,451.3	¥3,649.6	¥3,988.5	¥4,720.7	¥5,052.7
 Exchange Rate (Yen per US\$)	 221.1	 241.5	 238.1	 237.4	 241.8

Source: Matsushita Electric Industrial Co., Ltd.
Dataquest
April 1987

Matsushita Electric Industrial Co., Ltd.

Table 2

Matsushita Electric Industrial Co., Ltd. ESTIMATED SEMICONDUCTOR REVENUE (Millions of Dollars)

	1979	1980	1981	1982	1983	1984	1985	1986
Total Semiconductor	237	319	487	427	600	928	906	1,233
Total Integrated Circuit	103	149	277	250	367	592	596	807
Bipolar Digital (Technology)	11	13	10	7	13	22	21	30
TTL	0	0	0	0	0	18	17	22
ECL	0	0	0	0	0	4	4	8
Other Bipolar Digital	0	0	0	0	0	0	0	0
Bipolar Digital (Function)	11	13	10	7	13	22	21	30
Bipolar Digital Memory	0	0	1	0	0	0	0	0
Bipolar Digital Logic	11	13	9	7	13	22	21	30
MOS (Technology)	35	57	91	89	160	283	289	384
NMOS	17	27	53	50	103	184	170	237
PMOS	9	15	18	15	12	5	4	3
CMOS	9	15	20	24	45	94	95	144
MOS (Function)	35	57	91	89	160	283	289	384
MOS Memory	2	4	9	9	29	80	58	69
MOS Micro Devices	14	15	45	48	88	119	111	166
MOS Logic	19	38	37	32	43	84	100	149
Linear	57	79	176	154	194	287	305	393
Total Discrete	124	152	181	146	188	247	227	293
Transistor	80	90	110	94	122	157	139	181
Small Signal Transistor	0	0	0	0	0	95	86	115
Power Transistor	0	0	0	0	0	62	53	66
Diode	36	47	55	38	52	68	60	78
Small Signal Diode	0	0	0	0	0	68	60	78
Power Diode	0	0	0	0	0	0	0	0
Zener Diode	0	0	0	0	0	0	0	0
Thyristor	3	4	5	4	4	5	5	7
Other Discrete	5	11	11	10	10	17	23	27
Total Optoelectronic	10	18	29	31	45	89	84	133
LED Lamps	0	0	0	0	0	40	38	59
LED Displays	0	0	0	0	0	0	0	0
Optical Couplers	0	0	0	0	0	0	0	0
Other Optoelectronics	0	0	0	0	0	49	46	74
Exchange Rate (Yen/US\$)	219	227	221	248	235	237	238	167

Source: Dataquest
April 1987

Matsushita Electric Industrial Co., Ltd.

(Page intentionally left blank)

Matsushita

Matsushita Electric Industrial Co., Ltd.
1006 Kadoma, Kadoma City
Osaka 571, Japan
Telephone: 06-908-1121 Telex: J63426
(Billions of Yen Except Per Share Data)

Balance Sheet (November 20)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Working Capital	¥ 615.4	¥ 676.4	¥ 767.6	¥ 911.8	¥ 1,011.0
Long-Term Debt	¥ 35.5	¥ 49.2	¥ 40.4	¥ 160.0	¥ 156.2
Shareholders' Equity	¥1,275.2	¥1,435.3	¥1,602.1	¥1,830.7	¥ 2,061.0
After-Tax Return on Average Equity (%)	13.2	9.2	11.4	13.0	6.3

Operating Performance (Fiscal Year Ending November 20)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Revenue	¥3,451.3	¥3,649.6	¥3,988.5	¥4,720.7	¥ 5,052.7
Japanese Revenue	¥1,872.3	¥1,964.8	¥2,127.9	¥2,431.3	¥ 2,549.3
Non-Japanese Revenue	¥1,579.0	¥1,684.8	¥1,860.6	¥2,289.4	¥ 2,503.4
Cost of Revenue	¥2,230.1	¥2,354.2	¥2,571.0	¥3,038.1	¥ 3,288.1
R&D Expense	¥ 127.5	¥ 151.2	¥ 174.2	¥ 200.1	¥ 240.7
SG&A Expense	¥ 848.5	¥ 917.6	¥ 991.0	¥1,106.8	¥ 1,203.4
Pretax Income	¥ 431.9	¥ 428.9	¥ 498.1	¥ 668.4	¥ 689.4
Pretax Margin (%)	12.5	11.8	12.5	14.2	13.6
Effective Tax Rate (%)	53.7	53.1	53.9	54.7	54.6
Net Income	¥ 156.7	¥ 157.1	¥ 182.7	¥ 238.4	¥ 246.4
Average Shares Outstanding (Millions)	1,595	1,604	1,583	1,753	1,768
Per Share					
Earnings	¥ 98.24	¥ 97.92	¥ 103.44	¥ 132.20	¥ 134.64
Dividend	¥ 9.09	¥ 10.00	¥ 9.88	¥ 11.29	¥ 9.54
Book Value	¥ 799	¥ 895	¥ 1,012	¥1,044.0	¥1,165.74
Price Range*	¥ 800- 1,940	¥ 900- 1,425	¥ 1,200- 1,800	¥1,400.0- 2,050.0	¥ 1,050.0- 1,750.0
Total Employees	117,888	121,254	124,825	132,814	133,963
Capital Expenditures	¥ 202.6	¥ 161.0	¥ 144.5	¥ 247.8	¥ 255.1
Exchange Rate (Yen per US\$)	221.1	241.5	238.1	237.4	241.8

*Price ranges are expressed in yen per common share on the Tokyo Stock Exchange. Price ranges for 1981, 1982, 1983, 1984, and 1985 are estimated by Dataquest from bar charts in the Matsushita Annual Reports.

Source: Matsushita Electric Industrial Co., Ltd.,
Annual Reports
Dataquest
December 1986

Matsushita

Matsushita Electric Industrial Co., Ltd.
1006 Kadoma, Kadoma City
Osaka 571, Japan
Telephone: 06-908-1121 Telex: J63426
(Millions of Dollars Except Per Share Data)

Balance Sheet (November 20)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Working Capital	\$ 2,783.4	\$ 2,800.8	\$ 3,223.9	\$3,840.8	\$ 4,181.1
Long-Term Debt	\$ 160.6	\$ 203.7	\$ 169.7	\$ 674.0	\$ 646.0
Shareholders' Equity	\$ 5,767.5	\$ 5,943.3	\$ 6,728.7	\$7,711.5	\$ 8,523.6
After-Tax Return on Average Equity (%)	13.2	9.2	11.4	13.0	6.3

Operating Performance (Fiscal Year Ending November 20)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Revenue	\$15,609.7	\$15,112.2	\$16,751.4	\$19,885.0	\$20,896.2
Japanese Revenue	\$ 8,468.1	\$ 8,135.8	\$ 8,937.0	\$10,241.4	\$10,543.0
Non-Japanese Revenue	\$ 7,141.6	\$ 6,976.4	\$ 7,814.4	\$ 9,643.6	\$10,353.2
Cost of Revenue	\$10,086.4	\$ 9,748.2	\$10,798.0	\$12,797.4	\$13,598.4
R&D Expense	\$ 576.7	\$ 626.1	\$ 731.6	\$ 842.9	\$ 995.5
SG&A Expense	\$ 3,837.6	\$ 3,799.6	\$ 4,162.1	\$ 4,662.2	\$ 4,976.8
Pretax Income	\$ 1,953.4	\$ 1,776.0	\$ 2,092.0	\$ 2,815.5	\$ 2,851.1
Pretax Margin (%)	12.5	11.8	12.5	14.2	13.6
Effective Tax Rate (%)	53.7	53.1	53.9	54.7	54.6
Net Income	\$ 708.7	\$ 650.5	\$ 767.3	\$ 1,004.2	\$ 1,019.0
Average Shares Outstanding (Millions)	1,595	1,604	1,583	1,753	1,768
Per Share					
Earnings	\$ 0.44	\$ 0.41	\$ 0.48	\$ 0.57	\$ 0.56
Dividend	\$ 0.04	\$ 0.04	\$ 0.04	\$ 0.05	\$ 0.04
Book Value	\$ 3.61	\$ 3.71	\$ 4.25	\$ 4.40	\$ 4.82
Price Range*	\$ 3.62- 8.77	\$ 3.73- 5.90	\$ 5.04- 7.56	\$ 8.64- 5.90	\$ 4.34- 7.24
Total Employees	117,888	121,254	124,825	132,814	133,963
Capital Expenditures	\$ 916.3	\$ 666.7	\$ 606.9	\$ 1,043.8	\$ 1,055.0
Exchange Rate (Yen per US\$)	221.1	241.5	238.1	237.4	241.8

*Price ranges are expressed as U.S. dollar conversions of yen per common share on the Tokyo Stock Exchange. Price ranges for 1981, 1982, 1983, 1984, and 1985 are estimated by Dataquest from bar charts in the Matsushita Annual Reports, and converted to U.S. dollars according to the exchange rates given in this table.

Source: Matsushita Electric Industrial Co., Ltd.,
Annual Reports
Dataquest
December 1986

Matsushita

THE COMPANY

Background

Matsushita Electric Industrial Co., Ltd., was founded as a family business in 1918 by Konosuke Matsushita. Its first product was an adapter plug for consumer products. Matsushita has since grown to become the largest electronics company in Japan and one of the 50 largest industrial corporations worldwide, with fiscal 1985 sales of ¥5,052.7 billion (\$20.9 billion). Matsushita products are sold worldwide under the brand names National, Panasonic, Quasar, Technics, and other trade names.

In 1932, the Company's founder proclaimed the year to be the beginning of "Meichi," meaning "realization of mission." Mr. Matsushita visualized Meichi as requiring 250 years to achieve. The 250 years comprise ten 25-year phases and three segments that include development, implementation, and sharing the fruits of Matsushita's efforts with society as a whole. The first year of the third segment was 1982.

Company Organization

Matsushita Electric is the parent company of the Matsushita Group, as shown in Figure 1. The group consists of more than 25 companies, mostly involved in electrical and electronics products. The Matsushita Group, formerly a small collection of family businesses, expanded as the home electrical appliance market boomed after World War II.

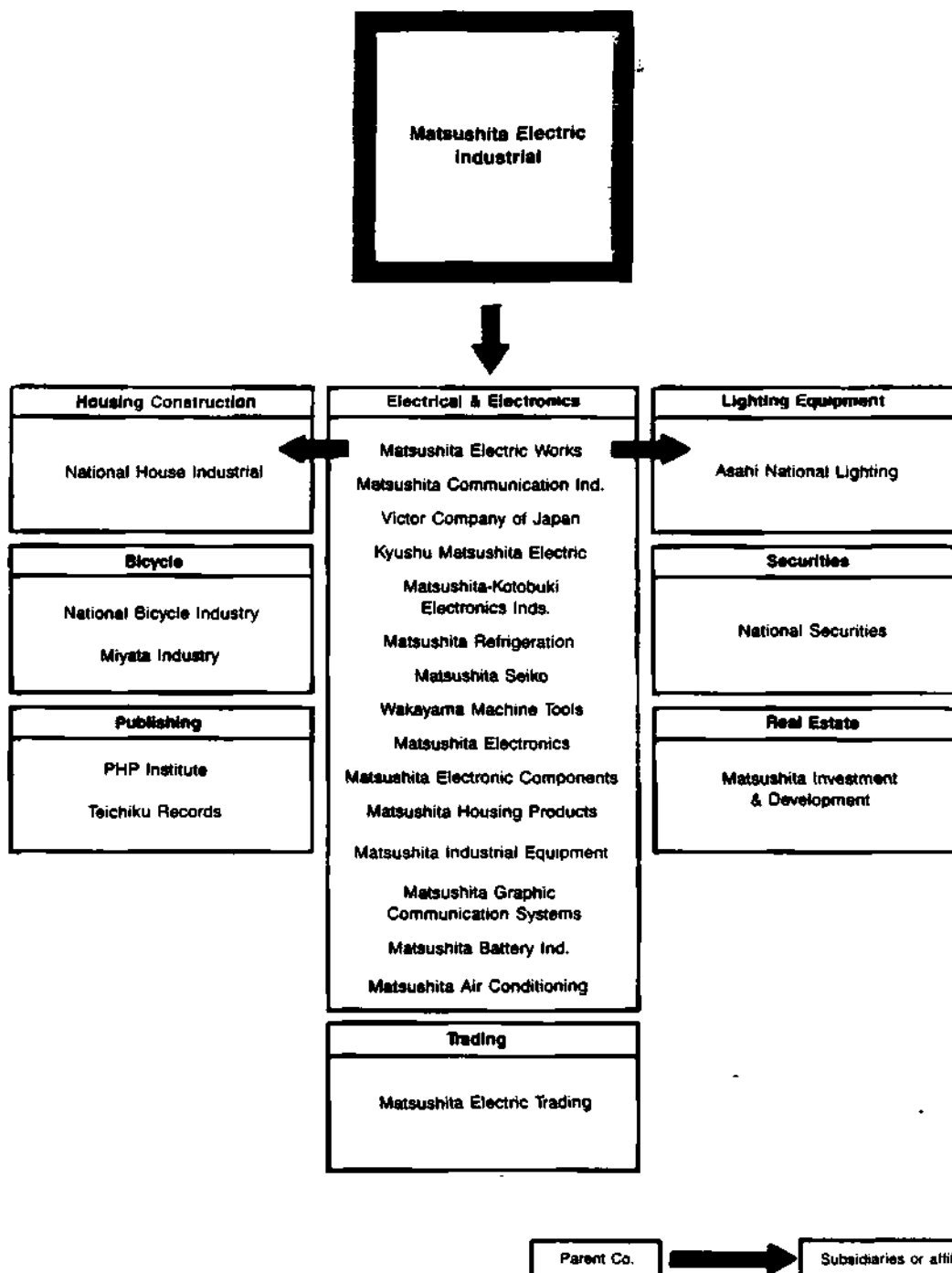
Matsushita's semiconductors are produced by a subsidiary, Matsushita Electronics Corporation (MEC), which is 65 percent owned by Matsushita Electric and 35 percent owned by N.V. Philips of the Netherlands. MEC was established in 1952. The Semiconductor Group was established in 1957, and semiconductors currently represent 45 percent of MEC's production. Figure 2 shows Matsushita Electronics Corporation's organization chart, including the Semiconductor Group.

At the end of the 1985 fiscal year, Matsushita Electric employed 133,963 workers. The Company is still headed by a member of the Matsushita family--Chairman Masaharu Matsushita.

Matsushita

Figure 1

MATSUSHITA GROUP

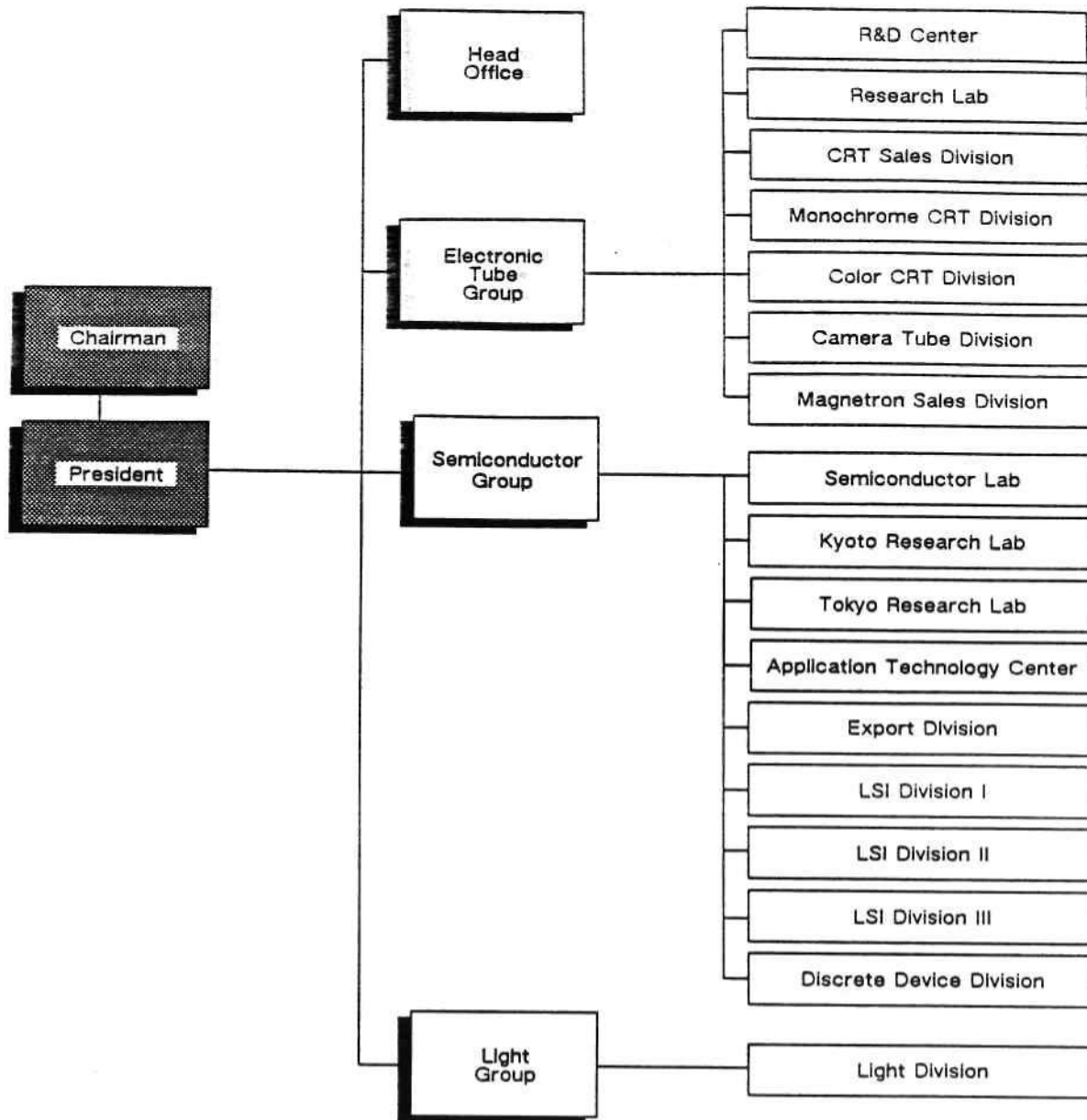


Source: Dodwell Marketing Consultants,
Industrial Groupings in Japan
1984/85, Tokyo: 1984

Matsushita

Figure 2

MATSUSHITA ELECTRONICS CORPORATION



Source: Matsushita Electronics Corporation
Dataquest
December 1986

Matsushita

Investment in the Company

Matsushita Electric's major shareholders are Moxley and Company (4.8 percent), Sumitomo Bank (4.6 percent), Sumitomo Life Insurance (4.6 percent), Nippon Life Insurance (4.1 percent), Matsushita Investment and Development (3.7 percent), Konosuke Matsushita (2.7 percent), and Kyowa Bank (2.0 percent). Foreign ownership is 20.8 percent. Matsushita is listed on the three major Japanese stock exchanges, as well as on the New York, Amsterdam, Frankfurt, Dusseldorf, Hong Kong, Pacific, and Paris stock exchanges.

OPERATIONS

Matsushita reported consolidated net earnings of ¥246.4 billion (\$1,019 million) on sales of ¥5,052.7 billion for the fiscal year ended November 20, 1985. This represents a 3.4 percent earnings increase from fiscal 1984 and a 7.0 percent increase in sales. Earnings grew at a compound annual growth rate (CAGR) of 12.0 percent from 1981 to 1985.

Matsushita's business operations are divided into the following six major product groups:

- Video equipment
- Audio equipment
- Home appliances
- Communication and industrial equipment
- Energy and kitchen-related products
- Electronic components

Table 1 shows Matsushita sales by product group from 1981 to 1985. Figure 3 graphically illustrates dramatic growth in the video equipment area, which is by far the Company's largest product group, and in the Communication and Industrial Equipment group.

Matsushita

Table 1

Matsushita Electric Industrial Co., Ltd.
SALES BY PRODUCT GROUP
(Billions of Yen)

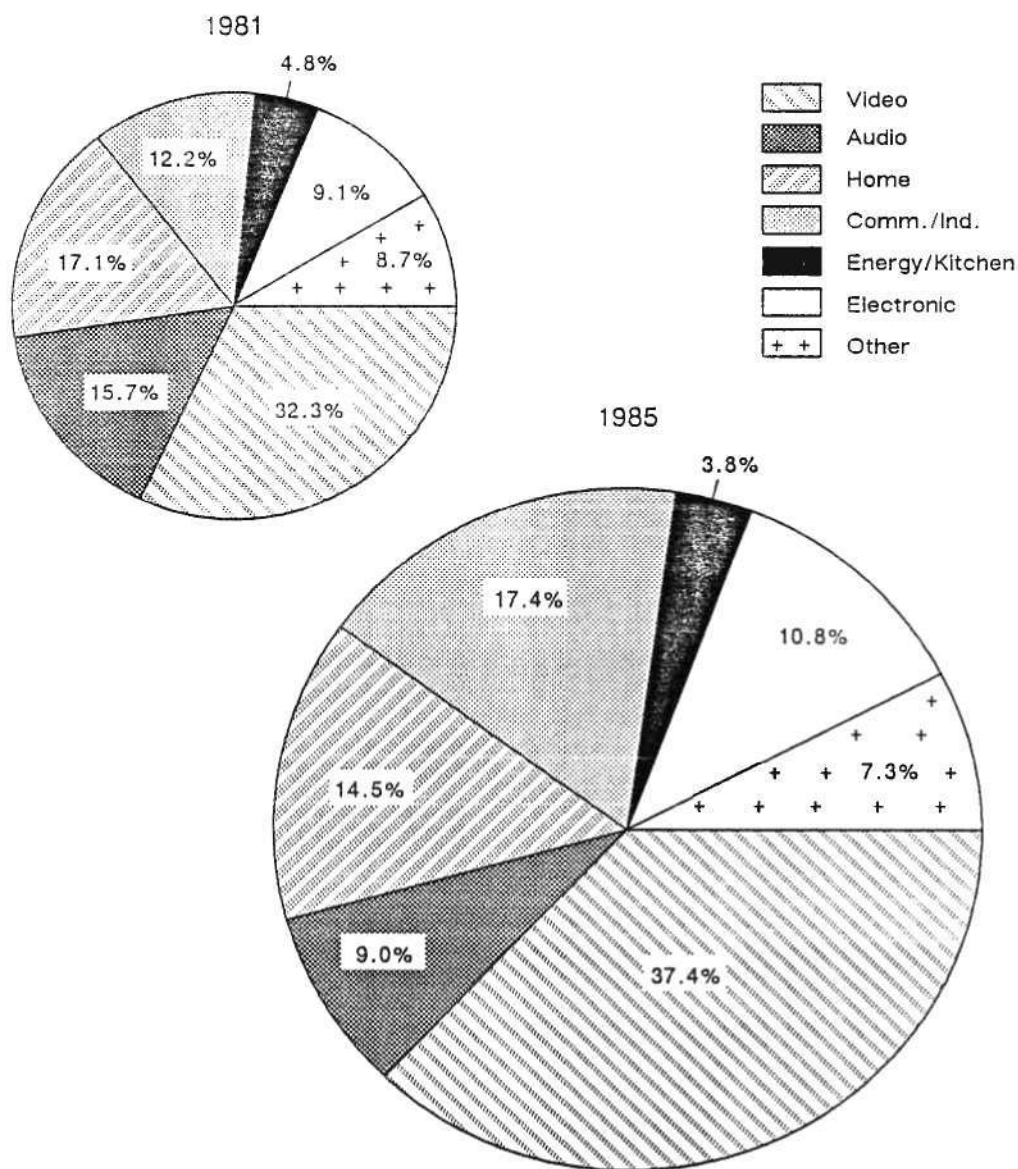
<u>Product Group</u>	<u>Fiscal Year Ending November 20</u>				
	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Video Equipment	¥1,116.0	¥1,341.4	¥1,443.4	¥1,726.4	¥1,890.2
Audio Equipment	543.4	484.5	480.7	478.9	452.8
Home Appliances	590.7	590.5	596.4	683.3	731.5
Communication and Industrial Equipment	422.7	452.3	588.4	783.9	880.2
Energy and Kitchen- Related Products	165.9	180.6	187.0	193.3	192.9
Electronic Components	312.8	309.6	385.4	542.7	538.1
Other	<u>299.8</u>	<u>290.7</u>	<u>307.2</u>	<u>312.2</u>	<u>367.0</u>
Total	¥3,451.3	¥3,649.6	¥3,988.5	¥4,720.7	¥5,052.7
Exchange Rate (Yen per US\$)	221.1	241.5	238.1	237.4	241.8

Source: Matsushita Electric Industrial Co., Ltd.
Dataquest
November 1986

Matsushita

Figure 3

Matsushita Electric Industrial Co., Ltd.
REVENUES BY PRODUCT LINE 1981 AND 1985



Source: Matsushita Electronic Industrial Co., Ltd.
Dataquest
December 1986

Matsushita

Semiconductors

Matsushita is the fifth largest Japanese semiconductor supplier, with estimated 1985 semiconductor revenue of \$906 million (see Table 2). All Matsushita semiconductors are manufactured by Matsushita Electronics Corporation. Dataquest expects Matsushita's capital expenditures for semiconductors to decrease from an estimated ¥87 billion (\$366 million) in 1985 to ¥58 billion (\$347 million) in 1986.

As shown in Table 2, \$305 million, or 34 percent, of Matsushita's 1985 semiconductor sales were linear devices, while \$227 million, or 25 percent, of semiconductor sales were discrete devices, with transistors being the Company's largest discrete product line. Behind linear, the next largest family of ICs was MOS microdevices.

Dataquest believes that in 1985 approximately 5 percent of Matsushita's semiconductor sales were to the United States, 1 percent were to Europe, 6 percent were to the Rest of World countries, and the largest segment (88 percent) were domestic sales. Table 3 shows the estimated geographic distribution of Matsushita's semiconductor sales.

Semiconductor Products and Technologies

Matsushita's semiconductor product line includes the following:

- Bipolar Digital Logic--LSTTL and ECL
- MOS Memory--CMOS and NMOS SRAMs, DRAMs, ROMs and EPROMs, MNOS nonvolatile memory
- MOS Microdevice--4-, 8-, and 16-bit MPUs, MCUs, and microperipherals
- MOS Logic--Standard CMOS logic, CMOS gate arrays, and standard cells
- Linear--Op amps, comparators, industrial linear ICs, D/A and A/D converters
- Discrete--Small signal and power transistors, junction FETs, thyristors, diodes, GaAs FETs
- Optoelectronic--LEDs, GaAs semiconductor lasers, microwave ICs

Matsushita also makes GaAs Hall Effect devices.

Matsushita

Table 2.

Matsushita Electric Industrial Co., Ltd.
ESTIMATED SEMICONDUCTOR REVENUE
(Millions of Dollars)

	1978	1979	1980	1981	1982	1983	1984	1985
Total Semiconductor	254	237	319	487	427	600	928	906
Total Integrated Circuit	86	103	149	277	250	367	592	595
Bipolar Digital (Technology)	10	11	13	10	7	13	22	21
TTL							18	17
ECL							4	4
Other Bipolar Digital								
Bipolar Digital (Function)	10	11	13	10	7	13	22	21
Bipolar Digital Memory				1				
Bipolar Digital Logic		11	13	9	7	13	22	21
MOS (Technology)	21	35	57	91	89	160	283	269
NMOS		17	27	53	50	103	184	170
PMOS		9	15	18	15	12	5	4
CMOS		9	15	20	24	45	94	95
MOS (Function)	21	35	57	91	89	160	283	269
MOS Memory		2	4	9	9	29	80	58
MOS Micro Devices		14	15	45	48	88	119	111
MOS Logic		19	38	37	32	43	84	100
Linear	55	57	79	176	154	194	287	305
Total Discrete	157	124	152	181	146	188	247	227
Transistor	105	80	90	110	94	122	157	139
Small Signal Transistor							95	86
Power Transistor							62	53
Diode	44	36	47	55	38	52	68	60
Small Signal Diode							68	60
Power Diode								
Zener Diode								
Thyristor	3	3	4	5	4	4	5	5
Other Discrete	5	5	11	11	10	10	17	23
Total Optoelectronic	11	10	18	29	31	45	89	84
LED Lamps							40	38
LED Displays								
Optical Couplers								
Other Optoelectronics							49	46
Exchange Rate (Yen/US\$)	210	219	227	221	248	235	237	238

Source: Dataquest
December 1986

Matsushita

Table 3

Matsushita Electric Industrial Co., Ltd.
ESTIMATED 1985 SEMICONDUCTOR REVENUE
BY GEOGRAPHIC REGION
(Millions of Dollars)

	<u>United States</u>	<u>Japan</u>	<u>Europe</u>	<u>ROW</u>	<u>Total</u>
Total Semiconductor	\$43	\$798	\$9	\$56	\$906
Integrated Circuit	33	535	3	24	595
Bipolar Digital	0	21	0	0	21
MOS	28	241	0	0	269
Linear	5	273	3	24	305
Discrete	10	181	4	32	227
Optoelectronic	0	82	2	0	84

Source: Dataquest
November 1986

Other activities in the semiconductor area include the following:

- Development of dual laser beam recrystallization technology and stacked layer construction incorporating planarized heat dispersal for fabrication of three-dimensional LSIs
- Development of a halftone image processing LSI
- Development of a 1.3 μ band semiconductor laser featuring long life (100,000 hours) and high data transmission quality
- Successful manufacture of an N-channel power MOSFET at microwave length with an operation frequency of 2.45 GHz. The MOSFET has power output of 7 watts and withstand voltage of 75 volts.

Matsushita is a leader in gallium arsenide (GaAs) technology and is involved in the Japanese government-sponsored optoelectronics project. Some of the Company's recent developments in this area include the following:

- 1982--GaAlAs LED
- 1982--GaAs monolithic frequency divider using source-coupled FET logic

Matsushita

- 1983--4 GHz, 25mW, GaAs IC using source-coupled FET logic *
- 1984--GaAs low-noise transistors for satellite broadcast reception
- 1985--A highly sensitive GaAs Hall device with 300mV Hall output voltage
- 1986--An ultrahigh-speed GaAs IC for optical transmission using an E-type FET; operation speed is 1.6 Gbits/second with less than 0.5 watts of power consumption

Almost all of the Company's microcontroller output is 4-bit, which is widely used in consumer electronics.

Table 4 gives a history of Matsushita's semiconductor developments.

At the 1986 ISSCC, Matsushita delivered several papers on the following topics:

- A smear-suppressing CCD imager using a bellbottom photodiode
- An 8-bit microprogrammable real-time image processor (RISP) for use in general purpose local image processing
- A 1MB DRAM with 33 MHz serial I/O ports

Licensing and Second-Sourcing

Matsushita, Sharp, Sanyo, and Mitsubishi are involved in a project to develop microprocessors for parallel-processing computers that do multiple jobs at the same time.

Also interesting to note are the Company's following activities:

- Matsushita and NTT have formed an R&D partnership for 4Mb and larger DRAMs.
- Matsushita has granted 3M a license to make a new generation of recording tapes using Matsushita patents and technology.
- Matsushita and Time Inc., the U.S. news and publishing company, are jointly developing a teletext/televideo terminal.
- Matsushita developed a CVD machine jointly with Denko, a semiconductor equipment maker.

Matsushita

Table 4

MATSUSHITA SEMICONDUCTOR DEVELOPMENTS

<u>Year</u>	<u>Development</u>
1957	Semiconductor division formed First products: germanium transistors and diodes
1957-1967	Developed discrete products, especially power and optoelectronic products
1967	Developed linear ICs for internal use
1971	Developed PMOS 4-bit MPU
1975	Developed 16-bit MPU (MN1610) Developed CMOS watch and calculator chips
1977	Developed 4-bit MCU (MN1400) in PMOS, NMOS, and CMOS, with 2K of ROM on board, for consumer applications
1979	Developed higher-speed version of MN1400 (MN1500), with 4K of ROM on board
1982	Developed GaAlAs LED Developed GaAs monolithic frequency divider using source-coupled FET logic
1983	Developed 4 GHz, 25mW GaAs IC using source-coupled FET logic
1984	Developed semiconductor laser with continuous oscillation of 200mW
1985	Developed 3-dimensional CMOS devices on an experimental basis
1985	Developed world's first 4Mb mask ROM

Source: Matsushita Electronics Corporation
Dataquest
November 1986

Matsushita

Product Portfolio Analysis

Figure 4 is a graphic analysis of Matsushita's 1985 product portfolio compared with worldwide competition. Figure 5 presents the same analysis applied only to the Company's Japanese competition. These figures show which product areas the Company has chosen to focus on.

The y axis is the historical product CAGR from 1981 to 1985. Matsushita's CAGR for each product is marked by a dot. In Figure 1, the worldwide product CAGR is marked by a dot surrounded by a circle that represents the total world market for the product. In Figure 2, the total Japanese company CAGR for each product is marked by a dot surrounded by a circle that represents total Japanese company sales for the products.

The locations of graph points can be interpreted as follows:

- Upper Right Quadrant--These are the "developing products." The Company is not the leading supplier in these products, but the products exhibit positive growth.
- Upper Left Quadrant--These are the "stars." The Company is the leading supplier of these products, and the products exhibit positive growth.
- Lower Left Quadrant--These are the "cash cows." The Company is the leading supplier in a declining product segment, but there is generally a high profit margin on these products.
- Lower Right Quadrant--These are the "dogs." The TAM for this product area is declining and the Company is not the leading supplier.

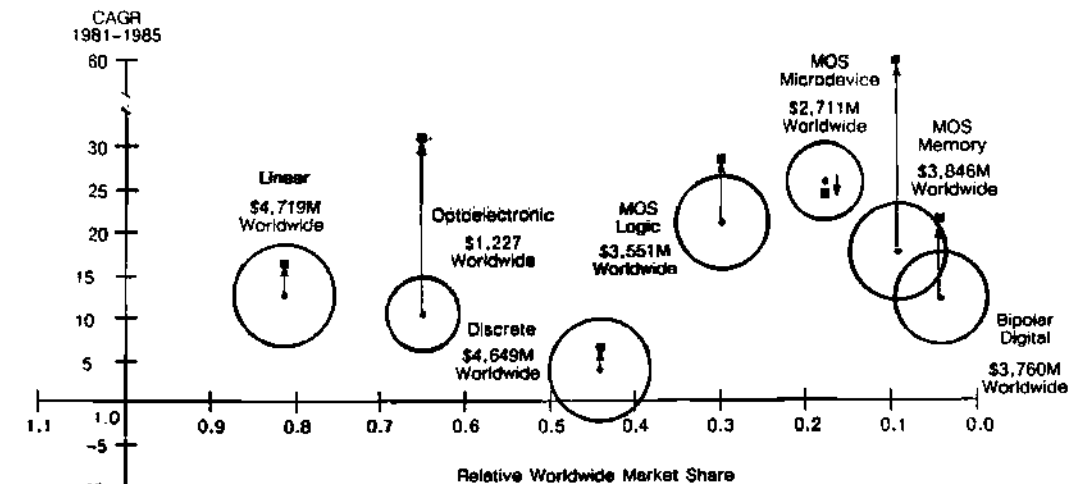
A competitive analysis of Matsushita's product portfolio shows that the Company's greatest strength is in linear ICs, in which it enjoys a large market share relative to the world leader, National Semiconductor. The Company is also quite strong in optoelectronics. Additionally, Matsushita's growth rate over the past five years has been stronger than the industry average in all major product areas except MOS microdevices. Growth has been especially strong in optoelectronics and MOS memory.

Viewed against its Japanese competitors only, Matsushita is the number one supplier of linear ICs and is also strong in optoelectronics and discrete devices. The company has enjoyed a higher than average CAGR in linear ICs, optoelectronics, microdevices, and MOS memory. In discretes and MOS logic, Matsushita's growth has been below the average for all Japanese companies. Its growth in bipolar digital ICs has been at the Japanese company average of 20.6 percent.

Matsushita

Figure 4

MATSUSHITA PRODUCT PORTFOLIO COMPARED TO WORLDWIDE COMPETITION



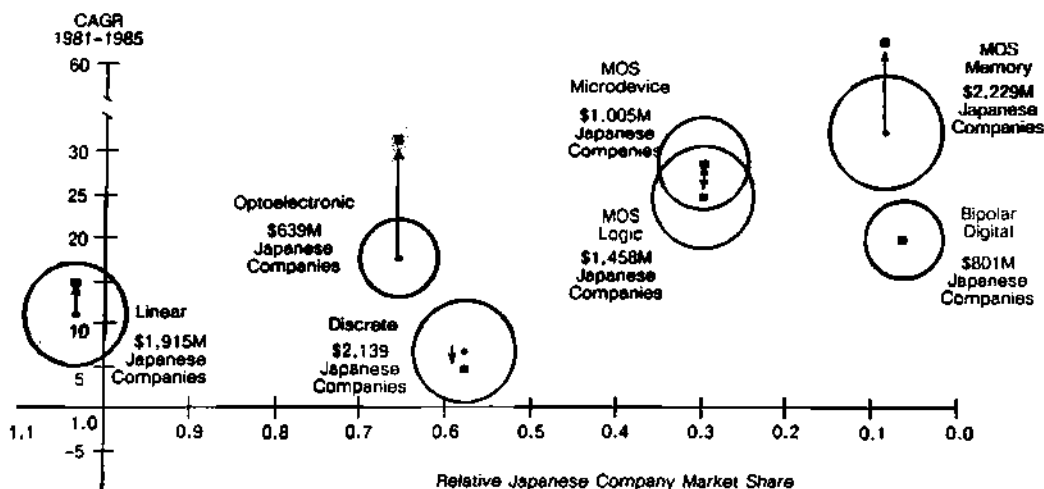
Note: Up arrow indicates growth higher than industry average;
down arrow indicates the opposite

■ Matsushita

Source: Dataquest
December 1986

Figure 5

MATSUSHITA PRODUCT PORTFOLIO COMPARED TO JAPANESE COMPETITION



Note: Up arrow indicates growth higher than Japanese companies' average;
down arrow indicates the opposite

■ Matsushita

Source: Dataquest
December 1986

Matsushita

Product Groups

Electronic Components

Sales in the Electronic Components Department (including semiconductors) were ¥538.1 billion in fiscal 1985, a 1 percent decrease from fiscal 1984. This department accounted for 11 percent of total Matsushita sales. Main products of this department include semiconductors, tubes, passive components, printed circuit boards, and lighting equipment.

Fiscal 1985 highlights for this department include the following:

- Development of flat picture tubes for OA displays
- Development of 6- and 8-inch color tubes for car dashboards

Video Equipment

Sales in the Video Equipment Department were ¥1,890.2 billion in fiscal 1985, an increase of 9 percent over fiscal 1984. This product group is by far Matsushita's leading product line, accounting for 37 percent of total Company sales. Major products of this department include television sets, video projection systems, VTRs, and related equipment.

Fiscal 1985 highlights include the following:

- Introduction of portable single-unit camera/VTRs that use standard VHS or VHS-C tape
- Introduction of an MII format 1/2-inch camera/recorder VTR, codeveloped with NHK (Japan Broadcasting Corporation) for professional broadcasting

Audio Equipment

Sales in the Audio Equipment Department were ¥452.8 billion in fiscal 1985, a decrease of 5 percent from fiscal 1984. This product group accounts for 9 percent of total company revenue. Major products of this department include compact disk players, radios, cassette recorders, stereo equipment, tape recorders, and electronic organs. The Company announced an automotive CD system in late 1985.

Matsushita

Home Appliances

Sales in the Home Appliances Department grew 7 percent in fiscal 1985 to ¥731.5 billion. This product group accounts for 14 percent of total Company sales. The major products of this department include refrigerators, washers and dryers, cooking equipment, air conditioners, fans, heaters, and vacuum cleaners.

Communication and Industrial Equipment

Fiscal 1985 sales in the Communication and Industrial Equipment Department were ¥880.2 billion, a 12 percent increase from fiscal 1984. This department accounts for 17 percent of total Company sales. Major products include communication, measuring, and office automation equipment; industrial robots; welding equipment; and air conditioning equipment. Matsushita has Japan's largest market share in facsimile equipment. In 1985, the Company introduced the "Memo Telephone," a compact single-unit facsimile/telephone combination for home and office use.

Energy and Kitchen-Related Products

Sales of energy and kitchen-related products decreased less than 1 percent in fiscal 1985 to ¥192.9 billion. This department represents only 4 percent of Matsushita's total revenue. Main products include batteries, gas appliances, kitchen sinks and cabinets, solar cells, and solar energy equipment.

INTERNATIONAL OPERATIONS

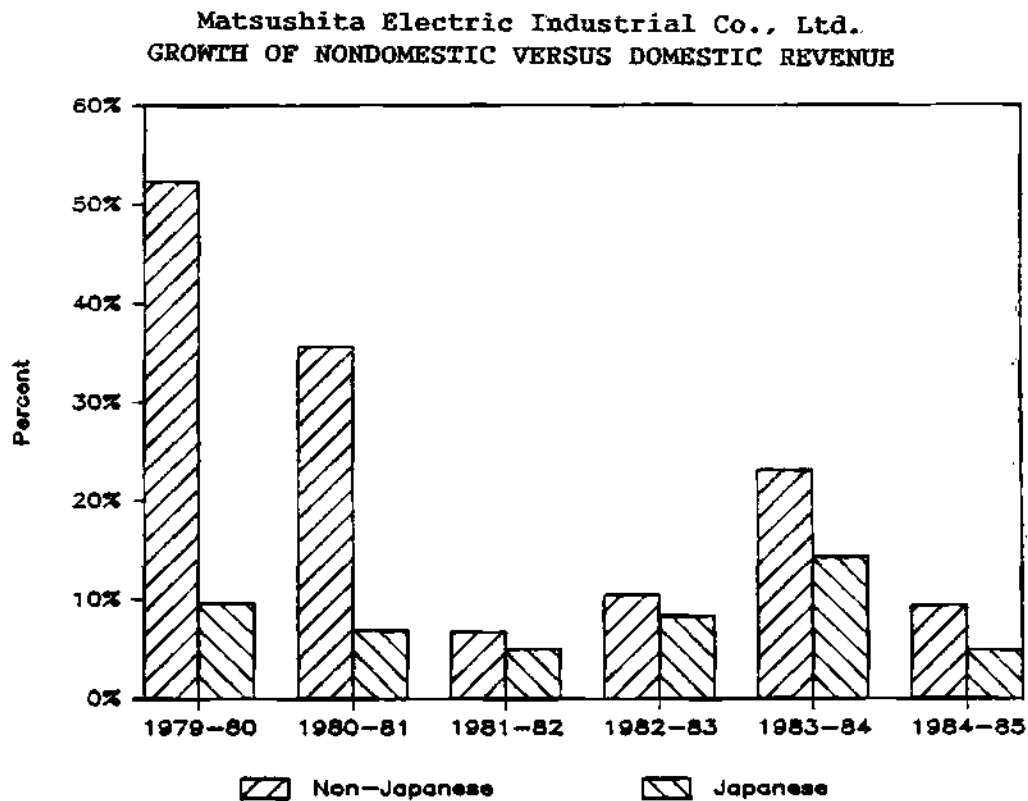
Overseas sales accounted for 49.5 percent of total Matsushita revenue in fiscal 1985, compared with 45.8 percent in 1980. These percentages are significantly higher than comparable figures for Fujitsu, Hitachi, Mitsubishi, NEC, and Toshiba; but they are not surprising if one realizes that most of Matsushita's products are consumer products and that the Company's audio and video equipment are a dominating force in international markets.

The CAGR for overseas sales was 12 percent from 1981 to 1985, while domestic sales grew at a CAGR of only 9 percent. Figure 6 shows the year-to-year growth of Matsushita's non-Japanese and Japanese sales from 1980 to 1985.

Matsushita has 48 manufacturing companies outside Japan, located in North, Central, and South America; the Far East; Oceania; Africa; and Europe. The Company also has 35 sales companies worldwide.

Matsushita

Figure 6



Source: Dataquest
December 1986

MANUFACTURING FACILITIES

Matsushita Electronics Corporation has ten semiconductor manufacturing facilities: eight in Japan, one in the United States, and one in Singapore. These are listed in Table 5. The Company also plans to build a new U.S. semiconductor plant in the midwest sometime in 1987, although no details are yet available. Currently, hybrid assembly is performed at Matsushita Electronic Components Company in Santa Clara, California.

Figure 7 is a map of Japan showing the Japanese factory locations. Two plants were recently built at Uozu, which came on-line in February and April of 1985, respectively. Out of total fiscal 1985 capital expenditures of ¥255.1 billion, Dataquest estimates that ¥87 billion was semiconductor related; we believe that ¥58 billion will be spent for semiconductor capital equipment and plants in 1986.

Matsushita

Table 5

**Matsushita Electronics Corporation
SEMICONDUCTOR MANUFACTURING FACILITIES**

<u>Map Code*</u>	<u>Location</u>	<u>Function and Products</u>
A	Arai Works Niigata Prefecture (est. 1976) (3 plants including one built in 1984)	Fab, assembly, test--ICs
B	Kagoshima Matsushita Denshi Kagoshima Prefecture (est. 1969)	Assembly--optoelectronics, germanium transistors
C	Nagaoka Factory Kyoto Prefecture (first plant est. 1967, second plant est. 1981)	Fab, assembly, and test-- ICs, discretes, and optoelectronics; VLSI R&D
D	Okayama Factory Okayama Prefecture (est. 1968)	Assembly--transistors
E	Takatsuki Denshi Oyo Lab Utsunomiya Factory Tochigi Prefecture (est. 1976)	Assembly--silicon transistors and diodes
F	Toyo Dempa (Affiliate) Kyoto Prefecture (est. 1968)	Assembly--silicon diodes
G	West Denki (Affiliate) Osaka Prefecture (est. 1967)	Assembly--germanium diodes
H	Uozu Factory Toyama Prefecture (est. 1984)	Fab, assembly--MOS logic and MPU
N/A	Matsushita Denshi (Singapore) Pte. Ltd. (est. 1978)	Assembly--silicon transistors, ICs
N/A	Matsushita Electronic Components Company (Santa Clara, California)	Assembly--custom hybrid ICs

*Map code refers to map in Figure 7, which shows Matsushita semiconductor factory locations.

N/A = Not Applicable

Source: Dataquest
December 1986

Matsushita

Figure 7

Matsushita Electronics Corporation
JAPANESE SEMICONDUCTOR MANUFACTURING FACILITIES



Source: Dataquest
December 1986

RESEARCH AND DEVELOPMENT

Matsushita's total research and development (R&D) expenditure for fiscal 1985 was ¥240.7 billion, a 20 percent increase from fiscal 1984. R&D expenditures have increased slightly as a percent of total sales, from 3.7 percent in 1981 to 4.8 percent in 1985.

Matsushita

Matsushita has five semiconductor R&D laboratories. They are as follows:

- Materials Research Laboratory--Performs research and development of materials used in electronic components
- Matsushita Electronics Corporation Research Laboratory--Performs semiconductor research and development
- Matsushita Technology Research Corporation (Kanagawa prefecture), a subsidiary of Matsushita Electric Industrial Co., Ltd.
- Matsushita Electric and Matsushita Electronics have both built new VLSI laboratories; the first is at Kadoma, Osaka prefecture and the second is at Kyoto.

VLSI research and development is also carried out at the Nagaoka Factory in Kyoto prefecture.

Matsushita's major 1985 R&D achievements included the following:

- Development of an Integrated Work Processor (IWP) that includes a word processor, personal computer, facsimile, and copier in one workstation
- Development with NTT of a large-scale optical fiber LAN system that can transmit 100Mb of digital signals per second
- Development of a biaspheric molded glass lens for CD player pickup, replacing the four or five ground lenses used in conventional systems

MARKETING

About 50 percent of Matsushita's semiconductor sales are captive. Domestic semiconductor sales are made directly to medium and large companies; sales to small companies are made through distributors. Matsushita's main Japanese distributors are Kanto Denshi Corporation and Chiyoda Denshi Kiki.

Sales outside Japan are handled through Matsushita Electric Trading Company, which sells the products to local sales companies or distributors. They, in turn, sell to OEM customers.

Matsushita Electric Industrial Co., Ltd.

Matsushita Electric Industrial Co., Ltd.
1006, Kadoma, Kadoma City
Osaka 571, Japan
Telephone: 06-908-1121 Telex: J63426
(Billions of Yen Except Per Share Data)

Balance Sheet (November 20)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Working Capital	¥ 418.8	¥ 495.4	¥ 548.4	¥ 615.4	¥ 676.4
Long-Term Debt	¥ 20.1	¥ 68.1	¥ 58.8	¥ 35.5	¥ 49.2
Shareholders' Equity	¥ 828.0	¥ 921.6	¥1,092.4	¥1,275.2	¥1,435.3
After-Tax Return on Average Equity (%)	11.4	11.2	12.3	13.2	9.2

Operating Performance (Fiscal Year Ending November 20)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Revenue	¥2,145.7	¥2,362.6	¥2,916.0	¥3,451.3	¥3,649.6
Japanese Revenue	¥1,424.3	¥1,598.7	¥1,752.1	¥1,872.3	¥1,964.8
Non-Japanese Revenue	¥ 721.4	¥ 763.9	¥1,163.9	¥1,579.0	¥1,684.8
Cost of Revenue	¥1,368.3	¥1,492.6	¥1,868.1	¥2,230.1	¥2,354.2
R&D Expense	¥ 77.0	¥ 84.9	¥ 101.5	¥ 127.5	¥ 151.2
SG&A Expense	¥ 598.3	¥ 657.2	¥ 770.8	¥ 848.5	¥ 917.6
Pretax Income	¥ 225.5	¥ 251.2	¥ 323.7	¥ 431.9	¥ 428.9
Pretax Margin (%)	10.6	10.6	11.1	12.5	11.8
Effective Tax Rate (%)	52.1	50.8	51.2	53.7	53.1
Net Income	¥ 89.2	¥ 98.3	¥ 124.6	¥ 156.7	¥ 157.1
Average Shares Outstanding (Millions)	1,443	1,481	1,519	1,595	1,604
Per Share					
Earnings	¥ 61.82	¥ 66.39	¥ 82.05	¥ 98.24	¥ 97.92
Dividends	¥ 9.42	¥ 8.26	¥ 8.26	¥ 9.09	¥ 10.00
Book Value	¥ 574	¥ 622	¥ 719	¥ 799	¥ 895
Price Range*	¥ 541- 795	¥ 622- 763	¥ 643- 979	¥ 800- 1,940	¥ 900- 1,425
Total Employees	95,487	98,292	107,57	117,888	121,254
Capital Expenditures	¥ 70.0	¥ 72.7	¥ 130.0	¥ 202.6	¥ 161.0
Exchange Rate (Yen per US\$)	209.2	217.9	228.3	221.1	241.5

*Price ranges are expressed in yen per common share on Tokyo Stock Exchange.
Price ranges for 1981 and 1982 are estimated by DATAQUEST from bar charts
in the Matsushita Annual Reports.

Source: Matsushita Electric Industrial Co., Ltd.
Annual Reports
DATAQUEST

Matsushita Electric Industrial Co., Ltd.

Table 1

Matsushita Electric Industrial Co., Ltd.
SALES BY PRODUCT GROUP
(Billions of Yen)

	Fiscal Year Ending November 20				
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Video Equipment	¥ 485.4	¥ 567.3	¥ 805.1	¥1,116.0	¥1,341.4
Audio Equipment	367.1	361.4	477.4	543.4	484.5
Home Appliances	513.4	544.8	544.4	590.7	590.5
Communication and Industrial Equipment	280.2	326.3	380.7	422.7	452.3
Energy and Kitchen- Related Products	123.5	144.8	163.0	165.9	180.6
Electronic Components	187.3	206.3	277.3	312.8	309.6
Other	<u>188.8</u>	<u>211.7</u>	<u>268.1</u>	<u>299.8</u>	<u>290.7</u>
Total	¥2,145.7	¥2,362.6	¥2,916.0	¥3,451.3	¥3,649.6
Exchange Rate (Yen per US\$)	209.2	217.9	228.3	221.1	241.5

Source: DATAQUEST

Matsushita Electric Industrial Co., Ltd.

Table 2

Matsushita Electric Industrial Co., Ltd.
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

	1975	1976	1977	1978	1979	1980	1981	1982
	*****	*****	*****	*****	*****	*****	*****	*****
Total Semiconductor	108	177	192	254	237	319	487	426
Total Integrated Circuit	22	40	60	86	103	149	277	249
Bipolar Digital (Technology)	1	2	6	10	11	13	10	7
TTL	-	-	-	-	-	-	-	-
DTL	-	-	-	-	-	-	-	-
ECL	-	-	-	-	-	-	-	-
Other Bipolar Digital	-	-	-	-	-	-	-	-
Bipolar Digital (Function)	1	2	6	10	11	13	10	7
Bipolar Digital Memory	-	-	-	-	-	-	1	-
Bipolar Digital Logic	-	-	-	-	11	13	9	7
MOS (Technology)	5	7	10	21	35	57	91	89
NMOS	-	-	-	-	-	27	53	50
PMOS	-	-	-	-	-	15	18	15
CMOS	-	-	-	-	-	15	20	24
MOS (Function)	5	7	10	21	35	57	91	89
MOS Memory	-	-	-	-	2	4	9	9
MOS Microprocessor	-	-	-	-	14	15	45	48
MOS Logic	-	-	-	-	19	38	37	32
Linear	16	31	44	55	57	79	176	153
Total Discrete	82	131	130	157	124	152	181	146
Transistor	52	93	92	105	80	90	110	94
Small Signal Transistor	-	-	-	-	-	-	-	-
Power Transistor	-	-	-	-	-	-	-	-
Diode	25	30	30	44	36	47	55	38
Small Signal Diode	-	-	-	-	-	-	-	-
Power Diode	-	-	-	-	-	-	-	-
Zener Diode	-	-	-	-	-	-	-	-
Thyristor	2	4	3	3	3	4	5	4
Other Discrete	3	4	5	5	5	11	11	10
Total Optoelectronic	4	6	2	11	10	18	29	31
LED Lamps	-	-	-	-	-	-	-	-
LED Displays	-	-	-	-	-	-	-	-
Optical Couplers	-	-	-	-	-	-	-	-
Other Optoelectronics	-	-	-	-	-	-	-	-

Source: DATAQUEST

Matsushita Electric

Matsushita Electric Industrial Co., Ltd.
Kadoma, Osaka, Japan
(Billions of Yen Except Per Share Data)

Balance Sheet (November 20)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Working Capital	¥ 375.6	¥ 418.8	¥ 495.4	¥ 548.4
Long-Term Debt	¥ 44.5	¥ 20.1	¥ 68.1	¥ 58.8
Shareholders' Equity	¥ 732.1	¥ 828.0	¥ 921.6	¥1,092.4
After-Tax Return on Average Equity (%)	11.4	11.4	11.2	12.3

Operating Performance (Fiscal Year Ending November 20)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Revenue	¥1,949.6	¥2,145.7	¥2,362.6	¥2,916.0
Japanese Revenue	¥1,264.3	¥1,424.3	¥1,598.7	¥1,752.1
Non-Japanese Revenue	¥ 685.3	¥ 721.4	¥ 763.9	¥1,163.9
Cost of Sales	¥1,243.2	¥1,368.3	¥1,492.6	¥1,868.1
R&D Expenditures	N/A	¥ 77.0	¥ 84.9	¥ 101.5
SG&A Expense	¥ 544.1	¥ 598.3	¥ 657.2	¥ 770.8
Pretax Income	¥ 198.0	¥ 226.5	¥ 251.2	¥ 323.7
Pretax Margin (%)	10.2	10.6	10.6	11.1
Effective Tax Rate (%)	51.9	52.1	50.8	51.2
Net Income	¥ 78.0	¥ 89.2	¥ 98.3	¥ 124.6
Average Shares Outstanding (Millions)	1,247	1,312	1,847	1,380
Per Share Data				
Earnings	¥ 62.55	¥ 68.00	¥ 73.03	¥ 90.25
Dividends	¥ 8.26	¥ 10.36	¥ 9.09	¥ 9.09
Book Value	¥ 587	¥ 631	¥ 684	¥ 792
Price Range*	\$ 19 1/8- 27 1/4	¥ 541- 795	¥ 622- 763	¥ 643- 979
Total Employees	94,108	95,487	98,292	107,057
Capital Expenditures	¥ 62.2	¥ 70.0	¥ 72.7	¥ 130.0
Exchange Rate (US\$ per Yen)	0.00370	0.00478	0.00459	0.00438

*Price range for 1977 is expressed in dollars per American Depository Receipt (ADR) on NYSE; remainder are expressed in yen per common share on Tokyo Stock Exchange. Each ADR represents 10 common shares.
N/A = Not Available

Source: Matsushita Electric Industrial Co., Ltd.
Annual Reports
DATAQUEST, Inc.

Matsushita Electric

Table 1

Matsushita Electric Industrial Co., Ltd.
SALES BY PRODUCT GROUP
(Billions of Yen)

	Fiscal Years Ending November 20			
	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Batteries	¥ 78	¥ 89	¥ 99	¥ 116
Semiconductors, Tubes, & Lighting Equipment	76	83	94	124
Industrial Equipment	94	100	113	130
Communication, Measuring, & Business Equipment	100	117	139	176
Home Appliances	566	646	702	711
Consumer Electronics & Components	858	930	1,016	1,401
Other	<u>178</u>	<u>181</u>	<u>200</u>	<u>258</u>
	¥1,950	¥2,146	¥2,363	¥2,916

Source: Matsushita Electric Industrial Co., Ltd.
Annual Reports
DATAQUEST, Inc.

Matsushita Electric

Table 2

Matsushita Electric Industrial Co., Ltd.
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

	1973	1974	1975	1976	1977	1978	1979	1980
TOTAL SEMICONDUCTOR	164	138	108	177	192	254	237	300
Total Integrated Circuit	29	25	22	40	60	86	103	130
Bipolar Digital	2	2	1	2	6	10	11	13
TTL								
DTL								
ECL								
Other								
Bipolar Digital (Recap)							11	13
Memory							0	0
Logic							11	13
MOS	5	4	5	7	10	21	35	57
NMOS								27
PMOS								15
CMOS								15
MOS (Recap)							35	57
Memory							2	4
Microprocessor							14	27
Logic							19	26
Linear	22	19	16	31	44	55	57	60
Total Discrete	133	111	82	131	130	157	124	152
Transistor			52	93	92	105	80	90
Small Signal								
Power Transistor								
Diode			25	30	30	44	36	47
Small Signal								
Power								
Zener								
Thyristor			2	4	3	3	3	4
Other			3	4	5	5	5	11
Total Optoelectronic	2	2	4	6	2	11	10	18
LED Lamps								
LED Displays								
Optical Couplers								
Other								

Source: DATAQUEST, Inc.

10.04 Matsushita Electronics

Table 10.04-1
Matsushita Electronics
ESTIMATED SEMICONDUCTOR REVENUES
(Dollars in Millions)

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
TOTAL SEMICONDUCTOR		124	164	138	108	177	192	254
TOTAL I C	12	20	29	25	22	40	60	86
BIPOLAR DIGITAL	1	1	2	2	1	2	6	10
TTL								
DTL								
ECL								
OTHER								
MOS	2	3	5	4	5	7	10	21
PMOS								
NMOS								
CMOS								
LINEAR	9	16	22	19	15	31	44	55
INTERFACE								
CONTROL								
ENTERTAINMENT								
OTHER								
HYBRID								
TOTAL DISCRETE		103	133	111	82	131	130	157
TRANSISTOR							92	105
SMALL SIGNAL								
POWER								
DIODE							30	44
SMALL SIGNAL								
POWER								
ZENER								
THYRISTOR							3	3
OTHER							5	5
OPTOELECTRONIC		1	2	2	4	6	2	11
LED LAMPS								
LED DISPLAYS								
COUPLERS								
OTHER								

Note: The following exchange rates were used to convert yen to dollars:
 1971: 343 yen = \$1.00; 1972: 302 yen = \$1.00; 1973: 269 yen = \$1.00;
 1974: 292 yen = \$1.00; 1975: 297 yen = \$1.00; 1976: 296 yen = \$1.00;
 1977: 266 yen = \$1.00; 1978: 207 yen = \$1.00

Source: DATAQUEST, Inc.

10.04 Matsushita Electric

Table 10.04.2-1
Matsushita Electric
ESTIMATED SEMICONDUCTOR REVENUES
(Dollars in Millions)

	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
TOTAL SEMICONDUCTOR	124	160	137	108	203	201
TOTAL I C	20	25	24	22	40	53
BIPOLAR DIGITAL	1	2	2	1	2	5
TTL						
DTL						
ECL						
OTHER						
MOS	3	4	4	5	7	9
PMOS						
NMOS						
CMOS						
LINEAR	16	19	18	16	31	39
INTERFACE						
CONTROL						
ENTERTAINMENT						
OTHER						
HYBRID						
TOTAL DISCRETE	103	133	111	82	157	146
TRANSISTOR						92
SMALL SIGNAL						
POWER						
DIODE						46
SMALL SIGNAL						
POWER						
ZENER						
THYRISTOR						3
OTHER						5
OPTOELECTRONIC	1	2	2	4	6	2
LED LAMPS						
LED DISPLAYS						
COUPLERS						
OTHER						

10.04 Matsushita Electric

Table 10.04.2-1
Matsushita Electric
ESTIMATED SEMICONDUCTOR REVENUES
(Dollars in Millions)

	1971	1972	1973	1974	1975	1976
<i>TOTAL SEMICONDUCTOR</i>		154	207	202	143	254
<i>TOTAL I C</i>	12	20	25	24	27	59
<i>BIPOLAR DIGITAL</i>	1	1	2	2	1	2
<i>TTL</i>						
<i>DTL</i>						
<i>ECL</i>						
<i>OTHER</i>						
<i>MOS</i>	2	3	4	4	5	7
<i>PMOS</i>						
<i>NMOS</i>						
<i>CMOS</i>						
<i>LINEAR</i>	9	16	19	18	21	50
<i>INTERFACE</i>						
<i>CONTROL</i>						
<i>ENTERTAINMENT</i>						
<i>OTHER</i>						
<i>TOTAL DISCRETE</i>		133	178	174	110	184
<i>TRANSISTOR</i>						
<i>SMALL SIGNAL</i>						
<i>POWER</i>						
<i>DIODE</i>						
<i>SMALL SIGNAL</i>						
<i>POWER</i>						
<i>ZENER</i>						
<i>THYRISTOR</i>						
<i>OTHER</i>						
<i>OPTOELECTRONIC</i>	0	1	4	4	6	11
<i>LED LAMPS</i>						
<i>LED DISPLAYS</i>						
<i>COUPLERS</i>						
<i>OTHER</i>						

Source: DATAQUEST, Inc.

10.04 Matsushita Electric

Table 10.04.2-1

Matsushita Electric
ESTIMATED SEMICONDUCTOR REVENUES
(Dollars in Millions)

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
<i>TOTAL SEMICONDUCTOR</i>		154	207	202
<i>TOTAL I C</i>	12	20	25	24
<i>BIPOLAR DIGITAL</i>	1	1	2	2
TTL				
DTL				
ECL				
OTHER				
<i>MOS</i>	2	3	4	4
PMOS				
NMOS				
CMOS				
<i>LINEAR</i>	6	12	14	13
INTERFACE				
CONTROL				
ENTERTAINMENT				
OTHER				
<i>HYBRID</i>	3	4	5	5
<i>TOTAL DISCRETE</i>		133	178	174
<i>TRANSISTOR</i>				
SMALL SIGNAL				
POWER				
<i>DIODE</i>				
SMALL SIGNAL				
POWER				
ZENER				
<i>THYRISTOR</i>				
<i>OTHER</i>				
<i>OPTOELECTRONIC</i>	0	1	4	4

Source: DATAQUEST, Inc.

Maxtor Corporation
211 River Oaks Parkway
San Jose, California 95134
Telephone: (408) 432-1700
Fax: (408) 432-4504
Dun's Number: 17-766-7219
Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Maxtor Corporation, incorporated in 1982, supplies high-capacity, high-performance magnetic and optical data storage products to the computer systems market. The company offers a family of 3.5- and 5.25-inch magnetic disk drives. Its data storage products are designed for use in computer systems that process large volumes of data and require rapid access to such data. Maxtor's products are used primarily for computer-aided engineering and design (CAE and CAD) workstations, multiuser and multitasking computer systems, systems, local area networks (LANs), and high-performance personal computers.

The company sells its products to OEMs through a direct sales force and to an extensive network of international and domestic industrial distributors. Maxtor also sells to end users and retail sales outlets via commercial distributors.

In June 1990, Maxtor acquired the assests of MiniScribe Corporation and formed Maxtor Colorado (MCO), a manufacturer of low-to-medium capacity 3.5-inch rigid disk drives. At the time of purchase, MiniScribe had sought protection under bankruptcy laws. A significant working capital investment by Maxtor has been required to increase manufacturing levels and to develop new products by MiniScribe. As a result, this investment, combined with operating losses from MiniScribe, has contributed significantly to the reduction of Maxtor's cash reserves.

Total revenue of \$871.3 million* for the fiscal year ended March 30, 1991 increased by 77 percent, or \$380 million, compared to 1990 total revenue of \$491.1 million. Of this increase, 78 percent, or \$298 million, is primarily due to sales of three 3.5-inch rigid disk drive families which were added to Maxtor's product portfolio as a result of the MiniScribe acquisition. The remainder of the revenue increase is due to increased unit sales of the company's LXT 3.5-inch and XT-8000 5.25-inch disk drive families. Revenue from the company's optical disk drive families increased by 43 percent, or \$4.7 million, in comparision to fiscal 1990.

Maxtor had export sales of approximately 37 percent, 33 percent, and 20 percent of total revenue, in fiscal years 1991, 1990, and 1989, respectively. In 1991, approximately 42 percent of export sales were to the Far East, and the balance of export sales was primarily to Europe. In fiscal 1990 and 1989, export sales were primarily to Europe.

A net loss totaling \$45.4 million was recorded in 1991 compared with net income of \$18.9 million in 1990. However, nearly \$30 million of this loss was comprised of restructuring, non-recurring, and other special charges. Gross margins declined from 23.0 percent in fiscal 1990 to 10.3 percent in fiscal 1991. A major factor behind this decrease was that the company's product development did not keep pace with competitors and market opportunities. This,

turn, limited revenue and growth, while strong price competition eroded margins on mature products.

R&D expense increased 53 percent to \$54.3 million during fiscal year 1991, up from \$35.5 million in fiscal 1990. Because Maxtor operates in an industry that is subject to rapid technological change, its ability to remain competitive and successful depends largely on its ability to anticipate such change. Accordingly, the company is planning to develop new higher capacity rigid disk drives in 5.25-inch and in smaller formats, and to continue application of new technologies in order to maintain its market position. Further development of erasable optical disk drive products will be performed at Maxoptix. Other areas of focus include recording heads and media, control and data handling electronics, mechanical technologies, and testing and manufacturing processes.

Capital expenditures increased 3.6 percent from fiscal 1990, totaling \$46.3 million in 1991. These expenditures represented 5.3 percent of total revenue. At the end of fiscal 1990, Maxtor had 8,303 employees worldwide.

In the magnetic storage devices market Maxtor currently competes with such companies as Conner Peripherals Inc., Micropolis Corporation, Quantum Corporation, NEC Corporation, Seagate Technology, and Sony Corporation. For sales of optical disk drives, the company is competing with such companies as Canon Inc., Hewlett-Packard Company, Hitachi Ltd., Ricoh Company Ltd., Sharp Electronics Corporation, and Sony Corporation.

All dollar amounts are in US dollars.

BUSINESS SEGMENT STRATEGIC DIRECTION

Maxtor's objective is to be a leading supplier of high-quality, high-performance mass storage products that cover a wide range of capacities and applications. Historically, the company has focused its engineering efforts toward developing some of the highest capacity drives in the industry. With its recent acquisition of MiniScribe, Maxtor acquired engineering and manufacturing teams skilled in developing and producing cost-effective, low-to-medium capacity disk drives.

Rigid Disk Drives

According to Dataquest, Maxtor ranked seventh in the worldwide rigid disk drive market with a 5.8 percent market share based on unit shipments of 1.73 million in calendar 1990.

5.25-Inch Drives

The company's 5.25-inch disk drive families offer unformatted storage capacities between 85 megabytes (found in the XT-1000/2000 family) and 1.7 gigabytes (found in the Panther family). All drives come with either an ST506 interface, an Enhanced Small Device Interface (ESDI), or a Small Computer System Interface (SCSI). In 1990, Dataquest estimates that Maxtor ranked third in the 5.25-inch disk drive market with a 5.4 percent share.

Maxtor anticipates that storage capacities will continue to increase over time

and that lower capacity 5.25-inch drives will be replaced by other form factors, such as 3.5-inch magnetic disk drive families, while higher capacity 5.25-inch drives will tend to replace drives of larger media sizes. Given this pattern, the company has decided to discontinue certain mature 5.25-inch drives during fiscal 1992. In fiscal 1991, sales of Maxtor 5.25-inch drive products decreased by 12 percent when compared to the previous year.

3.5-Inch Drives

Dataquest estimates that in calendar 1990, Maxtor ranked seventh in the 3.5-inch rigid disk drive market with a 6.2 percent share. The company's 3.5-inch magnetic drives offer a full range of formatted capacities between 40MB and 535MB. At the high-end of the range is the LXT family of disk drives, with capacities ranging from 201MB to 535MB. During the second half of 1991, Maxtor introduced the LXT-535 and the LXT-437, which offer 535MB and 437MB of storage capacity, respectively. Both of these drives also offer an average seek time of 12 milliseconds (ms) for reads and 13ms for write operations. All products in the LXT family are offered with an embedded SCSI or Advanced Technology (AT) controller.

At the low- to medium-end of this product group are the inch-high series which include the 7040 family (40MB capacity), the 7060 family (65MB capacity), the 7080 family (80MB capacity), and the 7120 family (130MB capacity). These products are high-performance drives that use either an AT or SCSI interface.

Optical Disk Drives

According to Dataquest, the optical disk drive market grew by 59 percent during 1990 to approximately \$347 million. Most of the revenue growth was in the 5.25-inch rewritable, 5.25-inch WORM, and CD-ROM segments. Through Maxoptix, a joint venture company formed with Osaka-based Kubota Corporation, Maxtor offers a number of optical disk drives. Tahiti I, the company's 5.25-inch erasable optical disk drive, offers high capacity and performance, and is aimed at PC and entry level workstation applications. The Tahiti I disk drive provides 1 gigabyte per cartridge of total storage and a seek time of 35 milliseconds. This drive also uses removable media, features the industry standard SCSI interface, and embodies magneto-optic recording technology. Production shipments of the Tahiti I drive began in the third quarter of fiscal 1990. The Tahiti II drive was publicly announced in May 1991 and addresses the performance requirements of the OEM market. Tahiti II features include a seek time as low as 25ms for the 1GB cartridge and can support sustained transfer rates of more than 1MB per second. At the time of the introduction, Maxoptix also announced major OEM relationships for Tahiti II with Wang Laboratories and Intergraph Corporation, two companies that will each introduce Tahiti II to their end-user base. Tahiti II will commence volume shipments in the second quarter of fiscal 1992.

According to Dataquest, Maxoptix ranked fourth in 5.25-inch rewritable drives in 1990 with a 9.0 percent market share based on estimated factory revenue of \$14.4 million. The company introduced its RXT-800 5.25-inch write-once/read-many (WORM) drive in 1987. The second generation of this product, the RXT-800HS drive, a half-height version, began volume shipments in mid-1990 and expands the market for the RXT-800 drive as a personal computer add-in solution. Both versions of the RXT-800 drive were developed jointly with and are manufactured

Ricoh Company Ltd. and offer 786MB of storage, a removable cartridge, and an embedded SCSI interface. The full-height RXT-800 is being gradually phased out and replaced by the RXT-800HS.

Storage Subsystems

Through its wholly-owned Storage Dimensions Inc. (SDI) subsidiary, Maxtor is providing mass storage subsystems that address the emerging storage needs of users of desktop computers and local area networks (LANs). SDI's objective is to develop high-end storage solutions by combining disk drives with software, firmware, and host adapters to enhance overall system performance and reliability. This system approach enables SDI to offer easy-to-install, high-capacity subsystems which are fully compatible with customers' computer systems. SDI's products for the personal computer environment include SpeedStor software, a leading PC/MS-DOS utility for integrating high-capacity disk drives into personal computers, and MacinStor software, which offers similar features for use in Apple Macintosh computers. SDI has also entered into a joint marketing agreement with Novell Inc. under which SDI provides data storage subsystems for the LAN market.

Further Information

For further information about the company's business segments, please contact Dataquest's Computer Storage industry service.

90 SALES OFFICE LOCATIONS

North America--14

Europe--5

Japan--1

ROW--3

MANUFACTURING LOCATIONS

North America

Longmont, Colorado

Design development, and manufacturing of new products; optical disk drive products

San Jose, California

Design, development, and manufacturing of new products; optical disk drive products

Europe

Bray, Ireland

Rigid disk drive products

ROW

Hong Kong

Rigid disk drive products

Penang, Malaysia

5

Rigid disk drive products
Singapore
Rigid disk drive products

SUBSIDIARIES

North America

Maxoptix Corporation (United States)
Storage Dimensions Inc. (United States)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1991

Compac Microelectronics

Compac signed an agreement to distribute Maxtor's full line of 3.5- and 5.25-inch disk drives.

Intergraph Corporation

Under terms of an OEM agreement, Intergraph selected Maxtor's 5.25-inch Tahiti II rewritable optical disk drive for use in its high-performance workstations.

Kubota Corporation

Kubota expanded its ownership share in Maxoptix Corporation from 25 percent to 35 percent by purchasing an additional 1.6 million shares of Series C preferred Maxoptix stock for \$6 million. Under terms of the transaction, Maxtor will retain ownership of approximately 65 percent of Maxoptix' shares, with a small number of shares also held under an employee stock option plan.

Wang Laboratories Inc.

Wang Laboratories signed an OEM agreement with Maxtor under which it will begin shipping the Tahiti II to its end-user customers.

1990

Computer & Communications Technology Corporation (CCT)

The two companies signed a licensing agreement authorizing Maxtor to make and sell products using a CCT-patented technology for disk drive recording heads and suspensions.

IBM Corporation

Maxtor was assigned the rights under a patent cross-licensing agreement between MiniScribe and IBM.

Marshall Industries

Maxtor signed an all-location authorization agreement with Marshall Industries, giving the distributor its first new line of Winchester disk drives three years.

Rodime Inc.

4

Maxtor was assigned the rights under a patent cross-licensing agreement between MiniScribe and Rodime.

Wyle Laboratories Electronic Marketing Group

Wyle Laboratories added Maxtor Corporation to its line card and agreed to distribute the entire line of Maxtor products.

1989

Hamilton/Avnet

Hamilton/Avnet reached an agreement and will market Maxtor's entire line of disk drives.

Kubota Corporation

Maxtor and Kubota announced the formation of a joint venture firm, Maxoptix Corporation, to develop and build Maxtor's optical disk drive products. Under terms of the agreement, Maxtor will own 75 percent of Maxoptix, while Kubota will hold the remaining 25 percent of the company.

1988

Novell, Inc.

The two companies signed a joint marketing agreement to provide data storage subsystems (Maxtor drives) for the LAN market.

MERGERS AND ACQUISITIONS

1990

MiniScribe Corporation

Maxtor acquired the assets of MiniScribe (renamed Maxtor Colorado), a manufacturer of high-performance disk drives for the personal computer industry, for approximately \$80 million.

KEY OFFICERS

James M. McCoy

Chairman of the board

Laurence R. Hootnick

President and chief executive officer

David A. Eeg

President and chief executive officer, Storage Dimensions Inc.

Steven P. Kitrosser

President and chief executive officer, Maxoptix Corporation

David S. Dury

Senior vice president, Finance and chief financial officer

Tom Burniece

Senior vice president, Engineering

Roger A. Nordby

Senior vice president, Operations

Bashker D. Biswas

Vice president, Human Resources and Administration

Mark Chandler

Vice president and general counsel

Gary Galusha

Vice president, Worldwide Sales

J.R. Livingston

Vice president, Information Services

Robert L. Rauch

Vice president, Quality

PRINCIPAL INVESTORS

State of Wisconsin Investment Board--8.88 percent

John Manley--7.54 percent

FOUNDERS

James M. McCoy

8

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

	1987	1988	1989	1990	1991
Five Year Revenue	\$181,985	\$271,190	\$350,985	\$491,134	\$871,305
Percent Change	-	49.02	29.42	39.93	77.41
Capital Expenditure	\$12,123	\$35,838	\$29,236	\$44,673	\$46,284
Percent of Revenue	6.66	13.22	8.33	9.10	5.31
R&D Expenditure	\$12,582	\$23,952	\$23,534	\$35,555	\$54,260
Percent of Revenue	6.91	8.83	6.71	7.24	6.23
Number of Employees	2,785	3,314	4,606	4,703	8,303
Revenue (\$K)/Employee	\$65.34	\$81.83	\$76.20	\$104.43	\$104.94
Net Income	\$20,822	\$14,131	\$5,213	\$18,943	(\$45,429)
Percent Change	-	-32.13	-63.11	263.38	-339.82
1990 Fiscal Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$147,074.0	\$239,585.0	\$261,093.0	\$223,553.0	
Quarterly Profit	\$6,686.0	\$1,620.0	(\$3,964.0)	(\$49,771.0)	

Source: Maxtor Corporation
Annual Reports and
Forms 10-K
Dataquest
1991

Table 2
Revenue by Geographic Region
(Percent)

Region	1987	1988	1989	1990	1991
North America	84.00	87.00	81.00	77.00	67.00
All Others	16.00	13.00	19.00	23.00	33.00

Source: Maxtor Corporation
Annual Reports

Table 3
Revenue by Distribution Channel
(Percent)

Channel	1988	1989	1990	1991
Direct Sales	0.00	0.00	0.00	0.00
Indirect Sales	100.00	100.00	100.00	100.00
OEMs	74.00	74.00	73.00	68.00
Distributors	26.00	26.00	27.00	32.00

Source: Maxtor Corporation
Forms 10-K
Dataquest
1991

7

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

Balance Sheet	1987	1988	1989	1990	1991
Total Current Assets	\$225,085.0	\$211,006.0	\$231,342.0	\$285,644.0	\$315,648.0
Cash	149,907.0	97,228.0	64,915.0	51,063.0	42,486.0
Receivables	38,568.0	53,152.0	68,579.0	103,608.0	125,014.0
Marketable Securities	-	-	28,244.0	50,968.0	-
Inventory	28,661.0	53,557.0	61,871.0	73,489.0	142,918.0
Other Current Assets	7,949.0	7,069.0	7,733.0	6,516.0	5,230.0
Net Property, Plants	\$25,230.0	\$53,176.0	\$66,940.0	\$89,599.0	\$127,251.0
Other Assets	\$3,168.0	\$13,148.0	\$11,328.0	\$9,299.0	\$10,957.0
 Total Assets	 \$253,483.0	 \$277,330.0	 \$309,610.0	 \$384,542.0	 \$453,856.0
 Total Current Liabilities	 \$45,447.0	 \$46,696.0	 \$57,788.0	 \$90,307.0	 \$177,946.0
Long-Term Debt	\$106,145.0	\$111,655.0	\$117,317.0	\$126,575.0	\$128,066.0
Other Liabilities	\$0.0	\$0.0	\$6,069.0	\$11,666.0	\$8,201.0
 Total Liabilities	 \$151,592.0	 \$158,351.0	 \$181,174.0	 \$228,548.0	 \$314,213.0
 Total Shareholders' Equity	 \$101,891.0	 \$118,979.0	 \$128,436.0	 \$155,994.0	 \$139,643.0
Common Stock	186.0	191.0	200.0	209.0	232.0
Other Equity	91,984.0	94,936.0	99,171.0	107,777.0	136,832.0
Retained Earnings	9,721.0	23,852.0	29,065.0	48,008.0	2,579.0
Total Liability and Shareholders' Equity	\$253,483.0	\$277,330.0	\$309,610.0	\$384,542.0	\$453,856.0

Source: Maxtor Corporation
Annual Reports and
Forms 10-K
Database
1991

Income Statement	1987	1988	1989	1990	1991*
Revenue	\$181,985.0	\$271,190.0	\$350,985.0	\$491,134.0	\$871,305.0
U.S. Revenue	152,867.0	227,800.0	280,788.0	329,060.0	548,922.0
Non-U.S. Revenue	29,118.0	43,390.0	70,197.0	162,074.0	322,383.0
Cost of Sales	\$119,301.0	\$19,579.0	\$281,053.0	\$378,242.0	\$781,330.0
R&D Expense	\$12,582.0	\$23,952.0	\$23,534.0	\$35,555.0	\$54,260.0
SG&A Expense	\$19,678.0	\$32,680.0	\$38,313.0	\$51,527.0	\$84,792.0
Capital Expense	\$12,123.0	\$35,838.0	\$29,236.0	\$44,673.0	\$46,284.0
Pretax Income	\$32,229.0	\$18,117.0	\$6,533.0	\$26,219.0	(\$45,429.0)
Pretax Margin	17.71	6.68	1.86	5.34	-5.21
Effective Tax Rate (%)	35.40	22.00	20.00	28.00	0.00
Net Income	\$20,822.0	\$14,131.0	\$5,213.0	\$18,943.0	(\$45,429.0)
Shares Outstanding,					
Thousands	19,408	19,876	20,240	20,974	24,026
Per Share Data					
Earnings	\$1.07	\$0.71	\$0.26	\$0.90	(\$1.89)
Dividends	-	-	-	-	-
Book Value	\$5.25	\$5.99	\$6.35	\$7.44	\$5.81

(1) 1991 results include the acquisition of the assets of MiniScribe Corporation

Source: Maxtor Corporation
Annual Reports and
Forms 10-K
Dataquest
1991

Key Financial Ratios

	1987	1988	1989	1990	1991
Liquidity					
Current (Times)	4.95	4.52	4.00	3.16	1.77
Total Assets/Equity %	248.78	233.09	241.06	246.51	325.01
Current Liability/ Equity (%)	44.60	39.25	44.99	57.89	127.43
Total Liability/ Equity (%)	148.78	133.09	141.06	146.51	225.01

Profitability (Percent)

Return on Assets	8.21	5.10	1.68	4.93	-10.01
Return on Equity	20.44	11.88	4.06	12.14	-32.53
Profit Margin	11.44	5.21	1.49	3.86	-5.21

Other Key Ratios

R&D Spending % of Revenue	6.71	8.83	6.71	7.24	6.20
Capital Spending % of Revenue	6.66	13.22	8.33	9.10	5.31
Employees	2,785	3,514	4,505	4,765	5,363
Revenues (\$K)/Employee	\$65.34	\$81.83	\$76.20	\$104.43	\$104.94
Capital Spending % of Assets	4.78	12.92	9.44	11.62	10.20

Source: Maxtor Corporation
Annual Reports and
Forms 10-K
Dataquest
1991

Company Backgrounder by Dataquest

Maxtor Corporation

211 River Oaks Parkway
San Jose, California 95134
Telephone: (408) 432-1700
Fax: (408) 434-6469
Dun's Number: 17-766-7219

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Maxtor Corporation, incorporated in 1982, supplies high-capacity, high-performance magnetic and optical data storage products to the computer systems market. The Company offers a family of 3.5- and 5.25-inch magnetic disk drives. Its data storage products are designed for use in computer systems that process large volumes of data and require rapid access to such data. Maxtor's products are used primarily for computer-aided engineering and design (CAE and CAD) workstations, multiuser and multitasking computer systems, local area networks (LANs), and high-performance personal computers.

The Company sells its products to original equipment manufacturers (OEMs) through a sales force and to an extensive network of international and domestic industrial distributors. Maxtor also sells to end users and retail sales outlets via commercial distributors.

In April 1990, the Company's bid to acquire MiniScribe Corporation of Colorado was approved by the US Bankruptcy Court. MiniScribe is a supplier of low- to medium-capacity, high-performance disk drives to major OEMs of personal computers.

Maxtor's strategic goal is long-term growth in one of the fastest-moving and most competitive marketplaces—high-capacity, high-performance disk drives. Maxtor believes that success lies in supplying many models of drives. In March 1989, Maxtor and Kubota Ltd. of Japan formed a jointly owned company, Maxoptix Corporation, to research, develop, and market optical storage products.

Total revenue increased 40 percent from \$351.0 million* in fiscal 1989 to \$491.1 million in fiscal 1990. This increase is primarily because of increased disk drive sales to an expanding customer base. The greatest revenue increase was in the XT-4000 and XT-8000 5.25-inch product families. These products

constituted approximately 67 percent of Maxtor's sales in fiscal year 1990. The enhanced small device interface (ESDI) and the small computer system interface (SCSI) increased 108 percent over fiscal 1989. The Company's 3.5-inch disk drive families represented less than 3 percent of the annual revenue.

Maxtor's export sales, primarily to Europe, were \$162.1 million, or approximately 33 percent of total revenue, in fiscal 1990. This was up from \$70.2 million, or 20 percent of total revenue, for fiscal 1989.

Net income increased 263 percent to \$18.9 million in 1990 compared with \$5.2 million in 1989. Gross margins improved from 19.9 percent in fiscal 1989 to 23.0 percent in fiscal year 1990. The primary factors behind this increase were the shift in the Company's sales toward higher-performance, higher-capacity drives, which generally have higher gross margins, and efforts to reduce manufacturing costs.

R&D expense increased 51 percent to \$35.6 million during fiscal year 1990, up from \$23.5 million in fiscal year 1989. Because Maxtor operates in an industry that is subject to rapid technological change, its ability to remain competitive and successful depends largely on its ability to anticipate such change. Some of the R&D expenditure was used to plan and develop new, higher-capacity magnetic disk drives in the 5.25-inch and smaller formats. Other areas of focus include recording heads and media, control and data handling electronics, mechanical technologies, erasable optical storage techniques, and testing manufacturing processes.

Capital expenditure increased 34.5 percent from fiscal 1989, totaling \$44.7 million for fiscal 1990. This represented 9.1 percent of total revenue. As of April 28, 1990, the Company had 4,703 regular employees worldwide.

*All dollar amounts are in US dollars.

In the magnetic storage devices market, Maxtor currently competes with such companies as Conner Peripherals, Micropolis, Quantum, Seagate Technology, and divisions of Fujitsu, Hewlett-Packard, and Hitachi. For sales of optical disk drives, the Company is competing with such companies as Canon, Hitachi, Ricoh, Sharp Electronics Corporation, and Sony Corporation.

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

BUSINESS SEGMENT STRATEGIC DIRECTION

Computer Storage

Dataquest estimates that Maxtor ranked eighth in the worldwide rigid disk drive market with a 3 percent market share and factory revenue of \$447 million in calendar 1989. Maxtor's products include 3.5- and 5.25-inch Winchester disk drive families. According to Dataquest, Maxtor ranked third in the 5.25-inch disk drive market with a 6.3 percent share. The Company's 5.25-inch family offers capacities from 85 Mbytes to 1.7 Gbytes (the 5.25 Panther drive),

while the 3.5-inch drives offer capacities from 50 to 340 Mbytes. The purchase of MiniScribe allows Maxtor to be more competitive in the 3.5-inch rigid disk drive market. Dataquest estimates that in calendar 1989, MiniScribe ranked fourth in the 3.5-inch rigid disk drive market with a 15.8 percent share.

According to Dataquest, the optical disk drive market grew 75 percent during 1989 to approximately \$218 million. Most of the revenue growth was in the 5.25-inch rewritable, 5.25-inch WORM, and CD-ROM segments. Through its Maxoptix subsidiary, Maxtor ranked sixth in the worldwide optical disk drive market, with a 5 percent market share and \$11 million in revenue for calendar 1989. Maxoptix has been supplying a 5.25-inch WORM optical disk drive made by Ricoh and introduced three drives manufactured by Panasonic in late autumn 1989. Dataquest ranks Maxoptix first in 5.25-inch WORM drives, with a 36 percent market share and estimated factory revenue of \$9 million. Maxoptix announced a family of erasable optical disk drives including the 1-Gbyte Tahiti I disk drive, which started shipping in December 1989.

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)

	1986	1987	1988	1989	1990
Five-Year Revenue	\$93.20	\$182.00	\$271.20	\$351.00	\$491.10
Percent Change	-	95.28	49.01	29.42	39.91
Capital Expenditure	\$7.70	\$17.40	\$38.10	\$29.20	\$44.70
Percent of Revenue	8.26	9.56	14.05	8.32	9.10
R&D Expenditure	\$6.80	\$12.60	\$24.00	\$23.50	\$35.60
Percent of Revenue	7.30	6.92	8.85	6.70	7.25
Number of Employees	1,771	2,785	3,314	4,606	4,703
Revenue (\$K)/Employee	\$52.63	\$65.35	\$81.83	\$76.20	\$104.42
Net Income	\$9.20	\$20.80	\$14.10	\$5.20	\$18.90
Percent Change	-	126.09	(32.21)	(63.12)	263.46
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$108.5	\$117.1	\$123.9	\$141.6	
Quarterly Profit	\$2.2	\$4.8	\$5.5	\$6.5	

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

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	NA	NA	82.00	80.00	67.00
International	NA	NA	18.00	20.00	33.00

NA = Not available

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

Table 3
Revenue by Distribution Channel (Percent)

Channel	1989	1990
Direct Sales	NA	0
Indirect Sales	NA	100
OEMs		
US OEMs	NA	47
International OEMs	NA	16
Distributors		
US Distributors	NA	16
International Distributors	NA	11
Subsidiaries	NA	10

NA = Not available

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—9
Europe—3
Asia/Pacific—1

MANUFACTURING LOCATIONS

North America

San Jose, California
Designs, develops, and manufactures new products

Asia/Pacific

Hong Kong
Subassemblies
Maxtor Malaysia
Subassemblies
Maxtor Singapore Ltd.

Mature products, subassemblies

Maxtor's manufacturing facilities total 687,000 square feet.

SUBSIDIARIES

North America

Maxoptix Corporation (United States)
Maxtor California (United States)
Maxtor Colorado (MiniScribe) (United States)
Storage Dimensions Inc. (United States)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Marshall Industries

Maxtor signed an all-location authorization agreement with Marshall Industries, giving the distributor its first new line of Winchester disk drives in three years.

Wyle Laboratories Electronic Marketing Group
Wyle Laboratories added Maxtor Corporation to its line card and agreed to distribute the entire line of Maxtor products.

1989

Hamilton/Avnet

Hamilton/Avnet will market Maxtor's entire line of drives. This agreement is expected to bring Maxtor a significant amount of new business.

Kubota Ltd.

Maxtor and Kubota announced the formation of a joint venture firm, Maxoptix Corporation, to develop and build Maxtor's optical disk drive products.

1988

Optotech

Maxtor and Optotech are combining efforts to forge an alliance of suppliers to establish standards for the media used in erasable optical disk drives.

Novell

The two companies have a joint marketing agreement to provide data storage subsystems (Maxtor drives) for the LAN market.

1987

Storage Dimensions, Inc.

The two companies formed a strategic corporate partnership that will market rigid and optical products to VARs, distributors, and systems integrators.

MERGERS AND ACQUISITIONS

1989

MiniScribe

Maxtor acquired MiniScribe (renamed Maxtor Colorado), which manufactures 3.5-inch rigid disk drives.

1987

U.S. Design Corporation

Maxtor acquired U.S. Design, which manufactures and markets high-performance storage subsystems, disk drive controllers, and host adapters.

KEY OFFICERS

James M. McCoy
Chairman of the board

George M. Scalise
President, chief executive officer

Steven P. Kitrosser
Vice president, European Operations, and president, Maxoptix Corporation

James Lynch
Vice president, Administration

Taroon Kamdar
Vice president, Corporate Development, and president, Maxtor Colorado

PRINCIPAL INVESTORS

John Manley—6.38 percent
Capital Growth Management—Not available
Fidelity Management—Not available
Investors Research Corporation—Not available
Security Management Company—Not available

FOUNDERS

James M. McCoy

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	\$49.70	\$225.20	\$218.20	\$231.40	\$285.60
Cash	21.30	150.00	97.20	93.20	102.00
Receivables	16.60	38.60	53.20	68.60	103.60
Inventory	10.40	28.70	53.60	61.90	73.50
Other Current Assets	1.40	7.90	14.20	7.70	6.50
Net Property, Plants	\$11.10	\$25.20	\$53.20	\$67.00	\$89.60
Other Assets	\$0.43	\$3.20	\$13.10	\$11.30	\$9.30
Total Assets	\$61.23	\$253.60	\$284.50	\$309.70	\$384.50
Total Current Liabilities	\$14.60	\$45.40	\$53.80	\$57.80	\$90.30
Long-Term Debt	\$3.30	\$106.10	\$111.70	\$117.30	\$126.60
Other Liabilities	0	0	0	\$6.10	\$11.70
Total Liabilities	\$17.90	\$151.50	\$165.50	\$181.20	\$228.60
Total Shareholders' Equity	43.33	102.10	119.00	128.50	155.90
Common Stock	0.15	0.19	0.19	0.20	0.20
Other Equity	(0.32)	(0.16)	(2.10)	(2.80)	(1.50)
Retained Earnings	(2.20)	9.70	23.81	29.10	48.00
Additional Paid Capital	45.70	92.37	97.10	102.00	109.20
Total Liability and Shareholders' Equity	61.23	\$253.33	\$284.59	\$309.70	\$384.50
Income Statement	1986	1987	1988	1989	1990
Revenue	\$93.20	\$182.00	\$271.20	\$351.00	\$491.10
Cost of Sales	\$63.60	\$119.30	\$195.80	\$281.10	\$378.20
R&D Expense	\$6.80	\$12.60	\$24.00	\$23.50	\$35.60
SG&A Expense	\$12.70	\$19.70	\$32.70	\$38.30	\$51.50
Capital Expense	\$7.70	\$17.40	\$38.10	\$29.20	\$44.70
Pretax Income	\$10.50	\$32.20	\$18.10	\$6.50	\$26.20
Pretax Margin (%)	11.27	17.69	6.67	1.85	5.33
Effective Tax Rate (%)	10.80	28.70	22.10	20.00	NA
Net Income	\$9.20	\$20.80	\$14.10	\$5.20	\$18.90
Shares Outstanding, Thousands	14,055	19,408	19,668	20,032	20,974
Per Share Data					
Earnings	\$0.65	\$1.07	\$0.72	\$0.26	\$0.90
Dividend	0	0	0	0	0
Book Value	\$3.07	\$5.22	\$6.00	\$6.46	\$6.46

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
<i>Liquidity</i>					
Current (Times)	3.40	4.96	4.06	4.00	3.16
Quick (Times)	2.69	4.33	3.06	2.93	2.35
Fixed Assets/Equity (%)	25.64	24.75	44.67	52.14	57.47
Current Liabilities/Equity (%)	33.73	44.59	45.18	44.98	57.92
Total Liabilities/Equity (%)	41.35	148.78	138.97	141.01	146.63
<i>Profitability (%)</i>					
Return on Assets	-	13.21	5.24	1.75	5.45
Return on Equity	-	28.67	12.76	4.20	13.29
Profit Margin	9.87	11.43	5.20	1.48	3.85
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	7.30	6.92	8.85	6.70	7.25
Capital Spending % of Revenue	8.26	9.56	14.05	8.32	9.10
Employees	1,771	2,785	3,314	4,606	4,703
Revenue (\$K)/Employee	\$52.63	\$65.35	\$81.83	\$76.20	\$104.42
Capital Spending % of Assets	12.58	6.86	13.39	9.43	11.63

NA = Not available

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

Maxtor Corporation
211 River Oaks Parkway
San Jose, California 95134
Telephone: (408) 432-1700
Fax: (408) 434-6469
Dun's Number: 17-766-7219

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Maxtor Corporation, founded in 1982, supplies high-capacity, high-performance 5.25-inch and 3.5-inch Winchester and optical disk storage devices to the computer industry. These devices, ranging from 85 Mbytes to 1 Gbyte, are designed for high-performance, multiuser, multitasking microcomputers and sophisticated workstations. These systems include CAE and CAD workstations, multiuser computer systems, local area networks (LANs), and high-performance personal computers. Maxtor has the largest installed base of high-capacity (more than 100 Mbytes) 5.25-inch Winchester drives. Maxtor's products are sold worldwide, through a direct sales force and distributors, to original equipment manufacturers (OEMs).

Maxtor's strategic goal is long-term growth in one of the fastest-moving and most competitive marketplaces—high-capacity, high-performance disk drives. Maxtor believes that success lies in supplying many models of drives. In March 1989, Maxtor and Kubota Ltd. of Japan formed a jointly owned company, Maxoptix Corp., to research, develop, and market optical storage products.

Despite spectacular advances in mass storage technology during the past five years, Maxtor believes that the industry is still in its infancy. To achieve long-term growth, Maxtor has strengthened its position worldwide in the data storage marketplace. Maxtor's competitive advantage in that market is that it currently offers high storage capacity and performance at a competitive cost per megabyte. In addition, Maxtor believes that it can spot and develop threshold technologies faster than its competitors.

Maxtor hopes to provide a growing customer base with tools that will give maximum memory productivity that will take full advantage of a computer's

power. To compete in this field, Maxtor must continue to build advanced, reliable products and evolve to a marketing- and manufacturing-driven organization. Maxtor intends to achieve its goals by an aggressive internal engineering program and joint efforts with partners.

Maxtor achieved revenue for fiscal 1989 of \$351 million,* up 30 percent from the previous year. Net income declined from \$14 million in fiscal 1988 to \$5 million in fiscal 1989.

Research and development expenditures totaled \$24 million in fiscal 1989, representing 7 percent of revenue. Capital expenditures totaled \$29 million in fiscal 1989, or 8 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

Computer Storage

Maxtor's products include 5.25- and 3.5-inch Winchester and optical disk drives that offer storage capacities ranging from 85 Mbytes to 1 Gbyte. Maxtor's high-end products include a 1-Gbyte, 5.25-inch erasable optical disk drive and an 800-Mbyte, 5.25-inch write-once, read-many (WORM) optical disk drive manufactured by Ricoh.

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

In September 1989, Maxtor announced a new 5.25-inch rigid disk drive product family that includes drives with capacities as high as 1,670 Mbytes and average seek times as fast as 10.5 milliseconds. The Panther drives have been designed cleanly into the standard 5.25-inch form factor and are offered with SMD-E, ESDI, IPI-2, and SCSI-2 interfaces. Dataquest believes that the Maxtor Panther disk drives have the specifications to be leaders in the next generation of 5.25-inch products.

The Ricoh-Maxtor approach has been to emphasize optical storage capacity and low cost over access time. The Ricoh-Maxtor product uses a constant linear velocity (CLV) design to achieve 800 Mbytes of storage, while sacrificing access time for capacity.

The active layer in the media is a polymer dye, which is a lower-cost approach than tellurium alloys. The Ricoh-Maxtor product was introduced at a price approximately 30 percent lower than the competition's for both drive and media. So far this strategy has worked; Dataquest estimates that Maxtor has the number one market share. Dataquest believes that Maxtor has switched from Ricoh to Panasonic WORM drives, however.

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	\$44	\$93	\$182	\$271	\$351
Percent Change	-	114.25	95.28	49.01	29.42
Capital Expenditure	\$5	\$8	\$17	\$38	\$29
Percent of Revenue	10.34	8.26	9.56	14.05	8.32
R&D Expenditure	\$3	\$7	\$13	\$24	\$24
Percent of Revenue	6.90	7.30	6.92	8.85	6.70
Number of Employees	N/A	1,771	2,785	3,314	4,606
Revenue (\$K)/Employee	N/A	\$52.63	\$65.35	\$81.83	\$76.20
Net Income	0	\$9	\$21	\$14	\$5
Percent Change	-	2,321.05	126.09	(32.21)	(63.12)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$97.90	\$108.45	N/A	N/A	
Quarterly Profit	\$1.40	\$2.18	N/A	N/A	

N/A = Not Available

Source: Maxtor Corporation
 Annual Reports
 Dataquest
 January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	N/A	N/A	N/A	82.00	70.00
International	N/A	N/A	N/A	18.00	30.00

N/A = Not Available

Source: Maxtor Corporation
 Annual Reports
 Dataquest
 January 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	0	0
Indirect Sales	100.00	100.00
OEMs	70.00	70.00
Distributors	30.00	30.00

Source: Maxtor Corporation

1988 SALES OFFICE LOCATIONS

North America—9

Europe—3

Asia/Pacific—1

MANUFACTURING LOCATIONS

North America

San Jose, California

Designs, develops, and manufactures new products

Asia/Pacific

Maxtor Malaysia

Subassemblies

Maxtor Singapore Ltd.

Mature products, subassemblies

Maxtor's manufacturing facilities total 687,000 square feet.

SUBSIDIARIES

North America

Maxtor Corporation (United States)

Storage Dimensions, Inc. (United States)

U.S. Design Corporation (United States)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

March 1989

Hamilton/Avnet

Hamilton/Avnet will market Maxtor's entire line of drives. This agreement is expected to bring Maxtor a significant amount of new business.

Kubota Ltd.

Maxtor and Kubota announced the formation of a joint venture firm, Maxoptix Corp., to develop and build Maxtor's optical disk drive products.

November 1988

Optotech

Maxtor and Optotech are combining efforts to forge an alliance of suppliers to establish standards for the media used in erasable optical disk drives.

Novell

The two companies have a joint marketing agreement to provide data storage subsystems (Maxtor drives) for the LAN market.

MERGERS AND ACQUISITIONS

May 1987

U.S. Design Corporation

Maxtor acquired U.S. Design, which manufactures and markets high-performance storage subsystems, disk drive controllers, and host adapters.

Storage Dimensions, Inc.

The two companies formed a strategic corporate partnership that will market rigid and optical products to VARS, distributors, and system integrators.

KEY OFFICERS

James M. McCoy

Chairman of the board and founder

George M. Scalise

President and chief executive officer

Steven P. Kitrosser

Executive vice president of Operations

David M. Kowalski

Vice president of Finance and Administration

Jim Miller

Vice president of Worldwide Sales

Deborah Stapleton

Vice president of Corporate Communications

Michael W. Warner

Vice president of Engineering

PRINCIPAL INVESTORS

John Manley—6.98 percent

FMR Corporation—5.07 percent

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

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$22.30	\$49.70	\$225.20	\$218.20	\$231.40
Cash	0.54	21.30	150.00	97.20	93.20
Receivables	12.00	16.60	38.60	53.20	68.60
Inventory	9.20	10.40	28.70	53.60	61.90
Other Current Assets	0.56	1.40	7.90	14.20	7.70
Net Property, Plants	\$5.30	\$11.10	\$25.20	\$53.20	\$67.00
Other Assets	\$1.40	\$0.43	\$3.20	\$13.10	\$11.30
Total Assets	\$29.00	\$61.23	\$253.60	\$284.50	\$309.70
Total Current Liabilities	\$9.90	\$14.60	\$45.40	\$53.80	\$57.80
Long-Term Debt	\$2.10	\$3.30	\$106.10	\$111.70	\$117.30
Other Liabilities	0	0	0	0	\$6.10
Total Liabilities	\$12.00	\$17.90	\$151.50	\$165.50	\$181.20
Total Shareholders' Equity	\$17.01	\$43.29	\$101.83	\$119.09	\$128.50
Converted Preferred Stock	29.60	0	0	0	0
Common Stock	0.38	0.15	0.19	0.19	0.20
Other Equity	(0.17)	(0.36)	(0.16)	(2.10)	(2.80)
Retained Earnings	(12.80)	(2.20)	9.70	23.90	29.10
Additional Paid Capital	0	45.70	92.10	97.10	102.00
Total Liabilities and Shareholders' Equity	\$29.01	\$61.19	\$253.33	\$284.59	\$309.70
Income Statement	1985	1986	1987	1988	1989
Revenue	\$43.50	\$93.20	\$182.00	\$271.20	\$351.00
Cost of Sales	\$35.00	\$63.60	\$119.30	\$195.80	\$281.10
R&D Expense	\$3.00	\$6.80	\$12.60	\$24.00	\$23.50
SG&A Expense	\$5.20	\$12.70	\$19.70	\$32.70	\$38.30
Capital Expense	\$4.50	\$7.70	\$17.40	\$38.10	\$29.20
Pretax Income	\$0.92	\$10.50	\$32.20	\$18.10	\$6.50
Pretax Margin (%)	2.11	11.27	17.69	6.67	1.85
Effective Tax Rate (%)	N/A	10.80	28.70	22.10	20.00
Net Income	\$0.38	\$9.20	\$20.80	\$14.10	\$5.20
Shares Outstanding, Millions	10,376	14,055	19,408	19,668	20,032
Per Share Data					
Earnings	0	\$0.65	\$1.07	\$0.72	\$0.26
Dividends	0	0	0	0	0
Book Value	\$1.66	\$3.07	\$5.22	\$6.00	\$6.46

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

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	2.25	3.40	4.96	4.06	4.00
Quick (Times)	1.32	2.69	4.33	3.06	2.93
Fixed Assets/Equity (%)	31.15	25.64	24.75	44.67	52.14
Current Liabilities/Equity (%)	58.19	33.73	44.59	45.18	44.98
Total Liabilities/Equity (%)	70.54	41.35	148.78	138.97	141.01
<i>Profitability (%)</i>					
Return on Assets	-	20.39	13.21	5.24	1.75
Return on Equity	-	30.51	28.67	12.76	4.20
Profit Margin	0.87	9.87	11.43	5.20	1.48
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	6.90	7.30	6.92	8.85	6.70
Capital Spending % of Revenue	10.34	8.26	9.56	14.05	8.32
Employees	N/A	1,771	2,785	3,314	4,606
Revenue (\$K)/Employee	N/A	\$52.63	\$65.35	\$81.83	\$76.20
Capital Spending % of Assets	15.52	12.58	6.86	13.39	9.43

N/A = Not Available

Source: Maxtor Corporation
Annual Reports
Dataquest
January 1990

Memorex Telex N.V.

Hoogoorddreef 9, 1101 BA Amsterdam
Postbus 22788, 1100 DG Amsterdam
Netherlands

Telephone: (31) 020-97 4331

Fax: Not Available

Dun's Number: 40-986-5086

Date Founded: January 1988

CORPORATE STRATEGIC DIRECTION

Memorex Telex N.V. designs, manufactures, and markets plug-compatible computer equipment and accessories. Among the Company's products are disk and tape storage devices, terminals, personal computers, controllers, printers, local area network (LAN) products, and computer supplies. Memorex Telex operates sales and service offices in 27 countries and markets its products through distributors in 50 other countries worldwide.

In January 1988, the Telex Corporation, originally founded in 1936, merged with Memorex International N.V., founded in 1961 as Memorex, to create Memorex Telex N.V. In 1978, prior to the merger, Memorex had acquired Telex's European operations. In the intervening years, Memorex continued expansion internationally, while Telex concentrated on US markets.

During the first six months after the merger, the two companies' American operations were consolidated and Company headquarters were established in Tulsa, Oklahoma. In addition, the product lines of Memorex and Telex were replaced by new product lines that combined the features of each company's products under a new Memorex Telex logo. During this same period, Memorex terminal operations in California were closed and a manufacturing facility was established in Raleigh, North Carolina. Terminals and certain other products previously obtained from third-party vendors are being built at the plant in Raleigh.

Memorex Telex had approximately 11,000 employees worldwide at the end of 1989.

During 1989, the Company continued efforts to streamline its organization. In May 1989, Memorex Telex N.V. spun off its Telex Communications Inc.

(TCI) subsidiary, and in December 1989, the Company sold its Memorex Telex Telecommunications division, which manufactured and marketed PBX equipment. The sale of these two divisions is part of the Memorex Telex strategy designed to focus more clearly on core business activities involving computer products and peripherals.

Memorex Telex also has reorganized its product planning, engineering, procurement, and marketing resources. Whereas the Company previously operated with seven business groups, it now operates with only five: Network Systems, Storage Systems, Personal Computers, Airline Systems, and Customer Engineering. This restructuring is designed to further focus and streamline the Company's operations.

The Company's main focus now is on development of systems networks and communications business. The Company is emphasizing its strength in storage and communications products coupled with support services to provide clients with systems integration and communications solutions. In April 1990, Memorex Telex acquired the Synchronous Terminals Products Division of AT&T. This merger will increase the Company's share of the 3270 plug-compatible market and expand the customer base.

Total revenue of Memorex Telex for the fiscal year ended March 31, 1990, was \$1.98 billion,* a 4 percent decrease from fiscal 1989 revenue of \$2.07 billion. The Company posted a net loss for the year of \$75.9 million, versus net income in fiscal 1989 of \$38.6 million. The Company attributes its loss to a sluggish market. In addition, interest expense and debt payments cost the Company over \$217 million in fiscal 1990.

*All dollar amounts are in US dollars.

Approximately 46 percent, or \$916 million, of fiscal 1990's total revenue came from US operations. Sales of \$600 million in Europe represent approximately 30 percent of total revenue. Sales to the Asia/Pacific region in fiscal 1990 were \$254 million, or 13 percent of total revenue. Sales in Canada and Rest of World accounted for the remaining revenue of \$209 million.

In March 1988, the Company changed its fiscal year-end from November 30 to March 31. The Company maintains its accounting records in US dollars and presents its consolidated financial statements in that currency.

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

Memorex Telex addresses markets within the data processing and communications industries. The Company operates five business segments: Storage Systems (responsible for disk and tape storage products business), Network Systems (responsible for 3270 products, local area networks (LANs), and intelligent systems), Personal Computers, Airline Systems, and Customer Engineering (responsible for service and support). The Company also offers a wide range of computer media-related products, supplies, and accessories. Approximately 40 percent of the products the Company distributes are sourced from outside suppliers.

Network Systems

The network systems segment includes the 3270 communications product line, which is the Company's largest revenue producer. In fiscal 1990, sales of 3270 communications equipment accounted for \$565 million, 28.5 percent of total revenue. The communications equipment product lines include display terminals, intelligent workstations, LAN equipment, printers, cluster controllers, and OEM tape drives. These products are marketed to end users and distributors of IBM 3270, System 3X, AS/400, and larger

computers. In addition to the 3270 products, the OEM tape drive products contributed \$118 million in sales (5.9 percent of revenue) during fiscal 1990.

Dataquest estimates that for the year ended December 31, 1989, Memorex Telex shipped over 390,000 display terminals, placing the Company among the top ten manufacturers of display terminals worldwide. Memorex Telex is the second leading vendor of 3270 terminals and control units in the North American market, with 26.7 and 19.0 percent market share, respectively.

Products included in the 3270 categories include the 1471, 1472, 1091, 1191, and 1192 series display stations; 1174, 1199, 1274, 1374 controller units; 1173, 1201, 1208, and 1324 series dot matrix printers; 1187, 1387, 1210, 1210-2 impact system printers; 1815, 1815-2, and HP/II/III Laserjet series laser printers, HP IIP and HP/III printers; and 1224, 1225, 262, and 1234 printers.

In April 1990, Memorex Telex acquired the Synchronous Terminal Products Division from AT&T. In addition to expanding the product offerings for Memorex Telex in the 3270 markets, the acquisition also provides benefit from the communications and networking experience of the AT&T division. Dataquest estimates the combined market share for the two companies in the 3270-compatible markets at 34.8 percent for display terminal products and 27 percent for control units.

Personal Computers

Memorex Telex also markets a line of industry-standard PCs through its Personal Computer Division. The Intelligent Systems Series 7000 currently consists of seven models. Two recent additions to this line, introduced in May 1990, are the 7270 and 7075 Intelligent Workstations. The 7075 uses the Intel 80386 microprocessor to provide enhanced features that extend the Company's AT-compatible product line. With up to 338MB hard disk capacity, the 7075 model is targeted for use as a LAN server. The 7270 model is the second product introduced by the Company to utilize Micro Channel Architecture (MCA). Sales of personal computer products in fiscal 1990 were \$197 million, slightly less than 10 percent of total sales.

Storage Systems

The storage systems segment markets large disk drives, tape drives, tape cache devices, disk controllers, string controllers, printers, solid-state storage devices, and rigid disks. Storage equipment products are targeted to end users of IBM System/38, AS/400, 4300 processors, and other larger IBM-compatible computers.

Within the storage systems segment, Memorex Telex has two product categories: large systems and midrange systems. The large storage systems business accounted for 13 percent of total revenue for fiscal 1990, with sales of \$259 million. Products in this category include 3890 disk storage array and 3898 storage control systems; 5490, 5480, and 5460 cartridge tape subsystems; and 5400 automated tape library and 9000 series channel extension systems, and the 689X solid-state DASD subsystem.

Formerly a separate business segment, midrange systems is a subset of the Storage Systems, Network Systems, and Customer Engineering businesses. The Company's midrange business is focused on the requirements of the midrange computer user market. The midrange systems product line includes disk, tape, memory, displays, personal computers, LANs, printers, leasing and brokerage options, and customer/systems engineering services. Sales in this category were \$122 million for fiscal 1990, representing over 6 percent of total revenue.

Recent product developments for the midrange market include the 5461 tape subsystem, an IBM 3490 device, and the new 5441 rack-mounted cartridge

tape system. Other products in this category include the 3260T/80T tape subsystems, 5460 cartridge tape subsystem (for AS/400 and S/38), 5157-2 tape streamer, 3935 disk storage subsystem, 1224 series dot matrix printer, and 1225 matrix series line printer.

Airline Systems and Customer Engineering

The airline systems group markets systems such as gate control and reservations systems tailored to the needs of the airline industry. This segment also markets systems to travel agencies, hotels, and rental car agencies. The customer engineering group provides preventive care and maintenance as well as installation of Memorex Telex products. Service sales were \$388 million for fiscal 1990, 19.6 percent of total revenue.

Other

Computer supplies and other business accounted for the remaining 15 percent of the Company's revenue with fiscal 1990 sales of \$334 million.

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)

	1989	1990		
Two-Year Revenue	\$2,065.6	\$1,983.4		
Percent Change	-	(3.98)		
Capital Expenditure	\$34.9	\$17.0		
Percent of Revenue	1.69	0.86		
R&D Expenditure	NA	NA		
Percent of Revenue	0	0		
Number of Employees	13,000	11,000		
Revenue (\$K)/Employee	\$159	\$180		
Net Income	\$38.6	(\$76.0)		
Percent Change	-	(296.89)		
1989 Calendar Year	Q1	Q2	Q3	Q4
Quarterly Revenue	NA	NA	NA	NA
Quarterly Profit	NA	NA	NA	NA

NA = Not available

Source: Memorex Telex N.V.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1989	1990
North America	54.40	46.18
International	45.60	53.82
Europe	28.30	30.00
Asia/Pacific	11.10	12.80
ROW	6.20	11.02

Source: Memorex Telex N.V.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1989	1990
Direct Sales	94.30	94.10
Indirect Sales	5.70	5.90

Source: Dataquest (1990)

1990 SALES OFFICE LOCATIONS

North America—200
Europe—20
Asia/Pacific—10
ROW—35

MANUFACTURING LOCATIONS

North America

Raleigh, North Carolina (United States)
3270 Display terminals
Tulsa, Oklahoma (United States)
Distribution Center
Santa Clara and Camarillo, California (United States)
Computer storage products

SUBSIDIARIES

North America

Memorex Computer Supplies (United States)
Memorex Corporation (United States)
Memorex Telex Corporation (United States)

Europe

Memorex Nederland B.V. (Netherlands)
Memorex Telex Distribution N.V. (Netherlands)
Memorex Telex Nederland B.V. (Netherlands)
Memorex Telex Services B.V. (United Kingdom)
Memorex Unirepair B.V. (Netherlands)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

1990

AT&T

Memorex Telex acquired AT&T's Synchronous Terminals Products Division.

KEY OFFICERS

Giorgio Ronchi

Chairman, chief executive officer, managing director

David Faulkner

Executive vice president, US Sales and Service, US Storage Systems, Asia and Pacific Regions

Jean-Claude Zanolli

Executive vice president, Operations, Europe and Latin America

Roy King

Senior vice president, Memorex Worldwide Systems

PRINCIPAL INVESTORS

Stichting Management Memorex International—30.94 percent
Eli S. Jacobs—26.38 percent
Chesterfield Investments—6.58 percent
Raleigh Investment Management—8.22 percent
Stichting M.L. Shareholders—11.22 percent

FOUNDERS

Information is not available.

Table 4
Comprehensive Financial Statement
Fiscal Year Ending March
(Millions of US Dollars¹, except Per Share Data)

Balance Sheet	1989²	1990
Total Current Assets	\$1,007.4	\$840.1
Cash	48.4	79.5
Receivables	384.5	360.0
Marketable Securities	0	0
Inventory	420.5	375.4
Other Current Assets	154.0	25.2
Net Property, Plants	\$1,003.4	\$964.0
Other Assets	\$198.6	\$178.5
Total Assets	\$2,209.4	\$1,982.6
Total Current Liabilities	\$727.5	\$582.8
Long-Term Debt	\$1,242.7	\$1,216.1
Other Liabilities	\$57.9	\$58.9
Total Liabilities	\$2,028.1	\$1,857.8
Total Shareholders' Equity	\$181.3	\$124.8
Converted Preferred Stock	181.3	124.8
Common Stock	0	0
Other Equity	0	0
Retained Earnings	NA	NA
Total Liabilities and Shareholders' Equity	\$2,209.4	\$1,982.6
Income Statement	1989²	1990
Revenue	\$2,065.6	\$1,983.4
US Revenue	1,123.6	916.0
Non-US Revenue	942.0	1,067.4
Cost of Sales	\$680.3	\$598.7
R&D Expense	NA	NA
SG&A Expense	\$418.9	\$403.4
Capital Expense	\$34.9	\$17.0
Pretax Income	NA	NA
Pretax Margin (%)	0	0
Effective Tax Rate (%)	NA	NA
Net Income	\$38.6	(\$76.0)
Shares Outstanding, Millions	33.6	33.6
Per Share Data		
Earnings	NA	NA
Dividend	NA	NA
Book Value	\$5.40	\$3.71

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending March
(Millions of US Dollars¹, except Per Share Data)

Key Financial Ratios	1989²	1990
<i>Liquidity</i>		
Current (Times)	1.38	1.44
Quick (Times)	0.81	0.80
Fixed Assets/Equity (%)	553.45	772.44
Current Liabilities/Equity (%)	401.27	466.99
Total Liabilities/Equity (%)	1,118.64	1,488.62
<i>Profitability (%)</i>		
Return on Assets	3.49	(3.63)
Return on Equity	42.58	(49.66)
Profit Margin	1.87	(3.83)
<i>Other Key Ratios</i>		
R&D Spending % of Revenue	0	0
Capital Spending % of Revenue	1.69	0.86
Employees	13,000	11,000
Revenue (\$K)/Employee	\$159	\$180
Capital Spending % of Assets	1.58	0.86

¹All company financial reports done in US currency.
²Restated to account for discontinued operations, sale of TCL.
 NA = Not available

Source: Memorex Telex N.V.
 Annual Reports and Forms 10-K
 Dataquest (1990)

Company Backgrounder by Dataquest

McDonnell Douglas Corporation

P.O. Box 516
Saint Louis, Missouri 63166
Telephone: (314) 232-0232
Fax: (314) 232-0790
Dun's Number: 00-626-5946

Date Founded: 1939

CORPORATE STRATEGIC DIRECTION

McDonnell Douglas Corporation and its divisions and subsidiaries (collectively referred to as MDC) operate principally in five industry segments: combat aircraft, transport aircraft, space systems and missiles, financial services, and information systems. Operations in the first three industry segments are conducted primarily by five principal operating divisions and one principal subsidiary corporation engaged in design, development, and production of the following major products:

- McDonnell Douglas Helicopter Company provides military and commercial transport aircraft and training systems.
- McDonnell Aircraft Company provides commercial and military helicopters and ordnance.
- McDonnell Douglas Missile Systems Company provides missiles.
- McDonnell Douglas Space Systems Company provides space launch vehicles and space station systems and integration.
- McDonnell Douglas Electronic Systems Company provides defense electronics, sensors, and command, control, communications, and intelligence (C3I) systems.

Through its McDonnell Douglas Finance Corporation subsidiary, McDonnell Douglas engages in financing a variety of commercial and industrial equipment and aircraft through lease and note agreements. In the information segment, the McDonnell Douglas Systems Integration Company provides information products and services to targeted industry segments, focusing on systems integration. In 1989, McDonnell Douglas restructured its Systems Integration Company, formerly known as McDonnell Douglas Information Systems, to have a sharper focus on systems integration by selling its computer, communications, and field service units. This included the selling

of TYMNET, Public Network Business, E-Mail Service, and electronic data interchange service to British Telecom.

In late 1989, McDonnell Douglas streamlined its organizational structure, cutting the managerial levels between the floor manager and the Company's chief executive officer to 4 or 5 from 11. Furthermore, the Company was restructured along product lines as opposed to functional lines. According to McDonnell Douglas' CEO, John F. McDonnell, the restructuring is designed to implement the Company's commitment to total quality management, which is the speeding and facilitating of communication, decision making, and teamwork with the primary purpose of achieving first-time quality goals.

As of late 1989, MDC was a major Strategic Defense Initiative (SDI) contractor. The Company has contracts valued at close to \$1 billion* related to SDI (aka Star Wars) work including a \$480 million contract to launch three satellite platforms beginning in 1991. The project is designed to test the neutral particle beam weapon from the platforms in space. The project, known as Integrated Space Experiments, is said to be the largest test project contracted under the program.

In 1989, McDonnell Douglas sold off its Health Services Systems to American Express for \$100 million and its Vitek Systems to ABG-Stella Acquisitions for \$110 million.

McDonnell Douglas' total revenue decreased 3.2 percent to \$14.6 billion in fiscal 1989. Net income decreased 37.4 percent to \$219.0 million in fiscal 1989 from \$350.0 million in fiscal 1988. McDonnell Douglas employs nearly 128,000 people worldwide.

*All dollar amounts are in US dollars.

R&D expenditure totaled \$617 million in fiscal 1989, representing 4.2 percent of revenue. This is an increase of 1.2 percent over the previous year's figure of \$610 million, representing roughly 4.0 percent of total revenue.

Capital expenditure totaled \$582 million in fiscal 1989, representing 4.0 percent of total revenue. This is a decrease of nearly 12.3 percent from the fiscal 1988 figure of \$654 million, which represented 4.3 percent of revenue.

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

BUSINESS SEGMENT STRATEGIC DIRECTION

Combat Aircraft

Through its McDonnell Aircraft Company division, MDC currently is producing the F-15 Eagle, the F/A-18 Hornet, the AV-8B Harrier II, and military training systems.

The F-15 Eagle is a supersonic, tactical fighter, which is currently operated by Israel, Japan, Saudi Arabia, and the US Air Force.

The F/A-18 Hornet is currently produced as a multi-mission strike fighter primarily for the US Navy and Marine Corps. MDC is the prime contractor for the F/A-18 and Northrop Corporation is the principal subcontractor.

The AV-8B Harrier II vertical/short takeoff and landing (V/STOL) attack aircraft began US Marine service in 1984. The B model aircraft has higher performance capabilities than the AV-8A Harrier, which is also in service with the marine corps. Great Britain and the US government have agreed to the joint development and production of the AV-8B V/STOL aircraft. MDC is the prime contractor, with British Aerospace as principal subcontractor.

The AH-64A Apache advanced attack helicopter for the US Army is the largest single program of the McDonnell Douglas Helicopter Company. This

two-place, twin-turbine powered helicopter is equipped with laser, infrared, and other advanced technology subsystems to detect and track enemy armored vehicles under all battle conditions, including night and adverse weather.

Currently, MDC is seeking a contract for the production of 4100 LHX light helicopters that would be produced in the next 15 years. MDC is a participant in one of two teams seeking a full-scale production contract that will be awarded in 1991.

McDonnell Douglas Helicopter Company also produces Model 500 series single-turbine light helicopters for commercial and military use. The 500E and 530F commercial models have various configurations and are sold for private/executive transport, civil government use, remote operations (geological, timber, fishery), and general utility. The 500MG military versions are sold to the free world governments for light attack and antiarmor applications with various armament options, including the MDHC 7.6mm CHAIN GUN and the TOW antiattack missile.

McDonnell Douglas Helicopter Company has announced the availability of two new helicopters employing no-tail-rotor (NOTAR) technology: the MD520N derivative of the current model 500 series and the MDX, a new eight-place, twin-engine aircraft. Initial production deliveries are scheduled for 1991 and 1993, respectively.

The McDonnell Douglas Helicopter Company also has an ordnance business that includes design, development, and production of gun and ammunition armament systems. The current product line consists of the 7.62mm, 25mm, and 30mm family of CHAIN GUN automatic weapons. Auxiliary products include turret, feed systems, control systems, and rocket launchers.

Transport Aircraft

The Douglas Aircraft Company (DAC), a division of MDC, currently produces commercial and military transport aircraft.

Dataquest estimates that MDC held 19.6 percent of the commercial aircraft market in 1989, down from the 20 percent reported in 1988. Current additions to MDC's civil aircraft line are the MD-80 and -90, upgrades of the DC-9; and the MD-11, an upgrade of the DC-10. Currently, the C-17, MDC's principal military transport aircraft, is in production—210 are being produced at a price tag of \$38 billion.

Space Systems and Missiles

MDC is engaged in a wide variety of programs in the electronics, missile, and space fields through the McDonnell Douglas Electronic Systems Company (MDESC), McDonnell Douglas Missile Systems Company (MDMSC), and the McDonnell Douglas Space Systems Company (MDSSC). These three divisional companies were created in 1988 by the restructuring of the former McDonnell Douglas Astronautics Company (MDAC) into companies that are more focused on related product lines. In 1988, MDESC's headquarters moved to Huntington Beach, California.

MDESC provides defense electronics systems and C3I systems. In 1989, MDESC contributed \$495 million to MDC's fiscal revenue, a 2.3 percent increase over the previous year's contributed revenue of \$484 million.

MDESC also designs, develops, and produces aircraft avionics, electronic components, and ground support equipment. Products include avionic controls and displays for the F-15, F/A-18, an AV-8B aircraft; voice warning systems for military and commercial aircraft; military test equipment; training systems; and special-purpose digital circuits using silicon, gallium arsenide, infrared detection, and hybrid technologies.

MDMSC engages in a wide variety of programs in the tactical missile and combat systems field. MDMSC is the prime contractor for the US Navy's Harpoon antiship missile, which is an all-weather, over-the-horizon missile that can be launched from surface ships, submarines, aircraft, and mobile ground units. The Harpoon is the most widely deployed surface missile system in the navy and has been widely ordered by allied nations. The Standoff Land Attack Missile (SLAM), a derivative of the Harpoon, is currently in production for the navy. SLAM has an extended fuselage and a new guidance system and will be suitable for use on a number of aircraft including MDC's F/A-18 Hornet fighter/attack aircraft.

MDSSC consists of the space transportation, Space Station, and strategic defense businesses. MDSSC provides the Delta II launch vehicle, aimed to boost medium-weight military, civil, and commercial payloads into geosynchronous transfer orbit. The Delta II was selected as the US Air Force medium launch vehicle (MLV) in 1987. MDSSC also provides the Payload Assist Model (PAM), which is a solid-fuel, upper-stage booster that lifts satellites to higher orbits

from the shuttle payload bay, from the Delta, or from other expendable launch vehicles. Customers include communications satellite manufacturers, system operators, and government agencies.

Through the Space Station Division (SSD) of MDSSC, MDC signed a contract with NASA in 1988 for the design, development, and production of a major portion of Space Station Freedom, a permanently manned national space center. SSD and its team, consisting of GE, Honeywell, IBM, and Lockheed, are responsible for many primary elements and integrated systems for the Space Station.

Information Systems

McDonnell Douglas Information Systems Company (MDISC) provides information products and services to targeted industry segments. MDISC focuses its operations on systems integration. Dataquest estimates that MDC held 2.3 percent market share of the worldwide CAD/CAM/CAE market based on total revenue of \$282.1 million for fiscal 1989. MDC benefited from mechanical applications in the aerospace industry and in the AEC and GIS/mapping market in Europe. Software revenue growth from 1988 to 1989 was over 31 percent, totaling \$90.2 million.

Dataquest estimates that MDC recorded \$180.4 million in factory revenue from the sale of midrange computer systems in 1989. This is a 26 percent decrease from the previous year's figure of \$227.5 million.

In systems integration, MDISC business units include Manufacturing and Engineering, Built Environment Technologies, Integrated Systems Engineering, and Integrated Business Systems. The Manufacturing and Engineering unit markets advanced systems for factory automation, including the Unigraphics CAD/CAM system that provides engineering design analysis and manufacturing automation. Other systems address such applications as direct numerical control, robotics, and manufacturing process control. The Built Environment Technologies unit provides computer graphics applications to architectural and engineering firms to help design buildings, handle engineering analysis, produce drawings, control construction, lay out interiors, and manage finished facilities. The Integrated Systems Engineering unit provides an integrated package of offerings that includes a fourth-generation language technology, a comprehensive application development methodology, and computer-aided software engineering (CASE)

development tools. The Integrated Business Systems unit designs and markets information management systems to banks, insurance companies, and accounting and commercial firms. Products and services include systems to manage deposit data, loan profiles, and billing/processing claims; systems to enroll customers through remote data centers; and application software.

Financial Services

McDonnell Douglas Finance Corporation (MDFC) is a subsidiary engaged in financing and leasing a variety of equipment, including commercial transport

aircraft, highway vehicles, railroad cars, shipping containers, computer peripheral equipment and computers, and medical equipment to customers over 60 industries.

Further Information

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	\$11,666.0	\$13,089.0	\$13,676.0	\$15,072.0	\$14,589.0
Percent Change	-	12.20	4.48	10.21	(3.20)
Capital Expenditure	NA	\$682.0	\$674.0	\$654.0	\$582.0
Percent of Revenue	0	5.21	4.93	4.34	3.99
R&D Expenditure	\$423.1	\$504.8	\$648.0	\$610.0	\$617.0
Percent of Revenue	3.63	3.86	4.74	4.05	4.23
Number of Employees	97,067	105,696	112,400	121,421	127,926
Revenue (\$K)/Employee	\$120.19	\$123.84	\$121.67	\$124.13	\$114.04
Net Income	\$345.7	\$277.5	\$313.0	\$350.0	\$219.0
Percent Change	-	(19.73)	12.79	11.82	(37.43)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$3,340.00	\$3,476.00	\$3,715.00	\$4,292.00	
Quarterly Profit	\$169.00	(\$48.00)	\$38.00	(\$17.00)	

NA = Not available

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

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	82.00	81.00	79.00	78.00	80.67
International	18.00	19.00	21.00	22.00	19.33
Europe	9.00	11.00	12.00	14.00	14.00
Asia/Pacific	6.00	6.00	7.00	7.00	4.00
ROW	3.00	2.00	2.00	1.00	1.00

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

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	100.00	100.00
Indirect Sales	0	0

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS (aka Corporate Marketing Outposts)

North America—8

Europe—3

Asia/Pacific—5

Japan—1

ROW—4

McDonnell Douglas also uses 126 local sales/marketing representatives, consultants, and distributors/service centers in approximately 63 countries.

MANUFACTURING LOCATIONS

North America

McDonnell Aircraft Company (St. Louis, Missouri, and Tulsa, Oklahoma)

Activities include the production, design, development, and support work for combat aircraft, including the F-15C/D, F-15E Eagle, F-15 V/STOL demonstrator, F/A-18 Hornet for the navy and the marine corps, AV-8B Harrier II for the marine corps, and teaming with Northrop on a prototype for the Advanced Tactical Fighter (ATF) designated the F-23A. Engineering for the ATA for the navy is in conjunction with General Dynamics.

McDonnell Douglas Helicopter Company (Mesa, Arizona, and Culver City, California)

Activities include the production of the AH-64 Apache attack helicopter for the US Army and the Army National Guard; production of the 7.62, 25, and 30mm family of CHAIN GUN automatic weapons including the 25mm Vehicle Rapid Fire Weapon System (VRFWS) Bushmaster M242, the primary weapon to the Bradley Fighting Vehicle; and developing an air-to-air attack version of the Apache. Other activities include demonstration of the NOTAR helicopter and competition for the LHX light helicopter contract teamed with Bell Helicopter (Textron).

McDonnell Douglas Electronic Systems (St. Louis, Missouri; Huntington Beach and Monrovia, California; Titusville, Florida; and Pueblo, Colorado)

Activities include the production of the Tomahawk cruise missile, which is sea-launched for the navy and ground-launched for the air force, in conjunction with General Dynamics; an upgraded version of the Dragon antiattack assault weapon and the the Shoulder-Launched Multipurpose

Assault Weapon(SMAW) for the Marine Corps; and Mass Mounted Lights (MMS) for the OH-58D Aeroscout helicopters. Other activities include the support and/or development of the Delta II space boosters and launch vehicles, the Inertial Upper Stage (IUS) and Payload Assist Module (PAM), the Harpoon antiship and land attack cruise missile for the navy, a SLAM variant, the Small Ground-Launched Cruise Missile (GLCM) and the Small Air-Launched Cruise Missile (ALCM)—sharing with other producers, High Endoatmospheric Defense Interceptor (HEDI) for the SDI program, laser communication, C3I data networks, payload ground operations for NASA, computer support for the Johnson Space Center, second sourcing for the AGM-129a Advanced Cruise Missile (ACM) for the air force, the GSTS and BM/C3 program for SDI, Beam Experiment Aboard a Rocket (BEAR) and Integrated Space Experiment (ISE) for SDI, and, lastly, the structural framework, airlocks, communications, guidance, navigation, and control systems for the space station in Huntington Beach.

Douglas Aircraft Company (Long Beach, California; Salt Lake City, Utah; and Macon, Georgia)

Activities include the support and/or development of the C-17 strategic transport aircraft, Advanced Concept Ejection Seats (ACES II), and T-45 jet trainers.

New Aircraft Products Division (St. Louis, Missouri)

Activities include the strategic planning and identification of technologies to be pursued for fighter aircraft projects.

SUBSIDIARIES

North America

McDonnell Aircraft Training Systems (MTS) (United States)

McDonnell Douglas Finance Corporation (United States)

McDonnell Douglas Helicopter Company (United States)

McDonnell Douglas Realty Company (United States)

Europe

McDonnell Douglas Bank (United Kingdom)

McDonnell Douglas Information Systems International Ltd. (United Kingdom)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Digital Equipment Corporation (DEC)

DEC signed a Cooperative Marketing Program (CMP) agreement with McDonnell Douglas Systems Integration Company to cooperatively market Force Management Systems II (FMS II), which is an integrated operator scheduling system that enables telecom management to forecast, schedule, and track telephone operator force levels.

MERGERS AND ACQUISITIONS

1989

Information Systems International (ISI)

ISI, located in Hemel Hempstead, England, was formed by merging McDonnell Douglas' Information Systems International and Information Systems (ISC)—the European distribution and manufacturing operation—with McDonnell Douglas' Computer Systems. ISI will continue to handle the marketing of McDonnell Douglas' computer systems and CAD/CAM line.

1988

Shape Data

Shape Data, located in Cambridge, England, was acquired principally to enter the conceptual design market. Shape Data is one of the ten largest computer companies worldwide and is known for its development of the Romulus solid modeling software and a new package that offers parametric surfaces known as Parasolid. McDonnell Douglas will provide Shape Data with an extensive distribution channel via its own CAD/CAM sales force.

1987

Frampton Computer Systems (Isis)

Frampton Computer Systems (Isis), located in Bristol, England, was acquired to be operated as an integral part of McDonnell Douglas' Information Systems International. Isis is a software company that develops payroll, pension, and personnel systems.

KEY OFFICERS

John F. McDonnell

Chairman and chief executive officer

Gerald A. Johnston

President

Edward C. Aldridge, Jr.

President, McDonnell Douglas Electronic Systems Company

Herbert L. Lanese

President, McDonnell Douglas Helicopter Company

R. Mark Kulhman

President, McDonnell Douglas Informations Systems Company

C. James Dorrenbacher

President, McDonnell Douglas Space Systems Company

William P. Brown

President, McDonnell Douglas Helicopter Company

E. Randolph Jayne II

President, McDonnell Douglas Missiles Systems Company

Robert H. Hood, Jr.

President, Douglas Aircraft Company

William S. Ross

President, McDonnell Douglas Aircraft Company

PRINCIPAL INVESTORS

Bankers Trust Company

FOUNDERS

Information is not available.

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

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$4,474.9	\$4,941.3	\$7,629.0	\$8,577.0	\$9,870.0
Cash	78.7	77.5	67.0	115.0	119.0
Receivables	1,266.8	1,463.4	1,415.0	1,420.0	1,350.0
Marketable Securities	-	-	2,354.0	2,763.0	-
Inventory	3,056.0	3,294.3	3,793.0	4,279.0	5,128.0
Other Current Assets	73.4	106.1	-	-	3,273.0
Net Property, Plants	\$1,700.4	\$2,007.6	\$2,333.0	\$2,542.0	\$2,648.0
Other Assets	\$1,093.0	\$961.8	\$662.0	\$766.0	\$879.0
Total Assets	\$7,268.3	\$7,910.7	\$10,624.0	\$11,885.0	\$13,397.0
Total Current Liabilities	\$4,030.7	\$4,306.6	\$3,623.0	\$3,622.0	\$5,175.0
Long-Term Debt	\$603.1	\$759.3	\$3,081.0	\$3,628.0	\$4,935.0
Other Liabilities	-	-	\$950.0	\$1,449.0	-
Total Liabilities	\$4,633.8	\$5,065.9	\$7,654.0	\$8,699.0	\$10,110.0
Total Shareholders' Equity	\$2,634.6	\$2,845.0	\$2,970.0	\$3,186.0	\$3,287.0
Common Stock	40.3	41.0	41.0	38.0	38.0
Other Equity	399.0	416.0	322.0	289.0	279.0
Retained Earnings	2,195.3	2,388.0	2,607.0	2,859.0	2,970.0
Total Liabilities and Shareholders' Equity	\$7,268.4	\$7,910.9	\$10,624.0	\$11,885.0	\$13,397.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$11,666.0	\$13,089.0	\$13,676.0	\$15,072.0	\$14,589.0
US Revenue	9,566.0	10,602.0	10,804.0	11,756.2	11,769.0
Non-US Revenue	2,100.0	2,487.0	2,872.0	3,315.8	2,820.0
Cost of Sales	\$9,415.0	\$10,541.0	\$10,921.0	\$12,108.0	\$12,180.0
R&D Expense	\$423.1	\$504.8	\$648.0	\$610.0	\$617.0
SG&A Expense	\$1,191.2	\$1,357.0	\$1,408.0	\$1,508.0	\$1,348.0
Capital Expense	NA	\$682.0	\$674.0	\$654.0	\$582.0
Pretax Income	NA	\$479.0	\$457.0	\$507.0	(\$120.0)
Pretax Margin (%)	0	3.66	3.34	3.36	(0.82)
Effective Tax Rate (%)	36.00	42.00	32.00	31.00	-
Net Income	\$345.7	\$277.5	\$313.0	\$350.0	\$219.0
Shares Outstanding, Millions	40.3	40.6	40.7	38.2	38.2
Per Share Data					
Earnings	\$8.60	\$6.86	\$7.75	\$9.13	\$5.72
Dividend	NA	NA	\$2.32	\$2.56	\$2.82
Book Value	\$65.37	\$70.07	\$72.97	\$83.40	\$86.05

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

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.11	1.15	2.11	2.37	1.91
Quick (Times)	0.35	0.38	1.06	1.19	0.92
Fixed Assets/Equity (%)	64.54	70.57	78.55	79.79	80.56
Current Liabilities/Equity (%)	152.99	151.37	121.99	113.68	157.44
Total Liabilities/Equity (%)	175.88	178.06	257.71	273.04	307.58
<i>Profitability (%)</i>					
Return on Assets	-	3.66	3.38	3.11	1.73
Return on Equity	-	10.13	10.77	11.37	6.77
Profit Margin	2.96	2.12	2.29	2.32	1.50
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	3.63	3.86	4.74	4.05	4.23
Capital Spending % of Revenue	0	5.21	4.93	4.34	3.99
Employees	97,067	105,696	112,400	121,421	127,926
Revenue (\$K)/Employee	\$120.19	\$123.84	\$121.67	\$124.13	\$114.04
Capital Spending % of Assets	0	8.62	6.34	5.50	4.34

NA = Not available

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

Mannesmann Tally GmbH

Postfach 29 69

D-7900 Ulm

Federal Republic of Germany

Telephone: (0 73 08) 80-0

Fax: (0 73 08) 59 03

Dun's Number: Not Available

Date Founded: 1890 (parent)

CORPORATE STRATEGIC DIRECTION

Mannesmann Tally GmbH is a member of the Mannesmann AG family. Mannesmann AG has a presence in 55 countries with \$12 billion in annual sales and over 120,000 employees worldwide. Mannesmann AG's business segments include technology, products, and services in the areas of machinery and plant construction, automotive components, and electrical and electronic engineering, as well as steel pipe and tubing.

Mannesmann Tally offers a broad line of computer printers. Its product line includes printers from across all major technologies: dot matrix serial and line printers, ink jet and nonimpact page printers.

An important merger for Mannesmann AG involved the agreement with Siemens AG to unite their office printing machine units under Mannesmann AG's subsidiary Mannesmann Tally. The deal must be approved by West Germany's Federal Cartel Office. If approved, the merger is likely to bolster Mannesmann Tally's spot as the biggest independent maker of office printers in Europe. Mannesmann expects the portable printer technologies to improve Mannesmann Tally's position in the United States, as well. Mannesmann now makes laser, matrix and line printers, while Siemens makes laser, ink jet, and thermal printers.

In the United States, Mannesmann Tally's business was originally developed in the original equipment manufacturer (OEM) market. Today, in addition to the traditional OEM business, Mannesmann Tally markets its line of printers through value added resellers (VARs). Mannesmann Tally has ten sales outlets in North America, along with 100 on-site service locations. Also, Mannesmann Tally is able to rely on the engineering skills and resources of its

multibillion dollar parent to promote expandability and innovation of its product lines.

Mannesmann Tally employs approximately 1,700 people and had sales of more than \$300 million in 1989 after shipments of more than 300,000 printers. Printers manufactured in Germany and the United States by Mannesmann Tally are sold throughout the world. Some of the Company's printers are developed and produced in Japan according to Mannesmann Tally's specifications.

Mannesmann seeks to develop nonproprietary systems that allow customers to choose among competing vendors without compromising integration capabilities. Toward this end, Mannesmann seeks to correspond strictly to recognized industry formats and protocols.

Detailed financial information is not available because, as mentioned previously, Mannesmann Tally is a unit of Mannesmann AG.

BUSINESS SEGMENT STRATEGIC DIRECTION

In 1979, Mannesmann Prozisionstechnik merged with the Tally Corporation, which was until then a separate company, and the new unit became Mannesmann Tally, a division of Mannesmann AG's data processing and information technology unit, Mannesmann Kienzle. Mannesmann Tally specializes exclusively in printers, and its product range includes standard and specialized printers for all sectors and requirements. Printer types include needle, ink jet, hammerbank, and laser printers, and, after the merger mentioned above, thermal printers as well.

Mannesmann Tally also supplies the special-purpose printers built by Mannesmann Kienzle that are used in voucher printing and in the banking and financial sector. All Mannesmann Tally printers provide standard emulations in the firmware. Interchangeable interfaces known as personality modules in the new printer generation ensure compatibility with virtually all computer systems. The majority of Mannesmann Tally printers will connect to any size of system.

The latest addition to Mannesmann Tally's range of laser printers is the MT 906, a 4-pages-per-minute (ppm) desktop printer. The MT 906 uses National Semiconductor's NS32CG16 processor in its controller. This processor is customized for graphic peripherals and reduces processing lag significantly. For desktop publishing applications, the MT 906 PS comes with the National Semiconductor coprocessor NS 32081 to speed up the PostScript PDL-compatible raster image processing (RIP) board.

Dataquest estimates that Mannesmann Tally ranked seventh in the overall European printer market based on its shipment of 305,800 units and \$321 million in revenue.

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—12

MANUFACTURING LOCATIONS

North America

Kent, Washington
Hammerbank line printers and laser printers and controllers

Europe

Berlin, Germany
Siemens factory (now part of Mannesmann Tally);
ink jet and thermal transfer printers
Elchingen, West Germany
Matrix needle printers and printheads

SUBSIDIARIES

North America

Mannesmann Tally Corporation (United States)

Europe

Mannesmann Tally GesmbH (Austria)
Mannesmann Tally Ltd. (Great Britain)
Mannesmann Tally SA (France)
Mannesmann Tally SRL (Italy)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

1990

Siemens AG

Mannesmann AG will merge its office printing machine unit with that of Siemens into its 100 percent subsidiary, Mannesmann Tally. Mannesmann will own 51 percent of the new firm, while Siemens will hold a 49 percent share. The merged firm is expected to have DM 900 million annual sales by the end of 1991. The deal does not cover Siemens' large-scale mainframe laser printers.

KEY OFFICERS

Dr. P. Jung

Chairman, Board of Management, and managing director, Engineering and Manufacturing

Walter Rossler

Managing director, Marketing

Herfried Thometschek

Managing director, Financial Administration

William Munro

President, Mannesmann Tally Corporation of the United States

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

MCI Communications Corporation

1133 19th Street, N.W.
Washington, D.C. 20036
Telephone: (202) 872-1600
Fax: (202) 887-2443
Dun's Number: 04-476-0643

Date Founded: 1968

CORPORATE STRATEGIC DIRECTION

MCI Communications Corporation of Delaware was organized in August 1968. MCI provides a wide spectrum of domestic and international voice and data communications services to its customers. It is the second largest nationwide carrier of long distance telephone services. In 1989, MCI handled approximately 7.5 billion billable calls. MCI's communications services include long distance service throughout the United States and Puerto Rico, international telephone service from the United States to 165 countries, record communications service between the United States and more than 200 countries, and a worldwide, time-sensitive electronic mail service.

Revenue increased by 26 percent in fiscal 1989 to \$6.5 billion,* up from \$5.1 billion in 1988. Billable calls increased by 40 percent in fiscal 1989. This increase is the result of strong growth in the Company's residential products and continued penetration of the business marketplace. Net income increased by 61 percent to \$558.0 million in 1989, compared with \$346.0 million in 1988.

Capital expenditure was 16.3 percent of revenue for fiscal 1989, totaling \$1.1 billion. This is a 17.0 percent increase over the 1988 figure of \$896 million, which represented 17.4 percent of total revenue. The increase in capital expenditure was related to overall growth of the Company and its nationwide network.

MCI does not report its R&D expenditure.

According to Dataquest, MCI had a 13.0 percent market share in the domestic long distance services industry in 1989. With the acquisition of Telecom USA in 1990, Dataquest estimates that MCI can

expect to have 14.4 percent market share for the 1990 fiscal year.

In addition to generating new customers by penetrating new telecommunications markets through the Telecom USA acquisition, MCI has improved its profitability by decreasing operating costs in relation to revenue and by achieving economies of scale in its networking capabilities. MCI is expanding its nationwide digital network to offer a variety of enhanced services in an effort to generate increased 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

Communications Services

MCI's domestic telephone services include intrastate long distance calls in 43 states. The Company is seeking additional intrastate authority. MCI users may dial long distance to and from anywhere in the United States and Puerto Rico. MCI's telephone services are provided by its domestic long distance telephone services subsidiary, MCI Telecommunications Corporation, which in turn has seven divisions, each covering a separate geographic area in the United States.

MCI's principal telephone service is dial 1 access, which is available in all areas where equal access has been implemented. As of December 31, 1989, 93 percent of all access lines have been converted to dial 1 access. Other MCI usage-sensitive, intercity

*All dollar amounts are in US dollars.

telephone services include MCI WATS, MCI PRISM sm, and MCI 800 Service sm. MCI WATS and MCI PRISM are outbound long distance services provided over dedicated access lines that connect customers directly with the MCI communications network. The MCI 800 Service allows callers to dial an 800 number without a charge or need for an operator.

MCI offers Vnet and private line service for customers with large volumes of communications between two or more locations within the United States or to 80 countries served by MCI. Vnet is a virtual private network voice and data service that offers customers communications management functions.

MCI also offers MCI Fax sm for the transmission of domestic and international facsimile messages via a software-defined dedicated network.

MCI markets its long distance telephone services both directly and through marketing arrangements with third parties.

International Services

Throughout 1989, MCI users were able to call from the United States to 165 countries, including France, Italy, Germany, Spain, Japan, and the United Kingdom. MCI offers private line leased channels and international business service, and an international digital wideband leased channel communications service to large customers for point-to-point transmission of overseas voice communications.

MCI also offers international record services such as telex and cablegrams. MCI's international record

services are provided by its Western Union International and RCA Globcom subsidiaries. MCI's electronic mail service allows a subscriber to send a message instantly from virtually any intelligent terminal to an electronic terminal of any other subscriber in over 80 countries. In an effort to expand its worldwide coverage, MCI Mail supports the X.400 protocol, the standard international format for electronic communications.

Communications Network

MCI provides its intercity telephone services and carries its domestic MCI Mail and MCI fax transmissions primarily over its own coast-to-coast optical fiber and terrestrial microwave communications system, as well as over leased facilities. In 1989, MCI expanded its digital transmission and switching facilities to meet the growing demand for additional services. As part of this program, MCI added six terminals and 1,952 route miles of digital transmission capacity in 1989. MCI plans to spend \$1.2 billion in 1990 to continue the development of its communications systems to meet competitive demands and to expand its global presence.

Further Information

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	\$2,542.0	\$3,592.0	\$3,939.0	\$5,137.0	\$6,471.0
Percent Change	-	41.31	9.66	30.41	25.97
Capital Expenditure	NA	\$1,074.0	\$619.0	\$896.0	\$1,052.0
Percent of Revenue	NA	29.90	15.70	17.40	16.30
Number of Employees	12,445	13,650	14,236	17,596	19,198
Revenue (\$K)/Employee	\$204.26	\$263.15	\$276.69	\$291.94	\$337.07
Net Income	\$113.0	(\$448.0)	\$88.0	\$346.0	\$558.0
Percent Change	91.53	(496.46)	(119.64)	293.18	61.27
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$1,500.00	\$1,594.00	\$1,667.00	\$1,710.00	
Quarterly Profit	\$145.00	\$150.00	\$165.00	\$108.00	

NA = Not available

Source: MCI Communications Corporation
Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

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

Source: Dataquest (1990)

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	100.00	100.00
Indirect Sales	0	0

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

Information is not available.

SUBSIDIARIES

North America

MCI International, Inc. (United States)
MCI Telecommunications Corporation (United States)
RCA Global Communications Inc. (United States)
Western Union International, Inc. (United States)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Bell Canada International (BCE)
MCI and BCE are parties to a joint venture in New Zealand with three New Zealand entities to form a competitive long distance venture.

National Science Foundation (NSF) Network
The NSF Network will send information to link 1,500 universities, companies, and government research networks.

Hotelecopy
MCI expanded its joint marketing program for FaxMail, a service of Hotelecopy. MCI will transmit all of Hotelecopy's facsimile traffic from self-service FaxMail terminals.

Regi Van Telegraphie en Telephony (RTT)
Belgium's RTT signed four agreements with MCI covering interconnection of virtual private network and messaging services.

International Telecharge

International Telecharge signed a deal to provide MCI with operator services for MCI's hotel industry customers.

IBM

IBM has jointly demonstrated with MCI, a T1 link between the NSF Network and NSF's European counterpart. The network enables both US and European scientists to collaborate more effectively as graphic images and text are displayed almost simultaneously.

EXECUTONE Information Systems, Inc.

MCI has signed a three-year agreement under which EXECUTONE will operate as a sales agent for MCI long distance services.

General Communication, Inc. (GCI)

GCI has signed a five-year agreement with MCI for long distance telephone services.

British Telecom Inc. (BTI)

MCI's Vnet customers will be able to connect UK locations to their domestic virtual private network through an interconnection agreement with BTI.

British Telecom and Kokusai Denshin Denwa

MCI announced in February that the three companies will jointly offer a new international network service aimed at multinational firms by midsummer 1990.

Telefonos de Mexico SA (Telemex)

MCI and Telemex have signed an agreement to provide direct voice and other telecom services between the United States and Mexico.

1989

Compression Labs, Inc. (CLI)

CLI and MCI agreed to market new month-to-month videoconferencing services.

Chrysler Motors

MCI is providing voice and data communications to Chrysler under a three-year, multimillion dollar contract.

General Electric Company

MCI is providing voice and data services to General Electronic Company under a three-year, multimillion dollar contract.

MERGERS AND ACQUISITIONS

1990

Western Union International

MCI has purchased the final piece of Western Union's transmission-based business, the Advanced Transmission Systems Division.

Infonet

MCI has acquired a 25 percent interest in Infonet from Computer Science.

Telecom USA

MCI acquired Telecom USA, the fourth largest long distance carrier in the United States, in a measure taken to increase market share.

KEY OFFICERS

William G. McGowan
Chief executive officer

V. Orville Wright
Chief executive officer

Bert C. Roberts, Jr.
Chief operating officer, president

Daniel F. Akerson
Chief financial officer

H. Brian Thompson
Executive vice president

PRINCIPAL INVESTORS

IBM

FOUNDERS

John D. Goeken

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

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$1,362.4	\$1,399.0	\$1,356.0	\$1,321.0	\$1,421.0
Cash/Investments	852.8	778.0	725.0	453.0	197.0
Receivables	422.3	567.0	581.0	823.0	1,171.0
Inventory	NA	NA	NA	NA	NA
Other Current Assets	87.3	54.0	50.0	45.0	53.0
Other Assets	\$3,147.3	\$3,859.0	\$4,024.0	\$4,522.0	\$4,917.0
Total Assets	\$4,509.7	\$5,258.0	\$5,380.0	\$5,843.0	\$6,338.0
Total Current Liabilities	\$1,307.8	\$1,137.0	\$1,206.0	\$1,522.0	\$1,717.0
Long-Term Debt	\$1,695.9	\$2,676.0	\$2,663.0	\$2,677.0	\$2,241.0
Other Liabilities	\$188.0	\$183.0	\$232.0	\$285.0	\$385.0
Total Liabilities	\$3,191.7	\$3,996.0	\$4,101.0	\$4,484.0	\$4,343.0
Total Shareholders' Equity	\$1,318.0	\$1,262.0	\$1,279.0	\$1,359.0	\$1,995.0
Converted Preferred Stock	0	0	0	1.0	1.0
Common Stock	23.6	28.0	29.0	29.0	30.0
Other Equity	795.4	1,183.0	1,185.0	930.0	1,036.0
Retained Earnings	499.0	51.0	65.0	399.0	928.0
Total Liabilities and Shareholders' Equity	\$4,509.7	\$5,258.0	\$5,380.0	\$5,843.0	\$6,338.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$2,542.0	\$3,592.0	\$3,939.0	\$5,137.0	\$6,471.0
Local Interconnection Expense	\$874.0	\$1,636.0	\$1,963.0	\$2,401.0	\$3,164.0
Leased Communications System Expense	\$280.0	\$267.0	\$163.0	\$247.0	NA
R&D Expense	NA	NA	NA	NA	\$35.0
SG&A Expense	\$835.0	\$1,097.0	\$1,107.0	\$1,356.0	\$1,635.0
Capital Expense	NA	\$1,074.0	\$619.0	\$896.0	\$1,052.0
Pretax Income	\$168.0	(\$463.0)	\$106.0	\$422.0	\$804.0
Pretax Margin (%)	6.61	(12.89)	2.69	8.21	12.42
Effective Tax Rate (%)	17.00	4.0*	26.0*	16.00	37.00
Net Income	\$113.0	(\$448.0)	\$88.0	\$346.0	\$558.0
Shares Outstanding, Millions	236.0	285.0	287.0	290.0	249.0
Per Share Data					
Earnings	\$0.48	(\$1.63)	\$0.31	\$1.23	\$2.09
Dividends	0	0	0	0	0
Book Value	\$5.58	\$4.43	\$4.71	\$4.69	\$8.01

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

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	1.04	1.23	1.12	0.87	0.83
Quick (Times)	1.04	1.23	1.12	0.87	0.83
Current Liabilities/Equity (%)	99.23	90.10	94.29	111.99	86.07
Total Liabilities/Equity (%)	242.16	316.64	320.64	329.95	217.69
<i>Profitability (%)</i>					
Return on Assets	2.69	(9.17)	1.65	6.17	9.16
Return on Equity	8.98	(34.73)	6.93	26.23	33.27
Profit Margin	4.45	(12.47)	2.23	6.74	8.62
<i>Other Key Ratios</i>					
Capital Spending % of Revenue	NA	29.9	15.7	17.4	16.3
Employees	12,445	13,650	14,236	17,596	19,198
Revenue (\$K)/Employee	\$362.37	\$385.20	\$377.92	\$332.06	\$330.14
Capital Spending % of Assets	NA	20.4	11.5	15.3	16.6

*Restatement
NA = Not available

Source: MCI Communications Corporation
Annual Reports
Dataquest (1990)

MCI Communications Corporation

1133 19th Street, N.W.
Washington, D.C. 20036
Telephone: (202) 872-1600
FAX: (202) 887-2443
Dun's Number: 04-476-0643

Date Founded: 1968

CORPORATE STRATEGIC DIRECTION

MCI Communications Corporation (MCI) is the second largest long distance telephone company in the United States, offering both domestic and international voice and data communications to its customers. MCI provides customers with the ability to make intrastate calls in 43 states, and interstate calls to and from the United States and Puerto Rico.

MCI remained very competitive in the long distance telecommunications market during 1988, ending the year in a very favorable position. Revenue increased from \$3.9 billion* in 1987 to \$5.1 billion in 1988, a growth rate of 30 percent. MCI conducts business operations in an extremely competitive marketplace where services are very price sensitive. The new price cap regulation, effective July 1, 1989, allows AT&T to fluctuate certain prices within an established ceiling and floor, and will intensify price competition. MCI attributes the double-digit revenue growth to the combination of introducing new services during 1988 (such as Worldwide Direct Dialing, Operator Services, domestic and international fax, and 900 service) while enhancing existing products (such as 800 services and virtual private networks (Vnet).

On August 2, 1988, MCI spent \$677 million to purchase 47 million shares of its common stock from IBM. In return, IBM bought 2 million shares of a new preferred stock for \$400 million. IBM sold Satellite Business Systems (SBS) to MCI in February 1986 and acquired the 47 million shares of stock as part of the transaction.

In addition to generating new customers as a result of penetrating new telecommunications markets, MCI has improved its profitability by decreasing operating costs in relation to revenue and by achieving

economies of scale in its networking capabilities. MCI is both expanding and leveraging its nationwide digital network to offer a variety of enhanced services in an effort to generate increased revenue. MCI substantially improved its bottom line, increasing its net income from \$88 million in 1987 to \$346 million in 1988. In 1988 MCI received \$60 million relating to the 1985 antitrust settlement brought against AT&T, its former Bell operating company subsidiaries, and others.

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

Long Distance Telephone Service

From 1986 through 1988, more than 90 percent of MCI's revenue was generated from its long distance telephone service. Besides intrastate calls in 43 United States and interstate calls to and from the United States and Puerto Rico, MCI also provides international telephone service from the United States to 150 countries, international record communications service between the United States and more than 200 countries, and a domestic and international time-sensitive electronic mail service. The facilities of other carriers are used to access countries where MCI does not have long distance agreements. Satellite and submarine cable, including TAT-8, which is a fiber-optic cable in the Atlantic Ocean, are used for overseas transmissions. In 1988, MCI ranked as the

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

number 2 long distance service, with 8.9 percent of the worldwide market share, according to a Dataquest estimate.

MCI's core long distance service is Dial 1 access service, which allows subscribers to be routed to MCI when 1 plus the telephone number is dialed.

Data Communication

During 1988, 6,242 route miles of digital transmission capacity, 63 percent of which were fiber-optic, were added to MCI's network system. Three regional Network Management Control Centers and one National Network Control Center monitor MCI's network 24 hours a day, every day of the year. Also, MCI is deploying Common Channel Signaling System No. 7 (SS7) throughout its network, which will both speed up the call set-up time and increase the ability to spot down transmission times.

Telecommunications Services

MCI entered four new markets during 1988. The first of these, Operator Services, will offer call-completion, collect, and person-to-person calling. The

second, Worldwide Direct Dialing, allows customers to dial to 150 countries and accounts for 99 percent of all overseas calls. The third, 900 Service, provides the benefits of an 800 service (e.g., routing and call handling); however, the caller is billed. With the fourth, Domestic and International Fax, customers can use non-fax equipment (telex, electronic mail, and personal computers) to generate and send fax messages.

Currently, MCI is attempting to capture a portion of the public pay phone market and become the pay phone premises owner's interexchange carrier. Although AT&T is the leading long distance carrier, MCI was able to leverage its existing market presence and penetrate deeper into the telecommunications service market during 1988.

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	\$1,959	\$2,542	\$3,592	\$3,939	\$5,137
Percent Change	-	29.76	41.31	9.66	30.41
Capital Expenditure	N/A	N/A	\$1,074	\$619	\$896
Percent of Revenue	N/A	N/A	29.90	15.70	17.40
Number of Employees	9,870	12,445	13,650	14,236	17,596
Revenue (\$K)/Employee	\$198.48	\$204.26	\$263.15	\$276.69	\$291.94
Net Income	\$59	\$113	(\$448)	\$88	\$346
Percent Change	-	91.53	(496.46)	(119.64)	293.18
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$1,500	\$1,594	\$1,667	N/A	
Quarterly Profit	N/A	N/A	N/A	N/A	

N/A = Not Available

Source: MCI Communications Corporation
Annual Reports
Dataquest
January 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
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

SUBSIDIARIES

North America

MCI Telecommunications Corporation (United States)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Compression Labs Inc.

CLI and MCI agreed to market new month-to-month videoconferencing service.

Chrysler Motors

MCI is providing voice and data communications to Chrysler under a three-year, multimillion dollar contract.

General Electric Company

MCI is providing voice and data services under a three-year, multimillion dollar contract.

1988

Ford Motor Credit

MCI is providing voice communications to 138 branch offices via Vnet under a \$15 million, three-year contract.

MERGERS AND ACQUISITIONS

1988

RCA Global Communications, Inc.

MCI acquired RCA Global Communications, which provides services for international communications.

KEY OFFICERS

William G. McGowan
Chief executive officer

V. Orville Wright
Chief executive officer

Bert C. Roberts, Jr.
Chief operating officer

Daniel F. Akerson
Chief financial officer

Richard T. Liebhaber
Executive vice president

H. Brian Thompson
Executive vice president

PRINCIPAL INVESTORS

International Business Machines

FOUNDERS

John D. Goeken

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	\$1,233.4	\$1,362.4	\$1,399.0	\$1,356.0	\$1,321.0
Cash/Investments	865.1	852.8	778.0	725.0	453.0
Receivables	305.2	422.3	567.0	581.0	823.0
Inventory	N/A	N/A	N/A	N/A	N/A
Other Current Assets	63.1	87.3	54.0	50.0	45.0
Other Assets	\$2,660.4	\$3,147.3	\$3,859.0	\$4,024.0	\$4,522.0
Total Assets	\$3,893.8	\$4,509.7	\$5,258.0	\$5,380.0	\$5,843.0
Total Current Liabilities	\$641.0	\$1,307.8	\$1,137.0	\$1,206.0	\$1,522.0
Long-Term Debt	\$1,821.1	\$1,695.9	\$2,676.0	\$2,663.0	\$2,677.0
Other Liabilities	\$232.6	\$188.0	\$183.0	\$232.0	\$285.0
Total Liabilities	\$2,694.7	\$3,191.7	\$3,996.0	\$4,101.0	\$4,484.0
Total Shareholders' Equity	\$1,199.1	\$1,318.0	\$1,262.0	\$1,279.0	\$1,359.0
Converted Preferred Stock	0	0	0	0	1.0
Common Stock	23.5	23.6	28.0	29.0	29.0
Other Equity	789.9	795.4	1,183.0	1,185.0	930.0
Retained Earnings	385.7	499.0	51.0	65.0	399.0
Total Liabilities and Shareholders' Equity	\$3,893.8	\$4,509.7	\$5,258.0	\$5,380.0	\$5,843.0
Income Statement	1984	1985	1986	1987	1988
Revenue	\$1,959.0	\$2,542.0	\$3,592.0	\$3,939.0	\$5,137.0
Local Interconnection Expense	\$480.0	\$874.0	\$1,636.0	\$1,963.0	\$2,401.0
Leased Communications					
System Expense	\$343.0	\$280.0	\$267.0	\$163.0	\$247.0
R&D Expense	N/A	N/A	N/A	N/A	N/A
SG&A Expense	\$696.0	\$835.0	\$1,097.0	\$1,107.0	\$1,356.0
Capital Expense	N/A	N/A	\$1,074.0	\$619.0	\$896.0
Pretax Income	\$50.5	\$168.0	(\$463.0)	\$106.0	\$422.0
Pretax Margin (%)	2.58	6.61	(12.89)	2.69	8.21
Effective Tax Rate (%)	(18.0)	17.0	4.0*	26.0*	16.0
Net Income	\$59.0	\$113.0	(\$448.0)	\$88.0	\$346.0
Shares Outstanding, Millions	235.0	236.0	285.0	287.0	290.0
Per Share Data					
Earnings	\$0.25	\$0.48	(\$1.63)	\$0.31	\$1.23
Dividends	0	0	0	0	0
Book Value	\$5.10	\$5.58	\$4.43	\$4.71	\$4.69

*Restatement

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
<i>Liquidity</i>					
Current (Times)	1.92	1.04	1.23	1.12	0.87
Quick (Times)	1.92	1.04	1.23	1.12	0.87
Current Liabilities/Equity (%)	53.46	99.23	90.10	94.29	111.99
Total Liabilities/Equity (%)	224.73	242.16	316.64	320.64	329.95
<i>Profitability (%)</i>					
Return on Assets	-	2.69	(9.17)	1.65	6.17
Return on Equity	-	8.98	(34.73)	6.93	26.23
Profit Margin	3.01	4.45	(12.47)	2.23	6.74
<i>Other Key Ratios</i>					
Capital Spending % of Revenue	N/A	N/A	29.9	15.7	17.4
Employees	9,870	12,445	13,650	14,236	17,596
Revenue (\$K)/Employee	\$394.51	\$362.37	\$385.20	\$377.92	\$332.06
Capital Spending % of Assets	N/A	N/A	20.4	11.5	15.3

N/A = Not Available

Source: MCI Communications
Corporation
Annual Reports
Dataquest
January 1990

Company Backgrounder by Dataquest

Mentor Graphics Corporation

8500 S.W. Creekside Place
Beaverton, Oregon 97005-7191
Telephone: (503) 626-7000
Fax: (503) 626-1202
Dun's Number: 03-137-4879

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Mentor Graphics Corporation was established in 1981 to design, manufacture, market, and service electronic design automation (EDA) systems. It was one of the first companies to offer computer-aided engineering (CAE) tools for designing and analyzing electronic circuits, and soon expanded its focus to include computer-aided design (CAD) tools for the physical layout of integrated circuits and printed circuit boards. Mentor Graphics now markets chip board- and system-level EDA tools, as well as software and hardware aimed at other EDA fields including computer-aided publishing (CAP), computer-aided electronic packaging (CAEP), computer-aided software engineering (CASE), and computer-aided testing (CAT). Dataquest estimates that Mentor Graphics held 3 percent share of the CAD/CAM worldwide market, ranking it sixth among CAD/CAM vendors during 1989.

Mentor Graphics' total revenue increased 26.4 percent to \$380.0 million* in fiscal 1989 from \$300.8 million in fiscal 1988. Net income increased 33.6 percent to \$44.8 million in fiscal 1989 from \$33.5 million in fiscal 1988. Dataquest believes that Mentor Graphics is the dominant vendor in the EDA application segment. The Company employed approximately 2,100 employees worldwide in 1989.

During fiscal 1989, systems revenue represented 79.6 percent, or \$302.5 million, of total revenue, while service and support represented the remaining 20.4 percent. Nineteen eighty-nine systems revenue increased 25 percent over fiscal 1988. Mentor Graphics attributed the growth in systems revenue to continued business growth especially in the European market, along with continued worldwide acceptance of its design automation and analysis tools, and the emergence of its IC design and PCB design products.

During fiscal years 1989, 1988, and 1987, R&D expenditure was \$50.9 million, \$33.8 million, and \$24.2 million, respectively. This represented 13.4, 11.2, and 10.9 percent, respectively, of total revenue. Mentor Graphics' R&D investment was aimed primarily at its commitment to deliver its software release 8.0. This commitment led to hiring additional engineering staff, increased capital equipment purchases, and facilities expansion. Although the Company plans to continue its large financial commitment to R&D activities, the growth rate for R&D is expected to be moderate in 1990.

Mentor Graphics markets its products principally to Fortune 500 companies in the aerospace, semiconductor, computer, telecommunications, and consumer electronics industries. It uses a direct sales force located throughout the United States, as well as wholly owned marketing subsidiaries located in Western Europe, Canada, Australia, and the Far East. During fiscal years 1989, 1988, and 1987, international sales accounted for 48.5, 47.8, and 45.9 percent, respectively, of total revenue. International revenue has come primarily from the European and Asia/Pacific markets.

Mentor Graphics' strategy is continuous expansion into new industry segments through internal development, acquisition, joint marketing, OEM agreements, and spin-off activity. Three recent developments that contribute to the Company's strategy include the announcement that Mentor Graphics has selected Sun Microsystems as a workstation platform; the acquisition of Silicon Compiler Systems (SCS), creating the Silicon Design Division; and lastly, the announcement of the Concurrent Design Environment based on the Falcon Framework.

Mentor Graphics uses Hewlett-Packard's (HP's) general-purpose 32-bit engineering workstations as the workstation base for its EDA systems. In January

*All dollar amounts are in US dollars.

1990, the Company announced its intention to support its software on the Sun hardware platform. Mentor Graphics believes that the use of HP and Sun hardware will further the Company's efforts to specialize in the development of application software while benefiting from HP and Sun's R&D efforts in general-purpose hardware and operating systems software. Mentor Graphics' products may be bought as complete systems, with the software already integrated with the workstations, or as software.

The decision to port to Sun eliminates platform choices as an issue for Mentor Graphics and its customers. Since Sun Microsystems and HP/Apollo combine for more than 80 percent of all new EDA nonproprietary workstations, the decision allows customers to take advantage of Mentor Graphics' technologies and the two most popular engineering workstations.

The acquisition of Silicon Compiler Systems complements Mentor Graphics' line of IC design tools as well as bolstering the Company's simulation technologies for the development of ICs. The acquisition also adds expertise in the Sun development environment, thus complementing Mentor Graphics' decision to port to Sun.

The Concurrent Design Environment is the new generation of the Company's EDA product line. This product line allows for the integration and simultaneous design of different aspects of an electronic system, including hardware and software.

In 1989, Mentor Graphics introduced the OpenDoor program for in-house software developers, application-specific integrated circuit (ASIC) vendors, and third-party design automation vendors. Through this program, participants can develop interfaces between their software tools and Mentor Graphics' software tools. OpenDoor participants can select from a variety of integration technologies and business relationships with Mentor Graphics.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information is not available on revenue by distribution channel. Table 3, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Mentor Graphics currently has seven product divisions, which include the Design and Analysis Division, the Silicon Design Division, the Printed Circuit Board (PCB) Division, the Electronic Packaging and Analysis Division, the Context Division, the Computer-Aided Software Engineering (CASE) Division, and the Advanced Products Division.

Electronic Design Automation (EDA)

According to Dataquest, Mentor Graphics ranked first and held 13.0 percent share of the 1989 worldwide EDA market. Dataquest estimates that Mentor Graphics ranked fifth in IC layout with 9.0 percent share of the worldwide market, and second in the PCB layout market with 12.3 percent share of the worldwide PCB market.

Mentor Graphics has a variety of proprietary application software. This software supports design creation and analysis for integrated circuits and electronic systems, including the systems themselves and the enclosure of the systems, as well as physical layout of semicustom and custom very-large-scale integrated (VLSI) circuits and printed circuit boards. Mentor Graphics provides software for documentation and project communication. It integrates its application software and HP/Apollo and Sun's general-purpose 32-bit workstations into a range of Concurrent Design Environment workstations. These workstations currently are marketed to companies in the aerospace, semiconductor, computer, telecommunications, and consumer electronics industries.

Mentor Graphics also offers optional software and special-purpose hardware to address specific applications within the electronic product development process. These applications include a general-purpose graphics editor that provides a range of graphic elements, text fonts, line styles, and fill patterns; simulation parts models that supply easily accessible and usable software models of electronic components; interactive circuit simulators that provide analytical capabilities for the analog- or transistor-level behavior of circuits; synthesis software; software that simplifies the design of ASICs by

enabling early design stages to be independent of vendors and technology; and products that allow customers to integrate actual VLSI components and semicustom circuits into the logic simulation process.

All Mentor Graphics applications are integrated into the Falcon Framework, which supports all levels of systems design across all design disciplines throughout the entire design cycle. Falcon Framework is aimed at supplying electronic designers with consistent graphics processing, text processing, window management, database management, design and decision management, and a variety of need-specific applications.

Design and Analysis Division (DAD)

DAD provides tools for architectural design; schematic capture; synthesis; digital logic, fault, and timing simulations/testing; and analog simulation/testing.

In May 1990, Mentor Graphics announced two new products, Design Architect and QuickSim II, from DAD. Design Architect is a comprehensive and integrated system for creating designs from the specification and architectural level to logic- and circuit-level descriptions. This product incorporates Mentor Graphics' second-generation network/schematic editor, a symbol editor, and for architectural design, a VHSIC hardware description language (VHDL) editor and compiler. QuickSim II is a high-performance logic simulator for function and performance verification of large, submicron ASIC and printed circuit board designs. Design Architect was specifically engineered to work with QuickSim II, supplying users with fast design iteration time and highly interactive analysis environment for architectural and gate/circuit-level designs.

Mentor Graphics foresees the computer-aided test area of the EDA market to be of strategic importance. Hence, the Company focuses its development activities on products used to create testable designs, develop test patterns, and transfer test-related information from the design engineer to the manufacturing test engineer. Mentor Graphics' test products consist of QuickGrade, a statistical fault grader; and Quick-Fault, a deterministic fault simulator. Along with these products, Mentor Graphics maintains a joint marketing agreement with Test Systems Strategies,

Inc. (TSSI). TSSI develops, manufactures, and markets interfaces between Mentor Graphics' simulators and a variety of commercial integrated circuit and printed circuit board test systems.

Context Division

Designing, manufacturing, marketing, and servicing of Mentor Graphics' computer-aided publishing software is conducted by its Context Division. This division provides documentation systems to make the production and management of publications for electronics design, computer-aided software engineering, and technical publishing groups more efficient and cost-effective. Although Mentor Graphics includes DOC documentation preparation software in its Design Station and higher-level station, the Context Division has focused on the documentation management needs of aerospace, engineering, and manufacturing companies. The Context series of documentation workstations is used primarily in the production of engineering documentation specifications, maintenance documentation, and product manuals. During March 1990, the Context Division introduced BOLD, an on-line electronic data delivery system that allows designers and technical writers to create, access, and maintain on-line information. The BOLD system offers immediate distribution of updated information, has full-text search capability across all documents in the on-line library, and fully supports Hypertext.

Silicon Design Division (SDD)

SDD offers systems and software for interactive and automatic placement and routing, interactive and automatic layout verification, and standard cell and gate-array layout. Mentor Graphics hopes to boost its position in the IC design segment by combining its existing tools with the acquisition of SCS. With the acquisition, Mentor Graphics gains SCS's Belgian facility, which will enhance its presence in the European marketplace.

Dataquest estimates that Mentor Graphics generated \$14.3 million in IC layout revenue for 1989, which represents nearly a 15 percent increase over 1988. SCS ranked second in IC layout in 1989 with 14.5 percent market share and \$23 million in revenue.

Printed Circuit Board (PCB) Division

The PCB Division offers systems and software for interactive and automatic placement and routing. The division supports analog, surface-mount, ceramic, hybrid layout, traditional through-pin, and other

technologies. According to Mentor Graphics, the PCB Division was the second largest division in revenue for fiscal year 1989.

The Board Station is a PCB design and layout workstation that is fully integrated with the complete line of Mentor Graphics EDA tools, including common databases capturing simulation, electronic packaging, physical layout, test, and documentation.

Introduced in 1990 was the Advanced Dynamic Editor, which combines the power of advanced routing technology with the skills of the PCB designer to offer ten times better performance than that of existing editing techniques.

Electronic Packaging and Analysis Division (EPAD)

EPAD offers modeling tools for enclosure design and analysis, drafting tools for creating engineering drawings, and thermal analysis tools for printed circuit boards. This division sells the Package Station workstation, a design automation tool targeted at the needs of electronic package designers. The Package Station workstation is fully integrated into the Company's workstation environment and offers direct access to the electronic component and layout data developed on its Board Station workstation. The Package Station also consists of software tools that supply engineers with the information needed to reduce heat buildup on printed circuit boards and in electronic packages early in the design process. In June 1990, Mentor Graphics announced the Reliability Predictor, which automates reliability calculation and tracks reliability predictions throughout a product's entire design. The Reliability Predictor can aid in thermal analysis as well as predict reliability using any combination of variables regarding schematic data or assumptions on packaging.

Computer-Aided Software Engineering (CASE) Division

The CASE Division offers tools for the structured analysis and design of software in real-time systems and for compliance with defense software development standards. The CASE Division complements the hardware side of the development cycle supported by Mentor Graphics' other divisions and products.

Mentor Graphics entered the CASE market when it purchased Tektronix's CASE division in April 1988. CASE Station was the first product Mentor Graphics' CASE Division introduced. CASE Station is a combination of the original Tektronix system with EDA tools integrated onto an Apollo platform. During September 1989, the CASE Division announced CodeLink Station, a comprehensive CASE set of tools that addresses software development from initial design through maintenance and allows product development teams to make critical software/hardware design trade-offs early in project development. CodeLink software enables embedded software design teams to observe the behavior of the software and hardware through a debugging tool based on the XRAY debugger developed by Microtec Research.

Advanced Products Division (APD)

APD is the heart of Mentor Graphics' R&D activities, including the design of the Company's Falcon Framework for the Concurrent Design Environment. This division also administers the Company's OpenDoor program, which enables the use of third-party and customer-specific tools in the Mentor Graphics design environment.

R&D alliances that affect the future of Mentor Graphics include the PCB technology transfer and joint development agreement with Ascent Logic as well as the acquisition of the R&D infrastructure of SCS.

Further Information

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	\$136,748	\$173,545	\$221,823	\$300,750	\$380,034
Percent Change	-	26.91	27.82	35.58	26.36
Capital Expenditure	\$22,537	\$10,200	\$14,696	\$31,205	\$39,195
Percent of Revenue	16.48	5.88	6.63	10.38	10.31
R&D Expenditure	\$14,538	\$16,798	\$24,179	\$33,814	\$50,942
Percent of Revenue	10.63	9.68	10.90	11.24	13.40
Number of Employees	777	900	1,200	1,700	2,100
Revenue (\$K)/Employee	\$175.99	\$192.83	\$184.85	\$176.91	\$180.97
Net Income	\$7,989	\$11,000	\$20,325	\$33,540	\$44,803
Percent Change	(19.21)	37.69	84.77	65.02	33.58
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$90,495	\$94,741	\$96,429	\$98,369	
Quarterly Profit	\$10,418	\$11,070	\$11,527	\$11,788	

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

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	66.05	60.82	54.15	52.16	51.53
International	33.95	39.18	45.85	47.84	48.47
Europe	22.30	22.56	25.14	25.76	27.37
Asia/Pacific	11.65	16.62	18.17	22.08	21.10

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

1990 SALES OFFICE LOCATIONS

North America—30
Europe—18
Asia/Pacific—8
Japan—3
ROW—1

MANUFACTURING LOCATIONS

North America

San Jose, California

Develops automated IC and PCB layout products
Beaverton, Oregon

Manufactures hardware modeling library products
and other special hardware products; integrates
hardware received from various suppliers,
primarily Apollo

SUBSIDIARIES

North America

Context Corporation (United States)
Contour Design Systems (United States)
Tektronix, Inc. (United States)
Trimeter Technologies (United States)
Synergy DataWorks, Inc. (United States)

Europe

Mentor Graphics Netherlands (Netherlands)

Asia/Pacific

Mentor Graphics Japan Co. Ltd. (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Hewlett-Packard (HP)

Mentor Graphics and HP signed a marketing
agreement calling for HP to integrate future HP
307X products with Mentor Graphics products and
resell them.

Ascent Logic

Mentor Graphics and Ascent Logic formed a technology transfer and joint development agreement. The agreement calls for the integration of Ascent Logic's systems engineering technology and products with the tools and the Falcon Framework for Concurrent Design offered by Mentor Graphics. Mentor Graphics also will market and support Ascent Logic's Requirements Driven Development (RDD) products, which will be integrated with Mentor Graphics' Concurrent Design Environment. Under the terms of the agreement, Mentor Graphics also can extensively use the RDD products internally.

Microtec Research, Inc.

Mentor Graphics and Microtec Research formed a strategic partnership that calls for the incorporation of the XRAY high-level debugger in Mentor Graphics' new embedded software development product, CodeLink Station.

Logic Modeling Systems Incorporated

Mentor Graphics and Logic Modeling Systems Incorporated formed an OEM agreement under which Mentor Graphics will market Logic Modeling Systems' LM-1000 hardware modeler with Mentor Graphics' QuickSim simulation environment.

Ikos Systems, Inc.

Mentor Graphics and Ikos Systems, Inc., have a comprehensive, multiple-phase agreement that includes joint development, joint marketing, and distribution for the companies' simulation products. Under the terms of the agreement, the two companies will market the Ikos hardware-based simulators jointly and will integrate the Ikos simulators with Mentor Graphics' logic simulator. Mentor Graphics also will sell Ikos' products in Japan through an OEM agreement.

1989

Cadence Design Systems Inc.

Mentor Graphics signed an OEM agreement to sell Cadence Design Systems' Dracula integrated circuit layout verification tools. The agreement is valued at over \$5 million over a two-year period. Mentor Graphics is entitled to renew the agreement annually through 1999.

Logic Automation

Logic Automation extended and expanded its software marketing agreement with Mentor Graphics for two more years. All of Mentor Graphics' IDEA workstations will automatically include Logic Automation's SmartModel simulation tools library.

The initial agreement that allowed Mentor Graphics to sell, distribute, and support Logic Automation products worldwide was formed in 1987.

LSI Logic

Mentor Graphics and LSI Logic announced that they have formed a license agreement for the availability of Co-Design Environment/Mentor Graphics (CDE/MG) software. CDE/MG links Mentor Graphics' IDEA Series design tools operation on current Apollo workstation to key modules of LSI Logic's Modular Design Environment (MDE) CAD tools.

1988

VLSI Technologies

Mentor Graphics entered into an agreement with VLSI Technologies that calls for the companies to work together toward making VLSI's future advanced technologies available on Mentor Graphics workstations and toward the development of design tools to support these ASIC technologies.

CAD

Mentor Graphics participated in the creation of the CAD Framework Initiative, which is investigating how open design automation environments might best be implemented.

Open Software Foundation (OSF)

Mentor Graphics became a member of OSF, which was founded by eight companies including Apollo, Digital, and IBM, and is dedicated to developing a UNIX-based open software environment. There are currently 26 member companies.

Minc Inc.

Mentor Graphics reached an agreement with Minc to incorporate its universal programmable logic device (PLD) synthesis tool into Mentor Graphics' board design and simulation environment. Under the terms of the five-year agreement, Mentor Graphics also has purchased the right to use Minc's PLD synthesis technology.

Tektronix

Mentor Graphics entered into a strategic alliance with Tektronix, a supplier of test and measurement instruments, to cooperate in the production of an integrated set of design and test products.

Test Systems Strategies, Inc. (TSSI)

Mentor Graphics entered into a joint marketing agreement with TSSI pursuant to which TSSI develops, manufactures, and markets interfaces between Mentor Graphics' Simulator and

QuickFault products to a wide range of commercial integrated circuit and printed circuit board test systems.

MERGERS AND ACQUISITIONS

1990

Silicon Compiler Systems Corporation (SCS)

Mentor Graphics purchased SCS, a company that provides a broad spectrum of integrated IC design systems on industry-standard Digital Equipment, HP/Apollo, and Sun platforms.

1989

Performance CAD

Mentor Graphics acquired Performance CAD, a developer of integrated circuit timing analysis tools.

Trimeter Technologies

Mentor Graphics acquired Trimeter Technologies, one of the three leading developers in the emerging logic synthesis field, for \$3 million cash plus royalties on future products. The combined Design and Analysis Division will work to combine the capabilities of Trimeter's logic synthesis tools with Mentor Graphics' own PLD synthesis and VHSIC hardware description language (VHDL) tools.

1988

Tektronix

Mentor Graphics reached a \$5 million agreement with Tektronix to purchase its CASE business and certain CAE-related technologies. The CASE division offers products that create a structured design environment for the production of software. Mentor Graphics' CASE products are designed to operate on DEC VAX and VAXstation computers and on standard Apollo workstations. At the same time, Tektronix elected to leave the design automation business and agreed to work with Mentor Graphics to migrate its customers to Mentor Graphics products. Tektronix also designated Mentor Graphics as a preferred vendor of design automation systems for use with Tektronix products.

Contour Design Systems

Mentor Graphics acquired Contour Design Systems, a leading supplier of analog component libraries and modeling technology. Mentor issued 75,000 shares of common stock in exchange for all outstanding shares of Contour.

KEY OFFICERS

Thomas H. Bruggere
Chairman of the board and chief executive officer

Gerald H. Langelier
President and chief operating officer

David C. Moffenbeier
Executive vice president

David L. Brinker
Vice president and general manager, Asia/Pacific

Jean-Claude Caraes
Vice president and general manager, Europe

Marvin S. Wolfson
Vice president, Product Group

Brian W. Maggs
Vice president, North American Sales

Stephen Swerling
Vice president, Technology

Dale T. Derby
Vice president, Operations

PRINCIPAL INVESTORS

Prudential Insurance of America—5.8 percent

FOUNDERS

Information is not available.

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

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$157,761	\$176,348	\$191,677	\$224,020	\$273,057
Cash	74,160	81,494	26,152	52,377	65,419
Receivables	50,821	59,332	63,423	72,827	97,204
Inventory	29,139	28,867	23,318	20,587	20,042
Other Current Assets	3,641	6,655	78,784	78,229	90,392
Net Property, Plants	\$31,117	\$29,482	\$32,826	\$44,124	\$61,856
Other Assets	\$5,203	\$6,191	\$4,663	\$13,558	\$27,033
Total Assets	\$194,081	\$212,021	\$229,166	\$281,702	\$361,946
Total Current Liabilities	\$51,185	\$54,001	\$39,039	\$58,519	\$79,159
Long-Term Debt	\$2,784	\$2,789	\$2,603	\$1,474	\$8,748
Other Liabilities	0	0	0	0	0
Total Liabilities	\$53,969	\$56,790	\$41,642	\$59,993	\$87,907
Total Shareholders' Equity	\$140,112	\$155,231	\$187,524	\$221,709	\$274,039
Converted Preferred Stock	0	0	0	0	0
Common Stock	124,123	125,924	132,125	138,752	153,464
Other Equity	823	3,141	8,908	4,607	2,608
Retained Earnings	15,166	26,166	46,491	78,350	117,967
Total Liabilities and Shareholders' Equity	\$194,081	\$212,021	\$229,166	\$281,702	\$361,946
Income Statement	1985	1986	1987	1988	1989
Revenue	\$136,748	\$173,545	\$221,823	\$300,750	\$380,034
US Revenue	90,328	105,542	120,116	156,879	195,840
Non-US Revenue	46,420	68,003	101,707	143,871	184,194
Cost of Sales	\$78,598	\$96,470	\$109,146	\$134,443	\$159,503
R&D Expense	\$14,538	\$16,798	\$24,179	\$33,814	\$50,942
SG&A Expense	\$36,022	\$47,840	\$61,181	\$87,614	\$110,966
Capital Expense	\$22,537	\$10,200	\$14,696	\$31,205	\$39,195
Pretax Income	\$12,082	\$16,545	\$31,740	\$50,626	\$66,233
Pretax Margin (%)	8.84	9.53	14.31	16.83	17.43
Effective Tax Rate (%)	33.90	33.50	36.00	33.70	32.40
Net Income	\$7,989	\$11,000	\$20,325	\$33,540	\$44,803
Shares Outstanding, Thousands	30,992	32,740	33,962	34,890	36,865
Per Share Data					
Earnings	\$0.26	\$0.34	\$0.60	\$0.96	\$1.22
Dividend	0	0	0	\$0.05	\$0.15
Book Value	\$4.44	\$4.84	\$5.70	\$6.56	\$7.84

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

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	3.08	3.27	4.91	3.83	3.45
Quick (Times)	2.51	2.73	4.31	3.48	3.20
Fixed Assets/Equity (%)	22.21	18.99	17.50	19.90	22.57
Current Liabilities/Equity (%)	36.53	34.79	20.82	26.39	28.89
Total Liabilities/Equity (%)	38.52	36.58	22.21	27.06	32.08
<i>Profitability (%)</i>					
Return on Assets	5.30	5.42	9.21	13.13	13.92
Return on Equity	7.56	7.45	11.86	16.39	18.07
Profit Margin	5.84	6.34	9.16	11.15	11.79
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	10.63	9.68	10.90	11.24	13.40
Capital Spending % of Revenue	16.48	5.88	6.63	10.38	10.31
Employees	777	900	1,200	1,700	2,100
Revenue (\$K)/Employee	\$175.99	\$192.83	\$184.85	\$176.91	\$180.97
Capital Spending % of Assets	11.61	4.81	6.41	11.08	10.83

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

Mentor Graphics Corporation

8500 S.W. Creekside Place
Beaverton, Oregon 97005-7191

Telephone: (503)626-7000

Fax: (503)626-1202

Dun's Number: 03-137-4879

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Mentor Graphics Corporation was established in 1981 to design, manufacture, market, and service electronic design automation (EDA) systems. It was one of the first companies to offer computer-aided engineering (CAE) tools for designing and analyzing electronic circuits, and soon expanded its focus to include computer-aided design (CAD) tools for the physical layout of integrated circuits and printed circuit boards. The Company now markets board- and system-level EDA tools, as well as software and hardware aimed at other EDA fields including computer-aided publishing (CAP), computer-aided electronic packaging (CAEP), computer-aided software engineering (CASE), and computer-aided testing (CAT).

Mentor Graphics' EDA applications run exclusively on the Apollo platform. Apollo Computer was acquired by Hewlett-Packard (HP) during early 1989. Mentor Graphics remains committed to the Apollo/HP platform and will support a new family of platforms, based upon the Motorola 68040, planned for introduction during 1990. Candidates being considered in Mentor's search for a second platform are likely to be Digital Equipment, HP/Apollo, IBM, and Sun Microsystems.

Mentor Graphics' total revenue increased 36 percent to \$300.8 million* in fiscal 1988 from \$221.8 million in fiscal 1987. Net income increased 65 percent to \$33.5 million in fiscal 1988 from \$20.3 million in fiscal 1987. According to Dataquest's research, Mentor Graphics has been the fastest-growing, most dominant vendor in the EDA application segment. Mentor Graphics employed approximately 1,700 employees in 1988.

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

The Company accelerated spending for research and development to \$33.8 million in fiscal 1988, or 11.2 percent of revenue. Capital spending was \$31.2 million, a dramatic 112 percent increase over fiscal 1987. This was due primarily to the purchase of land in Wilsonville, Oregon, to be developed as the future site of the Company's corporate headquarters, expected to be finished by late 1990.

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

BUSINESS SEGMENT STRATEGIC DIRECTION

Electronic Design Automation

Mentor Graphics is the world's leading supplier of EDA systems, ranking first in 1988 worldwide market share with 17.5 percent, per Dataquest estimate, and the fourth-largest supplier in the much larger design and automation industry. Dataquest estimates that Mentor ranks fifth in IC layout with 8.1 percent of the worldwide market share, and third in the PCB Layout market segment with 6.0 percent worldwide market share. The IDEA Series combines Mentor Graphics software with general-purpose 32-bit workstations manufactured by Apollo Computer. The Company also designs and manufactures special-purpose hardware products, both to complement and enhance the capabilities of its application software and to enhance the general-purpose workstations.

The IDEA Series currently is marketed to companies in the aerospace, semiconductor, computer, telecommunications, and consumer electronics industries.

Software

Mentor Graphics has added to its software product line in a variety of ways: through internal development, acquisition, OEM agreements, cooperative marketing agreements, and creating a subsidiary, Context Corporation. Software engineering tools are also available on workstations and mainframe computers manufactured by Digital Equipment Corporation.

Substantially all of the application software shares an underlying user interface and database structure

called Idealib. Idealib provides users with the graphics processing, text processing, window management, database management, and human interface capabilities needed to address current and future applications. Since Mentor's EDA systems may be linked over a local area network (LAN), all users in a network share a distributed relational database. Therefore, any user can access and use design data developed on any other workstation throughout the design process.

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	\$87,906	\$136,748	\$173,545	\$221,823	\$300,750
Percent Change	-	55.56	26.91	27.82	35.58
Capital Expenditure	\$10,446	\$22,537	\$10,200	\$14,696	\$31,205
Percent of Revenue	11.88	16.48	5.88	6.63	10.38
R&D Expenditure	\$7,742	\$14,538	\$16,798	\$24,179	\$33,814
Percent of Revenue	8.81	10.63	9.68	10.90	11.24
Number of Employees	500	777	900	1,200	1,700
Revenue (\$K)/Employee	\$175.81	\$175.99	\$192.83	\$184.85	\$176.91
Net Income	\$9,888	\$7,989	\$11,000	\$20,325	\$33,540
Percent Change	-	(19.21)	37.69	84.77	65.02
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	90.5	94.74	96.43	N/A	
Quarterly Profit	N/A	N/A	N/A	N/A	

N/A = Not Available

Source: Mentor Graphics 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	85.14	66.05	60.82	56.69	53.64
International	14.86	33.95	39.18	43.31	46.36
Europe	11.67	22.30	22.56	25.14	27.76
Asia/Pacific	3.19	11.65	16.62	18.17	20.60

Source: Mentor Graphics Corporation
 Annual Reports and
 Forms 10-K
 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

SALES OFFICE LOCATIONS

North America—23
Japan—3
Europe—15
Asia/Pacific—6
ROW—2

MANUFACTURING LOCATIONS

North America

San Jose, California
Develops automated IC and PCB layout products
Beaverton, Oregon
Manufactures hardware modeling library products
and other special hardware products; integrates
hardware received from various suppliers,
primarily Apollo

SUBSIDIARIES

North America

Context Corporation (United States)
Contour Design Systems (United States)
Tektronix, Inc. (United States)
Trimeter Technologies (United States)
Synergy DataWorks, Inc. (United States)

Japan

Mentor Graphics Japan Co. Ltd.

Europe

Mentor Graphics Netherlands (Netherlands)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1988

VLSI Technologies

Mentor Graphics entered into an agreement with VLSI Technologies that calls for the companies to work together toward making VLSI's future advanced technologies available on Mentor Graphics workstations and toward the development of design tools to support these ASIC technologies.

CAD

Mentor Graphics participated in the creation of the CAD Framework Initiative, which is investigating how open design automation environments might best be implemented.

OSF

Mentor Graphics became a member of the Open Software Foundation (OSF), which was founded by eight companies including Apollo, Digital, and IBM, and is dedicated to developing a UNIX-based open software environment. There are currently 26 member companies.

Minc Inc.

Mentor Graphics reached an agreement with Minc to incorporate its universal programmable logic device (PLD) synthesis tool into Mentor's board design and simulation environment. Under the terms of the five-year agreement, Mentor Graphics also has purchased the right to use Minc's PLD synthesis technology.

Tektronix

Mentor Graphics entered into a strategic alliance with Tektronix, a supplier of test and measurement instruments, to cooperate in the production of an integrated set of design and test products.

Test Systems Strategies

Mentor Graphics entered into a joint marketing agreement with Test Systems Strategies, Inc.

(TSSI) pursuant to which TSSI develops, manufactures, and markets interfaces between Mentor's Simulator and QuickFault products to a wide range of commercial integrated circuit and printed circuit board test systems.

MERGERS AND ACQUISITIONS

1989

Trimeter Technologies

Mentor Graphics acquired Trimeter Technologies, one of the three leading developers in the emerging logic synthesis field, for \$3 million cash plus royalties on future products. The combined design and analysis division will work to combine the capabilities of Trimeter's logic synthesis tools with Mentor's own PLD synthesis and VHSIC hardware description language (VHDL) tools.

1988

Tektronix

Mentor Graphics reached a \$5 million agreement with Tektronix to purchase its CASE business and certain CAE-related technologies. The CASE division offers products that create a structured design environment for the production of software. Mentor's CASE products are designed to operate on Digital Equipment Corporation's VAX and VAXstation computers well and on standard Apollo workstations. At the same time, Tektronix elected to exit the design automation business and agreed to work with Mentor to migrate its customers to Mentor Graphics products. Tektronix also

designated Mentor Graphics as a preferred vendor of design automation systems for use with Tektronix products.

Contour Design Systems

Mentor Graphics acquired Contour Design Systems, a leading supplier of analog component libraries and modeling technology. Mentor issued 75,000 shares of common stock in exchange for all outstanding shares of Contour.

KEY OFFICERS

Thomas H. Bruggere

Chairman of the board and chief executive officer

Gerald H. Langelier

President and chief operating officer

David C. Moffenbeier

Executive vice president

David L. Brinker

Vice president and general manager, Asia Pacific

Jean-Claude Caraes

Vice president and general manager, Europe

Frank J. Costa

Product group vice president

PRINCIPAL INVESTORS

Prudential Insurance of America—5.8 percent

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

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	\$91,862	\$157,761	\$176,348	\$191,677	\$224,020
Cash	37,428	74,160	81,494	26,152	52,377
Receivables	36,006	50,821	59,332	63,423	72,827
Inventory	16,108	29,139	28,867	23,318	20,587
Other Current Assets	2,320	3,641	6,655	78,784	78,229
Net Property, Plants	\$14,505	\$31,117	\$29,482	\$32,826	\$44,124
Other Assets	\$967	\$5,203	\$6,191	\$4,663	\$13,558
Total Assets	\$107,334	\$194,081	\$212,021	\$229,166	\$281,702
Total Current Liabilities	\$33,291	\$51,185	\$54,001	\$39,039	\$58,519
Long-Term Debt	\$2,798	\$2,784	\$2,789	\$2,603	\$1,474
Other Liabilities	0	0	0	0	0
Total Liabilities	\$36,089	\$53,969	\$56,790	\$41,642	\$59,993
Total Shareholders' Equity	\$71,245	\$140,112	\$155,231	\$187,524	\$221,709
Converted Preferred Stock	0	0	0	0	0
Common Stock	64,752	124,123	125,924	132,125	138,752
Other Equity	(685)	823	3,141	8,908	4,607
Retained Earnings	7,178	15,166	26,166	46,491	78,350
Total Liabilities and Shareholders' Equity	\$107,334	\$194,081	\$212,021	\$229,166	\$281,702
Income Statement	1984	1985	1986	1987	1988
Revenue	\$87,906	\$136,748	\$173,545	\$221,823	\$300,750
U.S. Revenue	74,840	90,328	105,542	125,741	161,314
Non-U.S. Revenue	13,066	46,420	68,003	96,082	139,436
Cost of Sales	\$51,656	\$78,598	\$96,470	\$109,146	\$134,443
R&D Expense	\$7,742	\$14,538	\$16,798	\$24,179	\$33,814
SG&A Expense	\$19,410	\$36,022	\$47,840	\$61,181	\$87,614
Capital Expense	\$10,446	\$22,537	\$10,200	\$14,696	\$31,205
Pretax Income	\$13,635	\$12,082	\$16,545	\$31,740	\$50,626
Pretax Margin (%)	15.51	8.84	9.53	14.31	16.83
Effective Tax Rate (%)	38.8	33.90	33.50	36.00	33.70
Net Income	\$9,888	\$7,989	\$11,000	\$20,325	\$33,540
Shares Outstanding, Thousands	13,882	15,496	16,370	16,981	17,445
Per Share Data					
Earnings	\$0.60	\$0.52	\$0.67	\$1.20	\$1.92
Dividends	0	0	0	0	\$0.10
Book Value	\$5.13	\$9.04	\$9.48	\$11.04	\$12.71

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

Key Financial Ratios	1984	1985	1986	1987	1988
<i>Liquidity</i>					
Current (Times)	2.76	3.08	3.27	4.91	3.83
Quick (Times)	2.28	2.51	2.73	4.31	3.48
Fixed Assets/Equity (%)	20.36	22.21	18.99	17.50	19.90
Current Liabilities/Equity (%)	46.73	36.53	34.79	20.82	26.39
Total Liabilities/Equity (%)	50.65	38.52	36.58	22.21	27.06
<i>Profitability (%)</i>					
Return on Assets	18.42	5.30	5.42	9.21	13.13
Return on Equity	27.76	7.56	7.45	11.86	16.39
Profit Margin	11.25	5.84	6.34	9.16	11.15
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	8.81	10.63	9.68	10.90	11.24
Capital Spending % of Revenue	11.88	16.48	5.88	6.63	10.38
Employees	500	777	900	1,200	1,700
Revenue (\$K)/Employee	\$175.81	\$175.99	\$192.83	\$184.85	\$176.91
Capital Spending % of Assets	9.73	11.61	4.81	6.41	11.08

Source: Mentor Graphics
 Corporation
 Annual Reports and
 Forms 10-K
 Dataquest
 January 1990

Company Backgrounder by Dataquest

Micro Dynamics, Ltd.

8555 Sixteenth Street, Seventh Floor

Silver Spring, Maryland 20910

Telephone: (301) 589-6300

Fax: (301) 589-3414

Dun's Number: Not Available

Date Founded: 1982

CORPORATE STRATEGIC DIRECTION

Micro Dynamics, Ltd., is a leading developer and vendor of midvolume document image management systems. The Company combines off-the-shelf hardware with its own multiuser software to provide complete, integrated solutions for managing information. Micro Dynamics holds the distinction of being the first provider of electronic image storage-and-retrieval systems based on the Apple Macintosh computer. In addition, the Micro Dynamics image system was the first and one of the few that incorporates optical character recognition (OCR) and full-text retrieval, thus providing access to documents both in digital image and searchable text formats.

Micro Dynamics relies on direct sales and on domestic and international marketing partners. The Company's target markets include the legal and pharmaceutical industries and Fortune 1000 companies.

Micro Dynamics has doubled in revenue and customers every year since its incorporation in 1985. The Company recently received its first venture capital investment from Safeguard Scientifics.

Financial statements are not included in this backgrounder because Micro Dynamics is a privately held corporation.

BUSINESS SEGMENT STRATEGIC DIRECTION

Micro Dynamics' Multi-User Archival and Retrieval System (MARS) first shipped in July 1987. The system combines off-the-shelf hardware in a variety

of networked configurations with Micro Dynamics software for image and document management. According to Dataquest, Micro Dynamics ranked fourth in 1989 worldwide shipments of midvolume document imaging systems. The Company shipped 6.5 percent of all midvolume systems.

The MD MARS Series 1000 is a basic system designed to support up to ten users. It combines Macintosh SEs as servers and workstations, scanners, a 5.25-inch write-once/read-many (WORM) drive for optical storage, an AppleTalk or Ethernet local area network (LAN), and the Access Management software to control file and system access. FreeForm text-retrieval software and an optical character reader are optional.

The MD MARS Series 3000 is an enhanced system designed to support up to 25 users. It combines Macintosh SEs and IIs as servers and workstations; large-screen, high-resolution monitors; high-speed scanning with a 50-sheet document feeder; a 12-inch WORM drive for optical storage; an AppleTalk or Ethernet LAN; and the Access Management software to control file and system access. FreeForm text-retrieval software and OCR capabilities are optional.

The MD MARS Series 4000 is a high-volume system designed to support up to 100 users. It combines the Macintosh II family of computers as servers and workstations; large-screen, high-resolution monitors; high-speed scanning with a 50-sheet document feeder; a 5.25-inch optical jukebox for optical storage; and an Ethernet LAN. FreeForm text-retrieval software and OCR capabilities are optional.

The MD MARS Series 5000 is a high-volume system designed to support hundreds of users. It combines the Macintosh II family of computers as servers and

workstations; large-screen, high-resolution monitors; high-speed scanning with a 50-sheet document feeder; a 12-inch WORM optical jukebox for optical storage; an Ethernet LAN; FreeForm full-text search-and-retrieval software; a Calera Recognition Server for OCR; and the Access Management software to control file and system access.

Recently added optional capabilities include support of 5.25-inch erasable magnetic optical disks and compatibility with scanners that enable MD MARS to accept both microfilm and X rays as digital images.

Since the introduction of MD MARS, Micro Dynamics has been closely identified with the Apple Macintosh. Currently Micro Dynamics is launching a development that will bring MD MARS to 386-based personal computers running Windows 3.0 and to Sun Microsystems' SPARCstations. This will make MD MARS available on three graphical interfaces for microcomputers.

Further Information

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

1989 SALES OFFICE LOCATIONS

North America—4

MANUFACTURING LOCATIONS

North America

Silver Spring, Maryland

SUBSIDIARIES

Micro Dynamics has no subsidiaries.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

Micro Dynamics has not participated in any mergers or acquisitions.

KEY OFFICERS

Audri Lanford

Chief executive officer and chairman

Jim Lanford

President and chief technical officer

John Bennison

Vice president, Software

Brian Stains

Vice president, Product Development

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

Microchip Technology, Inc.

Table 1

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

	<u>1987</u>	<u>1988</u>
Total Semiconductor	89	111
Total Integrated Circuit	89	111
Bipolar Digital (Function)		
Bipolar Digital Memory		
Bipolar Digital Logic		
MOS (Function)	89	111
MOS Memory	59	82
MOS Microdevices	19	18
MOS Logic	11	11
Analog		
Total Discrete		
Total Optoelectronic		

Table 2

**Microchip Technology, Inc.
1988 Worldwide Ranking by Semiconductor Markets
(Revenue in Millions of Dollars)**

	<u>1988 Rank</u>	<u>1987 Rank</u>	<u>1988 Revenue</u>	<u>Sales % Change 1987-1988</u>	<u>Industry % Change 1987-1988</u>
Total Semiconductor	54	53	\$111	24.7%	33.0%
Total Integrated Circuit	45	45	\$111	24.7%	37.4%
MOS (Function)	35	35	\$111	24.7%	54.5%
MOS Memory	26	21	82	39.0%	93.1%
MOS Microdevices	34	32	18	(5.3%)	39.9%
MOS Logic	60	56	11	0	29.2%

Source: Dataquest
December 1989

Microchip Technology, Inc.

Table 3

Microchip Technology, Inc.
Estimated 1988 Semiconductor Revenue by Geographic Region
(Millions of Dollars)

	<u>U.S.</u>	<u>Japan</u>	<u>Europe</u>	<u>ROW</u>
Total Semiconductor	\$59	\$8	\$12	\$32
Total Integrated Circuit	\$59	\$8	\$12	\$32
Bipolar Digital (Function)				
Bipolar Digital Memory				
Bipolar Digital Logic				
MOS (Function)	\$59	\$8	\$12	\$32
MOS Memory	48	7	5	22
MOS Microdevices	10		4	4
MOS Logic	1	1	3	6
Analog				
Total Discrete				
Total Optoelectronic				

Source: Dataquest
December 1989

Micro-Image Technology Ltd.

OVERVIEW

Micro-Image Technology (MIT) Ltd. is a wholly owned subsidiary of the British company Laporte Industries PLC, one of the world's leading manufacturers of specialist chemicals. Acquired by Laporte in 1983, MIT is part of the parent company's Electronic Products and Services (LEPS) Division.

MIT was founded in 1972 by a group of wafer processing engineers to provide a high-technology range of materials for the manufacture of what was becoming increasingly complex silicon integrated circuits. As a result of its recognition of the importance of ultrapure chemicals in improving yield in wafer fabrication, MIT became the first company to manufacture low-particulate chemicals. The Company is now at the core of the LEPS Division, forming the Micro-Image Technology Group. This group includes Countdown Clean Systems Ltd., a company founded in 1978 to provide clean-room garments and accessories.

The products and services provided by these two companies have in the past two years been further augmented by the introduction of a high-efficiency clean air filtration system manufactured in the United Kingdom under license from Flanders Filters Inc. of the United States. Wafer reclamation has also been added through the 1984 acquisition by the LEPS Division of Exsil Inc. of San Jose, California, which is the leading silicon wafer reclamation operation in the United States. The technology was subsequently transferred to the United Kingdom, where a \$1.3 million facility was opened in late 1985.

In Western Europe, the Micro-Image Technology Group has continued its growth with the LEPS Division recently acquiring Soprelec SA in France and MIT Halbleiterchemie GmbH in West Germany. As a result of these expansions and acquisitions, Laporte's electronic interests have grown fourfold since the initial acquisition of Micro-Image Technology Ltd. in 1983.

Thus the group, which still has the original Company as its central component, is as a result of the activities of the past few years now able to offer to semiconductor manufacturers in Western Europe a wide range of products and services to give total control over wafer processing. These include the following:

- Low-particulate chemicals
- Air-filtration products
- Clean-room garments and related products and services

Micro-Image Technology Ltd.

- Wafer-handling accessories
- Wafer reclamation
- Technical training courses in wafer fabrication

OPERATIONS

The operations of the Micro-Image Technology Group come within the Electronic Products and Services Division of Laporte Industries PLC, which has headquarters at Hanover House, Hanover Square, London.

The headquarters of the Micro-Age Technology Group, which houses administration, sales, manufacturing facilities, and warehousing, is located in modern premises at Greenhill Industrial Estate, Riddings, Derbyshire, in the United Kingdom. The site comprises four main manufacturing units varying in size from 10,000 square feet to 25,000 square feet.

The Company, which employs some 160 persons, manufactures and distributes from this site the following products:

- Low-particulate chemicals, including photoresists, with the recent addition in March 1986 of the new range of SPECTRUM photoresists
- Flanders filtration products
- Wafer-handling accessories
- Reclaimed silicon wafers employing the recently opened purpose-designed plant using Exsil technology (The plant has an output of 1,000 wafers a day and employs 12 people.)

Countdown Clean Systems Ltd., which is opening new facilities in 1986, also operates from Riddings and provides the following products:

- Clean-room garments (coveralls, hoods, face masks, overshoes, gloves, and wipes)
- Specialized cleaning service

To meet the increasing demand for the Group's products and services in Scotland, two facilities have been opened at Livingston and East Kilbride; these facilities stock a comprehensive range of products on a 24-hour response basis.

Micro-Image Technology Ltd.

In Western Europe, the Group's products are manufactured and supplied by these affiliated companies:

- France--Soprelec SA at Bonfoufle, near Paris
- West Germany--MIT Halbleiterchemie GmbH at Solingen, near Dusseldorf

FINANCIAL

Detailed financial information on the Micro-Image Technology Group is not available, as figures for the group are consolidated into the parent company's accounts.

The scale of operation of Laporte Industries is given in Table 1 for fiscal years ending December 29, 1983 through 1985.

Table 1

Laporte Industries
WORLDWIDE SALES REVENUE AND PROFIT
(Millions of U.S. Dollars)

	<u>1985</u>	<u>1984</u>	<u>1983</u>
Turnover	\$465	\$474	\$439
Profit Before Tax	\$ 72	\$ 63	\$ 46
Rate of Exchange £ Sterling per U.S. Dollar	0.77	0.75	0.66

Source: Laporte Industries PLC
Annual Reports 1985

Table 2 gives turnover figures for the two operating companies in the group during the same period.

Micro-Image Technology Ltd.

Table 2

Micro-Image Technology Group
SALES REVENUE
(Millions of U.S. Dollars)

	<u>1985</u>	<u>1984</u>	<u>1983</u>
Micro-Image Technology Ltd.	\$5.7	\$5.0	\$4.4
Countdown Clean Systems Ltd.	<u>1.7</u>	<u>1.3</u>	<u>0.8</u>
Total	\$7.4	\$6.3	\$5.2
Rate of Exchange			
£ Sterling per U.S. Dollar	0.77	0.75	0.66

Source: Micro-Image Technology Ltd.

While the sales of the group are small in relation to those of the parent company, the figures in Table 2 reveal that in 1983 these group sales represented 1.2 percent of the total, in 1984 1.3 percent, and in 1985 1.6 percent--a steadily improving trend. This is particularly noticeable when comparing the figures for 1985 with those for 1984, where the parent company experienced a fall in turnover of nearly 2 percent while turnover of the group rose 17 percent. Indeed, the figures in Table 2 reveal that the group is weathering the sharp recession experienced by the semiconductor industry during these two years very well.

Dataquest estimates that the group's share of the market for wet chemicals (excluding photoresists) supplied to the semiconductor industry in Western Europe has grown from about 28 percent in 1983 to 35 percent in 1985.

RESEARCH AND DEVELOPMENT

Laporte Industries and, in turn, the Micro-Image Technology Group has a high commitment to research and development (R&D) in terms of product and process development and application research. Major research projects are carried out at Widnes, Cheshire, which houses the parent company's research center employing some 200 personnel.

Micro-Image Technology Ltd.

R&D for the Micro-Image Technology Group is principally carried out at the Riddings site, with back-up facilities from Widnes. In total, the number of R&D personnel available for any project can number up to 20 persons. The R&D facilities include modern laboratories employing the very latest technology to simulate wafer processing techniques used by the Company's customers.

A number of licensing arrangements are in existence, including an exclusive manufacturing license and distribution agreement covering Europe for Flanders Filters in North Carolina in the United States. There are also marketing agreements with Eastman Kodak covering photoresists; Tau Laboratories for Tau pellicles; Compugraphics, Scotland, for resolution masks; Actinic Spectra Inc. of the United States for UV lamps; and H Square Corporation of Sunnyvale, California, in the United States, for vacuum wands and other wafer-handling equipment.

PRODUCTS

Low Particulate Chemicals

The Company produces a wide range of low-particulate chemicals, photoresists, and related products for large-scale integrated circuit processing. Table 3 gives the new particle classifications that apply to the Company's products. Each chemical is specified to contain a maximum particle concentration equivalent to one of the Microclass distributions shown in the table, using only counts performed with Hiac:Royco equipment.

Micro-Image Technology Ltd.

Table 3

PARTICLE CLASSIFICATIONS

<u>Classification</u>	Particle concentration per 10ml sample of given particle size					
	<u>0.5</u>	<u>1.0</u>	<u>2.0</u>	<u>5.0</u>	<u>10.0</u>	<u>15.0</u>
Microclass						
A	3,000	640	170	25	6.0	2.5
B	2,000	500	120	16	4.0	1.7
C	1,500	300	70	10	2.5	1.0
D	500	120	30	5	1.0	0.5
ASTM F312/NAV-AIR						
Class 0	34,000*	8,000*	1,900*	348	78	32

*These figures are extrapolations.

Source: Micro-Image Technology Ltd.

The following is a list of the Company's principal products, all of which are manufactured to conform on particle count to Class 0 (ASTM F-312):

- Isoclean acids and other chemicals

- | | |
|-----------------------------------|--|
| - Acetic Acid (Glacial) | - Hydrofluoric Acid
48 percent |
| - Ammonium Fluoride
40 percent | - Hydrogen Peroxide
30 percent |
| - Ammonia Solution | - Nitric Acid 70 percent
and Fuming |
| - Hydrochloric Acid
36 percent | - Orthophosphoric Acid
90 percent |
| - Hexamethyldisilazane | - Sulphuric Acid 98 percent,
96 percent |

Micro-Image Technology Ltd.

- Isoclean solvents

- | | |
|---------------------|----------------------|
| - Acetone | - n-Butyl Acetate |
| - n-Butyl Acetate | - Toluene |
| - Ethyl Acetate | - Trichloroethan III |
| - Ethylene Glycol | - Trichloroethylene |
| - Isopropyl Alcohol | - Xylene |
| - Methanol | |

- Isoform etchants

- | | |
|---------------------------------------|--|
| - Silicon Dioxide Etch | - Silox Glass Etch
(50:50:50) and (50:50) |
| - Aluminium Etch | - Fast Polysilicon Etch |
| - Chromium Etch | - Polysilicon Etch
(50:20:1) and (200:1) |
| - Silicon Etch (5:2:2) | - Contact Etch (10:1) |
| - Silicon Etch (6:1:1)
and (5:2:2) | |

More recently, the Company has introduced a new range of NANO-CLEAN-grade chemicals for higher yield in megabit-scale integration with particle concentrations conforming to the following microclasses as measured by Hiac:Royco 4100 particle counter with 346-BCL laser sensor:

- Microclass A

- | | |
|----------------------------------|------------------------------|
| - Acetone | - Nitric Acid 70 percent |
| - Ammonia Solution
35 percent | - Phosphoric Acid 85 percent |

- Microclass B

- | | |
|-----------------------------------|-----------------------------------|
| - Acetic Acid (Glacial) | - Hydrogen Peroxide
30 percent |
| - Ammonium Fluoride
40 percent | - Sulphuric Acid 98 percent |
| - Hydrochloric Acid
36 percent | |

Micro-Image Technology Ltd.

- Microclass C
 - n-Butyl Acetate
 - Isopropyl Alcohol
 - Methanol
 - Trichloroethane III
 - Trichloroethylene
 - Xylene
- Microclass D
 - Hydrofluoric Acid 48 percent

The Company also sells a range of analytic-reagent-grade chemicals, proprietary cleaning agents, mask coating and release agents, and deionized water.

Photoresists

The Company markets a number of negative and positive photoresists under the names Isopoly and Isofine. These are manufactured by Kodak and further refined and quality tested by the Company. Associated products include developers, thinners, and rinses.

The Isopoly range comprises the K-747 and MR series, both available in a number of viscosities, the former from 110-30 cps and the latter from 450 cps to 10 cps.

The Isofine range consists of the Electronic Beam Resist P5, especially designed to meet the critical geometry requirements of mask and reticle manufacturers involved in the advanced IC industry, and the K820 for LSI and VLSI circuit fabrication.

In conjunction with these high-purity products, the Company has recently introduced its MICROGUARD automatic chemical supply system. This system, which incorporates three components unique to Micro-Image Technology, provides a fully automated chemical supply direct to point of use from drums situated outside the clean room. Thus etch baths and automatic wafer processing equipment can now be replenished with high-purity, low-particulate chemicals from control consoles in the clean room itself.

Micro-Image Technology Ltd.

Spectrum Mega Positive Photoresists

This is a new range of photoresists, manufactured by the Company in the United Kingdom since March 1986. At present, there are three resists in the range, all based on safe solvent formulations:

- MEGA 1--A general-purpose product
- MEGA 2--A specialized resist for use on topography such as polysilicon or metal layers
- MEGA 3--A specialized resist for use in high-temperature applications where high-resolution is required (This resist is particularly useful as an etch mask for aluminium, silicon, and copper alloy substrates.)

Air Filtration Products

These products are manufactured by MIT under license in the United Kingdom from Flanders Filters Inc., the U.S. leader in this activity. The Company offers a complete service in Flanders VLSI Filters for VLSI production clean rooms to give Class 10 in critical areas using HEPA filters and Flanders CHANNEL-CEIL grid to give a Class 10 (0.12 microns) clean room ceiling. (Flanders VLSI and CHANNEL-CEIL are registered trademarks of Flanders Filters Inc.)

Accessories

The Company offers the following accessories:

- Vacuum wands and wafer-handling equipment
- Tau Pellicles--Coated and uncoated, adhesive type and frame types
- U.V. actinic spectra lamps
- MIT resolution mask
- Tweezers

Clean Room Products

The Company offers the following clean-room products:

- Gloves and wipes
- Entry mats and lockers

Micro-Image Technology Ltd.

- Headwear and footwear
- Coveralls
- Paper products
- Static control systems

Wafer Reclamation

The Company offers a service using the Exsil process to produce reclaimed silicon wafers from which all traces of foreign materials and process dopants are entirely removed from all wafer surfaces regardless of wafer thickness or orientation.

Wafers of all commercial diameters from 3 inches to 6 inches can be processed to the same SEMI standards of surface finish, surface cleanliness, and freedom from particulate contamination as prime wafers. The detailed specifications relating to individual customers' recycled wafers from Exsil are usually prenegotiated with the customers to ensure maximum possible yield up to customers' accepted standards.

OUTLOOK

Today, the Micro-Image Technology Group, occupies a strong market position in Western Europe across a broad range of products and services used in the manufacture of ICs. It allows IC manufacturers to achieve higher device yields and better reliability through improved contamination control.

The group views the future with confidence and is alert to the challenges posed by the emergence of dry technologies in the manufacture of complex ICs. The group sees a continuing expansion of its activities, not only geographically but in the range of products and services offered, with positive photoresists and silicon wafer reclamation viewed as being particularly promising areas of growth.

Micropolis Corporation

21211 Nordhoff Street
Chatsworth, California 91311
Telephone: (818) 709-3300
Fax: (818) 709-3396
Dun's Number: 08-301-0066

Date Founded: 1976

CORPORATE STRATEGIC DIRECTION

Micropolis Corporation designs and manufactures high-performance Winchester disk drives and markets these drives to original equipment manufacturers (OEMs). OEMs incorporate these drives into high-performance micro- and minicomputer systems for single- and multiuser applications, including computer-aided design (CAD), professional workstations, and local area networks (LANs). Micropolis' mission is "to provide its OEM customers with high-performance disk drives that will enable them to compete and win in the world market for their products."

The turmoil in the disk drive industry has greatly affected Micropolis' ability to remain competitive. Micropolis miscalculated the market in 1988, which made it vulnerable to excessive price competition and overproduction. The inaccurate market projection and subsequent overproduction reduced cash flow and threatened the Company's ability to invest in new technology.

Although Micropolis is committed to world leadership in the high-performance, high-capacity Winchester disk drive market, the price competition is extremely intense, with a few key companies dominating the market. One market segment that offers opportunity is that of computer systems that require small, powerful disk drives. However, the opportunity in the OEM segment is becoming even more uncertain as OEM customers begin making their own drives and Japanese companies become more active. Customers today are demanding greater storage capacity at high-quality standards, and several companies are providing these products.

Micropolis' net sales increased 22 percent to \$353 million* in fiscal 1988. Strong sales of the

1550/70 Series 380MB, 5.25-inch Winchester disk drives offset declining sales of the mature 1320/30 Series 85MB drive. Increased sales of the 1350/70 Series 170MB drives over those of the prior year accounted for the remaining increase in total sales. Seagate reduced the price of 80 to 85MB drives from \$700 to \$450 in 1988, severely damaging Micropolis' profitability.

Despite the increase in net sales, the Company's net income declined from \$27 million to a net loss of \$19 million during fiscal 1988.

For fiscal 1988, Micropolis' cost of sales increased to 92 percent of sales from 75 percent in prior years, primarily due to large sales costs for the 1550/70 Series drives and price competition for the 1320/30 Series. As mentioned above, the Company's overproduction swelled inventories and adversely affected cash flow.

Micropolis' R&D spending is concentrated on increasing the capacity and improving the access speed of its Winchester drives and on downsizing them. Fiscal 1988 R&D expenses, 8 percent of sales, increased over 1987 due to support for the advanced versions of the 1500 Series and new 1600 Series drives. In order to keep product costs down, every effort has been made to use low-cost heads and media to their technological limit. This engineering effort has often slowed production schedules, resulting in the loss of one full year of development time, but has kept profits maximized.

In November 1988, Micropolis announced layoffs as part of its plan to transfer drive production to the Far East while limiting U.S. operations to R&D and marketing functions.

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

As of February 1989, Micropolis employed about 3,200 persons, including 240 in engineering, 2,797 in manufacturing, 105 in marketing, and 56 in general management and administration.

For fiscal 1988, non-U.S. revenue accounted for 70 percent of sales.

On January 30, 1989, a class action lawsuit was filed against Micropolis and certain of its executive officers and directors, alleging violations of the Securities Exchange Act of 1934 and Rule 10b-5 thereunder, common law fraud, and negligent misrepresentation. The complaint contends that the market value of the Company's stock was artificially inflated as a result of omissions and misstatements of material facts about its business and financial results. No specific amount of damages has been claimed, and Micropolis intends to defend vigorously against the allegations. Management believes that the lawsuit is without merit and will have no material adverse effect upon the Company's financial position.

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 Drives

Micropolis ranked fifth among the 5.25-inch disk drive manufacturers for 1988. It offers a full line of 5.25-inch half- and full-height disk drives with capacities between 85 and 1,200MB. Micropolis' principal products are its 1320, 1350, 1370, 1550, 1570, 1650, and 1670 Series 5.25-inch Winchester drives.

The 1320 Series drives have up to 85MB capacity and employ the ST-506 interface. The 1350 Series has capacity up to 170MB and uses the enhanced small

device interface (ESDI). The 1370 Series is similar to the 1350 but uses the small computer system interface (SCSI). The 1550 Series has capacity up to 382MB and uses ESDI. The 1570 Series is similar to the 1550 but uses SCSI.

The 1650 Series of half-high drives has up to 180MB capacity and uses ESDI. The 1670 Series is similar to the 1650 but uses SCSI. The standard mix of ST-506, ESDI, AT, and SCSI interfaces are available, and the Micropolis SCSI is mature and well respected in the OEM industry.

In 1988, Micropolis announced a belated entry into the 3.5-inch disk drive marketplace with its 1700 Series with up to 380MB capacity. This product line subsequently has been removed from the market.

At Comdex 1988, Micropolis announced a series of 3.5-inch drives with capacities between 112 and 202MB.

In October 1988, Micropolis dropped its small disk array product because of poor response within the OEM market. Micropolis proved that the technology was possible, but system integrators wanted to put together their own subsystems and not buy an assembled product.

At Comdex 1989 in Las Vegas, Micropolis introduced the 1528 full-height drive. The 1528 has an unformatted capacity of 1.6 gigabytes (1,600MB) and an average access time of 14 milliseconds.

Further Information

For further information on the Company's business segment, please contact the appropriate industry services.

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

	1984	1985	1986	1987	1988
Five-Year Revenue	\$60	\$95	\$213	\$288	\$353
Percent Change	-	58.17	124.55	35.24	22.48
Capital Expenditure	\$7	\$8	\$16	\$22	\$64
Percent of Revenue	11.67	8.43	7.51	7.63	18.13
R&D Expenditure	\$4	\$5	\$11	\$22	\$28
Percent of Revenue	6.67	5.27	5.26	7.56	8.05
Number of Employees	N/A	N/A	N/A	2,385	3,120
Revenue (\$K)/Employee	N/A	N/A	N/A	\$0.12	\$0.11
Net Income	\$1	\$3	\$18	\$27	(\$19)
Percent Change	-	250.00	553.57	48.63	(171.32)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$80.63	\$79.28	\$66.50	N/A	
Quarterly Profit	N/A	N/A	N/A	N/A	

Source: Micropolis 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	100.00	84.00	30.00	31.00
International	0	0	16.00	70.00	69.00

Source: Micropolis Corporation
Annual Reports and
Forms 10-K

Table 3
Revenue by Distribution Channel (Percent)

Channel	1987	1988
Direct Sales	0	0
Indirect Sales	100.00	100.00
OEMs	70.00	70.00
Retail Distributors	30.00	30.00

Source: Dataquest
January 1990

1988 SALES OFFICE LOCATIONS

North America—6
Europe—4

MANUFACTURING LOCATIONS

North America

Chatsworth, California
Drive production

Asia/Pacific

Singapore
Full disk drive production
Bangkok, Thailand
Disk drive subassemblies

SUBSIDIARIES

North America

Micropolis Inc. (United States, Virgin Islands)
Micropolis Limited (United States)

Europe

Micropolis GmbH (Germany)
Micropolis S.A.R.L. (Europe)
Micropolis Scandinavia (Scandinavia)

Asia/Pacific

Micropolis Corp. Thailand Ltd. (Thailand)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Digital Equipment

Micropolis is supplying disk drives for Digital's new fleet of desktop computers. Digital has named Micropolis as the supplier of full-height 5.25-inch 380MB drives for the new machines.

1988

Sun Microsystems

Micropolis is the primary source for the 380MB class of 5.25-inch hard disk drives offered with the Sun-4/110 workstation.

KEY OFFICERS

Stuart P. Mabon
President

Chester Baffa
Senior vice president, Marketing and Sales

Ericson M. Dunstan
Senior vice president, Corporate Engineering

Dundas I. Flaherty
Senior vice president, Finance, and chief financial officer

Eugene F. Hovanec
Vice president and controller

PRINCIPAL INVESTORS

Windsor Funds, Inc.—8.3 percent
Kemper Financial Services—5 percent
Wellington Management/Thorndike—5 percent

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

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	\$54	\$61	\$106	\$221	\$209
Cash	20	22	38	101	15
Receivables	15	22	38	60	74
Inventory	19	17	27	52	112
Other Current Assets	1	1	3	8	8
Net Property, Plants	\$13	\$18	\$26	\$39	\$89
Other Assets	\$0.10	\$0.10	\$1	\$3	\$2
Total Assets	\$67	\$79	\$133	\$263	\$300
Total Current Liabilities	\$7	\$14	\$22	\$45	\$98
Long-Term Debt	0	0	0	\$75	\$75
Other Liabilities	\$0.30	\$1	\$0.40	\$5	\$6
Total Liabilities	\$7	\$15	\$22	\$125	\$179
Total Shareholders' Equity	\$60	\$64	\$111	\$138	\$121
Common Stock	9	10	11	11	11
Other Equity	46	46	73	74	76
Retained Earnings	5	8	27	53	34
Total Liabilities and Shareholders' Equity	\$67	\$79	\$133	\$263	\$300
Income Statement	1984	1985	1986	1987	1988
Revenue	\$60	\$95	\$213	\$288	\$353
U.S. Revenue	60	95	179	87	109
Non-U.S. Revenue	0	0	35	201	244
Cost of Sales	\$51	\$80	\$161	\$218	\$325
R&D Expense	\$4	\$5	\$11	\$22	\$28
SG&A Expense	\$7	\$8	\$11	\$14	\$18
Capital Expense	\$7	\$8	\$16	\$22	\$64
Pretax Income	\$1	\$4	\$32	\$36	(\$20)
Pretax Margin (%)	1.17	3.79	15.20	12.60	(5.69)
Effective Tax Rate (%)	N/A	22.00	44.00	25.00	N/A
Net Income	\$1	\$3	\$18	\$27	(\$19)
Shares Outstanding, Millions	9.3	9.4	10.6	11.3	11.5
Per Share Data					
Earnings	\$0.10	\$0.30	\$1.72	\$2.40	(\$1.69)
Dividends	0	0	0	0	0
Book Value	\$6.45	\$6.81	\$10.47	\$12.21	\$10.52

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

Key Financial Ratios	1984	1985	1986	1987	1988
<i>Liquidity</i>					
Current (Times)	7.76	4.35	4.82	4.90	2.13
Quick (Times)	5.04	3.17	3.59	3.74	0.99
Fixed Assets/Equity (%)	21.67	28.13	23.42	28.26	73.55
Current Liabilities/Equity (%)	11.67	21.88	19.82	32.61	80.99
Total Liabilities/Equity (%)	12.17	23.75	20.18	90.58	147.93
<i>Profitability (%)</i>					
Return on Assets	-	3.83	17.30	13.77	(6.90)
Return on Equity	-	4.52	20.91	21.85	(14.98)
Profit Margin	1.33	2.95	8.59	9.44	(5.50)
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	6.67	5.27	5.26	7.56	8.05
Capital Spending % of Revenue	11.67	8.43	7.51	7.63	18.13
Employees	N/A	N/A	N/A	2,385	3,120
Revenue (\$K)/Employee	N/A	N/A	N/A	\$0.12	\$0.11
Capital Spending % of Assets	10.39	10.13	12.07	8.38	21.33

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

Microsoft Corporation

16011 NE 36th Way

Box 97017

Redmond, Washington 98073-9717

Telephone: (206)882-8080

Fax: (206)883-8101

Dun's Number: 08-146-6849

Date Founded: 1974

CORPORATE STRATEGIC DIRECTION

Microsoft Corporation is the leading software manufacturing company. In fact, in 1988, Microsoft captured 33 percent of the personal computer software industry market share.

The Company has grown rapidly for three years. Its total revenue increased 36 percent to \$803.5 million* in fiscal 1989, from \$590.8 million in fiscal 1988. Net income increased 38 percent to \$170.6 million in fiscal 1989 from \$124.0 million in fiscal 1988. Microsoft has grown from fewer than 1,000 employees in 1985 to 4,000 employees in 1989.

The U.S. sales contribution to the total revenue grew to \$519.1 million in fiscal 1989. U.S. sales accounted for 65 percent of total sales, down from 68 percent in fiscal 1988.

Research and development expenditures totaled \$110.2 million in fiscal 1989, representing 14 percent of revenue. Much of this is dedicated to OS/2 software. Capital spending totaled \$89.3 million in fiscal 1989, representing 11 percent of revenue. The high capital expense is because of the new buildings being built on the corporate campus to accommodate the Company's fast growth.

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

Microsoft's product line is a mixture of system, development, and application software. The Company is the market leader in system and development software, and is very successful in producing and distributing many types of PC software products on multiple hardware platforms. In the application market, the Company's products include Word and Excel. Microsoft faces competition in four main areas: word processing, spreadsheets, windows, and graphics software.

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	\$140,417	\$197,514	\$345,890	\$590,827	\$803,530
Percent Change	-	40.66	75.12	70.81	36.00
Capital Expenditure	\$6,576	\$14,108	\$58,017	\$71,642	\$89,362
Percent of Revenue	4.68	7.14	16.77	12.13	11.12
R&D Expenditure	\$17,108	\$20,523	\$38,076	\$69,776	\$110,220
Percent of Revenue	12.18	10.39	11.01	11.81	13.72
Number of Employees	910	1,153	1,816	2,793	4,000
Revenue (\$K)/Employee	\$154.30	\$171.30	\$190.47	\$211.54	\$200.88
Net Income	\$24,101	\$39,254	\$71,878	\$123,908	\$170,538
Percent Change	-	62.87	83.11	72.39	37.63
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$197.02	\$220.23	\$235.16	N/A	
Quarterly Profit	41.12	45.35	49.59	N/A	

N/A = Not Available

Source: Microsoft Corporation
Annual Reports and
Forms 10-K

Table 2
Revenue by Geographic Region (Percent)

	1985	1986	1987	1988	1989
North America	88.15	81.66	73.03	67.56	64.59
International	11.85	18.34	26.97	32.44	35.41
Europe	10.02	14.22	19.75	24.51	26.39
Other	1.83	4.12	7.22	7.93	9.02

Source: Microsoft Corporation
Annual Reports and
Forms 10-K

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	0	0
Indirect Sales	100	100
Domestic OEMs	17	14
Domestic Retail	32	29
International OEMs	14	18
International Retail	34	37
Microsoft Press/Other	3	2

Source: Microsoft Corporation
Annual Reports and
Forms 10-K

1988 SALES OFFICE LOCATIONS

North America—12

MANUFACTURING LOCATIONS

North America

Snohomish County, Washington
Duplication of diskettes

Europe

Dublin, Ireland
Duplication of diskettes

SUBSIDIARIES

North America

Forethought Inc. (United States)
Microsoft Acquisition Corporation (United States)
Microsoft Canada Inc. (Canada)
Microsoft (Cayman) Inc. (United States)
Microsoft Company, Limited (United States)
Microsoft Disc Corporation (United States)
Microsoft FSC Corporation (United States)
Microsoft Ltd. (United States)

Europe

Microsoft AB (Sweden)
Microsoft BV (Netherlands)
Microsoft GmbH (West Germany)
Microsoft International BV (Netherlands)
Microsoft SARL (France)
Microsoft S.p.A. (Italy)
Microsoft SRL (Italy)

Asia/Pacific

Microsoft Pty. Limited (Australia)
Microsoft Taiwan (Taiwan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

IBM

IBM and Microsoft formed an alliance to create new IBM hardware and software that will lead to a multimedia home computer. Intel and IBM will work together to create chips, circuit boards, and software to turn IBM's PS/2 computers into multimedia computers. The companies want to create a home computer for the 1990s that offers television-quality video and compact disc-quality sound.

NCR

NCR Corporation announced its intention to extend its NCR license for Microsoft's work group products to include SQL Server and Communications Server. NCR previously licensed Microsoft LAN Manager, the network operating system for OS/2 and MS-DOS workstations. NCR, a leading vendor of personal computers, is the first PC hardware company to license the complete line of Microsoft work group products.

The Santa Cruz Operation

Microsoft has purchased a minority interest in The Santa Cruz Operation, a leading developer and publisher of UNIX system software. The Santa Cruz Operation uses technology licensed from Microsoft.

1988

Ashton-Tate

In 1988, Microsoft and Ashton-Tate announced that a Microsoft-enhanced version of the SQL Server would be marketed by the two companies. Ashton-Tate will be marketing the Microsoft SQL Server through its retail channels and Microsoft will be marketing the product through its OEM channel. The Microsoft SQL Server supports the Structured Query Language, the most commonly used language for application program communication with relational databases.

Philips and Sony

Microsoft reached an agreement with Philips and Sony to jointly develop an extended CD-ROM format called CD-ROM Extended Architecture.

This format is designed to allow the wide use and application of interactive data and information such as audio, still-image video, animation, graphics, and computer programming.

EISA

Microsoft is one of several companies participating in an industry alliance to support a major advance in the Industry Standard Architecture (ISA) used by the majority of PC manufacturers. The advance, called Extended Industry Standard Architecture (EISA), provides a 32-bit extension to the present 8- and 16-bit industry-standard expansion bus.

1987

3COM

Microsoft entered into a strategic relationship with 3Com to codevelop and jointly market the Microsoft OS/2 LAN Manager.

AT&T

Microsoft announced an agreement to develop for AT&T a new version of UNIX for the 80386 that will combine the features of Xenix and AT&T's System V technology. As part of the agreement, AT&T licensed UNIX for the first time. Microsoft delivered the merged Xenix/UNIX 386 product to AT&T during 1988.

Hewlett-Packard

Microsoft announced an alliance with Hewlett-Packard and Aldus Corporation to promote a Microsoft Windows-based solution for the desktop publishing market for machines running the MS-DOS operating system.

Olivetti

Microsoft announced a joint venture with Olivetti and SEAT (Societa Elenchi Ufficiali Degli Abbonati Al Telefono P.A.) to form a new company, Eikon Corporation. Eikon will provide a focus for the design, development, production, and marketing of CD-ROM products for the European market.

MERGERS AND ACQUISITIONS

1987

Forethought

Microsoft added to its Macintosh line by acquiring Forethought, Inc., the California software firm that developed PowerPoint, a desktop presentation program for the Macintosh. Forethought became the Microsoft Graphics Business Unit.

KEY OFFICERS

William H. Gates

Chairman of the board and chief executive officer

Jon A. Shirley

President and chief operating officer

Scott D. Oki

Senior vice president, Sales and Marketing

Steven A. Ballmer

Senior vice president, Systems Software

Jeremy Butler

Senior vice president, International Operations

PRINCIPAL INVESTORS

William H. Gates—38.1 percent

Paul G. Allen—18.6 percent

Steven A. Ballmer—5.9 percent

Table 4
Comprehensive Financial Statement
Fiscal Year Ending June 30
(Thousands of U.S. Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$52,066	\$147,980	\$213,002	\$345,348	\$468,949
Cash	18,948	102,676	132,484	183,225	300,791
Receivables	25,273	34,499	55,131	93,602	111,180
Inventory	5,919	8,008	16,555	53,542	37,755
Other Current Assets	1,926	2,797	8,832	14,979	19,223
Net Property, Plants	\$11,190	\$19,544	\$70,010	\$130,108	\$198,825
Other Assets	\$1,808	\$3,215	\$4,742	\$17,563	\$52,824
Total Assets	\$65,064	\$170,739	\$287,754	\$493,019	\$720,598
Total Current Liabilities	\$10,624	\$29,528	\$48,649	\$117,521	\$158,818
Long-Term Debt	0	\$1,879	0	0	0
Total Liabilities	\$10,624	\$31,407	\$48,649	\$117,521	\$158,818
Total Shareholders' Equity	\$54,440	\$139,332	\$239,105	\$375,498	\$561,780
Converted Preferred Stock	5	0	0	0	0
Common Stock	22	51	53	54	55
Paid-In Capital	4,439	50,767	76,811	90,046	110,425
Retained Earnings	49,974	89,228	161,106	285,014	455,552
Translation Adjustment	(714)	1,135	384	(4,252)	
Total Liabilities and Shareholders' Equity	\$65,064	\$170,739	\$287,754	\$493,019	\$720,598
Income Statement	1985	1986	1987	1988	1989
Revenue	\$140,417	\$197,514	\$345,890	\$590,827	\$803,530
U.S. Revenue	123,777	161,287	252,623	399,128	519,056
Non-U.S. Revenue	16,640	36,227	93,267	191,699	284,474
Cost of Sales	\$30,447	\$40,862	\$73,854	\$148,000	\$204,185
R&D Expense	\$17,108	\$20,523	\$38,076	\$69,776	\$110,220
SG&A Expense	\$51,955	\$75,223	\$107,073	\$185,604	\$246,895
Capital Expense	\$6,576	\$14,108	\$58,017	\$71,642	\$89,362
Pretax Income	\$42,823	\$65,984	\$121,338	\$183,738	\$250,796
Pretax Margin (%)	30.50	33.41	35.08	31.10	31.21
Effective Tax Rate (%)	43.70	40.50	40.80	32.60	32.00
Net Income	\$24,101	\$39,254	\$71,878	\$123,908	\$170,538
Shares Outstanding, Thousands	43,066	51,040	52,713	53,663	56,245
Per Share Data					
Earnings	\$0.52	\$0.78	\$1.30	\$2.22	\$3.03
Dividends	0	0	0	0	0
Book Value	\$1.26	\$2.73	\$4.54	\$7.00	\$12.64

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending June 30
(Thousands of U.S. Dollars, except Per Share Data)

Key Financial Ratio	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	4.90	5.01	4.38	2.94	2.95
Quick (Times)	4.34	4.74	4.04	2.48	2.72
<i>Profitability (%)</i>					
Return on Assets	42.80	31.40	31.70	31.74	28.10
Return on Equity	56.61	40.50	38.00	40.30	36.39
Profit Margin	17.16	19.87	20.78	20.97	21.22
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	12.18	10.39	11.01	11.81	13.72
Capital Spending % of Revenue	4.68	7.14	16.77	12.13	11.12
Employees	910	1,153	1,816	2,793	4,000
Revenue (\$K)/Employee	\$154.30	\$171.30	\$190.47	\$211.54	\$200.88
Capital Spending % of Assets	10.11	8.26	20.16	14.53	12.40

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

Micron Technology, Inc.

2805 E. Columbia Road
Boise, Idaho 83706
Telephone: (208) 383-4000
Fax: (208) 343-2536
Dun's Number: 09-312-0871

Date Founded: 1978

CORPORATE STRATEGIC DIRECTION

Micron Technology, Inc., was established in 1978 and incorporated in 1984. Micron designs, manufactures, and markets semiconductor memory components and board-level products used primarily in computer applications. Its concentration is in five specific areas: DRAMs, VRAMs, SRAMs, modules, and memory enhancement products for personal computers and workstations. Micron is one of the only three U.S. manufacturers of memory chips.

Total revenue increased 48.6 percent to \$446.4 million* in fiscal 1989 from \$300.5 in fiscal 1988. Net income reached \$106.1 million in fiscal 1989, resulting in a growth rate of 8.3 percent over fiscal 1988. Revenue for the first half of fiscal 1990 was down substantially, to \$143.5 million. This suggests that fiscal 1990 figures will be lower than those of fiscal 1989 unless Micron has a very strong second half. Micron employs 3,100 people throughout the world, with the majority at the Boise, Idaho, facility.

In January 1990, Micron became the first integrated circuit manufacturer to receive NCR's company-wide "S1" rating. S1 is the highest of NCR's six levels of supplier ratings in the NCR quality and service program. With this rating, NCR will accept Micron products based strictly on Micron's quality testing.

Micron is dedicating itself to continued diversification and customer service in the memory market by putting greater emphasis on research and development. Micron spent \$5.3 million, \$9.3 million, and \$21.4 million in research and development in the respective years 1987, 1988, and 1989. This calculates to be 5.8 percent, 3.1 percent, and 4.8 percent of

each year's revenue. In March 1988, Micron expanded its research and development facility by 25,000 square feet to house its growing R&D department and to provide additional production space for memory systems and single in-line memory modules (SIMMs). Micron also built Fab III, a 6-inch wafer fabrication facility, adjacent to its present facility in Boise. The new building will allow Micron to double its manufacturing capacity.

Micron is in the process of exploring many new products. It now is running test wafers on its 4Mb DRAM. Two designs are being developed in-house and the other is being acquired from IBM. With IBM as its principal customer, Micron will begin volume shipments in early 1991. Currently, Micron also is conducting development work on a 16Mb DRAM targeted for introduction in 1993 and five SRAM derivative products, including semicustom configured SRAMs, cache data SRAMs, and FIFOs targeted for introduction in 1991.

In March 1990, Micron announced authorization for JAN 38510 Part 2 Qualification by the Defense Electronics Supply Center (DESC) for Micron's 32Kx8 256K SRAM. Micron also offers a 64Kx4 SRAM and a 256Kx1 SRAM manufactured to the Mil-Standard-883 and DESC drawings. Although the military market is shrinking, a profit potential for Micron still exists because only a few SRAM suppliers are JAN-qualified.

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

DRAMs

Micron is one of only three American DRAM manufacturers on the open market; however, five U.S. suppliers manufacture offshore: Alliance, Intel, Motorola, Texas Instruments, and Vitelic. The DRAM product line is Micron's largest single revenue producer. Dataquest estimates that Micron ranked 11th or 12th in the DRAM market in 1989. Micron manufactures 256K and 1Mb DRAMs and produces the smallest DRAM chip, allowing for an increased number of chips per wafer. The 1Mb DRAM is among the smallest die sizes in the industry, and its design and process technology enables Micron to use fewer masking steps in production, thus reducing its manufacturing cost. During 1989, Micron produced a limited volume of 1Mb DRAMs due to technical difficulties.

SRAMs

The Company's SRAM product line includes 256, 64, and 16K densities in access speeds ranging from 12 to 45ns. The SRAM allows for greater processing speed. As part of its diversification effort in 1989, Micron introduced its Cache Data SRAM, which enhances the performance of the Intel 80386 and is compatible with the Intel 82385.

VRAMs

Video RAMs (VRAMs) are specific memory multipoint devices with a random access point and a

serial access point. They are used in high-speed graphics applications and are similar to the 1Mb DRAMs, although they are considered to be "value-added" DRAMs. VRAMs are used for real-time or high-resolution graphic video images or both; however, their primary application is video.

Modules

Micron manufactures 31 varieties of memory modules. SIMMs are small PC boards that are easier to install and consume less board space. Micron also offers 256K and 1Mb SIMMs for the Apple Macintosh. In 1989, Micron introduced video expansion cards for Macintosh systems. Micron also expanded its line of SRAM modules with four new products that have the fastest access times in the industry.

Memory Enhancement Products

Micron's Memory Applications Group manufactures and sells a series of system-level products that add value to individual components by integrating them into system applications. The group also maintains custom product design and manufacturing services, allowing Micron to respond quickly to customer needs. In 1989, the Group introduced memory application products for Apple, Compaq, and IBM computers.

Further Information

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

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

	1985	1986	1987	1988	1989
Five-Year Revenue	\$75.9	\$48.9	\$91.2	\$300.5	\$446.4
Percent Change	-	(35.57)	86.50	229.50	48.55
Capital Expenditure	N/A	N/A	N/A	N/A	N/A
Percent of Revenue	0	0	0	0	0
R&D Expenditure	\$6.6	\$2.9	\$5.3	\$9.3	\$21.4
Percent of Revenue	8.70	5.93	5.81	3.09	4.79
Number of Employees	722	1,080	1,479	2,230	3,100
Revenue (\$K)/Employee	\$105.12	\$45.28	\$61.66	\$134.75	\$144.00
Net Income	\$0.2	(\$33.9)	(\$22.9)	\$98.0	\$106.1
Percent Change	-	(22,700.00)	32.45	527.95	8.27
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$110.40	\$113.79	\$119.20	\$103.00	
Quarterly Profit	\$32.20	\$29.18	\$28.80	\$16.00	

N/A = Not Available

Source: Micron Technology, Inc.
 Annual Reports and
 Forms 10K
 Dataquest
 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	N/A	79.14	81.58	68.62	76.99
International	N/A	20.86	18.42	31.38	23.01
Far East/Japan	N/A	N/A	N/A	N/A	15.01
Europe	N/A	N/A	N/A	N/A	8.00

N/A = Not Available

Source: Micron Technology, Inc.
 Annual Reports and
 Forms 10K
 Dataquest
 1990

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	80.00	80.00
Indirect Sales	20.00	20.00

Source: Dataquest
 1990

1989 SALES OFFICE LOCATIONS

North America—1
Japan—0
Europe—2
Asia/Pacific—0
ROW—0

MANUFACTURING LOCATIONS

North America

Boise, Idaho
All production operations

SUBSIDIARIES

North America

Bay Area Electronic Sales Inc.
Micron Medical Inc.
Micron Overseas Trading Inc.
Southeast Technical Group Inc.

Europe

Micron Technology (UK) Ltd.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

Sanyo Electric Company

Sanyo was granted exclusive distribution rights for Micron component products in Japan.

IBM

The companies made an agreement giving Micron the rights to IBM's 4Mb DRAM process technology and chip design. In return, Micron will assist IBM with development work on different types of memory components.

Texas Instruments (TI)

The companies made a patent licensing agreement in which Micron paid TI \$38.2 million to cover cumulative royalties due from past use of TI's semiconductor patents. The agreement provides for ongoing royalty payments to TI on Micron's future shipments of DRAMs and any other semiconductor devices packaged in plastic. TI also is licensed to use Micron's semiconductor patents.

1988

Amstrad

The companies made a three-year agreement in which Amstrad has the option to purchase up to 9.03 percent of each of Micron's products.

American Telephone and Telegraph

The companies made a cross-licensing agreement relating to semiconductor patents.

Standard Microsystems Corporation

The companies made an agreement giving Micron a license to all of Standard Microsystems' existing patents and patents applied for through March 31, 2008, relating to semiconductors, integrated circuits, and semiconductor test equipment.

European Semiconductor Assembly

The companies made an agreement for European Semiconductor to package Micron's 256KB dynamic RAMs for Western European users.

MERGERS AND ACQUISITIONS

1989

Standard Microsystems Corporation

Micron purchased 1,629,000 shares of Standard Microsystems' common stock from C. B. Equities Group, equaling 14.4 percent of the company. As of February 1990, Micron retained 1,132,636 shares of Standard Microsystems stock, accounting for 10 percent of the company.

KEY OFFICERS

Randal W. Chance

President, chief operating officer

Joseph L. Parkinson
Chairman of the Board of Directors, chief
executive officer

James W. Garrett
Executive vice president, vice president of Sales
and Marketing

Steven R. Appleton
Vice president of Manufacturing

Thomas M. Trent
Vice president of Research and Development, chief
technical officer

Tyler A. Lowrey
Vice president of Process Research and Develop-
ment, assistant technical officer

PRINCIPAL INVESTORS

Amstrad—9.72 percent
Simplot Financial Corporation—14.31 percent

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

Balance Sheet*	1985	1986	1987	1988	1989
Total Current Assets	\$26.7	\$31.7	\$43.6	\$249.4	\$278.9
Cash	1.2	5.1	9.4	12.4	11.8
Receivables	3.8	9.0	15.2	53.5	57.8
Marketable Securities	N/A	N/A	N/A	151.9	149.4
Inventory	12.7	15.6	17.8	26.2	44.4
Other Current Assets	9.0	2.0	1.2	5.4	15.5
Net Property, Plants	\$104.5	\$97.7	\$84.2	\$117.4	\$326.1
Other Assets	\$1.8	\$1.6	\$1.5	\$20.7	\$19.9
Total Assets	\$133.0	\$131.0	\$129.3	\$387.5	\$624.9
Total Current Liabilities	\$5.3	\$8.3	\$18.6	\$63.6	\$70.4
Long-Term Debt	N/A	N/A	\$13.3	\$17.7	\$39.7
Other Liabilities	\$35.6	\$43.6	\$24.9	\$18.1	\$38.3
Total Liabilities	\$40.9	\$51.9	\$56.8	\$99.4	\$148.4
Total Shareholders' Equity	\$92.1	\$79.1	\$72.5	\$288.1	\$476.5
Common Stock	1.9	2.2	2.6	3.3	3.7
Other Equity	71.0	91.6	107.5	224.5	306.4
Retained Earnings	19.2	(14.7)	(37.6)	60.3	166.4
Total Liabilities and Shareholders' Equity	\$133.0	\$131.0	\$129.3	\$387.5	\$624.9
Income Statement	1985	1986	1987	1988	1989
Revenue	\$75.9	\$48.9	\$91.2	\$300.5	\$446.4
U.S. Revenue	N/A	38.7	74.4	206.2	343.7
Non-U.S. Revenue	N/A	10.2	16.8	94.3	102.7
Cost of Sales	\$63.9	\$64.8	\$91.4	\$143.7	\$230.2
R&D Expense	\$6.6	\$2.9	\$5.3	\$9.3	\$21.4
SG&A Expense	\$6.8	\$6.8	\$10.3	\$25.9	\$41.7
Capital Expense	N/A	N/A	N/A	N/A	N/A
Pretax Income	(\$6.6)	(\$33.9)	(\$22.9)	\$188.2	\$165.8
Pretax Margin (%)	(8.7)	(69.33)	(25.11)	62.63	37.14
Effective Tax Rate (%)	N/A	N/A	N/A	N/A	N/A
Net Income	\$0.2	(\$33.9)	(\$22.9)	\$98.0	\$106.1
Shares Outstanding, Millions	19.2	22.1	25.8	32.9	36.7
Per Share Data					
Earnings	\$0.01	(\$1.75)	(\$0.94)	\$3.25	\$2.85
Dividends	N/A	N/A	N/A	N/A	N/A
Book Value	\$4.80	\$3.58	\$2.81	\$8.76	\$12.98

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

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	5.04	3.82	2.34	3.92	3.96
Quick (Times)	2.64	1.94	1.39	3.51	3.33
Fixed Assets/Equity (%)	113.46	123.51	116.14	40.75	68.44
Current Liabilities/Equity (%)	5.75	10.49	25.66	22.08	14.77
Total Liabilities/Equity (%)	44.41	65.61	78.34	34.50	31.14
<i>Profitability (%)</i>					
Return on Assets	-	(25.68)	(17.60)	37.93	20.96
Return on Equity	-	(39.60)	(30.21)	54.35	27.75
Profit Margin	0.20	(69.33)	(25.11)	32.61	23.77
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	8.70	5.93	5.81	3.09	4.79
Capital Spending % of Revenue	0	0	0	0	0
Employees	722	1,080	1,479	2,230	3,100
Revenue (\$K)/Employee	\$105.12	\$45.28	\$61.66	\$134.75	\$144.00
Capital Spending % of Assets	0	0	0	0	0

*Financial numbers have been rounded off and have been taken from annual reports' current complete figures.
 N/A = Not Available

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

Micropolis Corporation

Micropolis Corporation
21211 Nordhoff Street
Chatsworth, California 91311
Telephone: (818) 709-3300
Fax: (818) 709-3396
Dun's Number: 08-301-0066

Date Founded: 1976

CORPORATE STRATEGIC DIRECTION

Micropolis Corporation designs and manufactures high-performance full- and half-height 5-1/4-inch Winchester disk drives and markets these drives to original equipment manufacturers (OEMs) and value-added resellers (VARs). OEMs incorporate these drives into high-performance micro- and minicomputer systems for single- and multiuser applications, including computer-aided design (CAD), professional workstations, and local area networks (LANs). Micropolis' stated mission is to provide its customers with high-performance disk drives that will enable the Company to compete and win in the world market for its products.

Total revenue decreased 13.0 percent to \$307 million* in fiscal year 1989, down from \$353 million in fiscal year 1988. Micropolis attributes the decline to a reduction in the volume and price of the mature 85 and 170MB drives. This was coupled with the delayed impact of Micropolis' new 760MB drive, of which significant volumes were not produced until the fourth quarter of 1989. Net loss totaled \$50 million during fiscal year 1989, representing a 157.8 percent decline from fiscal year 1988. Micropolis believes 1989 losses were due to rapidly changing and unusually difficult industry conditions in 1988 along with slow management reaction to those conditions. Micropolis spent 1989 in a recovery stage in which several steps were carried out. All assembly and testing of newer disk drives were moved to Micropolis' Singapore production facilities; the new production facility in Bangkok, Thailand, started production in January 1989 and began producing virtually all requirements for its read-write head positioners; unit material cost for its 380, 760, and 1,200MB drives was reduced 22 percent; and

development work on a 3.5-inch disk drive was shelved at midyear, reducing its quarterly R&D expenses. Micropolis returned to profitability in the second quarter of 1990. Micropolis employs 2,900 people, 75 percent of whom are in Manufacturing and Operations.

For fiscal year 1989, Micropolis' cost of sales increased to 100.5 percent of sales, up from 91.0 percent of sales in fiscal year 1988. The increase was caused by the decline of the 85 and 170MB products that possessed favorable margins as compared with the higher-cost 380MB. Micropolis also experienced substantial start-up costs in its Bangkok facility, intensified competitive pricing, losses on the accelerated production of the 180MB half-height drives, and excess manufacturing capacity. In fourth quarter 1989, cost of sales represented 87.4 percent of sales, reflecting savings in material costs and an increase in production volume. Micropolis is focusing on material cost reduction programs and hopes to improve its process yields in 1990.

During fiscal years 1989, 1988, and 1987, R&D expenditures totaled \$23 million, \$28 million, and \$22 million, respectively. These figures respectively represented 7.5, 8.1, and 7.6 percent of total revenue. Micropolis plans to reduce its R&D expenditure to \$19 million during fiscal 1990. Micropolis' R&D activities are focused on increasing the capacity and improving the access speed of its Winchester drives and on downsizing them into a more compact form. Because of Micropolis' financial situation, the development of a high-performance 3.5-inch disk drive came to a halt. For the immediate future, Micropolis intends to concentrate on the high-end 5.25-inch disk drive market, which will include continued development of the 1,600MB drives and bringing the new 1,200MB drives to volume production.

*All dollar amounts are in US dollars.

On January 30, 1989, a class action lawsuit was filed against Micropolis and certain of its executive officers and directors, alleging violations of the Securities Exchange Act of 1934 and Rule 10b-5 thereunder, common law fraud, and negligent misrepresentation. The complaint contends that the market value of Micropolis' stock was artificially inflated as a result of omissions and misstatements of material facts about its business and financial results. No specific amount of damages has been claimed, and Micropolis intends to defend vigorously against the allegations. Management believes that the lawsuit is without merit and will have no material adverse effect upon Micropolis' financial position.

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 Drives

According to Dataquest, Micropolis ranked sixth among the 5.25-inch disk drive manufacturers for 1989 based upon worldwide unit shipments. The Company offers a full line of 5.25-inch half- and full-height disk drives with capacities between 85 and 1,200MB. Micropolis' principal products are its 1320,

1330, 1350, 1370, 1558, 1568, 1578, 1588, 1650, 1660, 1670, and 1680 Series 5.25-inch Winchester drives.

The 1320 model drives have up to 85MB capacity and 28 milliseconds average access time, and employ the ST-412 Interface. The 1330 is similar to the 1320 but it is produced for distribution markets. The 1350 model has a capacity of up to 170MB and 23 milliseconds average access time, and uses the enhanced small device interface (ESDI). The 1370 model is similar to the 1350 in capacity and access speed, but uses the small computer system interface (SCSI), which includes intelligence not incorporated in the ST-412 and ESDI drives. The 1558 model has capacity up to 382MB and 18 milliseconds average access time, and uses the ESDI interface. The 1568 and 1588 models have 760MB using the ESDI and SCSI interfaces, respectively. The 1578 model is similar in capacity to the 1558, but uses the SCSI interface.

The 1650 model half-height drive has up to 180MB capacity and 16 milliseconds average access time, and uses ESDI interface. The 1660 model half-height 5.25-inch drive has 380MB and average access time of 15 milliseconds, and uses the ESDI interface. The 1670 model is similar in capacity and access speed to the 1650 but uses the SCSI interface. The 1680 model is comparable to the 1660 but uses the SCSI interface.

Further Information

For further information on the Company's business segment, please contact Dataquest's Computer Storage Industry Service.

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

	1985	1986	1987	1988	1989
Five-Year Revenue	\$95	\$213	\$288	\$353	\$307
Percent Change	-	124.55	35.24	22.48	(13.03)
Capital Expenditure	\$8	\$16	\$22	\$63	\$13
Percent of Revenue	8.43	7.51	7.63	17.85	4.23
R&D Expenditure	\$5	\$11	\$22	\$28	\$23
Percent of Revenue	5.27	5.26	7.56	8.05	7.49
Number of Employees	NA	NA	2,385	3,120	2,900
Revenue (\$K)/Employee	NA	NA	\$120.75	\$113.14	\$105.86
Net Income	\$3	\$18	\$27	(\$19)	(\$50)
Percent Change	-	553.57	48.63	(171.32)	(157.73)
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$80.63	\$79.28	\$66.50	\$80.93	
Quarterly Profit	(\$13.30)	(\$10.60)	(\$23.70)	(\$2.20)	

NA = Not available

Source: Micropolis 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	30.00	31.00	16.00
International	NA	NA	70.00	69.00	84.00

NA = Not available

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

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	0	NA
Indirect Sales	100.00	NA
OEMs	70.00	NA
Retail Distributors	30.00	NA

NA = Not available

Source: Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—6
Europe—5
Asia/Pacific—1

MANUFACTURING LOCATIONS

North America

Chatsworth, California

Refinement of the overall assembly process and development of prototypes for new products

Asia/Pacific

Singapore

Full disk drive production, assembly, and testing
Bangkok, Thailand
Disk drive subassemblies

SUBSIDIARIES

Europe

Micropolis A.B. (Sweden)
Micropolis GmbH (Germany)
Micropolis S.A.R.L. (France)

Asia/Pacific

Micropolis Corp. Thailand Ltd. (Thailand)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

Information is not available

KEY OFFICERS

Stuart P. Mabon
President

Chester Baffa
Senior vice president, Marketing and Sales

Ericson M. Dunstan
Senior vice president, Corporate Engineering

Robert Wallstrom
Senior vice president, Operations

David L. Bultman
Vice president, Product Programs

Terrance Ostridge
Vice president, Sales

A. T. M. Robertson
Vice president, Engineering

PRINCIPAL INVESTORS

Sigma Management, Inc.—6.0 percent
Provident Mutual Management Co., Inc.—5.0 percent

FOUNDERS

Information is not available.

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

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$61	\$106	\$221	\$210	\$144
Cash	22	38	101	15	9
Receivables	22	38	60	73	63
Inventory	17	27	52	113	63
Other Current Assets	1	3	8	9	9
Net Property, Plants	\$18	\$26	\$39	\$87	\$71
Other Assets	\$0.10	\$1	\$3	\$3	\$2
Total Assets	\$79	\$133	\$263	\$300	\$217
Total Current Liabilities	\$14	\$22	\$45	\$98	\$64
Long-Term Debt	0	0	\$75	\$75	\$75
Other Liabilities	\$1	\$0.40	\$5	\$6	\$6
Total Liabilities	\$15	\$22	\$125	\$179	\$145
Total Shareholders' Equity	\$64	\$111	\$138	\$121	\$72
Common Stock	10	11	11	11	12
Other Equity	46	73	74	76	76
Retained Earnings	8	27	53	34	(16)
Total Liabilities and Shareholders' Equity	\$79	\$133	\$263	\$300	\$217
Income Statement	1985	1986	1987	1988	1989
Revenue	\$95	\$213	\$288	\$353	\$307
US Revenue	95	179	87	109	50
Non-US Revenue	0	35	201	244	257
Cost of Sales	\$80	\$161	\$218	\$321	\$309
R&D Expense	\$5	\$11	\$22	\$28	\$23
SG&A Expense	\$8	\$11	\$14	\$22	\$25
Capital Expense	\$8	\$16	\$22	\$63	\$13
Pretax Income	\$4	\$32	\$36	(\$20)	(\$60)
Pretax Margin (%)	3.79	15.20	12.60	(5.69)	(19.54)
Effective Tax Rate (%)	22.00	44.00	25.00	NA	NA
Net Income	\$3	\$18	\$27	(\$19)	(\$50)
Shares Outstanding, Millions	9.4	10.6	11.3	11.5	11.6
Per Share Data					
Earnings	\$0.30	\$1.72	\$2.40	(\$1.69)	(\$4.31)
Dividend	0	0	0	0	0
Book Value	\$6.81	\$10.47	\$12.21	\$10.52	\$6.21

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

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	4.35	4.82	4.90	2.14	2.25
Quick (Times)	3.17	3.59	3.74	0.99	1.27
Fixed Assets/Equity (%)	28.13	23.42	28.26	71.90	98.61
Current Liabilities/Equity (%)	21.88	19.82	32.61	80.99	88.89
Total Liabilities/Equity (%)	23.75	20.18	90.58	147.93	201.39
<i>Profitability (%)</i>					
Return on Assets	-	17.30	13.77	(6.90)	(19.34)
Return on Equity	-	20.91	21.85	(14.98)	(51.81)
Profit Margin	2.95	8.59	9.44	(5.50)	(16.29)
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	5.27	5.26	7.56	8.05	7.49
Capital Spending % of Revenue	8.43	7.51	7.63	17.85	4.23
Employees	NA	NA	2,385	3,120	2,900
Revenue (\$K)/Employee	NA	NA	\$120.84	\$113.14	\$105.86
Capital Spending % of Assets	10.13	12.07	8.38	21.00	5.99

NA = Not available

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

Micron Technology, Inc.

Table 1

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

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
Total Semiconductor	24	117	36	63	115	331
Total Integrated Circuit	24	117	36	63	115	331
Bipolar Digital (Function)						
Bipolar Digital Memory						
Bipolar Digital Logic						
MOS (Function)	24	117	36	63	115	331
MOS Memory	24	117	36	63	115	331
MOS Microdevices						
MOS Logic						
Analog						
Total Discrete						
Total Optoelectronic						

Table 2

Micron Technology, Inc.
1988 Worldwide Ranking by Semiconductor Markets
(Revenue in Millions of Dollars)

	<u>1988</u>	<u>1987</u>	<u>1988</u>	<u>Sales</u>	<u>Industry</u>
	<u>Rank</u>	<u>Rank</u>	<u>Revenue</u>	<u>% Change</u>	<u>% Change</u>
				<u>1987-1988</u>	<u>1987-1988</u>
Total Semiconductor	28	43	\$331	187.8%	33.0%
Total Integrated Circuit	24	36	\$331	187.8%	37.4%
MOS (Function)	19	29	\$331	187.8%	54.5%
MOS Memory	11	12	331	187.8%	93.1%

Source: Dataquest
December 1989

Micron Technology, Inc.

Table 3

Micron Technology, Inc.
Estimated 1988 Semiconductor Revenue by Geographic Region
(Millions of Dollars)

	<u>U.S.</u>	<u>Japan</u>	<u>Europe</u>	<u>ROW</u>
Total Semiconductor	\$232	\$8	\$2	\$89
Total Integrated Circuit	\$232	\$8	\$2	\$89
Bipolar Digital (Function)				
Bipolar Digital Memory				
Bipolar Digital Logic				
MOS (Function)	\$232	\$8	\$2	\$89
MOS Memory	232	8	2	89
MOS Microdevices				
MOS Logic				
Analog				
Total Discrete				
Total Optoelectronic				

Source: Dataquest
December 1989

Micron Technology, Inc.

Micron Technology, Inc.
2805 East Columbia Road
Boise, Idaho 83706
Telephone: (208) 383-4000
(Millions of Dollars)

Balance Sheet (September 3)	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Total Current Assets	\$10.7	\$ 42.7	\$ 26.7	\$ 31.7	\$ 43.7
Cash	\$ 5.8	\$ 19.8	\$ 1.2	\$ 5.1	\$ 9.4
Receivables	\$ 2.3	\$ 11.7	\$ 3.8	\$ 9.0	\$ 15.2
Inventory	\$ 2.5	\$ 7.8	\$ 12.7	\$ 15.6	\$ 17.8
Net Property, Plant, & Eqp.	\$18.4	\$ 77.0	\$104.5	\$ 97.7	\$ 84.2
Depreciation	\$ 1.7	\$ 7.3	\$ 22.9	\$ 41.3	\$ 58.6
Total Assets	\$29.4	\$121.1	\$133.0	\$131.0	\$129.3
Total Current Liabilities	\$ 7.5	\$ 29.8	\$ 5.3	\$ 8.3	\$ 18.6
Long-Term Debt	\$ 9.6	0	\$ 35.6	\$ 18.7	\$ 13.3
Total Liabilities	\$17.2	\$ 31.7	\$ 40.9	\$ 51.9	\$ 56.8
Total Shareholders' Equity	\$12.2	\$ 89.3	\$ 92.1	\$ 79.1	\$ 72.6
Conv. Preferred Stock	0	0	0	0	0
Common Stock	\$12.9	\$ 1.8	\$ 1.9	\$ 2.2	\$ 2.6
Retained Earnings	(\$ 9.9)	\$ 7.9	\$ 19.2	(\$ 14.7)	(\$ 37.6)
Income Statement (September 3)	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Revenue	\$13.1	\$ 87.4	\$ 75.9	\$ 48.9	\$ 91.2
Cost of Sales	\$11.9	\$ 38.2	\$ 63.9	\$ 64.8	\$ 91.4
Gross Margin (%)	9.2	56.3	15.8	(32.5)	(0.2)
R&D Expense	\$ 0.2	\$ 2.7	\$ 6.6	\$ 2.9	\$ 5.3
SG&A Expense	\$ 1.8	\$ 7.3	\$ 6.7	\$ 6.8	\$ 10.3
Other Expense	0	\$ 1.8	\$ 3.7	\$ 3.0	\$ 2.3
Operating Income (Loss)	(\$ 0.7)	\$ 37.4	(\$ 4.9)	(\$ 28.6)	(\$ 18.2)
Interest, Net	(\$ 1.9)	(\$ 0.9)	(\$ 1.7)	(\$ 5.3)	(\$ 4.7)
Pretax Income	(\$ 2.6)	\$ 36.5	(\$ 6.6)	(\$ 33.9)	(\$ 22.9)
Provision for Taxes (Credit)	0	\$ 7.5	(\$ 6.7)	0	0
Extraordinary Items, Net	0	0	0	0	0
Net Income	(\$ 2.6)	\$ 29.0	(\$ 0.2)	(\$ 33.9)	(\$ 22.9)
Avg. Shares Outstanding (M)	38.3	17.6	19.1	19.4	24.3
Capital Expenditures (M)	\$10.6	\$ 65.1	\$ 43.2	\$ 12.2	\$ 9.6
Employees	N/A	958	722	1,080	1,479

N/A = Not Available

Source: Micron Technology, Inc.,
Annual Reports

Micron Technology, Inc.

THE COMPANY

Overview

Micron Technology, Inc., was established in 1978 in the state of Idaho. In 1984, the Company offered 2.1 million shares of common stock in an initial public offering that raised \$25 million and reincorporated in Delaware.

Micron produces primarily 64K, 256K, and 1-megabit DRAM components, with 256K DRAMs accounting for the majority of sales in fiscal 1987. The Company is one of only two United States-based DRAM suppliers. Micron also manufactures and markets a line of add-in memory cards, a line of image sensors, electronic cameras, and the PEAK fertility monitor.

Highlights

The following are some of Micron's fiscal 1987 highlights:

- Micron shrunk the die sizes of the 64K and 256K DRAMs, increasing die per wafer by 61 and 47 percent, respectively.
- The Company increased the number of employees from 1,110 to 1,479 people.
- The Company added CMOS capability.
- The Company began production of a prototype CMOS 1Mb DRAM.
- The Company sampled a CMOS 256K SRAM.
- The Company received certification for full MIL-STD-883C compliance.
- The Company restarted Fab I, which it shut down in 1985.
- The Company offered 2.3 million shares of common stock, which were used to reduce long-term bank debt.
- The Company became a founding member of Sematech.

On October 1, 1986, Micron dismissed without prejudice a suit that it filed against six Japanese manufacturers and their U.S. subsidiaries. The suit charged the Japanese manufacturers with monopolistic and predatory pricing practices and violations of federal antitrust and antidumping laws. The complaint was filed in September 1985 in the U.S. District Court in Boise, Idaho.

Micron Technology, Inc.

Financial Information

In its fiscal 1987, which ended September 3, Micron reported revenue of \$91.2 million, compared with \$48.9 million in fiscal 1986. The Company reported a net loss of \$22.9 million in fiscal 1987, decreasing from a net loss of \$33.9 million in 1986. The increase in revenue from 1986 was attributed to a ramp-up of 256K DRAM production capacity, which matched an increase in market demand and average selling price for 256K DRAMs. Micron reported that more than 85 percent of 1987 revenue was from the sale of 256K DRAMs, compared to 1986 when 64K DRAMs made up half of the Company's revenue. DRAM products, as a whole, represented 96 percent of revenue.

In August 1986, Micron made an offering of 2.3 million shares of common stock and raised \$13.4 million. In January 1987, Micron sold 3.5 million shares of common stock for \$4.38 per share to a group of European investors in a private placement. The net proceeds of about \$13.5 million were used for working capital and to repay borrowings under Micron's bank line of credit.

The Company reported that 82 percent of fiscal 1987 sales were in North America, 15 percent in the Far East, and 3 percent in Europe.

Management and Employees

As of September 3, 1987, Micron employed about 1,479 people. Table 1 lists the executives of the Company.

Table 1

Micron Technology, Inc. Company Executives

<u>Executive</u>	<u>Office</u>
Joseph L. Parkinson	Chairman of the board, chief executive officer
Ward A. Parkinson	Vice chairman of the board
Juan A. Benitez	President, chief operating officer
Randal W. Chance	Executive vice president
James W. Garrett	Vice president of sales and marketing
Leslie A. Gill	Vice president of finance, treasurer
Larry L. Grant	Vice president and general counsel
Edward J. Heitzberg	Vice president of quality
Tyler A. Lowrey	Vice president of process R&D, assistant technical officer
Thomas M. Trent	Vice president of R&D, chief technical officer

Source: Micron Technology, Inc.,
10K Report

Micron Technology, Inc.

Facilities

Micron's principal manufacturing, engineering, administrative, and support facility is located on a 200-acre site in Boise, Idaho. In 1986, the Company's facilities, which feature class-10 clean rooms, were certified by the Defense Electronics Supply Center (DESC) to certain military production standards. Table 2 lists Micron's semiconductor facilities.

Table 2

Micron Technology, Inc. Facilities

<u>Facility</u>	<u>Size Square Feet</u>	<u>Technology/Products</u>
Fabrication Facility I	30,000	NMOS, CMOS, 5-inch wafers, 64K and 256K DRAMs
Fabrication Facility II	17,000	NMOS, CMOS, 5-inch wafers, 1Mb DRAMs and SRAMs
Test & Assembly Facility I	30,000	
Test & Assembly Facility II	48,000	

Source: Micron Technology, Inc.,
10K Report

Capital and R&D Spending

Micron's capital spending in fiscal 1987 was \$9.6 million, as shown in Table 3. The Company has been working to convert its facilities for 256K DRAM production and for the anticipated demand for 1Mb DRAMs.

Recent R&D activities were directed toward the design and development of a high-performance 256K SRAM, a 256K video RAM, a 1Mb DRAM using a CMOS process, and certain board level systems products. The Company also continually works to reduce the size of its DRAMs, as well as to improve its NMOS and CMOS process technologies. The Company reported R&D spending of \$5.3 million in fiscal 1987.

Micron Technology, Inc.

Table 3

**Micron Technology, Inc.
Fiscal 1987 Capital and R&D Spending
(Millions of Dollars)**

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Revenue	\$13.1	\$87.4	\$75.9	\$48.9	\$91.2
Capital Expenditures	\$10.6	\$65.1	\$43.2	\$12.2	\$ 9.6
Percentage of Revenue	80.9%	74.5%	56.9%	25.0%	10.5%
R&D Expense	\$ 0.2	\$ 2.7	\$ 6.6	\$ 2.9	\$ 5.3
Percentage of Revenue	1.5%	3.1%	8.7%	5.9%	5.8%
Combined Capital and R&D Spending	\$10.8	\$67.8	\$49.8	\$15.1	\$14.9
Percentage of Revenue	82.4%	77.6%	65.6%	30.9%	16.3%

Source: Micron Technology, Inc.,
Annual Reports

PRODUCTS AND MARKETS

Semiconductor Products and Markets

Micron produces primarily 64K and 256K DRAM devices and has developed devices in a broad range of configurations and package types. In 1987, Micron began to diversify its memory product line and offered 1-megabit DRAMs, 256K SRAMs, 256K video RAMS, and a variety of SIMM memory modules.

According to Dataquest, Micron's semiconductor calendar revenue in 1987 was \$115 million, as shown in Table 4. In 1986, Micron ranked 10th in the 64K segment, 7th in 256K density, 10th at the 1Mb level, and 10th overall in the DRAM market.

As a result of the U.S.-Japan Semiconductor Trade Agreement, U.S. tariffs on the 64K DRAM increased the demand for Micron's devices and hurt the firm's Japanese competitors in terms of production planning and price competitiveness. At the 256K level, the foreign market value (FMV) system means added revenue from the sale of 256K DRAMs whenever the U.S. price falls below the FMV floor price. The FMV system also provides Micron with an opportunity to develop into a competitive supplier of 1Mb DRAMs.

Micron Technology, Inc.

Table 4

**Micron Technology, Inc.
Estimated Worldwide Semiconductor Revenue by Calendar Year
(Millions of Dollars)**

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Total Semiconductor	\$24	\$117	\$36	\$63	\$115
Total Integrated Circuit	\$24	\$117	\$36	\$63	\$115
MOS (Technology)					
NMOS	\$24	\$117	\$36	\$63	\$115
MOS (Function)					
MOS Memory	\$24	\$117	\$36	\$63	\$115

Source: Dataquest
March 1988

Semiconductor Revenue by Region

Sales within the United States in 1987 were \$94 million, representing 82 percent of Micron's annual semiconductor revenue. Sales to ROW countries were \$17 million, about 15 percent of total semiconductor revenue; sales to Japan were \$4 million, making up the remainder.

Channels of Distribution

The Company's products are marketed directly to computer manufacturers and through an international network of distributors and sales representatives. Among Micron's distributors are Anthem Electronics Inc., Hallmark Electronics, and Wyle Laboratories Electronic Marketing Group.

Semiconductor Products and Technologies

Technologies

Micron's 64K and 256K DRAMs are manufactured using a double-poly NMOS process technology. In 1987, the Company began to use a 1-micron CMOS process to develop its newest products, the 1Mb DRAM and a 256K SRAM.

Micron Technology, Inc.

Product Lines

Current products include 64K and 256K DRAMs, which are available in a wide variety of packages. New products include 1Mb DRAMs, 256K SRAMs, and the first member in a family of dual-port video RAMs (VRAMs). Micron began to offer prototypes of the 256K VRAM in December 1987. It is a dual-port DRAM that consists of a 64Kx4 DRAM combined with a 256x4 serial access memory. Micron plans to make a 1Mb version in the second half of 1988.

Table 5 is a list of Micron's products, all of which are available now.

Table 5

Micron Technology, Inc. Products

<u>Device</u>	<u>Organization</u>	<u>Speed</u>
DRAMs		
MT4264	64Kx1	120-200ns
MT1128	128Kx1	120-200ns
MT4065/MT4067	64Kx4	100-200ns
MT1256/MT1259	256Kx1	100-200ns
MT4C256/MT4C257	256Kx4	100-150ns
Memory Modules		
MT8066	64Kx8	120-200ns
MT9066	64Kx9	120-200ns
MT4257	256Kx4	100-200ns
MT8257	256Kx8	100-200ns
MT9257	256Kx9	100-200ns

Source: Micron Technology, Inc.

Products are available in both surface-mount and through-hole-compatible packages. Customers have a choice of either plastic or ceramic packages, as well as dual-in-line (DIP), zig-zag in-line (ZIP), or single-in-line (SIP) packages; single-in-line memory modules (SIMM); plastic-leaded chip carriers (PLCC); and small-outline J-leaded packages (SOJ).

Micron Technology, Inc.

Semiconductor Agreements

Micron has the following agreements:

- **ITT/STC**—In January 1983, Micron granted ITT Industries, Inc., a worldwide nonexclusive license to manufacture and sell 64K DRAMs. The agreement called for ITT to pay Micron royalties for four years, at which time ITT will have a fully paid, nonexclusive license.
 - In April 1983, ITT assigned its license rights to Standard Telephones and Cables PLC (STC), as a result of the sale of ITT's U.K. division to STC.
- **Samsung Semiconductor and Telecommunications Co., Ltd.**—In June 1983, Micron granted Samsung a license for 64K DRAMs; the agreement included an option for Micron's 256K DRAM.
 - In February 1986, Micron filed a suit against Samsung and its U.S. subsidiary, charging a breach of the agreement and seeking a permanent injunction prohibiting further manufacture and sale of DRAM products.
 - In May 1986, Samsung filed a counterclaim, seeking damages totaling \$30 million and alleging that Micron failed to comply with various terms of the agreement.
 - In June 1986, the companies entered into a settlement agreement. The licensing agreement was terminated and Samsung agreed to cease manufacturing certain 64K DRAMs based on technology received from Micron.
 - In return, Samsung granted Micron a license to manufacture and sell certain 64K SRAM and 64K EEPROM products in exchange for a 1.0 percent royalty on sales.
 - Samsung also purchased a 2.7 percent interest in Micron for \$5 million and an AMBYX burn-in test system.
- **Commodore Electronics Ltd.**—In May 1984, Micron granted Commodore a license to manufacture and use the 64K DRAM for internal purposes only. This agreement is no longer in effect.
- **National Semiconductor Corporation**—In November 1984, National purchased a license to manufacture and sell Micron's 64K DRAM for about \$5 million. The deal included an option on a 512K DRAM.

Micron Technology, Inc.

- **Barvon Research, Inc. (BRI)**—In November 1985, Micron purchased a minority equity interest in BRI, a privately held corporation specializing in the design and sale of ASIC devices based on CMOS process technology. As part of the agreement, BRI will design a number of ASICs, which Micron will manufacture and sell. BRI will also give Micron access to its CMOS design and development expertise.

System-Level Products

Micron also offers a line of system-level products including the MicronEye and Idetix industrial vision systems, the King's Castle and Queen's Bishop personal computer memory boards, the AMBYX burn-in and test oven, and the PEAK Ovulation Predictor. These products give Micron new uses for its memory products and open up markets and distribution channels such as retail markets.

The IS32 OpticRAM image sensor is a solid-state device capable of sending an image and translating it to digital, computer-compatible signals. It consists of a 64K DRAM packaged with a transparent glass lid. The device is the primary component of Micron's electronic camera product, the MicronEye. In 1986, the Company introduced its second-generation image-sensing device, the IS256 OpticRAM derived from its 256K DRAM. The device is used in Micron's Idetix, a recently introduced electronic camera. The Idetix gives vision to a computer and is used in machine vision systems.

The AMBYX System consists of three components. The AMBYX TBT-32000 burn-in and test oven's total capacity is 32,768 devices that may be tested and burned-in at one time. The AMBYX TBT-2000 is an engineering burn-in test station that performs thermal conditioning and functional testing with parametric verification of the DRAM's various configurations. The station can be programmed for specific production applications. The AMBYX single-board test station allows the user to perform multifunctional tests on a single board of DRAMs.

Micron Medical, incorporated in 1986 as a wholly owned subsidiary of Micron Technology, has embarked on a marketing plan for its first product, the PEAK Ovulation Predictor. The PEAK is a medical instrument designed to assist in the timing of conception and the study of biological infertility. Micron Medical will also develop instrumentation for use in the medical field.

Micron Technology, Inc.

THE COMPANY

Background

Micron Technology, Inc., was formed on October 5, 1978, under the laws of the State of Idaho. The initial shareholders and employees included semiconductor designers and layout experts previously employed by Mostek Corporation. Revenue to fund Micron Technology's development of an independent semiconductor design and to fund construction of a fabrication facility was furnished by local investors. The 50,000 square foot plant was completed in September 1981. Micron Technology is a privately held Company.

Operations

Micron Technology's corporate headquarters are in Boise, Idaho. Systems operations, wafer fabrication, limited assembly, and final test facilities are located in Boise, Idaho, but the majority of the assembly is subcontracted in Asia.

Marketing

Micron Technology markets its products through Company headquarters and a network of sales representatives. The Company also distributes its products directly, but plans to engage with national and regional distributors in the major market areas.

Micron Technology's marketing and sales headquarters are:

Micron Technology, Inc.
2805 East Columbia Road
Boise, Idaho 83706
Telephone: (208) 383-4000

PRODUCTS

Micron Technology's semiconductor products include 64K dynamic RAMs and 32K element image sensors. System products include electronic cameras and board-level products related to imaging systems.

Microrim, Incorporated

3925 159th Avenue Northeast

P.O. Box 97022

Redmond, Washington 98073

Telephone: (206) 885-2000

Fax: (206) 881-7923

Dun's Number: Not Available

Date Founded: 1981

CORPORATE STRATEGIC DIRECTION

Microrim, Incorporated, develops, markets, and supports database management system (DBMS) software. Over 600,000 IBM PC and IBM PC-compatible users employ R:BASE, the Company's flagship DBMS, to store, retrieve, and update large amounts of raw data. They then use R:BASE's extensive data manipulation, reports and forms formatting, and application development language and tools to convert the data into useful information. Microrim employs approximately 150 people.

Microrim is a privately held company, with a major investment from The Phoenix Partners, a Seattle-based venture capital partnership. The Company was founded by Wayne J. Erickson and Dennis L. Comfort in 1981. Before beginning the new company, Mr. Erickson and Mr. Comfort had led the technical team at Boeing Computer Services (BCS) that produced the first commercial database management systems based on the relational model Relational Information Management (RIM). RIM served as the basis for Microrim's first product, MicroRIM. In 1983, Microrim entered the PC DBMS market with its introduction of R:BASE 4000. Since then, Microrim has sought to develop a series of technologically superior DBMS products that will make information management easier and faster for more computer users.

R:BASE for DOS is available in English, International English, French, German, Dutch, Swedish, Spanish, Russian, and Japanese (with full support of the kanji character set), and will soon be available in Italian. It can be used with several operating environments. R:BASE for Operating System/2 (OS/2) is compatible with R:BASE for DOS and designed to take advantage of OS/2's multitasking capabilities

and greater addressable memory. R:BASE 5000, for IBM PCs, is for users with PCs limited to 256K of available memory. R:BASE 5000 for CTOS/BTOS is designed for users of Unisys' PC/workstation multiuser operating system.

From October 1985 to February 1986, Microrim completed a \$5.85 million round of financing led by The Phoenix Partners. The funds are being used to build Vanguard, an enterprise-wide data sharing system, to continue R:BASE development, and to expand Microrim's sales force and marketing programs.

Microrim manages its own distribution worldwide. The Company's product delivery system is a two-tier, distributor-dealer approach similar to that of most PC software companies. Microrim has direct-sales relationships with Egghead, Ingram Micro D, and other distributors and dealers in North America, Europe, Australia, New Zealand, and Southeast Asia. BCon Systems, Inc., is Microrim's main distributor in Japan. Microrim sells software upgrades and tools, customer support, advanced product training, and the R:BASE Exchange directly to end users.

Microrim maintains reseller and corporate field sales organizations to support its customers and distribution partners. In North America, sales representatives are located in Boston, New York, Washington, D.C., Atlanta, Miami, Chicago, Dallas, Los Angeles, San Francisco, and Seattle. International sales and customer support offices are located in London and Amsterdam.

Dataquest estimates that Microrim had sales of approximately \$21 million in 1989. Dataquest also believes that Microrim captured 2.5 percent of the DBMS market based on shipments of 34,000 units of R:BASE software.

Because Microrim is a privately held firm, comprehensive financial information is not available.

BUSINESS SEGMENT STRATEGIC DIRECTION

R:BASE

Microrim's goal in the development of R:BASE has been to provide the power of a full relational DBMS to the broadest possible base of users.

R:BASE 3.1, introduced in August 1990, is the most recent version of Microrim's DBMS. It has an intuitive, graphic-style interface, visual cross-tabs indicating relationships across columns of a table, data integrity, network data control, fully integrated ANSI Level 2 SQL language standard, and easy application generation without programming. R:BASE 3.1 can also directly read and write dBASE III and III PLUS files and directly use and update dBASE indexes through the use of Microrim's Dynamic Data Integration (DDI).

Microrim believes that R:BASE is a viable solution for developing corporate LAN-based applications due to its key networking feature, Concurrency Control. Concurrency Control enables simultaneous data entry and editing while ensuring the integrity of the data. It can be set to the row or column level and reduces unnecessary traffic as it protects the data. R:BASE also offers the Autorefresh feature that can automatically update all users' screens with current data at user-defined intervals.

Memory management advances have reduced R:BASE 3.1's memory requirements from 520K to 470K. Menu and mouse responsiveness, basic data I/O operations, and optimized functions such as sorts, queries, and lookups are faster and improved.

Microrim will continue to serve the character-based, file server architecture PC-DOS DBMS market by continuing to develop, market, and support R:BASE. In addition, Microrim is developing a "client" version of R:BASE to work with the Vanguard Database Engine.

Vanguard

In May 1987, Microrim determined that the architecture underlying today's DBMSs is inadequate to address its customers' requirements successfully, and initiated the development of a completely new DBMS, code-named Atlas. Renamed Vanguard in October 1989, this new system will be the first complete solution for enterprise-wide data sharing (EWDS) because it will deliver three benefits—usability, interoperability, and data integrity—in one system. Vanguard will enable users of incompatible hardware, operating systems, and DBMS software to transparently access, share, and update data (if the users are authorized).

The Vanguard family of products will serve the OS/2 Presentation Manager, Microsoft Windows 3.0, Apple Macintosh, DEC VAX/VMS, leading UNIX platforms including IBM's AIX, DEC ULTRIX, and Sun UNIX, as well as IBM MVS and VM mainframe environments in order to support multiplatform DBMS compatibility and applications portability.

Whereas R:BASE is designed to meet the demand for usability in the character-based PC-DOS market, Vanguard will advance DBMS usability by taking full advantage of leading graphical user interface environments. The Vanguard Database Engine will enforce data integrity and security required to support many computer users simultaneously accessing a variety of data types residing on a variety of machines in an organization.

Vanguard Data Connections are software packages that work with the Vanguard Database Engine and the engines of other leading relational DBMSs to enable data sharing across the multivendor, heterogeneous DBMS software environments that exist in most organizations today. All other back-end DBMS servers in existence today were designed with only distributed homogeneous data management in mind.

Vanguard for OS/2 Presentation Manager is scheduled to be shipped in early 1991, with support for all other platforms to be shipped during the subsequent 18 months. Based on client-server architecture, Vanguard will include a number of software products per platform—clients, servers, client-server combinations, connectivity software, and compilers—to provide flexible solutions for users of standalone PCs and workstations, work group users on small LANs, and users connected to large, enterprise-wide networks.

The Vanguard development process underwent a repositioning in 1989 when David Hull, formerly president of Microrim, was replaced as a result of Microrim's lack of profits. The repositioning may result in a delayed introduction of the Vanguard product family.

Further Information

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

1989 SALES OFFICE LOCATIONS

North America—10
Europe—2

MANUFACTURING LOCATIONS

Redmond, Washington
R:BASE and Vanguard database management software

SUBSIDIARIES

Information is not available.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Wayne J. Erickson
Chairman of the board

Jack Noonan
President and chief executive officer

Frank I. Schott
Senior vice president and chief financial officer

Dennis Comfort
Vice president of Development

Thomas Brandtonies
Vice president of Sales

Russ Sarbora
Vice president of Customer Services

PRINCIPAL INVESTORS

The Phoenix Partners

FOUNDERS

Wayne J. Erickson
Dennis L. Comfort

Company Backgrounder by Dataquest

Microsoft Corporation

16011 NE 36th Way
Box 97017
Redmond, Washington 98073-9717
Telephone: (206)882-8080
Fax: (206)883-8101
Dun's Number: 08-146-6849
Date Founded: 1974

CORPORATE STRATEGIC DIRECTION

Microsoft Corporation is the leading software manufacturing company. In fact, in 1988, Microsoft captured 33 percent of the personal computer software industry market share.

The Company has grown rapidly for three years. Its total revenue increased 36 percent to \$803.5 million* in fiscal 1989, from \$590.8 million in fiscal 1988. Net income increased 38 percent to \$170.6 million in fiscal 1989 from \$124.0 million in fiscal 1988. Microsoft has grown from fewer than 1,000 employees in 1985 to 4,000 employees in 1989.

The US sales contribution to the total revenue grew to \$519.1 million in fiscal 1989. US sales accounted for 65 percent of total sales, down from 68 percent in fiscal 1988.

Research and development expenditure totaled \$110.2 million in fiscal 1989, representing 14 percent of revenue. Much of this is dedicated to OS/2 software. Capital spending totaled \$89.3 million in fiscal 1989, representing 11 percent of revenue. The high capital expense is because of the new buildings being built on the corporate campus to accommodate the Company's fast growth.

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

Microsoft's product line is a mixture of system, development, and application software. The Company is the market leader in system and development software, and is very successful in producing and distributing many types of PC software products on multiple hardware platforms. In the application market, the Company's products include Word and Excel. Microsoft faces competition in four main areas: word processing, spreadsheets, windows, and graphics software.

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 US Dollars)

	1985	1986	1987	1988	1989
Five-Year Revenue	\$140,417	\$197,514	\$345,890	\$590,827	\$803,530
Percent Change	-	40.66	75.12	70.81	36.00
Capital Expenditure	\$6,576	\$14,108	\$58,017	\$71,642	\$89,362
Percent of Revenue	4.68	7.14	16.77	12.13	11.12
R&D Expenditure	\$17,108	\$20,523	\$38,076	\$69,776	\$110,220
Percent of Revenue	12.18	10.39	11.01	11.81	13.72
Number of Employees	910	1,153	1,816	2,793	4,000
Revenue (\$K)/Employee	\$154.30	\$171.30	\$190.47	\$211.54	\$200.88
Net Income	\$24,101	\$39,254	\$71,878	\$123,908	\$170,538
Percent Change	-	62.87	83.11	72.39	37.63
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$197.02	\$220.23	\$235.16	NA	
Quarterly Profit	41.12	45.35	49.59	NA	

NA = Not available

Source: Microsoft Corporation
Annual Reports and Forms 10-K

Table 2
Revenue by Geographic Region (Percent)

	1985	1986	1987	1988	1989
North America	88.15	81.66	73.03	67.56	64.59
International	11.85	18.34	26.97	32.44	35.41
Europe	10.02	14.22	19.75	24.51	26.39
Other	1.83	4.12	7.22	7.93	9.02

Source: Microsoft Corporation
Annual Reports and Forms 10-K

Table 3
Revenue by Distribution Channel (Percent)

Channel	1988	1989
Direct Sales	0	0
Indirect Sales	100.00	100.00
Domestic OEMs	17.00	14.00
Domestic Retail	32.00	29.00
International OEMs	14.00	18.00
International Retail	34.00	37.00
Microsoft Press/Other	3.00	2.00

Source: Microsoft Corporation
Annual Reports and Forms 10-K

1988 SALES OFFICE LOCATIONS

North America—12

MANUFACTURING LOCATIONS

North America

Snohomish County, Washington
Duplication of diskettes

Europe

Dublin, Ireland
Duplication of diskettes

SUBSIDIARIES

North America

Forethought Inc. (United States)
Microsoft Acquisition Corporation (United States)
Microsoft Canada Inc. (Canada)
Microsoft (Cayman) Inc. (United States)
Microsoft Company, Limited (United States)
Microsoft Disc Corporation (United States)
Microsoft FSC Corporation (United States)
Microsoft Ltd. (United States)

Europe

Microsoft AB (Sweden)
Microsoft BV (Netherlands)
Microsoft GmbH (Germany)
Microsoft International BV (Netherlands)
Microsoft SARL (France)
Microsoft S.p.A. (Italy)
Microsoft SRL (Italy)

Asia/Pacific

Microsoft Pty. Limited (Australia)
Microsoft Taiwan (Taiwan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

IBM

IBM and Microsoft formed an alliance to create new IBM hardware and software that will lead to a multimedia home computer. Intel and IBM will work together to create chips, circuit boards, and software to turn IBM's PS/2 computers into multimedia computers. The companies want to create a home computer for the 1990s that offers television-quality video and compact disc-quality sound.

NCR

NCR Corporation announced its intention to extend its NCR license for Microsoft's work group products to include SQL Server and Communications Server. NCR previously licensed Microsoft LAN Manager, the network operating system for OS/2 and MS-DOS workstations. NCR, a leading vendor of personal computers, is the first PC hardware company to license the complete line of Microsoft work group products.

The Santa Cruz Operation

Microsoft has purchased a minority interest in The Santa Cruz Operation, a leading developer and publisher of UNIX system software. The Santa Cruz Operation uses technology licensed from Microsoft.

1988

Ashton-Tate

In 1988, Microsoft and Ashton-Tate announced that a Microsoft-enhanced version of the SQL Server would be marketed by the two companies. Ashton-Tate will be marketing the Microsoft SQL Server through its retail channels and Microsoft will be marketing the product through its OEM channel. The Microsoft SQL Server supports the Structured Query Language, the most commonly used language for application program communication with relational databases.

Phillips and Sony

Microsoft reached an agreement with Philips and Sony to jointly develop an extended CD-ROM format called CD-ROM Extended Architecture.

This format is designed to allow the wide use and application of interactive data and information such as audio, still-image video, animation, graphics, and computer programming.

EISA

Microsoft is one of several companies participating in an industry alliance to support a major advance in the Industry Standard Architecture (ISA) used by the majority of PC manufacturers. The advance, called Extended Industry Standard Architecture (EISA), provides a 32-bit extension to the present 8- and 16-bit industry-standard expansion bus.

1987

3COM

Microsoft entered into a strategic relationship with 3Com to codevelop and jointly market the Microsoft OS/2 LAN Manager.

AT&T

Microsoft announced an agreement to develop for AT&T a new version of UNIX for the 80386 that will combine the features of Xenix and AT&T's System V technology. As part of the agreement, AT&T licensed UNIX for the first time. Microsoft delivered the merged Xenix/UNIX 386 product to AT&T during 1988.

Hewlett-Packard

Microsoft announced an alliance with Hewlett-Packard and Aldus Corporation to promote a Microsoft Windows-based solution for the desktop publishing market for machines running the MS-DOS operating system.

Olivetti

Microsoft announced a joint venture with Olivetti and SEAT (Societa Elenchi Ufficiali Degli Abbonati Al Telefono P.A.) to form a new company, Eikon Corporation. Eikon will provide a focus for the design, development, production, and marketing of CD-ROM products for the European market.

MERGERS AND ACQUISITIONS

1987

Forethought

Microsoft added to its Macintosh line by acquiring Forethought, Inc., the California software firm that developed PowerPoint, a desktop presentation program for the Macintosh. Forethought became the Microsoft Graphics Business Unit.

KEY OFFICERS

William H. Gates

Chairman of the board and chief executive officer

Jon A. Shirley

President and chief operating officer

Scott D. Oki

Senior vice president, Sales and Marketing

Steven A. Ballmer

Senior vice president, Systems Software

Jeremy Butler

Senior vice president, International Operations

PRINCIPAL INVESTORS

William H. Gates—38.1 percent

Paul G. Allen—18.6 percent

Steven A. Ballmer—5.9 percent

FOUNDERS

Information is not available.

Table 4
Comprehensive Financial Statement
Fiscal Year Ending June 30
(Thousands of US Dollars, except Per Share Data)

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$52,066	\$147,980	\$213,002	\$345,348	\$468,949
Cash	18,948	102,676	132,484	183,225	300,791
Receivables	25,273	34,499	55,131	93,602	111,180
Inventory	5,919	8,008	16,555	53,542	37,755
Other Current Assets	1,926	2,797	8,832	14,979	19,223
Net Property, Plants	\$11,190	\$19,544	\$70,010	\$130,108	\$198,825
Other Assets	\$1,808	\$3,215	\$4,742	\$17,563	\$52,824
Total Assets	\$65,064	\$170,739	\$287,754	\$493,019	\$720,598
Total Current Liabilities	\$10,624	\$29,528	\$48,649	\$117,521	\$158,818
Long-Term Debt	0	\$1,879	0	0	0
Total Liabilities	\$10,624	\$31,407	\$48,649	\$117,521	\$158,818
Total Shareholders' Equity	\$54,440	\$139,332	\$239,105	\$375,498	\$561,780
Converted Preferred Stock	5	0	0	0	0
Common Stock	22	51	53	54	55
Paid-In Capital	4,439	50,767	76,811	90,046	110,425
Retained Earnings	49,974	89,228	161,106	285,014	455,552
Translation Adjustment	(714)	1,135	384	(4,252)	
Total Liabilities and Shareholders' Equity	\$65,064	\$170,739	\$287,754	\$493,019	\$720,598
Income Statement	1985	1986	1987	1988	1989
Revenue	\$140,417	\$197,514	\$345,890	\$590,827	\$803,530
U.S. Revenue	123,777	161,287	252,623	399,128	519,056
Non-U.S. Revenue	16,640	36,227	93,267	191,699	284,474
Cost of Sales	\$30,447	\$40,862	\$73,854	\$148,000	\$204,185
R&D Expense	\$17,108	\$20,523	\$38,076	\$69,776	\$110,220
SG&A Expense	\$51,955	\$75,223	\$107,073	\$185,604	\$246,895
Capital Expense	\$6,576	\$14,108	\$58,017	\$71,642	\$89,362
Pretax Income	\$42,823	\$65,984	\$121,338	\$183,738	\$250,796
Pretax Margin (%)	30.50	33.41	35.08	31.10	31.21
Effective Tax Rate (%)	43.70	40.50	40.80	32.60	32.00
Net Income	\$24,101	\$39,254	\$71,878	\$123,908	\$170,538
Shares Outstanding, Thousands	43,066	51,040	52,713	53,663	56,245
Per Share Data					
Earnings	\$0.52	\$0.78	\$1.30	\$2.22	\$3.03
Dividends	0	0	0	0	0
Book Value	\$1.26	\$2.73	\$4.54	\$7.00	\$12.64

Table 4 (Continued)
Comprehensive Financial Statement
Fiscal Year Ending June 30
(Thousands of US Dollars, except Per Share Data)

Key Financial Ratio	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	4.90	5.01	4.38	2.94	2.95
Quick (Times)	4.34	4.74	4.04	2.48	2.72
<i>Profitability (%)</i>					
Return on Assets	42.80	31.40	31.70	31.74	28.10
Return on Equity	56.61	40.50	38.00	40.30	36.39
Profit Margin	17.16	19.87	20.78	20.97	21.22
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	12.18	10.39	11.01	11.81	13.72
Capital Spending % of Revenue	4.68	7.14	16.77	12.13	11.12
Employees	910	1,153	1,816	2,793	4,000
Revenue (\$K)/Employee	\$154.30	\$171.30	\$190.47	\$211.54	\$200.88
Capital Spending % of Assets	10.11	8.26	20.16	14.53	12.40

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

Microwave Monolithics

Microwave Monolithics
465 East Easy Street
Simi Valley, CA 93065
(805) 584-6642

Established 1982
No. of Employees: 25

BACKGROUND

Microwave Monolithics specializes in custom GaAs monolithic microwave ICs (MMICs) for Department of Defense applications. The Company is privately held by five partners and completed first-round financing in 1983 through private sources. It performed custom GaAs circuit design research and development work for government agencies and OEMs until financing was secured. By year-end 1984, it began to produce GaAs MMICs.

COMPANY EXECUTIVES

- President—Daniel R. Che'en (formerly manager, Microwave Research at Rockwell)
- Director of Operations—Robert Fairman

SERVICES

The Company provides GaAs technology R&D, GaAs chip design services, and manufacturing.

PROCESS TECHNOLOGY

Microwave Monolithics uses 0.5u GaAs (fine-line capability) technology.

PRODUCTS

The Company produces custom MMICs.

Microwave Monolithics

Applications

- Radar
- EW
- Telecommunications

FACILITIES

The Company's Simi Valley, California, facility occupies 8,000 square feet and contains two Class 100 clean rooms.

Microwave Monolithics

Microwave Monolithics
465 East Easy Street
Simi Valley, CA 93065
(805) 584-6642

Established 1982
No. of Employees: 20

BACKGROUND

Microwave Monolithics specializes in GaAs monolithic microwave ICs (MMICs) for Department of Defense microwave specialty circuits and for custom GaAs circuits.

The Company is privately held by five partners and completed first-round financing in 1983 through private sources. It performed custom GaAs circuit design research and development work for government agencies and OEMs until financing was secured. By year end 1984, it began to produce GaAs MMICs.

COMPANY EXECUTIVES

Microwave Monolithics' president is Daniel Che'en, who was formerly manager of Microwave Research at Rockwell.

SERVICES

The Company provides design services.

PROCESS TECHNOLOGY

Microwave Monolithics uses 0.5u GaAs fine-line capability technology.

PRODUCTS

The Company produces MMICs.

Microwave Monolithics

Applications

- Radar
- EW
- Telecommunications

FACILITIES

The Company's Simi Valley, California, facility has 8,000 square feet, including two class 100 clean rooms.

Microwave Semiconductor Corporation

Microwave Semiconductor Corporation
100 School House Road
Somerset, NJ 08873
(201) 563-6300

Established 1968
No. of Employees: 65*

BACKGROUND

MSC was founded in 1968 to design, develop and manufacture silicon-based microwave power transistors in the UHF 4-GHz frequency range. The Company integrated vertically into custom power amplifiers and amplifier subsystems for both commercial and military applications. In 1976, MSC entered the GaAs components market with power FETs based on flip-chip technology. The GaAs program is currently undergoing a major expansion that began in 1985 with funding of more than \$50 million from parent Siemens AG for facilities and capital equipment. This expanded GaAs program is addressing power FETs, MMICs, and analog and digital ICs.

MSC targets military and commercial microwave systems and subsystems markets including communications, radar, electronic warfare, avionics, and instrumentation. New high-speed GaAs IC products also are targeting light wave communications and high-speed computational and signal processing applications.

MSC's products are sold via manufacturers' representative organizations in the United States, Canada, the United Kingdom, Israel, Japan, and Taiwan, and via the Siemens sales organizations in Europe, India, and Brazil.

In October 1988, Siemens announced that it was looking for a buyer of the MSC operation.

COMPANY EXECUTIVES

- President—Saul Lederhandler (formerly vice president and general manager, OPCOA, Solid State Scientific Division)
- Vice President, R&D—James V. Lorenzo (formerly director III-V Technology, AT&T Bell Labs)
- Vice President, Sales and Marketing—Melvyn G. Morris (formerly vice president of sales, RCA Solid State)

*GaAs activity only; does not include any silicon device employees; excludes administrative functions such as accounting and personnel.

Microwave Semiconductor Corporation

- Vice President, Finance—Charles M. Fainsbert (formerly Assistant Treasurer, Turner Construction)
- Vice President, Manufacturing—Erik G. Halleus (formerly vice president and general manager, Microsemi Corporation)

FINANCIAL BACKING

MSC is a wholly owned subsidiary of Siemens Components, Inc.

SERVICES

- Foundry
- GaAs epitaxy (MOCVD)
- Custom MMIC and analog design

PROCESS TECHNOLOGY

- 0.5- and 1.0 μ m-GaAs D-MESFET
- E/D in development
- DSW and direct-write e-beam on 3-inch wafers

PRODUCTS

- Broadband distributed and reactively matched MMIC amplifiers
- Power GaAs FETs
- Fiber-optic chip sets (laser driver, transimpedance amp, mux, demux)
- ASICs

FACILITIES

MSC's Somerset, New Jersey, facility has 200,000 square feet, including a 7,500-square-foot class 10 clean room.

Microwave Semiconductor Corporation

Microwave Semiconductor Corporation
100 School House Road
Somerset, NJ 08873
(201) 563-6300

Established 1968
No. of Employees: N/A

BACKGROUND

MSC was founded in 1968 to design, develop and manufacture silicon-based microwave power transistors in the UHF 4-GHz frequency range. The Company integrated vertically into custom power amplifiers and amplifier subsystems for both commercial and military applications. In 1976, MSC entered the GaAs components market with power FETs based on flip-chip technology. The GaAs program is currently undergoing a major expansion that began in 1985 with funding of more than \$50 million from parent Siemens AG for facilities and capital equipment. This expanded GaAs program is addressing power FETs, MMICs, and analog and digital ICs.

MSC targets military and commercial microwave systems and subsystems markets including communications, radar, electronic warfare, avionics, and instrumentation. New high-speed GaAs IC products also are targeting light wave communications and high-speed computational and signal processing applications.

MSC's products are sold via manufacturers' representative organizations in the United States, Canada, the United Kingdom, Israel, Japan, and Taiwan, and via the Siemens sales organizations in Europe, India, and Brazil.

COMPANY EXECUTIVES

- President—Saul Lederhandler (formerly vice president and general manager, OPCA, Solid State Scientific Division)
- Vice President, R&D—James V. Lorenzo (formerly director III-V Technology, AT&T Bell Labs)
- Vice President, Sales and Marketing—Melvyn G. Morris (formerly vice president of sales, RCA Solid State)
- Vice President, Finance—Charles M. Fainsbert (formerly Assistant Treasurer, Turner Construction)
- Vice President, Manufacturing—Erik G. Halleus (formerly vice president and general manager, Microsemi Corporation)

Microwave Semiconductor Corporation

FINANCIAL BACKING

MSC is a wholly owned subsidiary of Siemens Components, Inc.

SERVICES

- Foundry
- GaAs epitaxy
- Custom MMIC and analog and digital IC design

PROCESS TECHNOLOGY

- 0.5- and 1.0um-GaAs D-MESFET
- E/D in development
- DSW and direct-write e-beam on 3-inch wafers

PRODUCTS

- Broadband distributed and reactively matched MMIC amplifiers
- Power GaAs FETs
- Fiber-optic chip sets (laser driver, transimpedance amp, mux, demux)
- Logic
- ASICs

FACILITIES

MSC's Somerset, New Jersey, facility has 200,000 square feet, including a 7,500-square-foot class 10 clean room.

MicroWave Technology, Inc.

MicroWave Technology, Inc.
4268 Solar Way
Fremont, CA 94538
(415) 651-6700

Established 1982
No. of Employees: 230

BACKGROUND

MicroWave Technology, Inc., (MwT) is a supplier of advanced GaAs products for defense-related microwave applications. The Company's products include microwave components and GaAs ICs in advanced packages called PICOPAKs. In 1987, MwT acquired Monolithic Microsystems, Inc., a maker of log video amplifiers (LVAs) located in Santa Cruz, California.

COMPANY EXECUTIVES

- Chairman of the Board—Thomas R. Baruch (formerly president of the Materials Division, Exxon)
- President/CEO—William Wilson
- Vice President, Finance—J. Geyton (formerly division controller, Avantek)
- Vice President, Materials—A. Herbig (formerly engineering manager, Avantek)
- Vice President, R&D—Dr. Masa Omori (formerly engineering manager, Avantek)
- Director, Sales—Aytch Roberts

FINANCIAL BACKING

- August 1983—Initial financing of \$4.8 million from Location Venture Capital
- Round 2 financing of \$4.3 million from venture capital and equipment lease
- June 1985—Line of credit of \$1.0 million

Investors were: Allstate Insurance Co.; Concord Partners; New Enterprise Associates; T. Rowe Price; Sequoia Capital; U.S. Venture Partners

MicroWave Technology, Inc.

SERVICES

The Company provides design and manufacturing services.

PROCESS TECHNOLOGY

- Gate lengths 0.1 to 0.25u
- GaAs MESFET
- AlGaAs HEMT
- Thin-film hybrid
- VPE on GaAs wafers

PRODUCTS

- Microwave subassemblies
- Microwave components
- GaAs FETs and HEMTs to 40 GHz
- Thin-film hybrid MICs
- MMICs
- GaAs epitaxial materials

APPLICATIONS

- Radar
- Expendable decoys
- Channelized receivers
- Radar warning receivers

MicroWave Technology, Inc.

- ECM systems
- Electronic support measures systems
- Hi-Rel (space-qualified) systems

FACILITIES

- Fremont, California—50,000 square feet, including 6,000 square feet of Class 1000 clean room
- Santa Cruz, California—8,200 square feet of manufacturing facilities

MicroWave Technology, Inc.

(Page intentionally left blank)

MicroWave Technology, Inc.

MicroWave Technology, Inc.
4268 Solar Way
Fremont, CA 94538
(415) 651-6700

Established 1982
No. of Employees: 140

BACKGROUND

MicroWave Technology, Inc., is a merchant supplier of advanced GaAs products for microwave applications. The Company's products include microwave components and GaAs ICs in advanced packages called PICOPAKs.

COMPANY EXECUTIVES

- President/CEO—Thomas R. Baruch (formerly president of the Materials Division, Exxon)
- Vice President, Finance—J. Geyton (formerly division controller, Avantek)
- Vice President, Materials—A. Herbig (formerly technical staff member, Avantek)
- Vice President, R&D—Dr. Masa Omori (formerly engineering manager, Avantek)
- Vice President, Marketing—James Cochrane (formerly production manager, Avantek)
- Vice President, Sales—David Gray (formerly sales manager, EM Systems)
- Vice President, Operations—Norm Gri (formerly manufacturing manager, Hewlett-Packard)
- R&D Manager—E. Stoneham (formerly engineering manager, Hewlett-Packard)

FINANCIAL BACKING

- August 1983—Initial financing of \$4.8 million from Location Venture Capital
- Round 2 financing of \$4.3 million from venture capital and equipment lease
- June 1985—Line of credit of \$1.0 million

MicroWave Technology, Inc.

SERVICES

The Company provides design and manufacturing services.

PROCESS TECHNOLOGY

- GaAs MESFET
- Thin-film hybrid

PRODUCTS

- GaAs FETs
- MICs
- MMICs
- Hybrids

Applications

- Military/aerospace
- Communications
- Others

FACILITIES

The Company's Fremont, California, facility has 31,000 square feet, including a 5,000-square-foot clean room.

Company Backgrounder by Dataquest

Minnesota Mining and Manufacturing Company (3M)

3M Center
St. Paul, Minnesota
Telephone: (612) 733-1110
Fax: (612) 733-9973
Dun's Number: 00-617-3082

Date Founded: 1929

CORPORATE STRATEGIC DIRECTION

Minnesota Mining and Manufacturing Company (also known as 3M) manufactures, markets, and designs pressure-sensitive adhesive tape, abrasives, specialty chemicals, roofing granules, and decorative products. 3M also serves the telecommunications and electronics markets. The Company's business developed from its research and technology in coating and bonding for coated abrasives.

3M's divisions, departments, projects, and other operating units are organized into four business sectors: Industrial and Electronic, Information and Imaging Technologies, Life Sciences, and Commercial and Consumer. These sectors have worldwide product responsibility for substantially all of the diversified 3M product lines.

3M's total revenue increased 6 percent to \$11.9 billion* in fiscal 1989 from \$11.3 billion in fiscal 1988. More than 30 percent of its revenue came from products introduced in the last five years. Net income increased 8 percent to \$1.2 billion in fiscal 1989 from \$1.1 billion in fiscal 1988. 3M employs 87,854 people worldwide.

Research and development expenditures totaled \$784 million in fiscal 1989, representing 7 percent of revenue. Capital spending totaled \$1.2 billion in fiscal 1989, representing 10 percent of revenue. Research and product development constitute an important part of 3M's activities, and products resulting from such research and product development have contributed in large measure to the Company's growth. Each major operating division and subsidiary has its own laboratory for improvement of existing products and development of related new products.

*All dollar amounts are in US dollars.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information on distribution channel is not available. Table 3, a comprehensive financial statement, is at the end of this profile.

BUSINESS SEGMENT STRATEGIC DIRECTION

Industrial and Electronic Sector

3M's Industrial and Electronic Sector serves almost every major industrial market, as well as many maintenance, office, and utilities markets, with a broad range of pressure-sensitive adhesive tapes, abrasives, specialty chemicals, roofing granules, and decorative products, as well as products in the electronics and telecommunications markets.

This sector produces electrical, electronic, and telecommunications connectors and devices; electronic packaging and interconnection devices; testing and faultfinding equipment systems; fiber optics; cable joining and terminating products; electrical insulating materials, including pressure-sensitive tapes, resins, and composite materials; and other related items of equipment, all designed for the needs of manufacturers of virtually every kind of electrical and electronic equipment, as well as the construction and maintenance segments of the electric utility, telephone, energy, and other markets. Permanent magnetic materials are used in various electrical utility, telephone, energy, and electrical and industrial manufacturing markets; fusion bond coating products are provided for corrosion protection of pipeline and structural steel. In addition, products are used in protecting electronic instruments and controls from damaging static buildup.

Information and Imaging Technologies

The Information and Imaging Technologies Sector serves a number of fast-changing markets in graphic communications; information storage, output and transfer; and audio, video, and data recording. It offers a complete line of products to serve the needs of all sizes of printers and graphic arts firms. It also offers a broad line of presensitized lithographic plates and related chemicals and supplies, duplicator press plates and automated imaging systems and related supplies, copy and art preparation materials, prepress proofing systems, and light-sensitive dry silver papers and films for electronically recorded images. This sector's imaging technologies are used in producing a line of photographic products, including medical X-ray films, graphic arts films, and amateur color films. Also provided by this sector are a number of image reproduction products and services, including laser images and other diagnostic medical hardware; overhead projectors and transparency films; fleet graphics for vehicles, railroad cars, and other applications; and sign faces and face materials for outdoor advertising and on-premises sign applications. This sector also markets equipment and supplies for business and educational applications, including processors, cameras, microfilm reader printers, and

communication terminals. In addition, it markets a line of supplies and accessories for the microfilm market, including film, aperture cards, and imaging supplies.

The Information and Imaging Technologies Sector manufactures and markets a complete line of magnetic recording products for numerous types of recording media, from home video recording to diverse professional, commercial, and industrial applications, with complex applications in computers, instrumentation, automation, and other fields. These magnetic media products include a full line of reel-to-reel, cartridge, and cassette tapes for audio and video recording in professional, commercial, educational, and home entertainment markets, as well as related equipment and supplies. In addition, this sector produces a broad line of data recording media, optical recording media, and a line of equipment and systems for broadcasting studios.

Further Information

For more information about the Company's business segments, please contact Dataquest's Document Image Management Systems Service (DIMS).

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

	1985	1986	1987	1988	1989
Five-Year Revenue	\$7,846.0	\$8,602.0	\$10,004.0	\$11,323.0	\$11,990.0
Percent Change	-	9.64	16.30	13.18	5.89
Capital Expenditure	\$767.0	\$704.0	\$763.0	\$897.0	\$1,187.0
Percent of Revenue	9.78	8.18	7.63	7.92	9.90
R&D Expenditure	\$507.0	\$564.0	\$650.0	\$721.0	\$784.0
Percent of Revenue	6.46	6.56	6.50	6.37	6.54
Number of Employees	88,093	84,498	85,144	85,569	87,854
Revenue (\$K)/Employee	\$89.06	\$101.80	\$117.50	\$132.33	136.48
Net Income	\$664.0	\$779.0	\$918.0	\$1,154.0	\$1,244.0
Percent Change	-	17.32	17.84	25.71	7.80
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$3,017.00	\$3,025.00	\$2,994.00	\$2,954.00	
Quarterly Profit	\$318.00	\$327.00	\$307.00	\$292.00	

Source: 3M
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1985	1986	1987	1988	1989
North America	67.00	63.00	57.43	55.42	55.05
International	33.00	37.00	42.57	44.58	44.95
Europe	-	-	-	-	-
Asia/Pacific	-	-	-	-	-
ROW	-	-	-	-	-

Source: 3M
Annual Reports and Forms 10-K
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—121
International—238

MANUFACTURING LOCATIONS

North America

Alabama—Decatur, Guin, Huntsville
Arizona—Tucson
Arkansas—Little Rock
California—Camaro, Chico, Corona, Culver City,
Foster City, Fresno, Irvine, Irwindale, Monrovia,
Mountain View, Northridge, Sacramento, Santa
Barbara, Santa Clara
Illinois—Bedford Park, Cordova
Indiana—Hartford City
Iowa—Knoxville, Ames
Kentucky—Cynthiana, Southfield
Minnesota—Saint Paul, Cottage Grove, Alexandria,
Pine City, Hutchinson, New Ulme, Fairmont
Missouri—Springfield, Columbia, Nevada
Nebraska—Northfolk, Valley
New Jersey—Bellmead, Freehold, West Caldwell
North Dakota—Wahpatan
Ohio—Columbus, Grove City, Mentor
Oklahoma—Witherford
Oregon—White City
Pennsylvania—Bristol
South Carolina—Greenville
South Dakota—Aberdeen, Mitchell
Texas—Austin, Brownwood
West Virginia—Middleway
Wisconsin—Cumberland, Prairie du Chien,
Menominee, Nekoosa, Wausau

SUBSIDIARIES

North America

Eastern Heights State Bank of Saint Paul (United
States)
Media Networks, Inc. (United States)
National Advertising Company (United States)
Riker Laboratories, Inc. (United States)
Sarns, Inc. (United States)

3M Canada Inc. (Canada)
3M Puerto Rico Inc. (Puerto Rico)
Unitek (United States)

Europe

Kettlehack Riker Pharma GmbH (Germany)
Laboratories Riker S.A. (France)
Moser 3M S.A. (France)
Suomen 3M OY (Finland)
3M AS (Denmark)
3M Belgium S.A./N.V. (Belgium)
3M Deutschland GmbH (Germany)
3M (East) A.G. (Switzerland)
3M Espana S.A. (Spain)
3M France S.A. (France)
3M Health Care Ltd. (Ireland)
3M Health Care Ltd. (United Kingdom)
3M Italia Finanziaria S.p.A. (Italy)
3M Netherlands B.V. (Netherlands)
3M Norge A/S (Norway)
3M Oesterreich GmbH (Austria)
3M Schweiz A.G. (Switzerland)
3M Svenska AB (Sweden)
3M United Kingdom P.L.C. (United Kingdom)

Asia/Pacific

3M Australia Pty. Ltd. (Australia)
3M Far East Ltd. (Hong Kong)
3M New Zealand Ltd. (New Zealand)
3M Singapore Private Ltd. (Singapore)

ROW

3M Argentina S.A.C.I.P.I.A. (Argentina)
3M Do Brasil Ltda. (Brazil)
3M Manufacturers Venezuela S.A. (Venezuela)
3M Mexico S.A. de C.V. (Mexico)
3M South Africa (Proprietary) Ltd. (South Africa)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1988

Sony

Under a licensing agreement, Sony is to be authorized to manufacture and market quarter-inch data cartridge products patented by 3M, including: 3M's DC300 series, DC600 series, and DC2000 quarter-inch data cartridge designs.

1987

Sun

Under an OEM agreement, 3M is to combine its family of electronic document management systems with Sun-3 and 10-mips Sun-4 workstations in an integrated system used to scan, retrieve, and update engineering documents.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Allen F. Jacobson

Chairman of the board and chief executive officer

L.D. Simone

Executive vice president, Information and Imaging Technologies Sector and Corporate Services

Allen J. Huber

Executive vice president, Commercial and Consumer Sector and Corporate Services

M.J. Monterio

Executive vice president, International Operations

Jerry E. Robertson

Executive vice president, Life Sciences Sector and Corporate Services

Kenneth A. Schoen

Executive vice president, Information and Imaging Technologies Sector

Lester C. Krough

Senior vice president, Research and Development

Russel J. McNaughton

Group vice president, Electronic Products

Gerald D. Pint

Group vice president, Telecom Systems

Benjamin L. Shely

Group vice president, Imaging Systems

PRINCIPAL INVESTORS

First Bank Systems. Inc.

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	\$3,473.0	\$3,961.0	\$4,343.0	\$5,078.0	\$5,382.0
Cash	131.0	322.0	432.0	529.0	448.0
Receivables	1,344.0	1,442.0	1,615.0	1,928.0	2,075.0
Marketable Securities	61.0	223.0	274.0	375.0	439.0
Inventory	1,622.0	1,654.0	1,770.0	1,947.0	2,120.0
Other Current Assets	315.0	320.0	252.0	299.0	300.0
Net Property, Plants	\$2,594.0	\$2,754.0	\$2,932.0	\$3,354.0	\$3,707.0
Other Assets	\$526.0	\$633.0	\$951.0	\$857.0	\$687.0
Total Assets	\$6,593.0	\$7,348.0	\$8,226.0	\$9,289.0	\$9,776.0
Total Current Liabilities	\$1,579.0	\$1,823.0	\$2,104.0	\$2,542.0	\$2,721.0
Long-Term Debt	\$431.0	\$436.0	\$435.0	\$406.0	\$885.0
Other Liabilities	\$575.0	\$626.0	\$627.0	\$827.0	\$792.0
Total Liabilities	\$2,585.0	\$2,885.0	\$3,166.0	\$3,775.0	\$4,398.0
Total Shareholders' Equity	\$4,008.0	\$4,463.0	\$5,060.0	\$5,514.0	\$5,378.0
Converted Preferred Stock	-	-	-	-	-
Common Stock	296.0	296.0	296.0	296.0	296.0
Other Equity	(677.0)	(567.0)	(431.0)	(623.0)	(1,410.0)
Retained Earnings	4,389.0	4,734.0	5,195.0	5,841.0	6,492.0
Total Liabilities and Shareholders' Equity	\$6,593.0	\$7,348.0	\$8,226.0	\$9,289.0	\$9,776.0
Income Statement	1985	1986	1987	1988	1989
Revenue	\$7,846.0	\$8,602.0	\$10,004.0	\$11,323.0	\$11,990.00
US Revenue	5,257.0	5,419.0	5,745.0	6,275.0	6,601.0
Non-US Revenue	2,589.0	3,183.0	4,259.0	5,048.0	5,389.0
Cost of Sales	\$4,746.0	\$5,074.0	\$5,852.0	\$6,551.0	\$6,946.0
R&D Expense	\$507.0	\$564.0	\$650.0	\$721.0	\$784.0
SG&A Expense	\$1,950.0	\$2,118.0	\$2,469.0	\$2,756.0	\$2,894.0
Capital Expense	\$767.0	\$704.0	\$763.0	\$897.0	\$1,187.0
Pretax Income	\$1,097.0	\$1,348.0	\$1,646.0	\$1,985.0	\$2,099.0
Pretax Margin (%)	13.98	15.67	16.45	17.53	17.51
Effective Tax Rate (%)	39.50	42.20	42.90	40.40	39.30
Net Income	\$664.0	\$779.0	\$918.0	\$1,154.0	\$1,244.0
Shares Outstanding, Millions	115.0	229.3	228.6	226.9	222.2
Per Share Data					
Earnings	\$5.77	\$3.40	\$4.02	\$5.09	\$5.60
Dividend	\$1.75	\$1.80	\$1.86	\$2.12	\$2.60
Book Value	\$34.85	\$19.46	\$22.13	\$24.30	\$24.20

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

Key Financial Ratios	1985	1986	1987	1988	1989
<i>Liquidity</i>					
Current (Times)	2.20	2.17	2.06	2.00	1.98
Quick (Times)	1.17	1.27	1.22	1.23	1.20
Fixed Assets/Equity (%)	64.72	61.71	57.94	60.83	68.93
Current Liabilities/Equity (%)	39.40	40.85	41.58	46.10	50.60
Total Liabilities/Equity (%)	64.50	64.64	62.57	68.46	81.78
<i>Profitability (%)</i>					
Return on Assets	-	11.18	11.79	13.18	13.05
Return on Equity	-	18.39	19.28	21.83	22.84
Profit Margin	8.46	9.06	9.18	10.19	10.38
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	6.46	6.56	6.50	6.37	6.54
Capital Spending % of Revenue	9.78	8.18	7.63	7.92	9.90
Employees	88,093	84,498	85,144	85,569	87,854
Revenue (\$K)/Employee	\$89.06	\$101.80	\$117.50	\$132.33	\$136.48
Capital Spending % of Assets	11.63	9.58	9.28	9.66	12.14

Source: 3M
 Annual Reports and Forms 10-K
 Dataquest (1990)

Minolta Camera Corporation, Ltd.

3-13, 2-chome, Azuchi-machi,
Chuo-ku, Osaka 541, Japan
Telephone US: (201) 825-4000
Telex Japan: J63403
Fax US: (201) 934-5153
Dun's Number: 19-635-2421

Data Founded: 1928

CORPORATE STRATEGIC DIRECTION

Minolta Corporation was established in New York in 1959 as a marketing and distribution arm of the Minolta Camera Corporation, Ltd., founded in Osaka, Japan, in 1928. Minolta Camera Corporation is one of the world's leading optical product manufacturers, producing lenses, cameras, lighting, and light-measuring equipment, micrographic reader/printers, and office copiers. Minolta Camera Corporation has two divisions: the Cameras and Accessories Division and the Business Machines Division.

The Cameras and Accessories Division is further divided into three product divisions: cameras, interchangeable lenses, and camera accessories and others. This division accounted for ¥149.4 billion (US\$1.0 billion), or 43 percent of total revenue for the year ending March 1990. Overall sales for the Camera and Accessories Division rose 6 percent during the year. (Percentage changes refer only to ¥ amounts; US\$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) The sale of cameras represented 57.8 percent of this division's revenue, while the sale of interchangeable lenses and camera accessories and others accounted for 14.4 percent and 27.8 percent, respectively.

The Business Machines Division is divided into two product categories: the copier segment and the microfilm equipment and others segment. This division was responsible for ¥198 billion (US\$1.4 billion), or 57 percent of total revenue for the year ending March 1990. Overall sales for the Business Machines Division rose 20 percent for the year. The sale of copiers represented 76 percent of total revenue, while the sale of microfilm equipment and others represented 24 percent of total revenue.

Total revenue for the year ending March 1990 was ¥347.4 billion (US\$2.4 billion), a 13.5 percent

increase over the preceding year's total of ¥306.1 billion (US\$2.4 billion). The increase was the result of a strong surge in office automation equipment in the international markets. Net income for the year ending March 1990 increased 90 percent to ¥3.8 billion (US\$26.6 million), up from ¥2.0 billion (US\$15.6 million) in the year ending March 1989. Reasons for this include a 12 percent reduction in the effective tax rate and cost-cutting measures taken by the Company.

R&D expenditure totaled ¥15.5 billion (US\$108.5 million), representing 4.5 percent of total revenue for the year ending March 1990. This increase is 6.2 percent over the previous year's figure of ¥14.6 billion (US\$114.1 million), representing 4.8 percent of total revenue for the year ending March 1989. Increased R&D activity in the Cameras and Accessories Division to counter a sluggish market is partially responsible for the posted increase in this figure. R&D for office automation systems has also increased from years past and is expected to continue increasing in the future.

Capital expenditure totaled ¥16.7 billion (US\$117.2 million), representing 4.8 percent of total revenue for the year ending March 1990. This increase is 6.4 percent over the year ending March 1989 figure of ¥15.7 billion (US\$122.2 million), representing 5.1 percent of total revenue. The increase, in part, was used to help expand international production capacities and international direct marketing capabilities. Minolta began operating a Brazilian manufacturing subsidiary in 1989, and began manufacturing toner in the United States. The number of employees is not available.

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

Business Machines Division

The Business Machines division manufactures and markets copiers, facsimile machines, laser printers, word processors, and microfilm-related equipment. Because Minolta expects office automation systems equipment to show strong and sustained growth for years to come, the Company is directing a large amount of its R&D spending to this area.

Copiers

Dataquest ranks Minolta seventh in the US plain paper copier market, with 59,900 units placed and 5.1 percent of the market. Ninety percent of the placements were in Segments 1 and 2, with the remaining 10 percent coming from Segments 3 and 4. Minolta recently introduced the EP 8601, a Segment 4 machine. In the Western European market, Minolta ranked sixth, with 6.0 percent market share in the plain paper copier market with 72,300 units placed in 1989.

Minolta and Panasonic agree to share copier technology. Panasonic will market the Minolta EP 8600 under its own name. Minolta has shared technology only two other times, once with IBM and once with Pitney Bowes. It is rare for two Japanese manufacturers to share technology. This agreement allows Panasonic to move into the higher segments of the copier market.

Other Minolta copiers currently being marketed include the EP 370, EP 370z, EP 570Z, EP 850, EP 2100, EP 3120/3150, EP 4230, EP 4300/4301, EP 5400/5401, and EP 8600.

Facsimile Machines

Minolta markets and manufactures facsimile machines worldwide. The Company's products include the recently released MinoltaFax 210, the MinoltaFax 380, the MinoltaFax 1000, and the MinoltaFax 3000. Other Minolta fax machines include the MinoltaFax 161, MinoltaFax 261, MinoltaFax 361, MinoltaFax 761, MinoltaFax 781, and MinoltaFax 851.

Office Automation (OA) Systems

Minolta's OA systems include Japanese word processors, laser printers, and microfilm-related equipment. Sales of these products surged nearly 20 percent during the period, largely because of the marketing of laser printers. Minolta's laser printers include the 340 G, SP 101, SP 130, and SP 340.

Cameras and Accessories Division

The Cameras and Accessories Division manufactures and markets single lens reflex (SLR) cameras, video cameras, compact cameras, camera lenses, and radiometric instruments. Because substantial growth in the camera market is not expected, Minolta anticipates intensifying competition. As a countermeasure, Minolta plans to devote considerable energy to increasing efficiency of R&D, manufacturing, and marketing operations.

Other

Minolta is also a world leader in planetariums, which are machines that simulate the solar system by using lasers to project the movement of the stars and planets on a concave ceiling. Sales of planetariums surged following the initial display of the Infinium universal planetarium in 1985. Minolta Planetarium Co., a specialized marketing subsidiary, was established in 1988, and a new factory is under construction in Toyokawa City.

Further Information

For further information about Minolta'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	\$1,394.7	\$2,047.1	\$2,109.1	\$2,386.5	\$2,438.6
Percent Change	-	46.77	3.03	13.15	2.18
Capital Expenditure	\$97.8	\$138.0	\$107.9	\$122.2	\$117.2
Percent of Revenue	7.01	6.74	5.12	5.12	4.80
R&D Expenditure	\$46.7	\$77.1	\$98.6	\$114.1	\$108.5
Percent of Revenue	3.35	3.76	4.67	4.78	4.45
Number of Employees	NA	NA	NA	NA	NA
Revenue (\$K)/Employee	NA	NA	NA	NA	NA
Net Income	\$49.9	\$48.3	\$18.5	\$15.6	\$26.6
Percent Change	-	(3.20)	(61.57)	(15.88)	70.37
Exchange Rate: (US\$1=¥)	¥221.26	¥150.76	¥138.03	¥128.25	¥142.47
1989 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	NA	NA	NA	NA	
Quarterly Profit	NA	NA	NA	NA	

NA = Not available

Source: Minolta Camera Co., Ltd.
Annual Reports and Forms 10-K
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
Asia/Pacific					
Japan	20.86	23.03	19.59	23.53	22.13
All Others	79.14	76.97	80.41	76.47	77.87

Source: Minolta Camera Co., Ltd.
Annual Reports and Forms 10-K
Dataquest (1990)

1990 SALES OFFICE LOCATIONS

North America—5
Europe—Not available
Asia/Pacific—Not available

MANUFACTURING LOCATIONS

North America

Goshen, New York
Toner

Europe

Germany
Copiers

Asia/Pacific

Indonesia
Cameras and photo accessories
Itami, Japan
Cameras and photo accessories
Mikawa, Japan
Cameras and photo accessories
Mizuho, Japan
Cameras and photo accessories
Sakai, Japan
Cameras and photo accessories
Sayama, Japan
Cameras and photo accessories
Toyokawa, Japan
Cameras and photo accessories

ROW

Brazil
Copiers

SUBSIDIARIES

North America

Minolta Advance Technology Inc. (United States)
Minolta Business Equipment Canada, Ltd. (Canada)
Minolta Business Systems, Inc. (United States)
Minolta Canada Inc. (Canada)
Minolta Copier Corporation of New York (United States)

Minolta Corporation (United States)
Minolta Office Systems, Inc. (United States)
Mohawk Marketing Corporation (United States)

Europe

Minolta Austria Gesellschaft mbH (Austria)
Minolta Business Equipment (Belgium) N.V. (Belgium)
Minolta Camera Benelux B.V. (Netherlands)
Minolta France S.A. (France)
Minolta GmbH (Germany)
Minolta Italia S.r.l. (Italy)
Minolta (SCHWEIZ) AG (Switzerland)
Minolta Svenska A.B. (Sweden)
Minolta (UK) Limited (United Kingdom)

Asia/Pacific

Aichi Minolta Business Equipment Co., Ltd. (Japan)
Ehime Minolta Business Equipment Co., Ltd. (Japan)
Fukuoka Minolta Business Equipment Co., Ltd. (Japan)
Kanagawa Minolta Business Equipment Co., Ltd. (Japan)
Kobe Minolta Business Equipment Co., Ltd. (Japan)
Kyoto Minolta Business Equipment Co., Ltd. (Japan)
Minolta Business Equipment Trading Co., Ltd. (Japan)
Minolta Camera Sales Co., Ltd. (Japan)
Minolta Hong Kong Limited (Hong Kong)
Minolta Malaysia Sdn. Bhd. (Malaysia)
Minolta Precision Engineering (M) Sdn. Bhd. (Malaysia)
Minolta Singapore (Pte.) Limited (Singapore)
Osaka Minolta Business Equipment Co., Ltd. (Japan)
Tokyo Minolta Business Equipment Co., Ltd. (Japan)
Yamanashi Minolta Business Equipment Co., Ltd. (Japan)

ROW

Minolta Copiadora do Amazonas, Ltda. (Brazil)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Polaroid

Minolta, via a licensing pact with Polaroid, will sell Polaroid-made cameras that will carry the Minolta name. The deal is limited to Polaroid's Spectra Pro model of instant cameras.

Ukrainian Government

Minolta has set up a joint marketing venture in the Ukraine. The venture will begin operations by importing Minolta's cameras, copiers, accessories, and supplies for the Ukrainian market.

Panasonic

Minolta and Panasonic agreed on a joint venture of technology and marketing regarding the EP 8600.

MERGERS AND ACQUISITIONS

1990

Minolta Lorraine (France)

Minolta Lorraine (France) will be formed as a subsidiary of Minolta Camera (Japan) to operate a copier parts and toner plant in France, which will serve Minolta's copier manufacturing operation in Germany, Develop Dr. Eisbein.

KEY OFFICERS

Hideo Tashima

President and director

Takayoshi Toshimitsu

Executive vice president and director

Naomi Fujita

Senior executive director

Seiichi Wasumi

Senior executive director

Ichiro Yoshiyama

Senior executive director

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

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

Balance Sheet	1985	1986	1987	1988	1989
Total Current Assets	\$1,119.5	\$1,610.0	\$1,802.2	\$1,984.1	\$2,062.0
Cash	305.2	266.2	362.3	350.7	366.0
Receivables	284.5	384.9	420.2	549.3	611.7
Marketable Securities	132.4	54.7	271.2	329.3	346.2
Inventory	355.2	675.3	680.9	667.4	649.8
Other Current Assets	42.2	229.0	67.7	87.4	88.2
Net Property, Plants	\$261.4	\$431.7	\$476.6	\$527.5	\$493.4
Other Assets	\$4.9	\$6.0	\$6.6	\$28.3	\$49.0
Total Assets	\$1,385.8	\$2,047.7	\$2,285.4	\$2,540.0	\$2,604.4
Total Current Liabilities	\$876.9	\$1,206.7	\$1,262.0	\$1,452.0	\$1,572.1
Long-Term Debt	\$143.6	\$252.8	\$371.2	\$261.7	\$218.9
Other Liabilities	\$0.7	\$1.7	\$1.7	\$2.2	\$4.0
Total Liabilities	\$1,021.3	\$1,461.2	\$1,634.9	\$1,715.9	\$1,795.0
Total Shareholders' Equity	\$364.5	\$586.4	\$650.6	\$824.1	\$809.4
Common Stock	65.7	98.1	108.8	176.1	178.5
Other Equity	163.6	256.7	291.8	385.6	371.5
Retained Earnings	135.2	231.6	250.0	262.4	259.3
Total Liabilities and Shareholders' Equity	\$1,385.8	\$2,047.7	\$2,285.4	\$2,540.0	\$2,604.4
Income Statement	1986	1987	1988	1989	1990
Revenue	\$1,394.7	\$2,047.1	\$2,109.1	\$2,386.5	\$2,438.6
Japanese	290.9	471.5	413.3	561.4	539.7
Non-Japanese Revenue	1,103.8	1,575.6	1,695.9	1,825.1	1,898.9
Cost of Sales	\$811.2	\$1,240.5	\$1,331.7	\$1,475.5	\$1,346.5
R&D Expense	\$46.7	\$77.1	\$98.6	\$114.1	\$108.5
SG&A Expense	\$469.4	\$687.4	\$749.6	\$839.8	\$903.4
Capital Expense	\$97.8	\$138.0	\$107.9	\$122.2	\$117.2
Pretax Income	\$105.7	\$101.5	\$54.8	\$57.9	\$71.1
Pretax Margin (%)	7.58	4.96	2.60	2.43	2.92
Effective Tax Rate (%)	53.00	52.00	66.00	73.00	61.00
Net Income	\$49.9	\$48.3	\$18.5	\$15.6	\$26.6
Shares Outstanding, Millions	203.0	227.0	229.2	272.4	278.8
Per Share Data					
Earnings	\$0.23	\$0.21	\$0.08	\$0.06	\$0.10
Dividend	\$0.03	\$0.06	\$0.06	\$0.07	\$0.06
Book Value	\$1.80	\$2.58	\$2.84	\$3.03	\$2.90
Exchange Rate (US\$1=¥)	¥221.26	¥150.76	¥138.03	¥128.25	¥142.47

Source: Minolta Camera Co., Ltd.
Annual Reports and Forms 10-K
Dataquest (1990)

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

Balance Sheet	1986	1987	1988	1989	1990
Total Current Assets	¥247,696.0	¥242,730.0	¥248,756.0	¥254,465.0	¥293,773.0
Cash	67,524.0	40,126.0	50,004.0	44,971.0	52,148.0
Receivables	62,953.0	58,034.0	57,999.0	70,454.0	87,153.0
Marketable Securities	29,285.0	8,245.0	37,430.0	42,233.0	49,329.0
Inventory	78,600.0	101,807.0	93,985.0	85,600.0	92,581.0
Other Current Assets	9,334.0	34,518.0	9,338.0	11,207.0	12,562.0
Net Property, Plants	¥57,831.0	¥65,078.0	¥65,791.0	¥67,653.0	¥70,296.0
Other Assets	¥1,092.0	¥898.0	¥913.0	¥3,631.0	¥6,976.0
Total Assets	¥306,619.0	¥308,706.0	¥315,460.0	¥325,749.0	¥371,045.0
Total Current Liabilities	¥194,033.0	¥181,926.0	¥174,188.0	¥186,219.0	¥223,981.0
Long-Term Debt	¥31,781.0	¥38,113.0	¥51,241.0	¥33,560.0	¥31,185.0
Other Liabilities	¥163.0	¥256.0	¥235.0	¥279.0	¥570.0
Total Liabilities	¥225,977.0	¥220,295.0	¥225,664.0	¥220,058.0	¥255,736.0
Total Shareholders' Equity	¥80,642.0	¥88,411.0	¥89,796.0	¥105,691.0	¥115,309.0
Common Stock	14,530.0	14,797.0	15,016.0	22,587.0	25,430.0
Other Equity	36,206.0	38,699.0	40,277.0	49,449.0	52,934.0
Retained Earnings	29,906.0	34,915.0	34,503.0	33,655.0	36,945.0
Total Liabilities and Shareholders' Equity	¥306,619.0	¥308,706.0	¥315,460.0	¥325,749.0	¥371,045.0
Income Statement	1986	1987	1988	1989	1990
Revenue	¥308,596.0	¥308,619.0	¥291,124.0	¥306,073.0	¥347,428.0
Japanese	64,359.0	71,082.0	57,042.0	72,005.0	76,896.0
Non-Japanese Revenue	244,237.0	237,537.0	234,082.0	234,068.0	270,532.0
Cost of Sales	¥179,496.0	¥187,012.0	¥183,813.0	¥189,231.0	¥191,839.0
R&D Expense	¥10,336.0	¥11,617.0	¥13,606.0	¥14,630.0	¥15,463.0
SG&A Expense	¥103,859.0	¥103,627.0	¥103,471.0	¥107,706.0	¥128,714.0
Capital Expense	¥21,641.0	¥20,800.0	¥14,900.0	¥15,669.0	¥16,693.0
Pretax Income	¥23,392.0	¥15,296.0	¥7,560.0	¥7,427.0	¥10,130.0
Pretax Margin (%)	7.58	4.96	2.60	2.43	2.92
Effective Tax Rate (%)	53.00	52.00	66.00	73.00	61.00
Net Income	¥11,030.0	¥7,275.0	¥2,560.0	¥2,001.0	¥3,787.0
Shares Outstanding, Millions	203.0	227.0	229.2	272.4	278.8
Per Share Data					
Earnings	¥50.02	¥32.15	¥10.37	¥7.39	¥13.62
Dividend	¥7.73	¥8.50	¥7.87	¥8.50	¥8.50
Book Value	¥397.25	¥389.48	¥391.78	¥388.00	¥413.59

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

Key Financial Ratios	1986	1987	1988	1989	1990
<i>Liquidity</i>					
Current (Times)	1.28	1.33	1.43	1.37	1.31
Quick (Times)	0.87	0.77	0.89	0.91	0.90
Fixed Assets/Equity (%)	71.71	73.61	73.27	64.01	60.96
Current Liabilities/Equity (%)	240.61	205.77	193.98	176.19	194.24
Total Liabilities/Equity (%)	280.22	249.17	251.31	208.21	221.78
<i>Profitability (%)</i>					
Return on Assets	-	2.36	0.82	0.62	1.09
Return on Equity	-	8.61	2.87	2.05	3.43
Profit Margin	3.57	2.36	0.88	0.65	1.09
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	3.35	3.76	4.67	4.78	4.45
Capital Spending % of Revenue	7.01	6.74	5.12	5.12	4.80
Employees	NA	NA	NA	NA	NA
Revenue (¥K)/Employee	NA	NA	NA	NA	NA
Capital Spending % of Assets	7.06	6.74	4.72	4.81	4.50
Exchange Rate: (US\$1=¥)	¥221.26	¥150.76	¥138.03	¥128.25	¥142.47

NA = Not available

Source: Minolta Camera Co., Ltd.
 Annual Reports and Forms 10-K
 Dataquest (1990)

Company Backgrounder by Dataquest

Mita Industrial Co., Ltd.

2-28, 1-chome, Tamatsukuri
Chuo-ku, Osaka 540, Japan

Telephone: (06) 764-3555

Fax: (06) 764-3981

Telex: MITAINTLJ64292

Dun's Number: 11-847-4022

Date Founded: 1934

CORPORATE STRATEGIC DIRECTION

Mita Industrial Co., Ltd., founded in 1934, engaged in the production of blueprinting machines. In 1951, Mita introduced a compact-sized blueprinter followed by Copystar A, a diazo copier for office use. Mita is currently active worldwide in the copier, facsimile, and laser-printer markets.

Mita's global organization is divided into four international regions: the Americas, Europe (including Africa and the Middle and Near East), Asia, and Oceania. Mita subsidiaries around the world undertake three main functions. The first is to sell Mita products, watch over market development, and develop new market opportunities. The second is to maintain Mita quality assurance by providing a continuation of customer service and training for service personnel. The third is to advertise and promote Mita products and to assist local sales activities in order to promote sales.

Financial information is not available because Mita Industrial Co., Ltd., is a privately held company.

BUSINESS SEGMENT STRATEGIC DIRECTION

Copiers

Mita manufactures and markets copiers in six of the seven Dataquest copier segments. Dataquest estimates that Mita had an 8.4 percent share of placements in the total US plain paper copier market for 1989, ranking it fourth in placements with 98,400. The

Company was most active in Segment 1, where it shipped 55,400 units and had 10.9 percent of the market in 1989. Mita also manufactures copiers for Gestetner, Monroe, Royal, Silver Reed, and Swintec. If shipments from these marketers are included, Mita would still be ranked fourth with 137,600 placements and 11.8 percent market share. This figure is representative of Mita's presence in the US plain paper copier market.

Dataquest estimates that Mita ranked ninth in the Western European market with 4.5 percent and 54,200 units placed in 1989. Again, Mita's largest market was the Segment 1 market, which was responsible for 60.5 percent of the Company's placements in Western Europe. Mita held 6 percent of the Segment 1 market in Western Europe for 1989. Mita also manufactured for AEG Olympia, Gestetner/Rex, Nashua, Océ, and Triumph Adler for distribution in the European countries. Mita's combined total of shipments (including the above marketing agreements) is approximately 150,000 with 12.9 percent of the market.

Mita Segment 1 copiers currently marketed include the CC-10/CC-20 personal copier, the C-1205/DC-1255, the DC-1605/DC-1656, and the DC-1685. The Segment 2 machines include the DC-2254/DC-2255 and the DC-2285; the Segment 3 machines include the DC-3255/DC-3285 and the DC-4055/DC-4085. The Segment 4 machines include the DC-4555/DC-4585, the DC-5055, the DC-5555/DC-5585, and the DC-5585H; the Segment 5 machine is the DC-7085.

Facsimile Machines

Mita manufactures and markets facsimile machines and also markets machines made by NEC America

Inc. Dataquest estimates that Mita had less than 1 percent share of the worldwide market for 1989. The machines that Mita manufactures and markets include the TC-70, the TC-120, and the LDC-550. The machines that Mita markets for NEC include the TC-110, the TC-170, and the TC-220.

Laser Printers

Mita participates in the laser printer market, but Dataquest estimates that it had less than 1 percent of the total worldwide market for 1989. Mita's laser printers include the LP-2080 and the LP-3155, both of which are available on an original equipment manufacturer (OEM) basis.

Further Information

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

1990 SALES OFFICE LOCATIONS

North America—8
Europe—10
Asia/Pacific—7

MANUFACTURING LOCATIONS

Asia/Pacific

Hirakata, Japan

Manufactures copier supplies, drums, and photoreceptors

Hong Kong

Manufactures copier equipment

Saitama, Japan

Manufactures the full range of products

SUBSIDIARIES

North America

Mita Copystar America, Inc. (United States)

Mita Copystar Canada, Ltd. (Canada)

Europe

Mita Copystar U.K., Ltd. (United Kingdom)

Mita Deutschland GmbH (Germany)

Mita Espana S.A. (Spain)

Mita Europe B.V. (Netherlands)

Mita Finland OY (Finland)

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

Mita GmbH Austria (Austria)

Mita Italia S.P.A. (Italy)

Mita Schweiz AG (Switzerland)

S.A. Mita Belgium N.V. (Belgium)

Asia/Pacific

Mita Copiers Australia Pty. Ltd (Australia)

Mita Corporation Ltd. (Thailand)

Mita Industrial Co., Ltd. (Hong Kong)

Mita New Zealand Ltd. (New Zealand)

Mita W.T. Singapore Pte. Ltd. (Singapore)

ROW

Mita Copystar Mexico, S.A. De C.V. (Mexico)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Information is not available.

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

Company Backgrounder by Dataquest

Mitac International Corporation

Taipei, Taiwan, R.O.C.
Telephone: 886-2-501-2679
Fax: 886-2-501-4265

Date Founded: 1974

CORPORATE STRATEGIC DIRECTION

Mitac International Corporation is a privately held company located in Taiwan with overseas subsidiaries in the United States, West Germany, United Kingdom, Japan, and Hong Kong. Mitac is a manufacturer of computer products worldwide and offers a full line of highly integrated, compact-design microcomputers that include PS/2- and AT-compatible machines. Mitac also is a distributor for Chips and Technologies, Cray, Intel, Microsoft, National Semiconductor, Northern Telecom, and Phoenix Technologies.

The 1990s will see Mitac repositioning itself as more than a vendor of PCs. Movement into high-end systems will be only part of the transformation because Mitac also will enter the video and communications fields. The establishment of Mitac's US-based ISDN communications MICC is part of the company's efforts to diversify into this area.

Total revenue increased by 67 percent to approximately \$500 million* in fiscal 1989 from approximately \$300 million in fiscal 1988. For the past five years, Mitac has been experiencing constant annual growth rates of 50 to 75 percent. Mitac's president, C.S. Ho, stated that the Mitac group sales target is \$1 billion by 1992. Mitac employs approximately 1,400 people worldwide.

Mitac's staff of over 120 engineers exclusively dedicated to research and development represents over 13 percent of Mitac's total employment. Mitac's research and development activities take place on both sides of the Pacific, as a cooperative effort between Mitac Research Corporation in San Jose, California, and Mitac's Taiwan-based research and development facilities.

*All dollar amounts are in US dollars.

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

BUSINESS SEGMENT STRATEGIC DIRECTION

Mitac has continued the transition from manufacturing products exclusively for OEM accounts toward marketing the majority of its products under the Mitac label. Starting in 1986, Mitac began offering its first Mitac-label systems. Since then the Company has introduced a complete line of full-featured small-footprint 8088-, 8086-, 80286-, 80386-, and 80386SX-based computers in addition to peripherals and UNIX-based multiuser/multitasking applications. Dataquest estimates that Mitac holds less than 1 percent of the worldwide personal computer market. However, Mitac is said to be the second-largest PC manufacturer in Taiwan, behind the Acer group. Mitac's 1990 product lineup includes high-end microprocessor systems as the Series 500 multi-CPU supermicro and laptops.

In 1989, Mitac announced a multiprocessing system and a 486-based microchannel system. Both will begin shipment in 1990.

In 1988, Mitac secured rights to manufacture and market PS/2-compatible machines through a cross-licensing agreement with IBM. Following the signing of the agreement, Mitac became one of a minority of vendors able to provide customers with both industry-standard and Micro Channel Architectures.

In addition to microcomputer offerings, Mitac produces advanced military-specification electronics for government use. In an effort to boost its technological skill and manufacturing expertise, Mitac has

cultivated ties with General Electric, Honeywell, Hughes, and Westinghouse.

Further Information

For more information about the Company's business segments, please contact the appropriate industry service. Dataquest tracks Mitac through its Personal Computer Industry Service (PCIS).

1990 SALES OFFICE LOCATIONS

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

MANUFACTURING LOCATIONS

Asia/Pacific

Hsinchu Science-Based Industrial Park, Taiwan
Manufacturing activities include the production of Mitac's entire product line. Mitac has invested heavily in its factory automation. In 1988, advanced surface-mount technology (SMT) equipment, auto-insertion machinery, and an automated burn-in room were installed at the Hsinchu plant.

SUBSIDIARIES

North America

American Mitac Corporation (United States)
Mitac Research Corporation (United States)
Mectel Corporation (United States)

Europe

Mitac GmbH (Germany)
Mitac (UK) Ltd. (England)

Asia/Pacific

Mitac Hong Kong (Hong Kong)
Mitac Japan Corporation (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

General Electric

Mitac and General Electric formed a joint venture, called Getac, that will offer electronics and information-handling equipment for defense use inside Taiwan. General Electric will provide the financial and technical support and Mitac will handle supervision.

1988

IBM Cross-Licensing Contract

Mitac has licensed IBM's PS/2 patents under a three-year cross-license contract. The agreement covers patent rights on all IBM information-handling systems, including the XT, AT, and PS/2 Micro Channel Architecture (MCA). Mitac is required to pay a basic 1 percent entrance fee to use the products and technology. Future royalties will be 1 to 5 percent.

Sequent Computer Systems

Mitac and Sequent Computer Systems entered into a three-year, \$9 million agreement in which Mitac will market Sequent Computer Systems' multiuser systems. The two firms also will develop Chinese-language computer terminals and software, and applications software.

MERGERS AND ACQUISITIONS

1989

Wyse Technology

A Taiwanese consortium, of which Mitac is a member, acquired Wyse Technology for about \$262 million. The consortium is known as Channel International Corporation.

KEY OFFICERS

Mathew Mlau
Chairman of the board

C.S. Ho
President

Mitac, Inc.

BACKGROUND

Mitac, Inc., was founded in 1974. Its wide range of products (including floppy disk drives, Winchester subsystems, Chinese terminals, add-in expansion boards, and 16-bit personal computers) are aimed at OEM and distributor customers worldwide. With the completion of its new factory in the Hsinchu Science Park, Mitac now has over 100,000 square feet of factory space devoted to the manufacture of microcomputers, disk drives, and expansion boards. Representing an investment of US\$3 million, the new factory is equipped with high-efficiency assembly lines, Zehnter 810 automatic circuit board testers, various kinds of quality control instruments, and multilayer automatic burn-in chambers where boards and microcomputers are subjected to 48 hours of burn-in at 100 degrees F.

Chairman: Matthew Miao

President: C. S. Ho

Head office: 9F, 585, Ming Sheng E. Road, Taipei, Taiwan

Factory: 1, R & D Road, 2, Hsinchu Science-Based Ind. Park, Hsin chu, Taiwan

Telephone: Head office--(02) 501-8231
Factory--(033) 262-152

Telex: 11942, 20261 ATTN: TAI AUTO, MECTAC

Fax: 886-02-5014265

Capital: US\$2,500,000

Established: 1974

Employees: 400

Mitac, Inc.

SEMICONDUCTORS PURCHASED (Millions of U.S. Dollars)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Total semiconductor	\$3.30	\$5.95	\$7.9	\$6.75
IC	3.00	5.90	7.8	6.70
TTL (74 series)	1.40	2.70	3.6	3.00
MOS	1.60	3.20	4.2	3.70
Discrete	0.03	0.05	0.1	0.05

Source: Dataquest
March 1987

AFFILIATED COMPANY

- Mitac International, Inc.

President: C.S. Ho

Address: 1, R & D Road, 2, Hsinchu Science Based Industrial
Park, Hsinchu, Taiwan

Telephone: (035) 262-152/8

Telex: 20621 MECTAC

Capital: US\$1,250,000

Employees: 280

OVERSEAS COMPANIES

- American Mitac Corporation

Address: 3385 Viso Ct., Santa Clara, CA 95050, U.S.

Telephone: (408) 988-0258; (408) 988-7508

Telex: 9103382201 MECTEL

Fax: 408-9809742

Mitac, Inc.

- Mitac Japan Corporation

Address: 4-13-5, Alaska, Minato-ku, Tokyo 107, Japan

Telephone: (3) 5866510

Telex: TERACO J 25612

Mitel Corporation

350 Legget Drive
P.O. Box 13089
Kanata, Ontario, Canada K2K 1X3
Telephone: (613) 592-2122
Fax: (613) 592-4784
Dun's Number: Not Available
Date Founded: 1973

CORPORATE STRATEGIC DIRECTION

Mitel Corporation is a leading international manufacturer of telecommunications products and semiconductor devices. Telecommunications products include PBXs for voice and data, special telephone sets, public switching systems, network devices, and other telecom-related products. Mitel also designs, manufactures, and sells integrated circuits and thick-film hybrids for use in its own electronic telecommunications products and for sale to other telecommunications and industrial electronic equipment manufacturers. As of mid-1990, British Telecom is looking to sell its 51 percent ownership in Mitel.

The major telecommunications product market in which Mitel competes is the customer premises communications equipment market. The principal geographic markets in which Mitel competes are the United States, Canada, and the United Kingdom. Mitel also competes in Asia, Australia, the Caribbean, Germany, Italy, Mexico, the Netherlands, New Zealand, Africa, and Scandinavia. Competition and distribution methods vary by geographic market.

In the United States, Mitel sells most of its PBX systems, other than the SX-2000 family of PBX systems, through telecom supply houses that are primarily national distributors of telephone equipment. The distributors, in turn, sell to independent telephone companies and to interconnect companies. As an adjunct to the telecom supply house distribution channel, Mitel has established the Mitel Qualified Dealer (MQD) program. This program provides direct marketing support and customer service to qualifying interconnect companies. In addition, products sold to the US government and the RCA Service Company are sold directly by Mitel. During fiscal 1990, sales of PBX systems to customers in the United States comprised 33 percent of Mitel's total revenue.

In Canada, Mitel sells its telecommunications products to Canada's ten major telephone companies, with some having exclusive distribution agreements for the sale and service of selected Mitel products within their operating territories. For example, AGT has an exclusive agreement to distribute all Mitel's products in the province of Alberta. Also, Mitel sells its complete range of telecommunications equipment, except for the SX-2000 product, to over 20 independent interconnect companies who sell to end users. The independent interconnect companies operate under the Mitel Quality Dealer Network Program and market analog and digital products, except for the SX-2000 system, on a nonexclusive basis in designated marketing areas in Canada. Mitel also sells SX-2000 systems directly to the marketplace through its Major Systems Sales (MSS) organization. Sales to specialized end users with large internal communications networks are conducted on a direct relationship basis.

Mitel sells its telecommunications equipment in the United Kingdom directly to customers as well as through British Telecom and distributors. During fiscal 1990, sales of PBX systems to the United Kingdom accounted for 28 percent of Mitel's total revenue.

Mitel markets its telecommunications products under licensing and/or distribution agreements and directly in several countries in Europe, the South Pacific, and the Caribbean, Asia, and Africa. Since 1982, Mitel has marketed its products in Mexico through an entity jointly owned by Mitel and the government-owned telephone company there. During fiscal 1990, sales of PBX systems to customers in European and other markets accounted for 28 percent of Mitel's total revenue.

Total revenue decreased 1 percent to \$427.4 million* (US\$362.6 million) in fiscal 1990 from \$432 million (US\$365.2 million) in fiscal 1989. (Percentage changes refer only to Can\$ amounts; US\$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) Net income decreased 45 percent to \$12.1 million (US\$10.3 million) in fiscal 1990 from \$22.2 million (US\$18.8 million) in fiscal 1989. Mitel experienced a 191 percent increase in net income in fiscal 1989. The Company employs 4,111 people worldwide.

R&D expenditure totaled \$37.5 million (US\$31.8 million) in fiscal 1990, representing 9 percent of revenue.

More detailed information is available in Tables 1 and 2, which appear after "Business Segment Strategic Direction" and present corporate highlights and revenue by region. Information on revenue by distribution channel is not available. Tables 3 and 4, comprehensive financial statements, are at the end of this backgrounder.

BUSINESS SEGMENT STRATEGIC DIRECTION

PBX

Sales of Mitel's PBX product accounted for 62 percent, 54 percent, and 49 percent of the Company's total product sales during fiscal 1988, 1989, and 1990, respectively.

The SX-200 system, first manufactured in fiscal 1979, is a microprocessor-controlled PBX that uses digital stored program and analog switching and is capable of handling up to approximately 150 telephone extension lines. The SX-200 PBX has low power consumption and can accommodate a wide range of operational features including a self-diagnostic capability. This identifies faulty circuit cards for immediate replacement and supports the operation of advanced Mitel proprietary telephones, which are sold under the SUPERSET 3 and SUPERSET 4 brand names.

The SX-100 system, introduced in fiscal 1980, is a microprocessor-controlled PBX that uses digital stored program control and analog switching and is capable of handling approximately 80 telephone extension lines. The SX-100 system can be equipped with the same operational features and flexibility in the mix of lines and trunks as the SX-200 systems.

During fiscal 1980, Mitel first manufactured the SX-20 system, a compact microprocessor-controlled PBX that uses digital stored program control and analog switching and is capable of handling up to 72 telephone extension lines and 12 outside lines. During fiscal 1984, Mitel introduced the SUPERGENERIC software enhancement, which upgraded the performance of the SX-20 PBX and permitted interfacing with the SUPERSET 3 and SUPERSET 4 feature telephones.

During fiscal 1984, Mitel introduced the first of its SX-2000 system products, the SX-2000 SG system. The SX-2000 SG system introduced an advanced architecture with powerful and easy-to-use administrative and maintenance facilities, designed to meet the immediate telecommunications requirements as well as future trends.

During fiscal 1986, the MS2001 feature enhancement was introduced, which increased the line size to 2,500 lines, permitted the SX-2000 SG system to support the SUPERSET 3 and SUPERSET 4 advanced feature telephones, and introduced the SX-2000 SG system to several countries.

Also, during fiscal 1986, the MS2002-01 software became available to SX-2000 SG system users. This software introduced a powerful digital private network protocol, Mitel Superswitch Digital Network (MSDN) and Digital Private Network Signaling System (DPNSS), to the UK market. This protocol uses the Integrated Services Digital Network (ISDN) signaling concept. ISDN provides a separate signaling channel allowing feature transparency among multiple vendors' PBXs. The MS2002-01 software also introduced two totally integrated application packages: a message center and a motel/hotel package.

The Generic 1000 feature enhancement became available during fiscal 1986 to all SX-200 PBX users to upgrade existing SX-200 PBX installations. This upgrade provides expanded line size up to approximately 400 lines, along with integrated voice/data capability. In September 1986, Mitel introduced the

*All dollar amounts are in Canadian dollars unless otherwise stated.

Generic 1001 product for the SX-200 PBX family. This product uses the PCM digital switch to provide increased line size and integrated voice/data capability.

In addition to enhancing the features of Generic 1000, the Generic 1001 software introduced a new all-digital configuration known as the SX-200D PBX. The SX-200 D product is a fully featured PBX that permits upgrading from an analog SX-200 PBX to a digital configuration.

During fiscal 1987, the MS2002-02 software became available to SX-2000 SG system users. This software introduced MSDN/DPNSS to the North American market, providing advanced voice and data networking capability.

During fiscal 1988, the MS2003-00 software became available. This software expanded the hotel/motel package and the MSDN/DPNSS functions and also introduced the Dataset 2100 and 4100 series. MS2003-00 also introduced the SX-2000 S system, which is a smaller version of the SX-2000 SG system and is capable of handling 100 to 500 lines.

During fiscal 1988, Mitel introduced a new digital PBX in North America, the SX-50, targeted at the under 100-line general business and hotel/motel marketplace. The SX-50 PBX supports both the SUPERSET 3 and SUPERSET 4 feature telephones. It is designed as a modular system that can be easily upgraded and serviced on a customer's premises.

During fiscal 1988, the Generic 1002 software became available to all SX-200 D PBX users. This release added to the SX-200 D PBX a Digital Line Card that supports the SUPERSET 3DN and SUPERSET 4DN digital telephones and the Dataset 1100 series, and permits the SX-200 D PBX to integrate voice and data over a single twisted pair of wires.

During fiscal 1989, Generic 1003 was introduced, adding two new configurations (144 ports and 672 ports) to the product portfolio, permitting up to 500 fully digital lines. Generic 1003 also introduced T1 trunking and automatic call distribution (ACD).

Also during fiscal 1989, the MS2003-01 software became available. This expanded the SX-2000 SG system line coverage to 1,000 lines, further enhanced MSDN/DPNSS, and introduced Answer Plus to provide users with ACD and auto attendant functionality.

Central Office Equipment

During fiscal 1988, Mitel announced its entry into the public switching market with the introduction of the GX5000 product, a digital central office switch for rural and suburban applications. In March 1988, Mitel released the first of its central office products, the GX5000 system, which is capable of handling up to 1,000 lines.

During fiscal 1989, Mitel introduced the GS5000-01 software, which provides GX5000 system customers with calling features.

During fiscal 1989, Mitel announced that it had entered into a distribution agreement with British Telecom Teletrade covering distribution rights for the GX5000 system in selected international markets. The first international release was introduced in 1989.

Network Devices

During fiscal 1985, Mitel introduced the Dataset 1 and Dataset 2 devices to allow interconnection of other vendors' data communications products and direct networking with Mitel's SX-200 family of products. The Dataset 1 product is a compact desktop unit that permits data transmission at rates up to 9.6 kilobits per second in asynchronous mode. Dataset 2 permits data transmission at rates up to 9.6 kilobits per second in asynchronous mode or 19.2 kilobits per second synchronously.

During fiscal 1988, Mitel introduced the Dataset 1100 series on the SX-200 D product line. The Dataset 1100 series is available in three package options, each providing high-speed, 19.2 kilobits per second, error-correcting asynchronous data communications links for a large range of computer or terminal applications. The Dataset 1101 cartridge, installed on the SUPERSET 3DN or SUPERSET 4DN digital telephones, makes it possible to place a data call with the touch of a single key and simultaneously carry on a voice call over the same line using a single port of the PBX. The Dataset 1102, a rack-mounted unit, provides two RS-232 connections to the host computer while requiring only one port in the PBX. The Dataset 1103, a standalone unit, can be used alone with a printer or computer or in conjunction with a standard telephone set as an associated data line. The Dataset 1100 series is supported on the SX-200 D PBX.

During fiscal 1989, Mitel introduced the Dataset 2100 series. The Dataset 2100 series is available in two options, each capable of operating in synchronous and asynchronous modes with speeds up to 19.2 kilobits per second. The Dataset 2102 is a rack-mounted unit; the Dataset 2103 is a standalone model. The Dataset 2100 series is supported on the SX-200 D PBX and is expected to be supported on the SX-2000 SG and the SX-2000 S systems in fiscal 1990.

In May 1989, Mitel introduced the Dataset 2200 series, which is available in two options, each providing high-speed synchronous data communication at speeds of 48, 56, or 64 kilobits per second. The Dataset 2202 is a rack-mounted unit; the Dataset 2203 is a standalone unit.

Also in May 1989, Mitel introduced the Dataset 4100 series. Products in this series, when used in conjunction with each other, eliminate the need for coaxial cabling between IBM 3270-type devices and display terminals, allowing signals to be converted and transmitted through a PBX. The Dataset 4113 is a standalone desktop model that is plugged into a display terminal. The Dataset 4122 is a controller card that is installed in a Datacabinet and provides the necessary interface between terminals and peripheral devices to a host computer. The Dataset 4100 series is supported on the SX-2000 SG and the SX-2000 S systems.

Voice and Data Peripheral Enhancement Equipment

The SMART-1 call controller, manufactured and sold by Mitel, provides simplified access to Inter-exchange Carrier (IXC) networks and can also be used to provide enhancements to PABX products, key systems, and Centrex and single-line installations.

Key Systems

Mitel markets a variety of electronic key systems ranging from two to ten lines and designed for small to medium-size business environments. The products include the TalkTo 208, TalkTo 308, TalkTo 616, and TalkTo 1032.

The Panther II system, introduced during fiscal 1989, is a major software upgrade of the existing Panther family and includes an 8-line, 20-station system, a display set, and a basic set. The Panther II system

provides an extensive number of new features and programming flexibility for the small business environment.

Telephone Sets

Mitel designs, manufactures, and markets advanced feature telephones. They include the SUPERSET 3 and SUPERSET 4 advanced feature telephones, the SUPERSET 3DN and SUPERSET 4DN digital telephones, the SUPERSET 7 telephone console, and other products described below that provide enhanced functional capability to existing telephone systems.

The Panther II Display Set, which was released in conjunction with the Panther II system, is a fully featured telephone providing a 32-character LCD that monitors call activity, programs messages, displays the date and time, and confirms dialed digits.

Mitel also manufactures and supplies single-line telephone sets, which include a basic telephone and a fully featured Trillium 1000 telephone. These products were designed to meet the needs of the PBX and Centrex market.

During fiscal 1989, Mitel developed two new single-line sets, the SUPERSET 1 and SUPERSET 2. Both sets are marketed as proprietary sets for use with all Mitel PBXs.

Integrated Circuits

Most Mitel telecommunications products use integrated circuits and thick-film hybrids designed and manufactured by Mitel. These include analog crosspoint switching components to connect phone calls in analog PBX products, digital time space switches to connect calls in digital PBX products, codec encoder/decoder and filter circuits for digitally encoding and decoding analog voice signals for transmission through digital switches and transmission paths, and digital and analog line and trunk interface circuits to connect analog and digital PBXs to station apparatus and the public switched network.

Integrated Services Digital Network (ISDN)

During fiscal 1987, Mitel introduced a complete range of components for the ISDN reference model, including interface devices for the S, U, T1, and CEPT interfaces and a compatible single-chip telephone circuit. The S interface provides the ability to

run multiple ISDN voice and data set extensions on customers' premises. The U interface provides the ISDN basic rate voice and data communication between customers' premises and the central office. The T1 and CEPT interfaces provide the ISDN primary rate network connections for North America and Europe, respectively.

During 1988, Mitel promoted the 2B1Q line code for the ISDN U interface. This line code was accepted by American National Standards Institute (ANSI) as the North America Standard and introduced the MB8900 ISDN prototype development system.

During fiscal 1989, Mitel introduced the MB89500, the world's first ISDN R (rate adaption) interface circuit, and added Link Access Protocol for the

D channel (LAPD) protocol software support for the MB8900 ISDN Express Card prototype development system. The ISDN R interface allows existing data equipment to be interfaced to the ISDN, and the LAPD software provides the signaling to control communication over this network.

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)

	1986	1987	1988	1989	1990
Five-Year Revenue	\$297.0	\$342.9	\$341.9	\$365.2	\$362.6
Percent Change	-	15.45	(0.31)	6.83	(0.70)
Capital Expenditure	-	-	-	-	-
Percent of Revenue	-	-	-	-	-
R&D Expenditure	\$37.2	\$34.2	\$23.5	\$24.5	\$31.8
Percent of Revenue	12.54	9.97	6.87	6.71	8.77
Number of Employees	4,655	4,270	4,379	4,131	4,111
Revenue (\$K)/Employee	\$63.80	\$80.31	\$78.07	\$88.41	\$88.21
Net Income	(\$115.2)	(\$61.6)	(\$19.8)	\$18.8	\$10.3
Percent Change	-	(46.47)	(67.85)	191.36	(45.28)
Exchange Rate (US\$1=Can\$)	Can\$1.39	Can\$1.32	Can\$1.23	Can\$1.19	Can\$1.19
1990 Fiscal Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	\$102.70	\$101.30	\$106.00	\$117.40	
Quarterly Profit	\$4.20	\$0.20	\$3.20	\$4.50	

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

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
North America	72.00	70.00	66.00	58.00	47.00
International	28.00	30.00	34.00	42.00	53.00

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

1990 SALES OFFICE LOCATIONS

North America—19
Europe—13
Asia/Pacific—3
ROW—2

MANUFACTURING LOCATIONS

North America

Bromont, Quebec, Canada
Design and manufacture of both in-house and commercially available ICs and thick-film hybrids
Kanata, Ontario, Canada
PBX products
Ogdensburg, New York
PBX products

Europe

Caldicot, Wales
PBX products, design and manufacture of both in-house and commercially available ICs and thick-film hybrids

Asia/Pacific

Hong Kong
Key telephone systems
Wellington, New Zealand
PBX products

SUBSIDIARIES

North America

Mitel Inc. (United States)
Mitel Finance Corporation (United States)
165556 Canada Inc. (Canada)

Europe

Mitel Telecom Ltd. (United Kingdom)
Mitel Mikroelektronik und Telefon GmbH (Germany)
Mitel S.p.A. (Italy)
Stellars Holdings (Nederland) B.V. (Netherlands)

Asia/Pacific

Mitel (Far East) Ltd. (Hong Kong)
Mitel Telecommunications Ltd. (New Zealand)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Intel Microelectronic Products

Mitel signed a technology exchange agreement regarding communications chips with Intel Microelectronic Products. The chips that will be developed by the two companies will increase the functionality and compactness of PBXs, telephones, and T1 multiplexers, while decreasing their cost.

MERGERS AND ACQUISITIONS

1990

Coradian Corporation

Mitel entered into an agreement to acquire, by means of a cash merger, all of the issued and outstanding capital stock of Coradian Corporation, an independent interconnect company. Coradian's 1989 revenue was over \$27 million.

KEY OFFICERS

Anthony F. Griffiths
Chairman of the board

John E. Jarvis
President and chief executive officer

Anthony P. Crisalli
Executive vice president, Product Development

F. Robert Dyer
Senior vice president, Marketing

Edward J. Ohlschlager
Senior vice president, Product Supply

Dr. M. Douglas Smeaton

Executive vice president and general manager,
Semiconductor Division

David J. Thomas

Chief financial officer and executive vice presi-
dent, Finance

John W. Combs

Vice president and general manager, US region

T. Kent Elliot

Vice president, Mitel Enterprises

Jean-Bernad Miellet

Vice president and general manager, EMEAA
region

John J. Jankin

Vice president and general manager, Canada,
Caribbean, and Latin America

PRINCIPAL INVESTORS

British Telecom plc—51 percent

FOUNDERS

Information is not available.

Table 3
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	\$411.2	\$381.1	\$248.6	\$253.3	\$224.2
Cash	281.7	261.1	97.4	108.8	81.2
Receivables	61.5	67.1	79.3	84.4	85.4
Inventory	65.0	50.4	69.2	57.7	54.7
Other Current Assets	3.0	2.6	2.7	2.5	2.9
Net Property, Plants	\$129.3	\$102.1	\$113.4	\$109.6	\$108.6
Other Assets	\$38.0	\$3.8	\$1.7	\$5.1	\$2.5
Total Assets	\$578.5	\$487.0	\$363.6	\$368.0	\$335.3
Total Current Liabilities	\$69.7	\$222.8	\$104.1	\$103.4	\$92.1
Long-Term Debt	\$194.9	\$14.9	\$15.2	\$8.5	\$4.8
Other Liabilities	\$5.2	\$2.2	\$2.4	-	-
Total Liabilities	\$269.8	\$239.9	\$121.7	\$111.8	\$97.0
Total Shareholders' Equity	\$308.7	\$247.1	\$242.0	\$256.2	\$241.6
Converted Preferred Stock	52.7	55.4	59.8	61.5	41.6
Common Stock	383.4	240.8	189.2	196.1	197.1
Other Equity	(127.4)	(49.2)	(7.0)	(1.4)	2.9
Retained Earnings	-	-	-	-	-
Total Liabilities and Shareholders' Equity	\$578.5	\$487.0	\$363.6	\$368.0	\$338.6
Income Statement	1986	1987	1988	1989	1990
Revenue	\$297.0	\$342.9	\$341.9	\$365.2	\$362.6
Canadian Revenue	88.7	69.0	67.7	78.9	53.7
Non-Canadian Revenue	208.3	273.9	274.2	286.3	308.9
Cost of Sales	\$192.9	\$193.5	\$196.8	\$210.9	\$208.1
R&D Expense	\$37.2	\$34.2	\$23.5	\$24.5	\$31.8
SG&A Expense	\$94.2	\$100.1	\$109.4	\$104.8	\$102.8
Capital Expense	-	-	-	-	-
Pretax Income	(\$63.9)	(\$23.6)	(\$20.3)	\$14.2	\$10.6
Pretax Margin (%)	(21.52)	(6.88)	(5.94)	3.89	2.92
Effective Tax Rate (%)	-	-	-	-	-
Net Income	(\$115.2)	(\$61.6)	(\$19.8)	\$18.8	\$10.3
Shares Outstanding, Millions	40.3	78.9	78.9	78.9	79.0
Per Share Data					
Earnings	(\$2.96)	(\$0.83)	(\$0.31)	\$0.18	\$1.70
Dividend	-	-	-	-	-
Book Value	\$7.66	\$3.13	\$3.07	\$3.25	\$3.06
Exchange Rate (US\$1=Can\$)	Can\$1.39	Can\$1.32	Can\$1.23	Can\$1.19	Can\$1.19

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

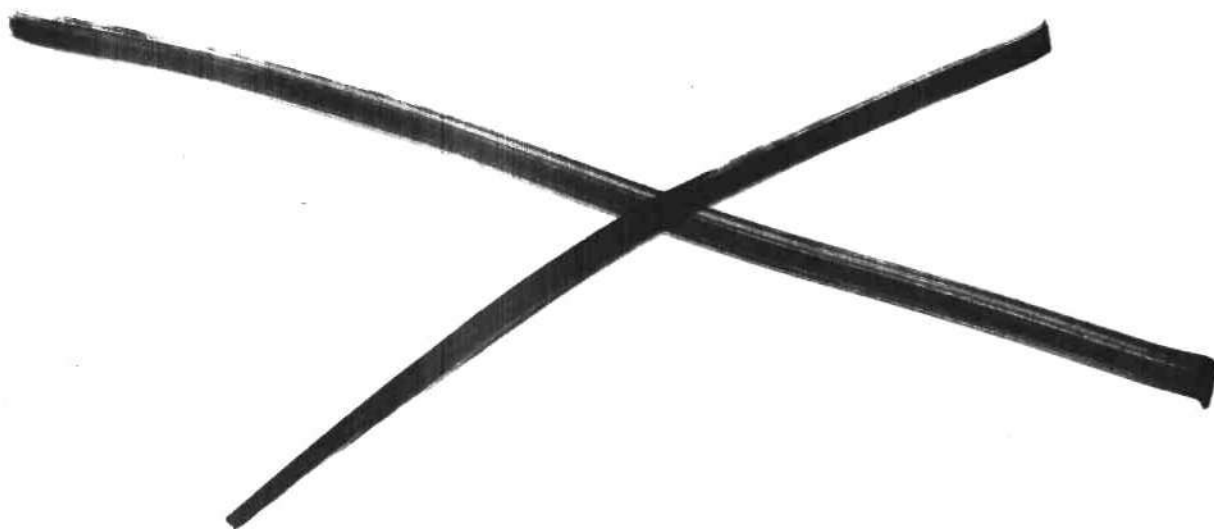
Table 4
Comprehensive Financial Statement
Fiscal Year Ending March
(Millions of Canadian Dollars, except Per Share Data)

Balance Sheet	1986	1987	1988	1989	1990
Total Current Assets	\$572.1	\$503.9	\$304.8	\$299.7	\$268.1
Cash	391.9	345.2	119.4	128.7	99.6
Receivables	85.6	88.7	97.2	99.8	100.6
Marketable Securities	-	-	-	-	-
Inventory	90.4	66.6	84.9	68.3	64.5
Other Current Assets	4.2	3.4	3.3	2.9	3.4
Net Property, Plants	\$179.9	\$135.0	\$139.0	\$129.7	\$128.0
Other Assets	\$52.8	\$5.0	\$2.1	\$6.0	\$2.9
Total Assets	\$804.8	\$643.9	\$445.9	\$435.4	\$399.0
Total Current Liabilities	\$97.0	\$294.6	\$127.7	\$122.3	\$108.6
Long-Term Debt	\$271.2	\$19.7	\$18.6	\$10.0	\$5.7
Other Liabilities	\$7.2	\$2.9	\$2.9	-	-
Total Liabilities	\$375.4	\$317.2	\$149.2	\$132.3	\$114.3
Total Shareholders' Equity	\$429.4	\$326.7	\$296.7	\$303.1	\$284.7
Converted Preferred Stock	73.3	73.3	73.3	72.8	49.0
Common Stock	533.4	318.4	232.0	232.0	232.3
Other Equity	(177.3)	(65.0)	(8.6)	(1.7)	3.4
Retained Earnings	-	-	-	-	-
Total Liabilities and Shareholders' Equity	\$804.8	\$643.9	\$445.9	\$435.4	\$399.0
Income Statement	1986	1987	1988	1989	1990
Revenue	\$413.2	\$453.4	\$419.2	\$432.1	\$427.4
Canadian Revenue	123.4	91.2	83.0	93.4	63.3
Non-Canadian Revenue	289.8	362.2	336.2	338.7	364.1
Cost of Sales	\$268.4	\$255.8	\$241.3	\$249.5	\$245.3
R&D Expense	\$51.8	\$45.2	\$28.8	\$29.0	\$37.5
SG&A Expense	\$131.0	\$132.3	\$134.1	\$124.0	\$121.2
Capital Expense	-	-	-	-	-
Pretax Income	(\$88.9)	(\$31.2)	(\$24.9)	\$16.8	\$12.5
Pretax Margin (%)	(21.52)	(6.88)	(5.94)	3.89	2.92
Effective Tax Rate (%)	-	-	-	-	-
Net Income	(\$160.2)	(\$81.5)	(\$24.3)	\$22.2	\$12.1
Shares Outstanding, Millions	40.3	78.9	78.9	78.9	79.0
Per Share Data					
Earnings	(\$4.12)	(\$1.10)	(\$0.38)	\$0.21	\$2.00
Dividend	-	-	-	-	-
Book Value	\$10.66	\$4.14	\$3.76	\$3.84	\$3.60

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

Key Financial Ratios	1986	1987	1988	1989	1990
<i>Liquidity</i>					
Current (Times)	5.90	1.71	2.39	2.45	2.43
Quick (Times)	4.97	1.48	1.72	1.89	1.84
Fixed Assets/Equity (%)	41.90	41.32	46.85	42.79	44.96
Current Liabilities/Equity (%)	22.59	90.17	43.04	40.35	38.15
Total Liabilities/Equity (%)	87.42	97.09	50.29	43.65	40.15
<i>Profitability (%)</i>					
Return on Assets	-	(11.57)	(4.66)	5.13	2.92
Return on Equity	-	(22.18)	(8.10)	7.53	4.13
Profit Margin	(38.77)	(17.98)	(5.80)	5.14	2.83
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	12.54	9.97	6.87	6.71	8.77
Capital Spending % of Revenue	0	0	0	0	0
Employees	4,655	4,270	4,379	4,131	4,111
Revenue (\$K)/Employee	\$88.76	\$106.18	\$95.73	\$104.60	\$103.96
Capital Spending % of Assets	-	-	-	-	-
Exchange Rate (US\$1=Can\$)	Can\$1.39	Can\$1.32	Can\$1.23	Can\$1.19	Can\$1.19

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



Mitsubishi Electric Corporation

Mitsubishi Denki Building
2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo 100 Japan
Telephone: (03) 218-2111
Fax: (03) 218-3686
Dun's Number: 09-141-8897

Date Founded: 1921

CORPORATE STRATEGIC DIRECTION

Established in 1921, Mitsubishi Electric Corporation is one of the world's foremost electronics and electrical appliance manufacturers. The Corporation is a pioneer in information processing equipment and new communications systems, incorporating teleconferencing technology, satellite relay, and optical fiber communications. Applying advances in electronics to industrial equipment, power generation, transportation, and consumer products, Mitsubishi Electric has been instrumental in improved efficiency, automation, and safety.

The Company achieved record net sales and profit during fiscal year 1990. Total revenue increased 7.3 percent to ¥2.9 billion (US\$20.9 billion) in fiscal year ending March 1990, up from ¥2.8 billion (US\$21.6 billion) in year ending March 1989. (Percentage changes refer only to ¥ amounts; US\$ percentage changes will differ because of fluctuations in Dataquest exchange rates.) Net income totaled ¥76.8 billion (US\$539 million) for fiscal 1990, representing an increase of 44.3 percent over fiscal 1989.

Mitsubishi Electric divides its products into four separate segments: information and communications systems and electronic products, systems, and devices; consumer products; heavy machinery; and industrial products and automotive equipment. The Company's information and communications systems and electronic products, systems, and devices segment generated the greatest amount of sales. This segment made up 30.4 percent of the Company's total sales. Consumer products sales represented the second most profitable segment, with 25.5 percent of the total, followed closely by the heavy machinery segment, which contributed 23.0 percent. Industrial products and automotive equipment accounted for 21.1 percent of total sales.

For 1990, Mitsubishi Electric's growth strategies are targeted at the restructuring of its operations and the promotion of globalization. The Company plans to focus on three main objectives: establishing a high value-added business organization centered on information and communications systems and electronic products, systems, and devices; improving its international manufacturing and sales network; and utilizing its management resources in an effective manner.

The Company believes its greatest global marketing challenge lies in the completion of construction of an efficient international manufacturing and sales network. During 1990, the Company took many actions geared at achieving this goal. In May 1990, the Company purchased the computer hardware division of Apricot Computers Plc of the United Kingdom. The company has been renamed Apricot Computers Ltd. and will be a subsidiary of Mitsubishi Electric UK Ltd. Mitsubishi Electric Europe GmbH is investing approximately ¥42.0 billion (US\$294 million) in the construction of a new production facility in Germany. Mass production of 4MB DRAMs is expected to begin in 1991 and will be followed by the manufacture of application-specific integrated circuits (ASICs) and ICs using advanced production technology. In September 1989, Mitsubishi Electric Corporation was listed on the London Stock Exchange and in November became listed on the Paris Stock Exchange.

During fiscal years 1990 and 1989, R&D expenditure totaled ¥145.1 billion (US\$1.0 billion) and ¥118.5 billion (US\$924 million), respectively. These figures represented 4.9 percent and 4.3 percent of total revenue, respectively. The Company's R&D efforts developed a digital image signal processor (DISP) during 1990, which is suitable for use in a wide range of high-precision, high-speed digital-image and video-signal processing such as that used

in video teleconferencing systems. Also developed during the year was a superconductive ceramic fiber with a diameter of 30 to 50 microns.

Capital expenditure totaled ¥223.5 billion (US\$1.6 billion), representing 7.5 percent of total revenue for year ending March 1990. This is an increase of nearly 7 percent of the 1989 figure of ¥209.5 billion (US\$1.6 billion). The Company's efforts went to construct a synchrotron radiation facility for use in the R&D of ultrafine processing semiconductors and the analysis of new materials.

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 and Communications Systems, Electronic Products, Systems, and Devices

Products in the information and communications systems, electronic products, systems, and devices area include semiconductors, mobile telephones, computers, radar systems, satellites, CRTs, printers, disk drives, POS terminals, facsimile transceivers, and information network systems and equipment. This segment produced the greatest amount of sales in 1990, totaling ¥903.5 billion (US\$6.0 billion), an 11.7 percent increase over 1989. The growth was attributed to increased sales of microcomputers, power devices, and communications equipment. A rise in export sales of semiconductors, cellular telephones, and computer peripherals also contributed significantly to this segment's growth.

Semiconductors

According to Dataquest, Mitsubishi ranks seventh in worldwide semiconductor market with an estimated ¥333.5 billion (US\$2.6 billion) in semiconductor sales for 1989. Mitsubishi ranked fifth in the MOS memory segment with ¥153.9 billion (US\$1.2 billion), or a 7.1 percent share of the worldwide market,

and fifth in the MOS microcomponents segment with ¥55.8 billion (US\$435 million), or a 5.3 percent market share, according to Dataquest estimates.

Throughout fiscal 1990, Mitsubishi Electric had many product developments, as well as expansion of its production facilities. The Company produced a memory card that it claims can accommodate one thousand 8.25 x 11.75-inch pages of information in Japanese. The Company also developed a 1MB EPROM with full capabilities, an access time of 120 nanoseconds, and a large-scale integrated (LSI) circuit that processes images and pictures ten times faster than existing models. Building began on Mitsubishi Electric's 32-bit MPU to The Real-Time Operating System Nucleus (TRON) specifications. The Company also developed a 64-bit RISC MPU using the UNIX operating system. Early in 1988, 4MB DRAMs were developed and tested and, in early 1989, the Company started production of 4MB DRAMs at the Saijo plant.

During fiscal 1989, Mitsubishi Electric expanded its 1MB DRAM manufacturing capabilities by installing a 1MB DRAM mass-production line in its Saijo and Kochi plants. This allowed production of 1MB DRAMs to reach 1 million units per month. The Kochi plant also expanded its facilities for microcomponents, enabling plant production capacity to reach 4 million units per month. The Company is enlarging its Durham, North Carolina, facility to accommodate the manufacturing of 1MB DRAMs and application-specific integrated circuits (ASICs). The full process of wafer fabrication to assembly to testing will be completed in-house.

Communications

Mitsubishi Electric's communications products include digital private branch exchanges (PBXs), facsimile machines, satellites, and video teleconferencing systems. During April 1989, the Company introduced small-capacity digital PBXs and upgraded its facsimile machines to G4 Integrated Services Digital Network (ISDN) specifications. The Company developed multichannel access mobile facsimile transmission and receiving equipment in 1988. Another innovation in digital communication being produced by Mitsubishi Electric is a packet multiplexer that connects computers and terminal units to a switching packet network.

Mitsubishi Electric is a leading manufacturer of satellite technology. In spring 1989, Mitsubishi Electric established a partnership with an American Company and a French company, receiving orders for commercial communications satellites meeting the INTELSAT-VII series standards. The Company also manufactures Japan's ETS-VI Engineering Test Satellite, which uses an ion engine for correcting the satellite's attitude and for extending the satellite's life by lightening the load. Both the INTELSAT-VII and the ETS-VI are planned for departure in 1992. Over the past three years, the Company has been involved in the development of the CS-3b domestic communications satellite, the IR-5120A thermal imager, a variety of active-phased array radars for the Japan Defense Agency, and mission computers and electronic equipment for use in fighter planes.

Information Processing Systems

Information processing systems include general-purpose, small business, and personal computers in addition to other systems. Mitsubishi Electric introduced the mp286L laptop computers and the mp386s desktop computer to the US and European markets in 1988 and 1989, respectively. The mp386s utilizes a 32-bit central processing unit. The Company began domestic marketing of its AX computers as well in 1988. In April 1989, the Company opened a subsidiary that provides systems development and information-processing services using MIND, a digital value-added network. MIND was first used to connect the Company's domestic facilities. However, it is now being extended to the Company's overseas facilities as well as being offered to other companies and clients.

Consumer Products

Sales of Mitsubishi Electric consumer products increased 8.4 percent over 1989, equaling ¥757.5 billion (US\$5.1 billion). The Company credits the growth to increased domestic consumer spending on value-added items such as color televisions, refrigerators, washing machines, and air conditioners.

Heavy Machinery

Mitsubishi Electric's sales of heavy machinery totaled ¥685.6 billion (US\$4.6 billion), representing a 7.2 percent increase over the previous year. Despite lower expected sales resulting from a drop in large-scale orders, strong domestic demand for elevators and transportation equipment, supported by major contracts for power systems and other items, allowed for a slight growth in sales.

Industrial Products and Automotive Equipment

In Mitsubishi Electric's industrial products and automotive equipment segment, the 10.5 percent increase in sales to ¥629.7 billion (US\$4.2 billion) was due primarily to extensive investment in plant and equipment and expansion of factory automation that occurred throughout the industry. This was complemented by strong domestic automobile production and increased use of mechatronics equipment.

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)

	1986	1987	1988	1989	1990
Five-Year Revenue	\$9,752	\$13,208	\$17,571	\$21,637	\$20,892
Percent Change	-	35.44	33.03	23.14	(3.44)
Capital Expenditure	\$697	\$791	\$1,038	\$1,633	\$1,569
Percent of Revenue	7.15	5.99	5.91	7.55	7.51
R&D Expenditure	\$403	NA	\$739	\$924	\$1,018
Percent of Revenue	4.13	NA	4.20	4.27	4.87
Number of Employees	71,479	73,536	75,795	85,723	85,723
Revenue (\$K)/Employee	\$136	\$180	\$232	\$252	\$244
Net Income	\$136	\$66	\$161	\$415	\$539
Percent Change	-	(51.09)	142.29	157.94	29.86
Exchange Rate (US\$1=¥)	¥221.26	¥159.56	¥138.03	¥128.25	¥142.47
1990 Calendar Year	Q1	Q2	Q3	Q4	
Quarterly Revenue	NA	NA	NA	NA	
Quarterly Profit	NA	NA	NA	NA	

NA = Not available

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest (1990)

Table 2
Revenue by Geographic Region (Percent)

Region	1986	1987	1988	1989	1990
Asia/Pacific	NA	NA	NA	NA	77.40
Japan	NA	NA	NA	NA	77.40
International	NA	NA	NA	NA	22.60

NA = Not available

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest (1990)

1989 SALES OFFICE LOCATIONS

North America—22
Europe—9
Asia/Pacific—36
Japan—34
ROW—7

MANUFACTURING LOCATIONS

North America

Mitsubishi Consumer Electronics America, Inc.
(United States)
Color TVs, projection TVs, car telephones
Mitsubishi Electric Manufacturing Cincinnati, Inc.
(United States)
Electrical auto parts, car audio equipment
powerex, diodes, thyristors, and transistors
Mitsubishi Electric Sales Canada (Canada)
Color TVs
Mitsubishi Electronics Industries Canada, Inc.
(Canada)
Color CRTs
Mitsubishi Semiconductor America, Inc. (United States)
Semiconductors

Europe

Mitsubishi Electric (United Kingdom)
Color TVs, VCRs

Asia/Pacific

D. B. Seiko (Japan)
Electrical auto parts
Dahsen Electronic Industries (Malaysia)
Audio equipment
K. K. Sowa (Japan)
Electrical equipment
Kanebo Denshi (Japan)
IC assembly
Kang Yong Electric Manufacturing (Malaysia)
TVs, air conditioners, fans
Koryo Denki (Japan)
Electrical/electronic materials
Koshin Denki (Japan)
Measuring instruments, electrical equipment
MELCO Manufacturing Thailand (Thailand)
FDDs for personal computers

Mitsubishi Australia Pte. Ltd. (Australia)
Color TVs, car telephones
Mitsubishi Electric Home Appliance (Japan)
Home electrical appliances
Mitsubishi Electronics Manufacturing (Singapore)
Color TVs, car audio equipment
Mitsubishi Kochi (Japan)
1Mb DRAMs
Mitsubishi Precision (Japan)
Electronic instruments
Mitsubishi Sajo (Japan)
1Mb DRAMs
Oi Electric (Japan)
Communications equipment
Omori Denki Kogyo (Japan)
Electrical equipment
Osram Melco (Japan)
Lamps
Ryoden Denshi Kiko (Japan)
Antennas
Ryoden Kasei (Japan)
Electrical/electronic materials
Ryoden Tokki (Japan)
Electronic applied equipment
SPC Electronics (Japan)
Microwave/ultrasonic applied equipment
Sanryo Sangyo (Japan)
Electronic equipment
Sanwa Denki (Japan)
Electrical equipment
Seiryu Buhin (Japan)
Electrical equipment parts
Shihlin Electric and Engineering (Malaysia)
Capacitors, electrical auto parts, transformers
Shizuki Electric (Japan)
Capacitors
Shoryo Denshi (Japan)
Electrical equipment
Thai CRT (Thailand)
Color CRTs
Toyo Kiko Seisakusho (Japan)
Air conditioning equipment
VXL India (India)
Wattmeters, relays, time buses

ROW

Comercio e Industria Induco (South America)
Power systems for communications equipment
Friem S. A. de C. V. (South America)
Refrigerators, washing machines
Grupo Industrial Comasa (South America)
Compressors for refrigerators

SUBSIDIARIES

North America

Horizon Research, Inc. (United States)
Mitsubishi Consumer Electronics America, Inc.
(United States)
Mitsubishi Electric America, Inc. (United States)
Mitsubishi Electric Manufacturing Cincinnati, Inc.
(United States)
Mitsubishi Electric Sales America, Inc. (United States)
Mitsubishi Electric Sales Canada, Inc. (Canada)
Mitsubishi Electronics America, Inc. (United States)
Mitsubishi Electronics Industries Canada, Inc.
(United States)
Mitsubishi Semiconductor America, Inc. (United States)

Europe

Melco Iberia S.A. (Spain)
Mitsubishi Electric Europe GmbH (Germany)
Mitsubishi Electric France S.A. (France)
Mitsubishi Electric Netherlands B.V. (Netherlands)
Mitsubishi Electric (UK) Ltd. (United Kingdom)

Asia/Pacific

Ad. Melco Co., Ltd. (Japan)
Koryo Denki (Japan)
Koshin Denki (Japan)
Melcom Business Machines Co., Ltd. (Japan)
Mitsubishi Electric Credit Co., Ltd. (Japan)
Mitsubishi Electric Home Appliance Co., Ltd. (Japan)
Mitsubishi Electric Service Engineering Co., Ltd.
(Japan)
Mitsubishi Electronics Manufacturing Singapore
(Pte.) Ltd. (Singapore)
Mitsubishi Space Software Co., Ltd. (Japan)
Nakayama Kikai Co., Ltd. (Japan)
Ryoden Denshi Kiko (Japan)
Ryoden Elevator Construction Co., Ltd. (Japan)
Ryoden Engineering Co., Ltd. (Japan)
Ryoden Estate Co., Ltd. (Japan)
Ryoden Kasei (Japan)
Ryoden Service Co., Ltd. (Japan)
Ryoden Tokki Co., Ltd. (Japan)
Ryoden Unyu Co., Ltd. (Japan)
Ryoreisha Co., Ltd. (Japan)
Ryowa Shoko Co., Ltd. (Japan)
SPC Electronics Corporation (Japan)
Sanryo Sangyo (Japan)
Seiryu Buhin (Japan)

Shiga Bolt Co., Ltd. (Japan)
Tada Electric Co., Ltd. (Japan)
The Kodensha Co., Ltd. (Japan)
Toyo Electric Co., Ltd. (Japan)
Toyo Kiko Seisakusho (Japan)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1990

Interactive Systems Corporation

Mitsubishi Electric Corporation signed an agreement to distribute Interactive Systems Corporation's UNIX products in Europe.

Yokogawa Hewlett-Packard Company

Yokogawa Hewlett-Packard Company has agreed to work with Mitsubishi Electric Corporation to develop in-circuit emulators and software development equipment for Mitsubishi's 16-bit microcontrollers.

AT&T Microelectronics

Mitsubishi Electric Corporation signed a technology-sharing and marketing agreement with AT&T Microelectronics. Under this five-year agreement, AT&T will receive access to Mitsubishi's SRAM design and process technology. AT&T also will get global manufacturing and marketing rights to all of Mitsubishi's SRAM products.

Raytheon

Mitsubishi Electric Corporation will produce US-developed Aim-7M Sparrow missiles under license from Raytheon. The Aim-7M Sparrow is an all-weather, air-to-air, medium-range missile that will be used with a fleet of F-15 fighters.

1989

Siam Cement

Under a joint venture, Mitsubishi established capital participation in Siam Compressor Industry Co., Ltd.

1988

Fujitsu and Hitachi

Fujitsu, Hitachi, and Mitsubishi Electric Corporation developed the first silicon on the TRON-based H32/200 32-bit MPU. First silicon was also achieved on several peripheral devices.

National Semiconductor

Mitsubishi Electric Corporation began importing National Semiconductor's 32-bit MPUs and assembling National's high-speed TTLs in Japan.

RCA Corporation

The companies made a licensing agreement for TV sets and color CRTs.

Goldstar Electric Equipment

The companies made a licensing agreement for CD players.

1987

Texas Instruments

The companies made a licensing agreement for semiconductors and ICs.

Motorola Inc.

The companies made a licensing agreement for semiconductors and ICs.

Samtel Color

The companies made a licensing agreement for color CRTs.

Melco Manufacturing

The companies made a licensing agreement for floppy disk devices.

KEFICO Corporation

The companies made a licensing agreement for automotive engine control equipment.

Thai CRT

The companies made a licensing agreement for color CRTs.

National Semiconductor

The companies made an agreement for the OEM import of 32-bit microprocessors by Mitsubishi.

Intel Corp.

Mitsubishi subcontracts production of Intel 8-bit microcontrollers for the Japanese market.

Osram GmbH

The companies undertook a joint venture in Japan to produce lamps.

MERGERS AND ACQUISITIONS

1990

Apricot Computers

Mitsubishi Electric Corporation acquired Apricot Computers' computer hardware division for \$64.0 million. The PC unit will trade under

the name Apricot Computers Ltd. as a subsidiary of Mitsubishi Electric (UK) Ltd., while Apricot will change its name to ACT. The hardware unit makes IBM-compatible Micro Channel Architecture (MCA) machines.

KEY OFFICERS

Nihachiro Katayama
Chairman

Moriya Shiki
President

Shinichi Yufu
General manager, International Operations Group

Kokichi Sonda
General manager, Headquarters—Marketing

Yasuo Endo
General manager, Information and Communication Systems Group

Hideo Morii
General manager, Corporate Strategic Planning Office

Hisao Oka
General manager, Headquarters—Research and Development; Headquarters—Engineering and Manufacturing

PRINCIPAL INVESTORS

Mitsubishi Trust & Banking—5.6 percent
Meiji Mutual Life Insurance—4.1 percent
Mitsui Trust & Banking—4.1 percent
Nippon Life Insurance—3.7 percent
Mitsubishi Bank—3.2 percent
Japan Securities Clearing—2.7 percent
Sumitomo Trust & Banking—2.3 percent
Yasuda Trust & Banking—2.1 percent
Employees' Association—2.0 percent
Norinchukin Bank—1.9 percent

FOUNDERS

Information is not available.

Table 3
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	\$5,446	\$8,051	\$10,668	\$14,490	\$17,532
Cash	462	NA	2,482	3,738	4,557
Receivables	2,077	NA	3,994	5,133	5,024
Marketable Securities	494	NA	833	985	3,059
Inventory	1,810	NA	2,478	3,336	3,602
Other Current Assets	604	NA	881	1,299	1,290
Net Property, Plants	1,756	NA	3,501	4,050	3,901
Other Assets	1,083	NA	1,979	2,559	841
Total Assets	\$8,284	\$12,182	\$16,149	\$21,099	\$22,274
Total Current Liabilities	\$4,810	NA	\$9,817	\$12,698	\$11,612
Long-Term Debt	\$974	NA	\$1,489	\$2,112	\$4,082
Other Liabilities	\$389	NA	\$808	\$1,206	\$1,337
Total Liabilities	\$6,173	NA	\$12,114	\$16,016	\$17,032
Minority Interest	\$17	NA	\$38	\$100	\$118
Total Shareholders' Equity	\$2,095	NA	\$3,996	\$4,982	\$5,125
Common Stock	532	NA	1,096	1,328	1,214
Other Equity	506	NA	1,168	1,504	1,577
Retained Earnings	1,057	NA	1,732	2,150	2,334
Total Liabilities and Shareholders' Equity	\$8,284	\$12,182	\$16,149	\$21,099	\$22,274
Income Statement	1986	1987	1988	1989	1990
Revenue	\$9,752	\$13,208	\$17,571	\$21,637	\$20,892
Japanese Revenue	NA	NA	NA	NA	16,162
Non-Japanese Revenue	NA	NA	NA	NA	4,730
Cost of Sales	\$7,285	\$10,187	\$13,162	\$15,612	\$14,828
R&D Expense	\$403	NA	\$739	\$924	\$1,018
SG&A Expense	\$1,547	\$2,594	\$2,679	\$3,424	\$3,449
Capital Expense	\$697	\$791	\$1,038	\$1,633	\$1,569
Pretax Income	\$327	\$239	\$455	\$1,005	\$1,267
Pretax Margin (%)	3.36	1.81	2.59	4.65	6.06
Effective Tax Rate (%)	58.0	58.0	56.0	56.0	54.0
Net Income	\$136	\$66	\$161	\$415	\$539
Shares Outstanding, Millions	1,799	1,864	2,023	2,124	2,135
Per Share Data					
Earnings	\$6.18	\$3.44	\$7.80	\$19.24	\$24.36
Dividend	NA	NA	NA	NA	NA
Book Value	\$1.16	0	\$1.98	\$2.35	\$2.40
Exchange Rate (US\$1=¥)	¥221.26	¥159.56	¥138.03	¥128.25	¥142.47

NA = Not available

Source: Mitsubishi Electric Corporation
 Annual Reports
 Dataquest (1990)

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

Balance Sheet	1986	1987	1988	1989	1990
Total Current Assets	¥1,204,998	¥1,284,614	¥1,472,490	¥1,858,299	¥2,497,749
Cash	102,119	NA	342,638	479,376	649,249
Receivables	459,647	NA	551,235	658,279	715,763
Marketable Securities	109,215	NA	115,044	126,281	435,817
Inventory	400,423	NA	341,987	427,791	513,199
Other Current Assets	133,594	NA	121,586	166,572	183,721
Net Property, Plants	¥388,487	NA	¥483,311	¥519,387	¥555,846
Other Assets	¥239,533	NA	¥273,194	¥328,241	¥119,823
Total Assets	¥1,833,018	¥1,943,779	¥2,228,995	¥2,705,927	¥3,173,418
Total Current Liabilities	¥1,064,193	NA	¥1,355,048	¥1,628,557	¥1,654,413
Long-Term Debt	¥215,532	NA	¥205,548	¥270,815	¥581,555
Other Liabilities	¥86,129	NA	¥111,537	¥154,669	¥190,538
Total Liabilities	¥1,365,854	NA	¥1,672,133	¥2,054,041	¥2,426,506
Minority Interest	¥3,715	NA	¥5,263	¥12,887	¥16,781
Total Shareholders' Equity	¥463,449	NA	¥551,599	¥638,999	¥730,131
Common Stock	117,658	NA	151,310	170,285	172,984
Other Equity	111,981	NA	161,273	192,935	224,646
Retained Earnings	233,810	NA	239,016	275,779	332,501
Total Liabilities and Shareholders' Equity	¥1,833,018	¥1,943,779	¥2,228,995	¥2,705,927	¥3,173,418
Income Statement	1986	1987	1988	1989	1990
Revenue	¥2,157,708	¥2,107,505	¥2,425,319	¥2,774,931	¥2,976,420
Japanese Revenue	NA	NA	NA	NA	2,302,603
Non-Japanese Revenue	NA	NA	NA	NA	673,817
Cost of Sales	¥1,611,843	¥1,625,497	¥1,816,806	¥2,002,269	¥2,112,504
R&D Expense	¥89,118	NA	¥101,948	¥118,507	¥145,076
SG&A Expense	¥342,333	¥413,835	¥369,750	¥439,127	¥491,343
Capital Expense	¥154,192	¥126,236	¥143,291	¥209,454	¥223,500
Pretax Income	¥72,461	¥38,175	¥62,784	¥128,950	¥180,472
Pretax Margin (%)	3.36	1.81	2.59	4.65	6.50
Effective Tax Rate (%)	58.0	58.0	56.0	56.0	54.0
Net Income	¥30,047	¥10,598	¥22,213	¥53,236	¥76,796
Shares Outstanding, Millions	1,799	1,864	2,023	2,124	2,135
Per Share Data					
Earnings	¥1,367	¥549	¥1,077	¥2,468	¥3,471
Dividend	NA	NA	NA	NA	NA
Book Value	¥258	0	¥273	¥301	¥342

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

Key Financial Ratios	1986	1987	1988	1989	1990
<i>Liquidity</i>					
Current (Times)	1.13	NA	1.09	1.14	1.51
Quick (Times)	0.76	NA	0.83	0.88	1.20
Fixed Assets/Equity (%)	83.83	NA	87.62	81.28	76.13
Current Liabilities/Equity (%)	229.62	NA	245.66	254.86	226.59
Total Liabilities/Equity (%)	294.72	-	303.14	321.45	332.34
<i>Profitability (%)</i>					
Return on Assets	-	0.56	1.06	2.16	2.61
Return on Equity	-	4.57	8.05	8.94	11.22
Profit Margin	1.39	0.50	0.92	1.92	2.58
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	4.13	NA	4.20	4.27	4.87
Capital Spending % of Revenue	7.15	5.99	5.91	7.55	7.51
Employees	71,479	73,536	75,795	85,723	89,113
Revenue (¥K)/Employee	¥30,187	¥28,660	¥31,998	¥32,371	¥33,401
Capital Spending % of Assets	8.41	6.49	6.43	7.74	7.04
Exchange Rate (US\$1=¥)	¥221.26	¥159.56	¥138.03	¥128.25	¥142.47

NA = Not available

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest (1990)

Mitsubishi Electric Corporation

Mitsubishi Denki Building
2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo 100 Japan
Telephone: (03) 218-2111
Fax: (03) 218-3686
Dun's Number: 09-141-8897

Date Founded: 1921

CORPORATE STRATEGIC DIRECTION

Established in 1921, Mitsubishi Electric Corporation is one of the world's foremost electronics and electrical appliance manufacturers. The Corporation is a pioneer in information processing equipment and new communications systems, incorporating teleconferencing technology, satellite relay, and optical fiber communications. Applying advances in electronics to industrial equipment, power generation, transportation, and consumer products, Mitsubishi Electric has been a strong promoter of improved efficiency, automation, and safety.

Sales in the Company's information and communication systems and electronic products, systems, and devices segment make up 28.2 percent of total sales. Consumer product sales were the second most important segment with 27.3 percent of the total, followed closely by the heavy machinery segment, which contributed 26.2 percent. Industrial products and automotive equipment accounted for 18.3 percent of total sales.

Mitsubishi's total revenue increased 26 percent to \$19.4 billion* in fiscal 1988 from \$15.4 billion in fiscal 1987. Net income increased 135 percent to \$177.7 million in fiscal 1988 from \$75.7 million in fiscal 1987. Mitsubishi employs more than 75,700 people worldwide.

Japan's domestic sales contribution to Mitsubishi's total revenue grew to \$14.9 billion in 1988. Domestic sales accounted for 77 percent of the total, up marginally from 76 percent in fiscal 1987. Forty-six percent of the Company's 74 sales offices are in Japan. The

Company has manufacturing locations worldwide with a concentration in Japan.

Research and development expenditures totaled \$815.6 million in fiscal 1988, representing 4 percent of revenue. Capital spending totaled \$1.7 billion in fiscal 1988, or 9 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

Information and Communication Systems, Electronic Products, Systems, and Devices

Products in the information and communications systems, electronic products, systems, and devices area include semiconductors, mobile telephones, computers, radar systems, satellites, CRTs, printers, disk drives, POS terminals, facsimile transceivers, and information network systems and equipment. This segment of the Company's products is the largest and had the largest sales increase percentage, 18.5 percent in 1988. The increase was attributed to the expanded line of communication and information processing systems that proved to be highly successful, and to the rebound of domestic and overseas semiconductor market.

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

Semiconductors

According to Dataquest, Mitsubishi placed eighth in the 1988 world semiconductor market share ranking with an estimated \$2.3 billion in semiconductor sales. This was a 55 percent increase over the Company's 1987 semiconductor sales. Mitsubishi ranked fourth in the MOS memory segment with \$932 million or 8.1 percent of the worldwide market share, and fifth in the MOS microdevice segment with \$402 million, or 5.3 percent market share, according to Dataquest's estimate.

Accomplishments in the memory segment include the addition of a 1Mb DRAM line to Mitsubishi's Kochi plant. Early in 1988, 4Mb DRAMs were developed and sampled, and in early 1989, Mitsubishi started production of 4Mb DRAMs at the Sajo plant. Three 25ns, 256K CMOS SRAMs were introduced in 1988. These products have the fastest access times currently available for cache and main memory products. Three 15ns, 64K SRAMs were developed jointly with NTT, and a 1Mb EEPROM was developed with a new CMOS EEPROM cell.

Mitsubishi increased the production of microcontroller products manufactured specifically for industrial use. Also in the microdevice segment, Mitsubishi started a 16-bit, 1-chip microcomputer series at Kochi. The chip incorporates an EPROM with the world's largest memory, according to Mitsubishi. Its 8-bit MPUs reached 1 million units per month in March 1988. In 1989, it began building its 32-bit MPU to The Real-Time Operating System Nucleus (TRON) specifications. The Company also developed a 64-bit RISC MPU using the UNIX operating system.

Other semiconductor accomplishments include the development of a superlow-static, high-electric-motion transistor for use in telecommunications products. Mitsubishi developed an optical neurochip for commercial applications and jointly developed a high-speed voice and image data processing chip with Sharp.

Other developments include LSI chip sets, which were developed with Hitachi for EDTV, and laser printer ICs that were shipped at the end of 1988. In March 1988, it was reported that Mitsubishi had begun talks with the major European banks and computer houses in order to interest them in its family of

"smart" cards and memory cards. It is Mitsubishi's plan to dominate the European IC card market.

Communications

Mitsubishi considers communications to be its most important field. A key product in this area is a video teleconferencing system. The Company also is marketing satellite communications systems to private companies. Another innovation in digital communications is a packet multiplexer that connects computers and terminal units to a switching packet network. Mitsubishi Electric has held the largest share of its domestic market for wireless communication equipment for several decades. In 1988, Mitsubishi developed multichannel access (MCA) mobile facsimile transmission and receiving equipment, breaking new ground in the rapidly expanding MCA market, and reinforced its sales network for PBXs.

Information Processing Systems

Information processing systems include general-purpose, small business, and personal computers in addition to other systems. In small business computers, the Company introduced the M3300 series workstation, an advanced 16-bit personal computer. In fiscal 1987, it developed a 32-bit workstation. Mitsubishi also developed an artificial intelligence computer, the MELCOM PSI, and now has an upgraded version, the MELCOM PSI-II.

According to Dataquest estimates, Mitsubishi has less than 1 percent of the worldwide market share in the personal computer industry. It also had less than a 1 percent market share of workstations shipped worldwide in 1988. Mitsubishi is ranked ninth in the CAD/CAM mapping application segment of the industry. It earned \$15.4 million in 1988 and captured 1 percent of the worldwide market share. Mitsubishi was also one of the six leading suppliers of flexible disk drives that captured 83 percent of 1988 revenue. The Company captured 11 percent of the market share itself.

Consumer Products

Mitsubishi's sales in the consumer products segment increased 8.5 percent to \$5.2 billion, reflecting higher domestic consumer spending and growth in new housing construction, increasing demands for such items as large-screen color televisions, VCRs, and air conditioners.

Heavy Machinery

The Company's sales of heavy machinery went up 10.4 percent to \$5.0 billion, due primarily to the domestic construction boom, creating improved sales of elevators, expanded public works investment, and increased overseas orders for its railway transportation systems.

Industrial Products and Automotive Equipment

In Mitsubishi's industrial products and automotive equipment segment, the 12.2 percent increase in sales

to \$3.5 billion is due to increased foreign and domestic capital investment, particularly in mechatronics equipment and manufacturing rationalization equipment. The increase in automotive equipment sales was fueled by expanded domestic demand for automobiles and increased installation of mechatronics equipment to meet car buyers' desire for higher quality.

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	\$7,723.7	\$8,300.6	\$12,692.4	\$15,353.4	\$19,402.5
Percent Change	-	7.47	52.91	20.97	26.37
Capital Expenditure	\$498.7	\$530.3	\$907.1	\$901.7	\$1,747.9
Percent of Revenue	6.46	6.39	7.15	5.87	9.01
R&D Expenditure	\$263.6	\$307.6	\$524.2	\$675.8	\$815.6
Percent of Revenue	3.41	3.71	4.13	4.40	4.20
Number of Employees	65,904	68,745	71,479	73,536	75,795
Revenue (\$K)/Employee	\$117.20	\$120.74	\$177.57	\$208.79	\$255.99
Net Income	\$169.0	\$188.1	\$176.7	\$75.7	\$177.7
Percent Change	-	11.30	(6.06)	(57.16)	134.74
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: Mitsubishi Electric Corporation
 Annual Reports
 Dataquest
 January 1990

Table 2
Revenue by Geographic Region (Percent)

Region	1984	1985	1986	1987	1988
Japan	73.57	72.36	72.58	76.17	76.90
International	26.43	27.64	27.42	23.83	23.10

Source: Mitsubishi Electric Corporation
 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—22
 Japan—34
 Europe—9
 Asia/Pacific—2
 ROW—7

MANUFACTURING LOCATIONS

North America

Mitsubishi Consumer Electronics, America Inc.
 Color TVs, projection TVs, car telephones
 Mitsubishi Electric Manufacturing Cincinnati, Inc.
 Electrical auto parts, car audio equipment
 powerex, diodes, thyristors, and transistors
 Mitsubishi Electric Sales Canada
 Color TVs
 Mitsubishi Electronics Industries Canada Inc.
 Color CRTs
 Mitsubishi Semiconductor America Inc.
 Semiconductors

Japan

D. B. Seiko
 Electrical auto parts
 K. K. Sowa
 Electric equipment
 Kanebo Denshi
 IC assembly
 Koryo Denki
 Electric/electronic materials
 Koshin Denki
 Measuring instruments, electric equipment
 Mitsubishi Electric Home Appliance
 Home electrical appliances
 Mitsubishi Kochi
 1Mb DRAMs
 Mitsubishi Precision
 Electronic instruments
 Mitsubishi Sajo
 1Mb DRAMs
 Oi Electric
 Communications equipment
 Omori Denki Kogyo
 Electric equipment
 Osram Melco
 Lamps

Ryoden Denshi Kiko
 Antennas
 Ryoden Kasei
 Electric/electronic materials
 Ryoden Tokki
 Electronic applied equipment
 SPC Electronics
 Microwave/ultrasonic applied equipment
 Sanryo Sangyo
 Electronic equipment
 Sanwa Denki
 Electric equipment
 Seiryu Buhin
 Electric equipment parts
 Shizuki Electric
 Capacitors
 Shoryo Denshi
 Electric equipment
 Toyo Kiko Seisakusho
 Air-conditioning equipment

Europe

Mitsubishi Electric (United Kingdom)
 Color TVs, VCRs

Asia/Pacific

Dahsen Electronic Industries
 Audio equipment
 Kang Yong Electric Manufacturing
 TVs, air conditioners, fans
 Melco Manufacturing Thailand
 FDDs for personal computers
 Mitsubishi Australia Pte. Ltd.
 Color TVs, car telephones
 Mitsubishi Electronics Manufacturing, Singapore
 Color TVs, car audio equipment
 Shihlin Electric and Engineering
 Capacitors, electrical auto parts, transformers
 Thai CRT
 Color CRTs
 VXL India
 Wattmeters, relays, time buses

ROW

Comercio e Industria Induco
 Power systems for communications equipment
 Friem S. A. de C. V.
 Refrigerators, washing machines
 Grupo Industrial Comasa
 Compressors for refrigerators

SUBSIDIARIES

North America

Horizon Research, Inc.
Mitsubishi Consumer Electronics America, Inc.
Mitsubishi Electric America, Inc.
Mitsubishi Electric Manufacturing Cincinnati, Inc.
Mitsubishi Electric Sales America, Inc.
Mitsubishi Electric Sales Canada, Inc.
Mitsubishi Electronics America, Inc.
Mitsubishi Electronics Industries Canada, Inc.
Mitsubishi Semiconductor America, Inc.

Japan

Ad. Melco Co., Ltd.
D. B. Seiko
K. K. Sowa
Kanebo Denshi
Koryo Denki
Koshin Denki
Melcom Business Machines Co., Ltd.
Mitsubishi Electric Credit Co., Ltd.
Mitsubishi Electric Home Appliance
Mitsubishi Electric Service Engineering Co., Ltd.
Mitsubishi Precision
Mitsubishi Space Software Co., Ltd.
Nakayama Kikai Co., Ltd.
Oi Electric
Omori Denki Kogyo
Osram Melco
Ryoden Denshi Kiko
Ryoden Elevator Construction Co., Ltd.
Ryoden Engineering Co., Ltd.
Ryoden Estate Co., Ltd.
Ryoden Kasei
Ryoden Service Co., Ltd.
Ryoden Tokki
Ryoden Unyu Co., Ltd.
Ryoreisha Co., Ltd.
Ryowa Shoko Co., Ltd.
SPC Electronics
Sanryo Sangyo
Sanwa Denki
Seiryu Buhin
Shiga Bolt Co., Ltd.
Shizuki Electric
Shoryo Denshi
Tada Electric Co., Ltd.
The Kodensha Co., Ltd.
Toyo Electric Co., Ltd.
Toyo Kiko Seisakusho

Europe

Melco Iberia S.A.
Mitsubishi Electric Europe, GmbH
Mitsubishi Electric Netherlands B.V.
Mitsubishi Electric (Scandinavia) AB
Mitsubishi Electric (U.K.) Ltd.

Asia/Pacific

Dahsen Electronic Industries
Kang Yong Electric Mfg.
Melco Mfg. Thailand
Melco Sales Singapore Pte. Ltd.
Mitsubishi Electric Australia Pty. Ltd.
Mitsubishi Electric AWA
Mitsubishi Electric (H.K.) Ltd.
Mitsubishi Electric Singapore Pte. Ltd.
Mitsubishi Electronics Manufacturing Singapore
Shihlin Electric and Engineering
Thai CRT
VXL India

ROW

Comercio e Industria Induco
Friem S. A. de C. V.
Grupo Industrial Comasa
Melco-Tec Rep. Com. e Assessoria Tecnica Ltda.
Melco Argentina, S.R.L.
Melco do Brasil, Com. e Rep. Ltda.
Melco (Middle East) Ltd.
Middle East Electric Company W.L.L.

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1988

RCA Corporation
TV and color CRT licensing agreement
GoldStar Electric Equipment
License pickups for CD players

1987

Texas Instruments
License semiconductors, ICs
Motorola Inc.
License semiconductors, ICs

Samtel Color

License color CRTs

Melco Manufacturing

License floppy disk devices

KEFICO Corporation

License automotive engine control equipment

Thai CRT

License color CRTs

National Semiconductor

OEM import of 32-bit microprocessors by Mitsubishi

Intel Corp.

Mitsubishi subcontracts production of Intel 8-bit microcontrollers for Japanese market

Osram GmbH

Joint venture in Japan to produce lamps

KEY OFFICERS

Nihachiro Katayama

Chairman

Moriya Shiki

President

Shinichi Yufu

General manager, International Operations Group

Fukuichi Hirose

General manager, Headquarters—Strategic Products Control, Marketing

Yasuo Endo

General manager, Information and Communication Systems Group

Bujiro Kobayashi

General manager, Electronic Devices Group

Kunikazu Sakata

General manager, Corporate Strategic Planning Office

Hisao Oka

General manager, Headquarters—Research and Development

PRINCIPAL INVESTORS

Mitsubishi Trust & Banking—5.6 percent

Mitsui Trust & Banking—4.1 percent

Meiji Mutual Life Insurance—4.1 percent

Nippon Life Insurance—3.7 percent

Mitsubishi Bank—3.2 percent

Japan Securities Clearing—2.7 percent

Sumitomo Trust & Banking—2.3 percent

Yasuda Trust & Banking—2.1 percent

Employees' Association—2.0 percent

Norinchukin Bank—1.9 percent

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

Balance Sheet	1984	1985	1986	1987	1988
Total Current Assets	\$4,734.9	\$4,991.1	\$7,088.3	\$9,175.8	\$11,779.9
Cash	454.9	446.0	600.7	1,074.2	2,070.1
Receivables	1,882.4	1,930.6	2,703.8	3,260.7	4,409.9
Marketable Securities	340.1	390.3	642.4	840.3	920.3
Inventory	1,211.5	1,427.8	2,355.4	2,644.1	2,735.9
Other Current Assets	846.0	796.4	786.0	1,356.5	1,643.7
Net Property, Plants	\$1,232.2	\$1,299.9	\$2,285.2	\$2,924.7	\$3,866.5
Other Assets	\$927.0	\$972.4	\$1,409.0	\$1,783.6	\$2,185.5
Total Assets	\$6,894.1	\$7,263.4	\$10,782.5	\$13,884.1	\$17,831.9
Total Current Liabilities	\$4,259.7	\$4,353.3	\$6,260.0	\$8,095.1	\$10,840.4
Long-Term Debt	\$823.9	\$1,029.9	\$1,267.8	\$1,461.0	\$1,644.4
Other Liabilities	\$308.7	\$324.0	\$506.6	\$680.6	\$892.3
Total Liabilities	\$5,392.3	\$5,707.2	\$8,034.4	\$10,236.7	\$13,377.1
Minority Interest	\$9.1	\$11.6	\$21.8	\$29.6	\$42.1
Total Shareholders' Equity	\$1,492.7	\$1,544.6	\$2,726.3	\$3,617.8	\$4,412.7
Converted Preferred Stock	0	0	0	0	0
Common Stock	361.8	346.2	692.1	994.0	1,210.4
Other Equity	355.9	322.7	658.9	980.8	1,290.2
Retained Earnings	775.0	875.7	1,375.3	1,643.0	1,912.1
Total Liabilities and Shareholders' Equity	\$6,894.1	\$7,263.4	\$10,782.5	\$13,884.1	\$17,831.9
Income Statement	1984	1985	1986	1987	1988
Revenue	\$7,723.7	\$8,300.6	\$12,692.4	\$15,353.4	\$19,402.5
Japanese Revenue	5,682.7	6,006.6	9,212.4	11,695.2	14,920.9
Non-Japanese Revenue	2,041.0	2,294.0	3,480.0	3,658.2	4,481.6
Cost of Sales	\$5,680.3	\$6,085.9	\$9,481.4	\$11,610.7	\$14,534.4
R&D Expense	\$263.6	\$307.6	\$524.2	\$675.8	\$815.6
SG&A Expense	\$1,207.1	\$1,249.8	\$1,907.8	\$2,280.1	\$2,958.0
Capital Expense	\$498.7	\$530.3	\$907.1	\$901.7	\$1,747.9
Pretax Income	\$356.6	\$396.5	\$426.2	\$272.7	\$502.3
Pretax Margin (%)	4.62	4.78	3.36	1.78	2.59
Effective Tax Rate (%)	56.00	58.00	58.00	58.00	56.00
Net Income	\$169.0	\$188.1	\$176.7	\$75.7	\$177.7
Shares Outstanding, Millions	1,598.0	1,620.0	1,714.0	1,864.0	2,023.2
Per Share Data					
Earnings	\$10.54	\$10.62	\$8.04	\$3.92	\$8.54
Dividends	\$0.02	\$0.02	\$0.02	\$0.02	\$0.02
Book Value	\$0.93	\$0.95	\$1.59	\$1.94	\$2.18

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

Key Financial Ratios	1984	1985	1986	1987	1988
<i>Liquidity</i>					
Current (Times)	1.11	1.15	1.13	1.13	1.09
Quick (Times)	0.83	0.82	0.76	0.81	0.83
Fixed Assets/Equity (%)	82.55	84.16	83.82	80.84	87.62
Current Liabilities/Equity (%)	285.37	281.84	229.62	2234.76	245.66
Total Liabilities/Equity (%)	361.24	369.49	294.70	282.95	303.15
<i>Profitability (%)</i>					
Return on Assets	-	2.66	1.96	0.61	1.12
Return on Equity	-	12.39	8.27	2.39	4.43
Profit Margin	2.19	2.27	1.39	0.49	0.92
<i>Other Key Ratios</i>					
R&D Spending % of Revenue	3.41	3.71	4.13	4.40	4.20
Capital Spending % of Revenue	6.46	6.39	7.15	5.87	9.01
Employees	65,904	68,745	71,479	73,536	75,795
Revenue (\$K)/Employee	\$117.20	\$120.74	\$177.57	\$208.79	\$255.99
Capital Spending % of Assets	7.23	7.30	8.41	6.49	9.80

Source: Mitsubishi Electric Corporation
 Annual Reports
 Dataquest
 January 1990

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Building
2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo 100 Japan
Telephone: (03) 218-2111; Telex: J24532
(Billions of Yen)

Balance Sheet (March 31)	1984	1985	1986	1987	1988
Total Current Assets	¥1,089	¥1,248	¥1,205	¥1,285	¥1,472
Cash	¥ 183	¥ 209	¥ 211	¥ 268	¥ 374
Receivables	¥ 432	¥ 483	¥ 460	¥ 456	¥ 551
Inventory	¥ 279	¥ 357	¥ 400	¥ 370	¥ 342
Other Current Assets					¥ 205
Net Property, Plant, and					
Equipment	¥ 283	¥ 325	¥ 388	¥ 409	¥ 483
Depreciation	¥ 366	¥ 430	¥ 500	¥ 578	¥ 723
Other Assets					¥ 274
Total Assets	¥1,586	¥1,816	¥1,833	¥1,943	¥2,229
Total Current Liabilities	¥ 980	¥1,088	¥1,064	¥1,133	¥1,355
Long-Term Debt	189	257	216	205	206
Other Liabilities					116
Total Liabilities	¥1,242	¥1,430	¥1,370	¥1,433	¥1,677
Total Shareholders' Equity	¥ 343	¥ 386	¥ 463	¥ 507	¥ 552
Conv. Preferred Stock	0	0	0	0	0
Common Stock	¥ 83	¥ 87	¥ 118	¥ 139	¥ 151
Other Equity					¥ 162
Retained Earnings	¥ 184	¥ 219	¥ 234	¥ 230	¥ 239
Total Liability and					
Total Equity	¥1,585	¥1,816	¥1,833	¥1,940	¥2,229
Income Statement (March 31)	1984	1985	1986	1987	1988
Revenue	¥1,741	¥2,035	¥2,109	¥2,108	¥2,368
Domestic Sales	¥1,271	¥1,461	¥1,518	¥1,596	¥1,808
Overseas Sales	¥ 469	¥ 574	¥ 592	¥ 512	¥ 560
Cost of Sales	¥1,306	¥1,521	¥1,612	¥1,625	¥1,817
Gross Margin (%)	25	25	24	23	23
R&D Expense	¥ 61	¥ 77	¥ 89	¥ 95	¥ 102
SG&A Expense	¥ 278	¥ 312	¥ 324	¥ 319	¥ 370
Other Operating Expenses					¥ 29
Total Operating Expenses	¥1,645	¥1,910	¥2,025	¥2,039	¥2,318
Operating Income (Loss)	¥ 84	¥ 99	¥ 65	¥ 33	¥ 50
Interest, Net	(¥ 2)	¥ 1	¥ 7	¥ 5	¥ 13
Pretax Income	¥ 82	¥ 99	¥ 72	¥ 38	¥ 63
Provision for Taxes (Credit)					¥ 45
Effective Tax Rate (%)	55	55	63	76	71
Extraordinary Items, Net	¥ 2	¥ 3	¥ 3	¥ 1	¥ 4
Net Income	¥ 39	¥ 47	¥ 30	¥ 11	¥ 22
Avg. Shares Outstanding					
(Millions)	1,598	1,620	1,714	1,864	1,976
Employees	65,904	68,745	71,479	73,536	75,795
Capital Spending	¥ 115	¥ 133	¥ 154	¥ 126	¥ 218
Exchange Rate					
(Yen per US\$1)	236	245	221	160	138

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
June 1989

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Building
2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo 100 Japan
Telephone: (03) 218-2111; Telex: J24532
(Millions of Dollars)

Balance Sheet (March 31)	1984	1985	1986	1987	1988
Total Current Assets	\$4,613	\$5,093	\$5,452	\$ 8,029	\$10,667
Cash	\$ 775	\$ 853	\$ 956	\$ 1,675	\$ 2,710
Receivables	\$1,833	\$1,970	\$2,080	\$ 2,853	\$ 3,993
Inventory	\$1,181	\$1,457	\$1,812	\$ 2,314	\$ 2,478
Other Current Assets					\$ 1,486
Net Property, Plant, and Equipment	\$1,201	\$1,326	\$1,758	\$ 2,559	\$ 3,500
Depreciation	\$1,551	\$1,756	\$2,260	\$ 3,614	\$ 5,239
Other Assets					\$ 1,986
Total Assets	\$6,719	\$7,412	\$8,294	\$12,147	\$16,152
Total Current Liabilities	\$4,151	\$4,442	\$4,815	\$ 7,083	\$ 9,819
Long-Term Debt	\$ 803	\$1,051	\$ 975	\$ 1,278	\$ 1,493
Other Liabilities					\$ 841
Total Liabilities	\$5,264	\$5,836	\$6,197	\$ 8,957	\$12,153
Total Shareholders' Equity	\$1,455	\$1,576	\$2,097	\$ 3,166	\$ 4,000
Conv. Preferred Stock	0	0	0	0	0
Common Stock	\$ 353	\$ 353	\$ 532	\$ 870	\$ 1,094
Other Equity					\$ 1,174
Retained Earnings	\$ 782	\$ 893	\$1,058	\$ 1,438	\$ 1,732
Total Liability and Total Equity	\$6,719	\$7,412	\$8,294	\$12,123	\$16,153
Income Statement (March 31)	1984	1985	1986	1987	1988
Revenue	\$7,376	\$8,305	\$9,545	\$13,172	\$17,159
Domestic Sales	\$5,387	\$5,964	\$6,868	\$ 9,972	\$13,101
Overseas Sales	\$1,989	\$2,341	\$2,677	\$ 3,200	\$ 4,058
Cost of Sales	\$5,536	\$6,210	\$7,293	\$10,159	\$13,167
Gross Margin (%)	25	25	24	23	23
R&D Expense	\$ 257	\$ 314	\$ 403	\$ 591	\$ 739
SG&A Expense	\$1,176	\$1,275	\$1,468	\$ 1,995	\$ 2,681
Other Operating Expenses					\$ 210
Total Operating Expenses	\$6,969	\$7,799	\$9,164	\$12,745	\$16,797
Operating Income (Loss)	\$ 357	\$ 402	\$ 294	\$ 209	\$ 362
Interest, Net	(\$ 9)	\$ 2	\$ 34	\$ 30	\$ 94
Pretax Income	\$ 348	\$ 405	\$ 328	\$ 239	\$ 457
Provision for Taxes (Credit)					\$ 326
Effective Tax Rate	55	55	63	76	71
Extraordinary Items, Net	\$ 7	\$ 11	\$ 15	\$ 9	\$ 29
Net Income	\$ 165	\$ 192	\$ 136	\$ 66	\$ 159
Avg. Shares Outstanding (Millions)	1,598	1,620	1,714	1,864	1,976
Employees	65,904	68,745	71,479	73,536	75,795
Capital Spending	\$ 486	\$ 541	\$ 698	\$ 789	\$ 1,580
Exchange Rate (Yen per US\$1)	236	245	221	160	138

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
June 1989

Mitsubishi Electric Corporation

The following tables are included in this section:

Table 1—Sales by Product Segment (Billions of Yen)

Table 2—Estimated Worldwide Semiconductor Revenue by Calendar Year (Billions of Yen)

Table 3—Estimated Worldwide Semiconductor Revenue by Calendar Year (Millions of Dollars)

Table 4—1988 Estimated Semiconductor Revenue Percent by Region (Millions of Dollars)

Table 5—1988 Percent Change in Worldwide Semiconductor Revenue

Table 1

Sales by Product Segment (Billions of Yen)

	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
Machinery	¥ 548	¥ 577	¥ 582	¥ 562	¥ 621
Industrial/Automotive	333	368	405	387	434
Information/Electronics	401	573	512	564	668
Consumer Products	<u>459</u>	<u>517</u>	<u>610</u>	<u>595</u>	<u>645</u>
Total	¥1,741	¥2,035	¥2,109	¥2,108	¥2,368

Source: Mitsubishi Electric Company
Annual Report

Mitsubishi Electric Corporation

Table 2

**Estimated Worldwide Semiconductor Revenue by Calendar Year
(Billions of Yen)**

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988*</u>
Total Semiconductor	71	84	119	229	158	188	215	296
Total IC	47	61	90	182	120	146	178	252
Bipolar Digital (Technology)	8	11	16	29	18	22	18	17
MOS (Technology)	22	34	58	128	77	91	117	183
NMOS	18	28	44	110	61	73	88	104
PMOS	2	2	3	1	1	0	0	1
CMOS	2	4	12	17	16	18	29	78
BiCMOS								
MOS (Function)	22	34	58	128	77	91	117	183
MOS Memory	7	20	37	88	35	48	71	123
MOS Microdevices	4	6	13	37	29	34	39	49
MOS Logic	10	8	8	4	13	8	8	11
Analog	17	16	16	24	25	33	44	53
Total Discrete	24	23	28	44	33	37	33	40
Transistor	9	8	9	13	15	16	13	15
Diode	5	5	4	5	1	1	1	1
Thyristor	6	6	4	6	9	9	8	8
Other Discrete	4	4	12	20	8	11	11	17
Total Optoelectronic	N/A	1	1	3	4	5	4	4
Exchange Rate (Yen per US\$1)	221	248	235	237	238	167	144	130

*Preliminary estimates for 1988

N/A = Not Available

Source: Dataquest
June 1989

Mitsubishi Electric Corporation

Table 3

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

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988*</u>
Total Semiconductor	321	340	505	964	662	1,123	1,492	2,278
Total IC	212	244	384	766	504	873	1,239	1,940
Bipolar Digital (Technology)	38	44	68	123	75	134	122	128
MOS (Technology)	99	137	247	541	323	544	812	1,408
NMOS	80	114	186	463	255	436	612	803
PMOS	9	9	12	5	2	2	1	5
CMOS	10	14	49	73	66	106	199	600
BiCMOS	0	0	0	0	0	0	0	0
MOS (Function)	98	137	247	541	323	544	812	1,408
MOS Memory	33	81	158	370	147	289	492	943
MOS Microdevices	20	25	54	156	122	205	267	377
MOS Logic	45	31	35	15	55	50	53	88
Analog	76	63	69	102	105	195	305	405
Total Discrete	109	94	119	185	140	221	227	311
Transistor	39	33	38	56	64	94	89	118
Diode	22	19	15	23	3	4	5	5
Thyristor	29	25	15	23	37	56	54	61
Other Discrete	19	17	51	83	35	67	79	127
Total Optoelectronic	N/A	2	2	13	18	29	26	27
Exchange Rate (Yen per US\$1)	221	249	237	237	238	168	144	130

*Preliminary estimates for 1988

N/A = Not Available

Source: Dataquest
June 1989

Mitsubishi Electric Corporation

Table 4

**1988 Estimated Semiconductor Revenue
Percent by Region
(Millions of Dollars)**

<u>Product</u>	<u>United States</u>	<u>Japan</u>	<u>Europe</u>	<u>ROW</u>
Semiconductor	13%	69%	4%	14%
IC	15%	65%	4%	15%
Bipolar Digital	6%	91%	0	2%
MOS (Technology)	20%	65%	6%	9%
MOS Memory	26%	53%	7%	13%
MOS Micro	6%	92%	2%	0
MOS Logic	17%	83%	0	0
Analog	0	58%	0	42%
Discrete	0	89%	2%	9%
Optoelectronics	4%	89%	7%	0
Exchange rate (Yen per US\$1)				130

Source: Dataquest
June 1989

Table 5

**1988 Percent Change in Worldwide Semiconductor Revenue
(Millions of Dollars)**

	<u>1987</u>	<u>1988</u>	<u>% Change</u>	<u>World Market % Change</u>
Semiconductor	\$1,492	\$2,278	52.7%	31.9%
IC	\$1,239	\$1,940	56.6%	36.5%
Bipolar Digital	122	128	4.9%	9.2%
MOS (Technology)	812	1,408	73.4%	53.1%
MOS Memory	492	943	91.7%	90.3%
MOS Micro	267	377	41.2%	39.8%
MOS Logic	53	88	66.0%	28.1%
Analog	305	404	32.5%	15.3%
Discrete	\$ 227	\$ 311	37.0%	13.2%
Optoelectronics	\$ 26	\$ 27	3.8%	25.4%
Exchange Rate (Yen per US\$1)	144	130		

Source: Dataquest
June 1989

Mitsubishi

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo 100, Japan
(03)218-2111

Established 1898
No. of Employees: 75,795

BACKGROUND

Mitsubishi Corporation was founded in 1898 as a heavy electrical equipment plant in Nagasaki. Its main areas of business are heavy machinery, electronic products and systems, industrial products, and consumer products. It was the first commercial Japanese electronics company to develop an integrated circuit, and in 1987 began R&D on 4Mb and larger DRAMs. Today, Mitsubishi is Japan's fourth largest electronics company. In 1986, the Company began marketing a sequential inference machine developed as part of MITI's Fifth-Generation Computer Project.

GaAs activity at Mitsubishi was initiated in 1963. Mitsubishi operated its first pulse-mode AlGaAs 780nm laser at room temperature in 1967. The company began marketing low-noise 12 GHz to 18 GHz GaAs FETs in mid-1980. In late 1982, Mitsubishi started constructing a prototype production line for GaAs LSI. Mitsubishi has a joint venture with Monsanto that produces and markets GaAs substrates.

In mid-1984, Mitsubishi announced that it had developed the technology required for mass production of GaAs solar cells for such applications as communications satellites. The cells have conversion efficiencies that range up to 19 percent. The cells are used in the CS-3 communication satellite launched in 1987. This development work was accomplished under the sponsorship of the National Space Development Agency of Japan.

A low-voltage 4Kx4 GaAs SRAM was developed by Mitsubishi's LSI R&D Laboratory, Itami, Hyogo, Japan, under the MITI Scientific Computing Systems Program. Test devices, using a 1.0u E/D DCFL SAG MESFET process and dual-layer metal, were operated at 1.0V power supply voltage, t_{aa} of 11ns max and P_d of 1.0W. The $5.79 \times 4.73 \text{ mm}^2$ die incorporates four blocks of 128x32 memory cells, each $31.5 \times 24 \text{ um}^2$.

COMPANY EXECUTIVES (GaAs ACTIVITIES)

- President—Moriya Shiki
- Head of Marketing—Shinichi Yufu
- Senior Executive Vice President/GM Semiconductor Div.—Yuichi Okutomo

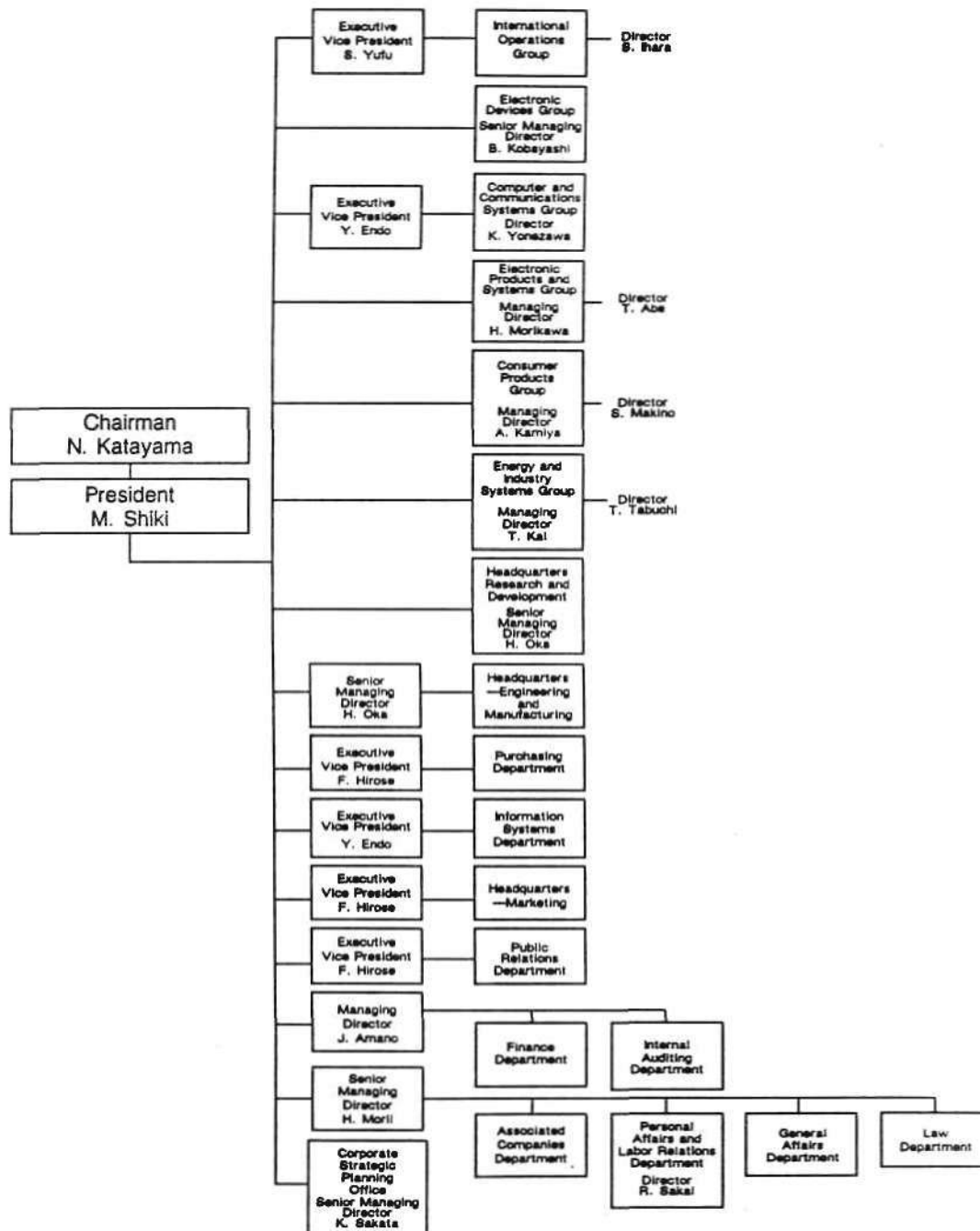
COMPANY ORGANIZATION

Figure 1 is a Mitsubishi organization chart.

Mitsubishi

Figure 1

Mitsubishi Electric Corporation Company Organization



0005365-1

Source: Dataquest
November 1989

Mitsubishi

FINANCIAL BACKING AND STRATEGIC ALLIANCES

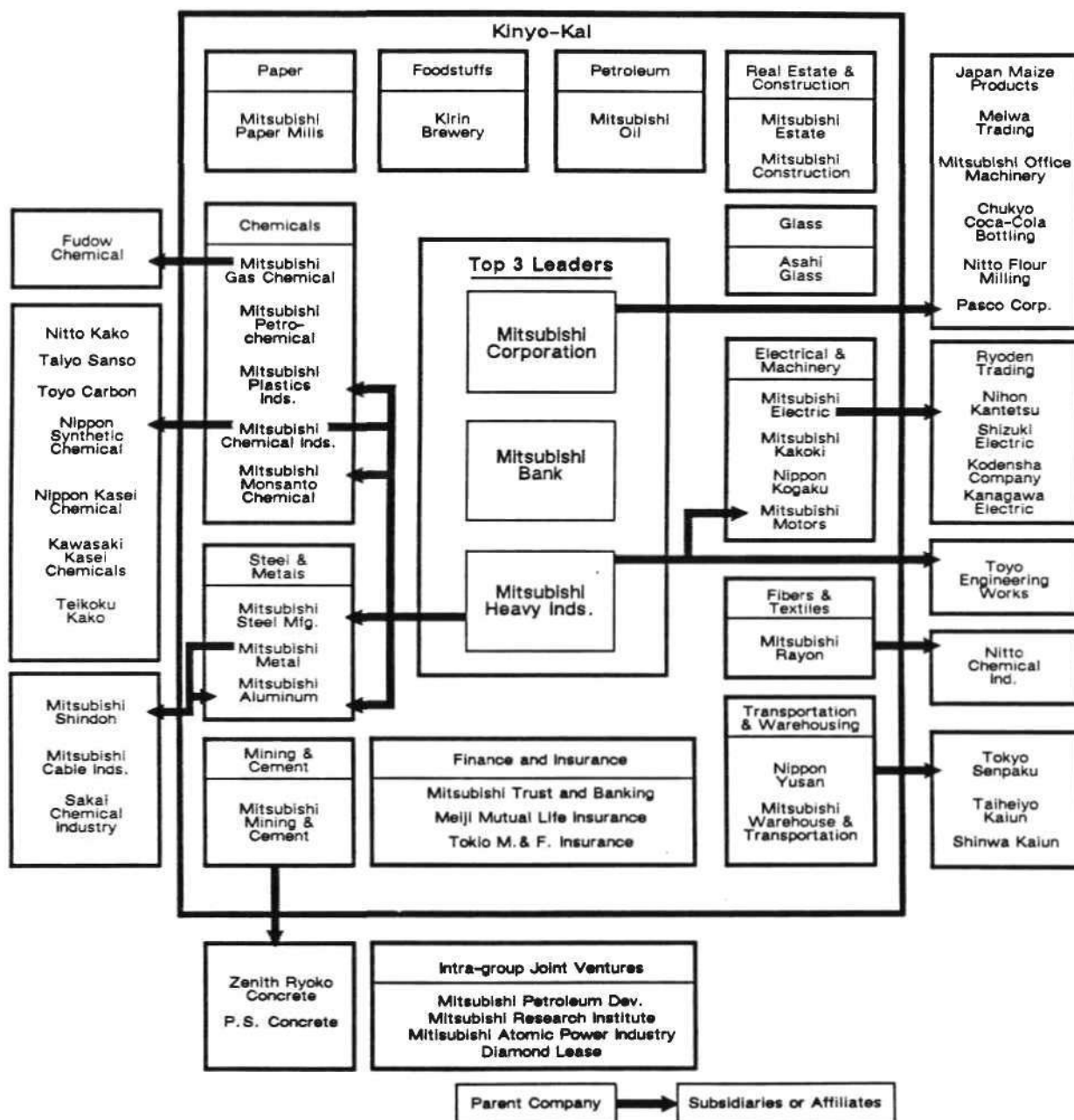
Mitsubishi is a member of the Mitsubishi group (see Figure 2), a continuation of the Mitsubishi Zaibatsu. Although the zaibatsu were dissolved following World War II, the Mitsubishi Zaibatsu companies reorganized into one of the most powerful industrial groups in Japan.

The top five shareholders in Mitsubishi are Mitsubishi Trust and Banking Corporation (5.7 percent), Mitsui Trust and Banking Corporation (4.2 percent), Meiji Mutual Life Insurance Company (4.1 percent), Nippon Life Insurance Company (3.8 percent), and Mitsubishi Bank Ltd. (3.2 percent). The Mitsubishi Electric Group Employee Shareholders Union owns 2.1 percent; another 4.2 percent is foreign-owned.

Mitsubishi has technology-sharing and licensing agreements with Dai Nippon Printing Co., GE, Hoya Corporation, Intel, Materials Research Corp., Matsushita, Nihon MRC Co., Sanyo, Sharp, TI, Ulvac Coating Co., Westinghouse, and others. Recent agreements include photonic integration (NTT and Batelle) and silicon semiconductor alliances with National and TI.

Mitsubishi

Figure 2
Mitsubishi Group



0005365-2

Source: Dodwell Marketing Consultants
Industrial Groupings in Japan

Mitsubishi

PROCESS TECHNOLOGY

- 1.0-micron E/D DCFL self-aligned gate GaAs MESFET
- Submicron GaAs MESFET

PRODUCTS

- MMICs and digICs
- LEDs
- Lasers
- Detectors
- Small-signal and power GaAs FETs

Applications

- Fiber-optic communications
- High-speed instrumentation
- Military/aerospace
- UHF and microwave communications
- Consumer
- Transportation
- EDP
- Electronics peripherals

FACILITIES

- Kita-Itami Works—Includes optoelectronic device production

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo, 100, Japan
Telephone: (03) 218-2111; Telex: J24532
(Billions of Yen)

Balance Sheet (March 31)	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Total Current Assets	¥ 994	¥1,089	¥1,248	¥1,205	¥1,285
Cash	¥ 170	¥ 183	¥ 209	¥ 211	¥ 268
Receivables	¥ 415	¥ 432	¥ 483	¥ 460	¥ 456
Inventory	¥ 251	¥ 279	¥ 357	¥ 400	¥ 370
Net Property, Plant, and Equipment	¥ 233	¥ 283	¥ 325	¥ 388	¥ 409
Depreciation	¥ 318	¥ 366	¥ 430	¥ 500	¥ 578
Total Assets	¥1,421	¥1,586	¥1,816	¥1,833	¥1,943
Total Current Liabilities	¥ 864	¥ 980	¥1,088	¥1,064	¥1,133
Long-Term Debt	185	189	257	216	205
Total Liabilities	¥1,116	¥1,242	¥1,430	¥1,370	¥1,433
Total Shareholders' Equity	¥ 305	¥ 343	¥ 386	¥ 463	¥ 507
Conv. Preferred Stock	0	0	0	0	0
Common Stock	¥ 79	¥ 83	¥ 87	¥ 118	¥ 139
Retained Earnings	¥ 151	¥ 184	¥ 219	¥ 234	¥ 230
Income Statement (March 31)	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Revenue	¥1,558	¥1,741	¥2,035	¥2,109	¥2,108
Domestic Sales	¥1,190	¥1,271	¥1,461	¥1,518	¥1,596
Overseas Sales	¥ 367	¥ 469	¥ 574	¥ 592	¥ 512
Cost of Sales	¥1,154	¥1,306	¥1,521	¥1,612	¥1,625
Gross Margin (%)	26	25	25	24	23
R&D Expense	¥ 53	¥ 61	¥ 77	¥ 89	¥ 95
SG&A Expense	¥ 251	¥ 278	¥ 312	¥ 324	¥ 319
Operating Income (Loss)	¥ 86	¥ 84	¥ 99	¥ 65	¥ 33
Interest, Net	(¥ 12)	(¥ 2)	¥ 1	¥ 7	¥ 5
Pretax Income	¥ 74	¥ 82	¥ 99	¥ 72	¥ 38
Effective Tax Rate (%)	55	55	55	63	76
Extraordinary Items, Net	¥ 2	¥ 2	¥ 3	¥ 3	¥ 1
Net Income	¥ 35	¥ 39	¥ 47	¥ 30	¥ 11
Avg. Shares Outstanding (Millions)	1,577	1,598	1,620	1,714	1,864
Employees	64,432	65,904	68,745	71,479	73,536
Capital Spending	¥ 73	¥ 115	¥ 133	¥ 154	¥ 126
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
December 1987

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo, 100, Japan
Telephone: (03) 218-2111; Telex: J24532
(Millions of Dollars)

Balance Sheet (March 31)	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Total Current Assets	\$3,993	\$4,613	\$5,093	\$5,452	\$ 8,029
Cash	\$ 683	\$ 775	\$ 853	\$ 956	\$ 1,675
Receivables	\$1,666	\$1,833	\$1,970	\$2,080	\$ 2,853
Inventory	\$1,009	\$1,181	\$1,457	\$1,812	\$ 2,314
Net Property, Plant, and Equipment	\$ 934	\$1,201	\$1,326	\$1,758	\$ 2,559
Depreciation	\$1,276	\$1,551	\$1,756	\$2,260	\$ 3,614
Total Assets	\$5,706	\$6,719	\$7,412	\$8,294	\$12,147
Total Current Liabilities	\$3,471	\$4,151	\$4,442	\$4,815	\$ 7,083
Long-Term Debt	\$ 745	\$ 803	\$1,051	\$ 975	\$ 1,278
Total Liabilities	\$4,480	\$5,264	\$5,836	\$6,197	\$ 8,957
Total Shareholders' Equity	\$1,226	\$1,455	\$1,576	\$2,097	\$ 3,166
Conv. Preferred Stock	0	0	0	0	0
Common Stock	\$ 318	\$ 353	\$ 353	\$ 532	\$ 870
Retained Earnings	\$ 606	\$ 782	\$ 893	\$1,058	\$ 1,438
Income Statement (March 31)	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Revenue	\$6,255	\$7,376	\$8,305	\$9,545	\$13,172
Domestic Sales	\$4,780	\$5,387	\$5,964	\$6,868	\$ 9,972
Overseas Sales	\$1,475	\$1,989	\$2,341	\$2,677	\$ 3,200
Cost of Sales	\$4,636	\$5,536	\$6,210	\$7,293	\$10,159
Gross Margin (%)	26	25	25	24	23
R&D Expense	\$ 211	\$ 257	\$ 314	\$ 403	\$ 591
SG&A Expense	\$1,010	\$1,176	\$1,275	\$1,468	\$ 1,995
Operating Income (Loss)	\$ 346	\$ 357	\$ 402	\$ 294	\$ 209
Interest, Net	(\$ 49)	(\$ 9)	\$ 2	\$ 34	\$ 30
Pretax Income	\$ 297	\$ 348	\$ 405	\$ 328	\$ 239
Effective Tax Rate	55	55	55	63	76
Extraordinary Items, Net	\$ 7	\$ 7	\$ 11	\$ 15	\$ 9
Net Income	\$ 141	\$ 165	\$ 192	\$ 136	\$ 66
Avg. Shares Outstanding (Millions)	1,577	1,598	1,620	1,714	1,864
Employees	64,432	65,904	68,745	71,479	73,536
Capital Spending	\$ 292	\$ 486	\$ 541	\$ 698	\$ 789
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
December 1987

Mitsubishi Electric Corporation

THE COMPANY

Overview

Mitsubishi Electric Corporation (hereafter referred to as Mitsubishi) began in 1898 as a heavy electrical equipment plant adjacent to the Nagasaki Shipyard. A related plant was set up in 1905 at Mitsubishi Shipbuilding's Kobe Works. In 1921, these two units were consolidated to form Mitsubishi Electric Manufacturing Company. During the Company's early years, it established heavy electrical equipment factories throughout Japan. In 1923, a technical cooperation agreement was made with Westinghouse Electric International; production of consumer goods began in the 1930s.

In 1958, Mitsubishi established separate groups for heavy machinery, electronics, consumer products, and overseas business. The Semiconductor Marketing Division began in 1972, and the Computer Marketing Division was founded in 1976. Mitsubishi is the fourth largest Japanese electronics company, following Matsushita, Hitachi, and Toshiba.

Mitsubishi has been a major supplier of electronic equipment to the Japan Defense Agency for more than 20 years. The Company produces missiles and electronics for use in land, sea, and air vehicles; active phased-array radar used in fire-control systems; the next-generation warning control radar; and computers for fighter planes. Mitsubishi also was the prime contractor for 9 of the 18 satellites launched by Japan's National Space Development Agency.

Company Organization

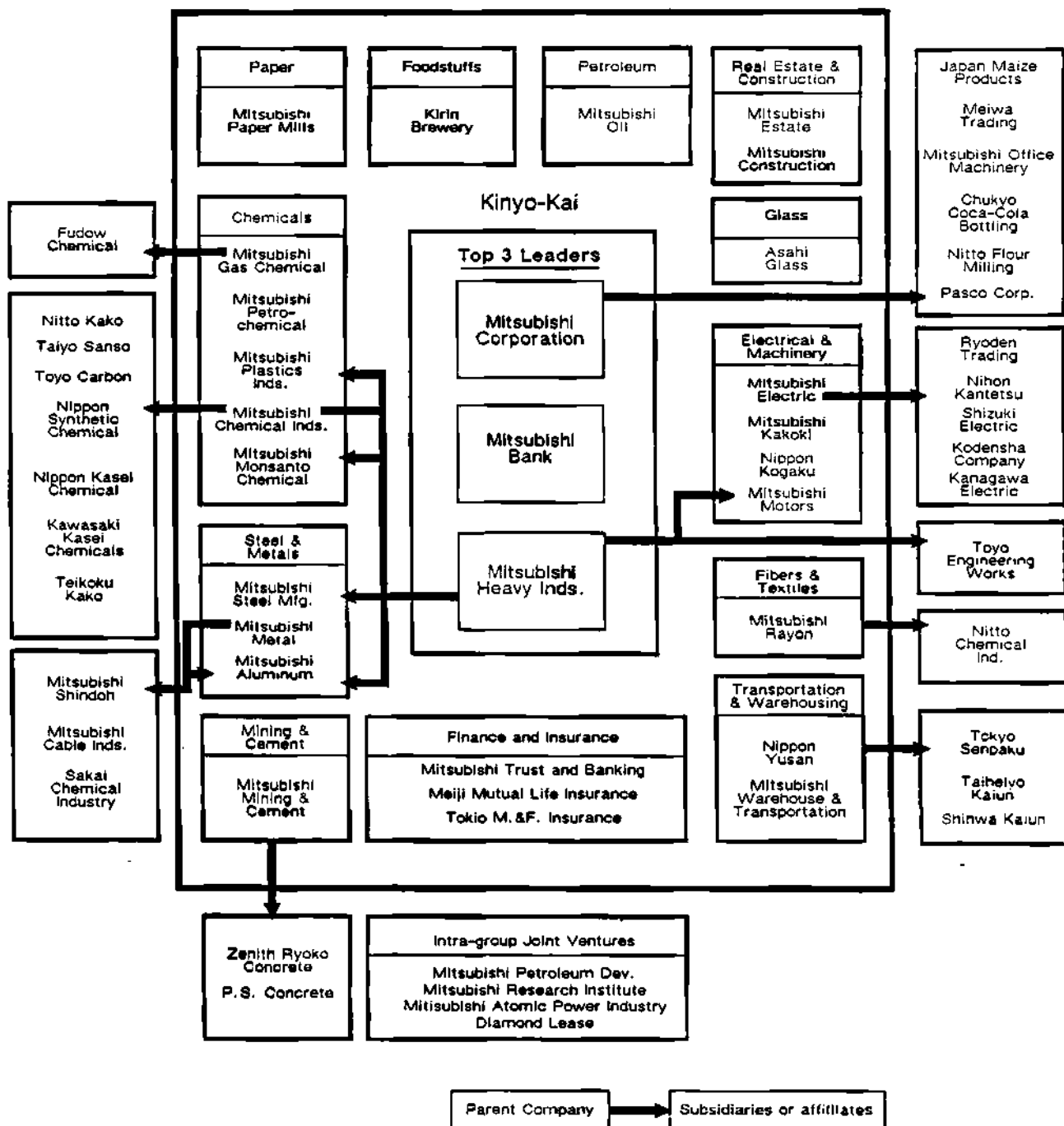
Mitsubishi is a member company of the Mitsubishi Group (see Figure 1). The Mitsubishi Group is a continuation of the pre-World War II Mitsubishi Zaibatsu, which began in 1870 as a small shipping company called Tsukumo Shokai. By the time the war began, the Mitsubishi Zaibatsu was the second largest in Japan, after the Mitsui Zaibatsu. After the war, the zaibatsu were dissolved; however, the Mitsubishi Zaibatsu companies reorganized into one of the largest and most powerful industrial groups in Japan.

Mitsubishi employs 73,536 people under the leadership of Chairman Nihachiro Katayama and President Moriya Shiki.

Figure 2 is a diagram of the Mitsubishi Company organization.

Mitsubishi Electric Corporation

Figure 1
Mitsubishi Group

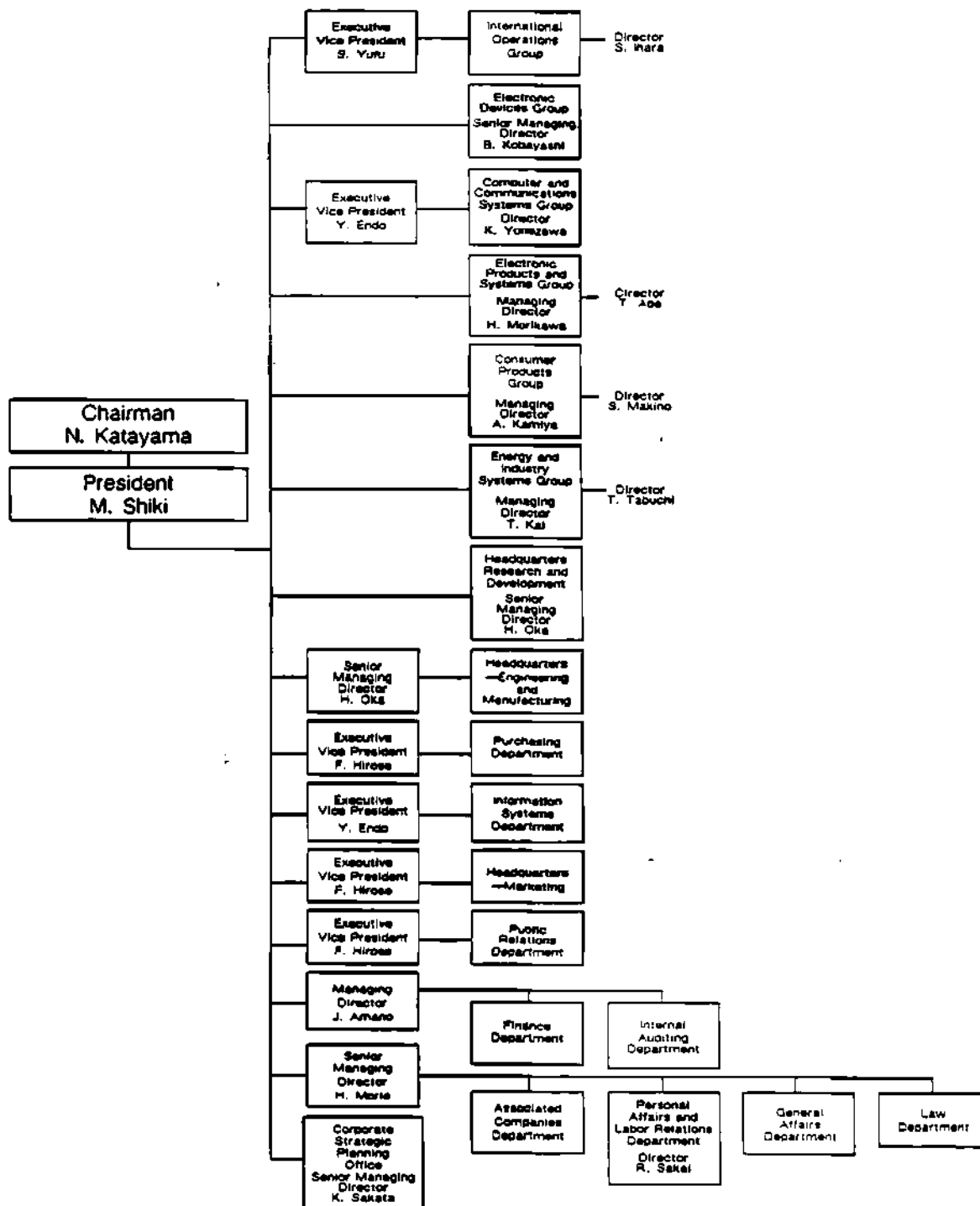


Source: Dodwell Marketing Consultants
Industrial Groupings in Japan
1986/1987 Tokyo: 1988

Mitsubishi Electric Corporation

Figure 2

Mitsubishi Electric Corporation Organization Chart



Source: Dataquest
December 1987

Mitsubishi Electric Corporation

Financial Information

Mitsubishi's major shareholders are listed in Table 1.

Table 1

Mitsubishi Electric Corporation Major Shareholders

<u>Shareholders</u>	<u>Percent of Shares</u>
Meiji Mutual Life Insurance Company	4.2%
Mitsubishi Trust & Banking Corporation	3.7%
Nippon Life Insurance Company	3.7%
Mitsubishi Bank, Limited	3.3%
Mitsui Trust & Banking Corporation	2.5%
Daiwa Securities Co., Ltd.	2.4%
Mitsubishi Electric Group Employees Shareholding Union	2.0%
Norin Chukin Bank	1.9%

Source: Japan Company Handbook

Of Mitsubishi's outstanding stock, 7.9 percent is foreign-owned. Mitsubishi is listed on the three major Japanese stock exchanges, as well as on the Amsterdam and Frankfurt stock exchanges.

Net income of the Company decreased to ¥11 billion in fiscal 1987 from ¥30 billion in fiscal 1986. The factors affecting net income were: virtually no change in revenue from fiscal 1986, a ¥13 billion increase in cost of sales, and a ¥16 billion increase in other expenses that reflected heavy foreign exchange losses in the period.

Mitsubishi's main lines of business are the following:

- Heavy Machinery
- Industrial Products and Automotive Equipment
- Information and Communication Systems and Electronic Devices
- Consumer Products

Mitsubishi Electric Corporation

Sales in the Information and Communications Systems and Electronic Devices Groups (including semiconductors) represented about 27 percent of revenue and rose 10 percent to ¥562 billion in fiscal 1987. The increase was attributed to high domestic sales volumes that overcame the depressed sales in exported personal computers.

Sales in the Heavy Machinery Group were ¥562 billion in fiscal 1987, a decrease of 3 percent from fiscal 1986. This group accounted for 27 percent of Mitsubishi's total sales.

The Industrial Products and Automotive Equipment Group had sales of ¥387 billion in fiscal 1987, a decrease of 5 percent from fiscal 1986. The group accounted for 18 percent of total Mitsubishi sales; it is the Company's smallest product group.

Sales in the Consumer Products Group were ¥595 billion in fiscal 1987, a decrease of 2 percent from 1986. This group accounted for 28 percent of Mitsubishi's total sales, and it is the Company's largest product group.

Table 2 shows Matsushita's revenue by lines of business. Figure 3 shows each line of business as a percentage of Mitsubishi's total business for 1983 and for 1987.

Table 2

Mitsubishi Electric Corporation Revenue by Lines of Business (Billions of Yen)

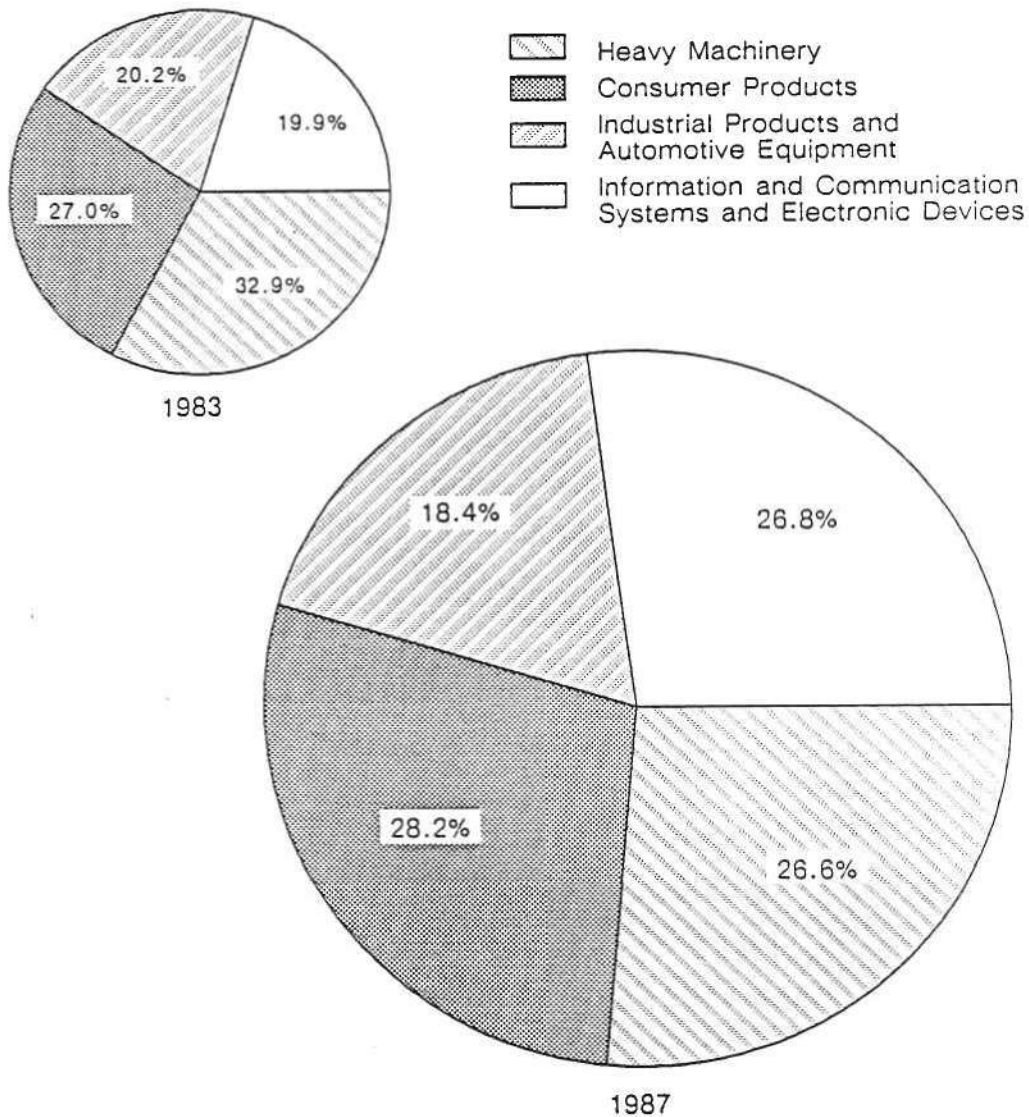
	<u>Fiscal Year Ending March 31</u>				
	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Heavy Machinery	¥ 512	¥ 548	¥ 577	¥ 582	¥ 562
Information and Communications and Electronic Devices	310	401	573	512	564
Industrial Products and Automotive Equipment	315	333	368	405	387
Consumer Products	<u>421</u>	<u>459</u>	<u>517</u>	<u>610</u>	<u>595</u>
Total	¥1,558	¥1,741	¥2,035	¥2,109	¥2,108
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
December 1987

Mitsubishi Electric Corporation

Figure 3

Mitsubishi Electric Corporation
Revenue by Line of Business—1983 and 1987



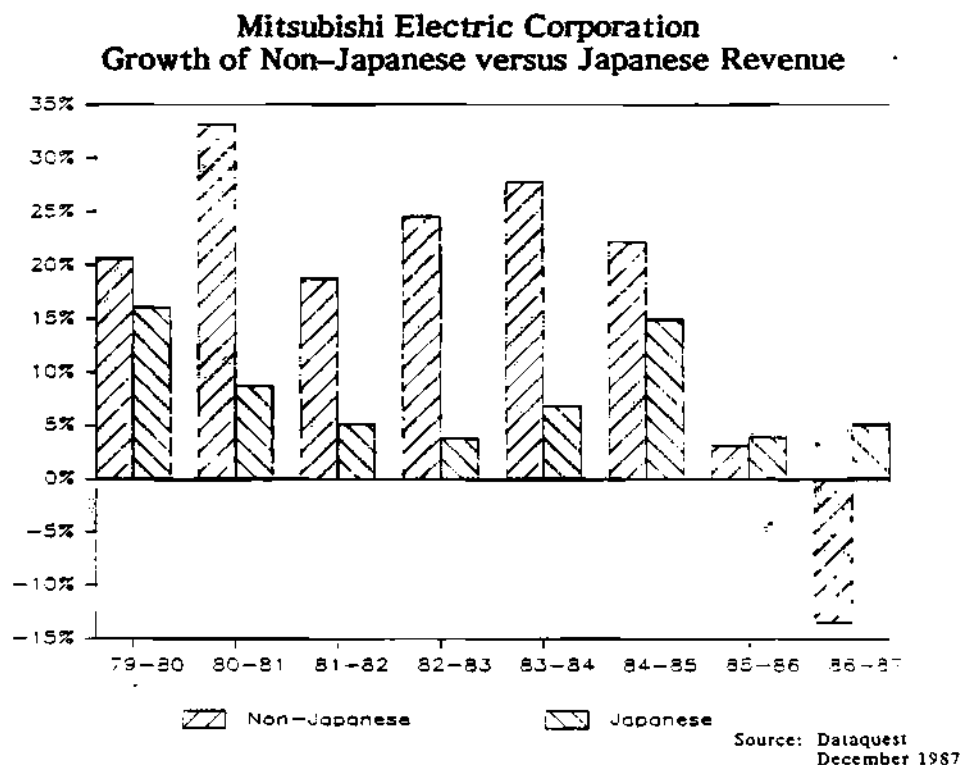
Source: Dataquest
December 1987

Mitsubishi Electric Corporation

International Operations

Overseas sales, which were ¥512 billion, accounted for 24 percent of Mitsubishi's 1987 sales. This amount represents a decline of 14 percent from 1986. To remain competitive in its overseas markets, the Company is boosting offshore production and is expanding the number of its facilities. Figure 4 compares the growth rates of domestic and nondomestic sales from 1979 through 1987.

Figure 4



Facilities

Mitsubishi currently maintains four manufacturing plants in North America: a newly constructed color television and cellular mobile telephone plant in Braselton, Georgia; a color television plant in Santa Ana, California; a television picture tube plant in Ontario, Canada; and a semiconductor plant in Durham, North Carolina. A fifth plant in Mason, Ohio, is scheduled to begin production in 1988. This plant will manufacture automotive parts and control units for use in electronics, electrical parts, and audio equipment.

Mitsubishi has nine semiconductor plants in Japan and one in the United States. These plants are listed in Table 3. The Japanese plants are also shown on the map in Figure 5.

Mitsubishi Electric Corporation

Table 3

Mitsubishi Electric Corporation Semiconductor Manufacturing Facilities

<u>Map Code</u>	<u>Location</u>	<u>Floor Space (Square Meters)</u>	<u>Employees</u>	<u>Function and Products</u>
A	Kita-itami Works, Hyogo Prefecture	116,834	3,054	Fab, assembly, test-- MOS logic, discretes
B	Kumamoto #1-Kumamoto, Kumamoto Prefecture (Kita-itami Works)	13,000	400	Assembly, test--ICs
C	Kumamoto #2-Kikuchi, Kumamoto Prefecture (Kita-itami Works)	16,000	1,200	Fab, test--ICs
D	Fukuoka Handotai Factory, Fukuoka Prefecture	13,000	N/A	Fab, assembly, and test--bipolar logic discretes
D	Fukuoka New Plant, Fukuoka Prefecture	10,000	N/A	Fab, assembly, test
E	Saijo Industrial Park, Ehime Prefecture (Kita-itami Works)	22,000	N/A	Fab, test--64K DRAMS
E	Saijo Factory #2, Ehime Prefecture (Kita-itami Works)	N/A	N/A	Fab, assembly, test-- 256K DRAMS
F	Semiconductor Laboratory, Hyogo Prefecture	N/A	N/A	Fab, test--discretes, optoelectronics
G	Kagami Plant, Kochi Prefecture	N/A	N/A	Fab, assembly, test-- CMOS microdevices
	Mitsubishi Semiconductor U.S.A., North Carolina	20,000	200	Assembly, test--MOS 64K and 256K DRAM

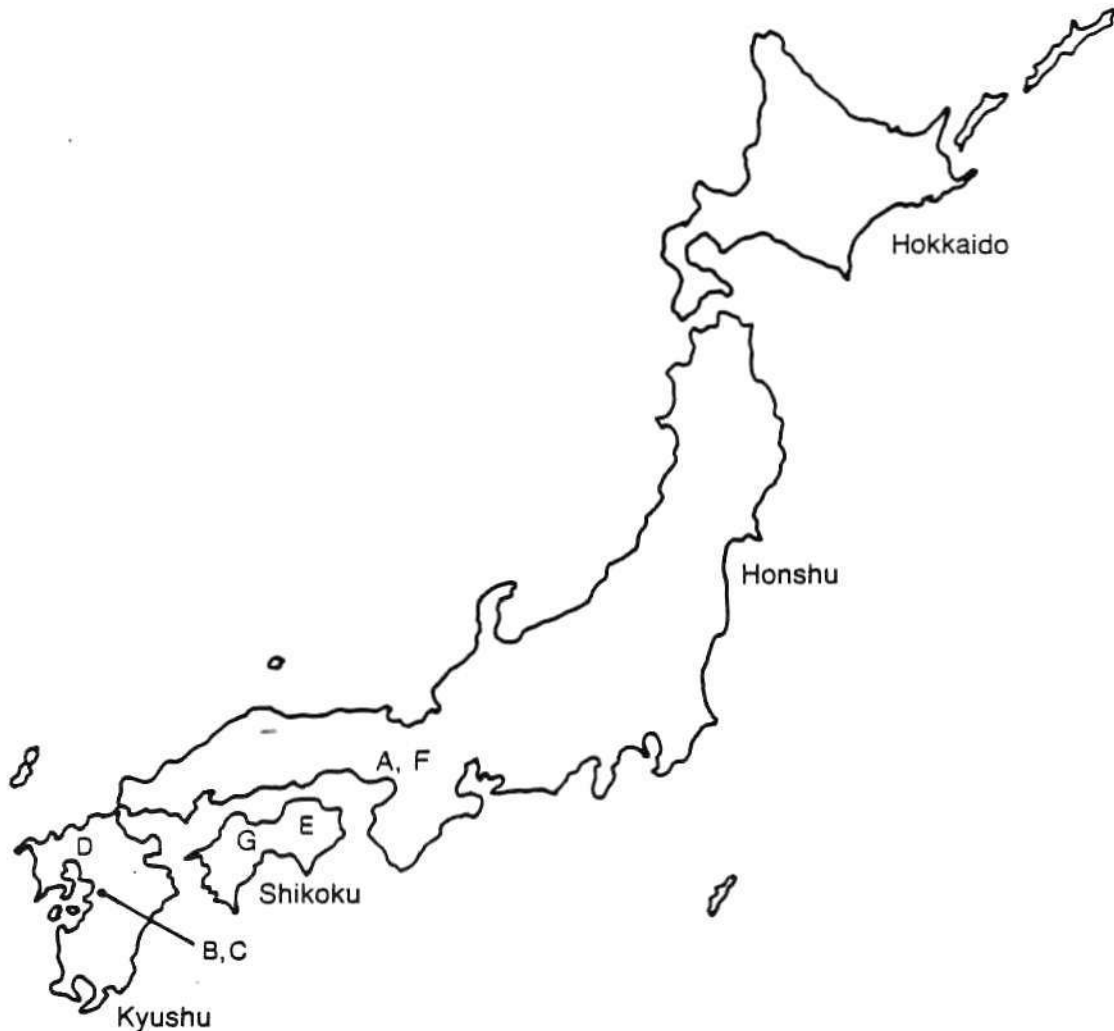
N/A = Not Available

Source: Dataquest
December 1987

Mitsubishi Electric Corporation

Figure 5

Mitsubishi Electric Corporation Semiconductor Factory Locations in Japan



Source: Dataquest
December 1987

Mitsubishi Electric Corporation

Capital and R&D Spending

Mitsubishi's corporate capital spending decreased from ¥154 billion to ¥126 billion in fiscal 1987. When combined, capital spending and R&D spending have been consistently running about 10 percent of total revenue, as shown in Table 4. Table 5 shows capital and R&D spending in U.S. dollars.

Table 4
Mitsubishi Electric Corporation
Capital and R&D Spending—1986
(Billions of Yen)

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Revenue	¥1,558	¥1,741	¥2,035	¥2,109	¥2,108
Capital Spending	¥ 73	¥ 115	¥ 133	¥ 154	¥ 126
Percent of Revenue	5%	7%	7%	7%	6%
R&D Expense	¥ 53	¥ 61	¥ 77	¥ 89	¥ 95
Percent of Revenue	3%	3%	4%	4%	4%
Combined Capital and R&D Spending	¥ 125	¥ 175	¥ 209	¥ 243	¥ 221
Percent of Revenue	8%	10%	11%	11%	10%
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
December 1987

Turning to the semiconductor area, Dataquest estimates that Mitsubishi made capital investments totaling \$120 million in calendar year 1986 (see Table 6). This amount represents 11 percent of Mitsubishi's semiconductor revenue. In recent years, Mitsubishi has built two semiconductor plants at Saijo on Shikoku Island. The facilities were the first semiconductor plants to be built there and are used specifically for producing 64K, 256K, and 1Mb DRAMs.

Mitsubishi Electric Corporation

Table 5

Mitsubishi Electric Corporation Capital and R&D Spending—1986 (Millions of Dollars)

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Revenue	\$6,255	\$7,376	\$8,305	\$9,545	\$13,172
Capital Spending	\$ 292	\$ 486	\$ 541	\$ 698	\$ 789
Percent of Revenue	5%	7%	7%	7%	6%
R&D Expense	\$ 211	\$ 257	\$ 314	\$ 403	\$ 591
Percent of Revenue	3%	3%	4%	4%	4%
Combined Capital and R&D Spending	\$ 503	\$ 743	\$ 855	\$1,101	\$ 1,380
Percent of Revenue	8%	10%	11%	11%	10%
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
December 1987

Table 6

Mitsubishi Electric Corporation Semiconductor Capital Spending—1986 Calendar Year (Millions of Dollars)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Semiconductor Revenue	\$340	\$505	\$964	\$662	\$1,140
Semiconductor Capital Spending	\$ 80	\$132	\$274	\$261	\$ 120
Percent of Revenue	24%	26%	28%	39%	11%

Source: Dataquest
December 1987

Mitsubishi Electric Corporation

The Company also built a plant in Durham, North Carolina, which began operation in the first half of 1985. It was built for the assembly of 64K and 256K DRAMs. In January 1987, the Company announced that it will build a full-scale semiconductor production facility in North Carolina in the near future. Plans include employing approximately 40 engineers and investing \$32.1 million in plant construction.

Research and Development

In fiscal 1987, Mitsubishi's research and development (R&D) spending was ¥95 billion, a 6.2 percent increase over fiscal 1986 R&D spending of ¥89 billion.

Mitsubishi maintains nine R&D laboratories, as follows:

- Central Research Laboratory (Hyogo Prefecture)—Basic research in mechanical, electrical, optical, and biological technology
- Product Development Laboratory (Hyogo Prefecture)—Development of new electronic and mechatronic parts
- Consumer Electronics Development Laboratory (Osaka Prefecture)—Development of consumer electronics products and mass-production technologies
- Manufacturing Development Laboratory (Hyogo Prefecture)—Research and development of production-line automation and other technologies; testing of materials and components
- Consumer Products Research Laboratory (Kanagawa Prefecture)—Development of home automation electronic systems; testing of products and packaging
- LSI Development Laboratory (Hyogo Prefecture)—Research and development of ICs and discretes; new product development (A new VLSI Development Wing was added in fiscal 1986.)
- Information Systems and Electronics Development Laboratory (Kanagawa Prefecture)—Overall development of information systems and equipment
- Industrial Design Center (Kanagawa Prefecture)—Industrial design activities concerning all Mitsubishi products
- Materials Engineering Laboratory (Hyogo Prefecture)—Research and development of materials and electronic devices

Mitsubishi Electric Corporation

Mitsubishi has established five target areas for research and development: factory automation, data processing systems, communications, audio visual products, and electronic devices. Recent projects include:

- The MELCOM PSI Computer with inference capability; processes the PROLOG computer language
- A gallium arsenide semiconductor laser capable of switching between two different wave lengths in response to the amount of electrical current input
- A teleconferencing system that can send and receive voice, visual, and facsimile transmissions over a single phone circuit
- A successful continuous test run of a molten carbonate fuel cell for 10,000 hours (The goal is to raise the length of time to between 25,000 and 40,000 hours.)
- Five types of MELCARD IC cards

PRODUCTS AND MARKETS

Semiconductor Product Markets

Mitsubishi, the first commercial Japanese electronics firm to develop an integrated circuit, was the largest 64K DRAM supplier in 1986, with 18 percent of the market. The Company also is one of the top three suppliers of 256K and 1Mb DRAMs.

As shown in Table 7, \$569 million, or 50 percent, of Mitsubishi's 1986 semiconductor sales were MOS devices. By far the largest product family was MOS memory, with sales of \$305 million, or 27 percent of total Mitsubishi semiconductor sales. In addition to DRAMs, Mitsubishi is the third largest supplier of MOS EPROMs, with 14 percent of the market in 1986.

Mitsubishi's semiconductor sales in all product areas showed growth greater than the industry growth rate, as Table 8 illustrates.

In the microcomponent area, Mitsubishi announced that it planned to begin full-scale 16-bit microcontroller (MCU) production at its Kochi plant in September. The Kochi plant, which began operating in late 1986, had been operating only assembly lines for the device. Mitsubishi, which had been using 16-bit MCUs only for internal use, also announced that it will begin producing 16-bit MCUs for industrial use. Plans involve offering a 16-bit single-chip MCU, the 3700 series, on the market late this year. A vertically integrated production system for 32-bit MCUs is planned for 1989 at the Kochi plant.

Mitsubishi Electric Corporation

Table 7

Mitsubishi Electric Corporation Estimated Worldwide Semiconductor Revenue (Millions of Dollars)

	1982	1983	1984	1985	1986
Total Semiconductor	340	505	964	662	1,140
Total Integrated Circuit	244	384	766	504	913
Bipolar Digital (Technology)	44	68	123	75	134
TTL			99	59	104
ECL			21	14	28
Other Bipolar Digital			3	2	2
Bipolar Digital (Function)	44	68	123	75	134
Bipolar Digital Memory					
Bipolar Digital Logic	44	68	123	75	134
MOS (Technology)	137	247	541	323	569
NMOS	114	186	463	256	449
PMOS	9	12	5	2	3
CMOS	14	49	73	66	117
MOS (Function)	137	247	541	323	569
MOS Memory	81	158	370	147	305
MOS Microdevices	25	54	156	122	180
MOS Logic	31	35	15	55	84
Linear	63	69	102	106	210
Total Discrete	94	119	185	140	197
Transistor	33	38	56	64	89
Small Signal Transistor			56	64	89
Power Transistor					
Diode	19	15	23	3	4
Small Signal Diode			3	3	4
Power Diode			20		
Zener Diode					
Thyristor	25	15	23	37	52
Other Discrete	17	51	83	35	52
Total Optoelectronic	2	2	13	18	30
LED Lamps			4		
LED Displays					
Optical Couplers					
Other Optoelectronics			9	18	30
Exchange Rate (Yen per US\$)	248	235	237	238	167

Source: Dataquest
December 1987

Mitsubishi Electric Corporation

Table 8

**Mitsubishi Electric Corporation
Company Growth Rate Compared to Industry Growth Rates
(Millions of Dollars)**

	1985	1986	Company % Change (1985-1986)	Industry % Change (1985-1986)
Total Semiconductor	\$662	\$1,140	72%	25%
Total IC	\$504	\$ 913	81%	24%
Bipolar Digital	75	135	80%	14%
MOS Digital	323	569	76%	25%
Linear	106	210	98%	30%
Total Discrete	\$140	\$ 198	41%	25%
Total Optoelectronic	\$ 18	\$ 29	61%	37%

Source: Dataquest
December 1987

The Company's total MCU production, including 4-bit and 8-bit models and peripheral chips, was recently increased from 10 million units to between 12 million and 13 million units per month. The Company plans to increase MCU production again to 15 million units by year end.

In September 1987, Mitsubishi announced that it plans a full-fledged advance into the power semiconductor market. Late this year or early in 1988, the Company will begin importing thyristors and power diodes from Powerex, a joint venture between Mitsubishi, General Electric, and Westinghouse. The devices will be used for general-purpose welding machines and sequencers. Sales in the first year are targeted at ¥1 billion to ¥2 billion (\$7 million to \$14 million).

Dataquest believes that approximately 10 percent of Mitsubishi's 1986 semiconductor sales were to the United States, 5 percent were to Europe, 1 percent were to Rest of World, and the remaining 84 percent were domestic sales. Table 9 shows the estimated geographic distribution of Mitsubishi's semiconductor sales.

Mitsubishi's semiconductor organization is shown in Figure 6.

Mitsubishi Electric Corporation

Table 9

**Mitsubishi Electric Corporation
Estimated Semiconductor Revenue by Region—1986
(Millions of Dollars)**

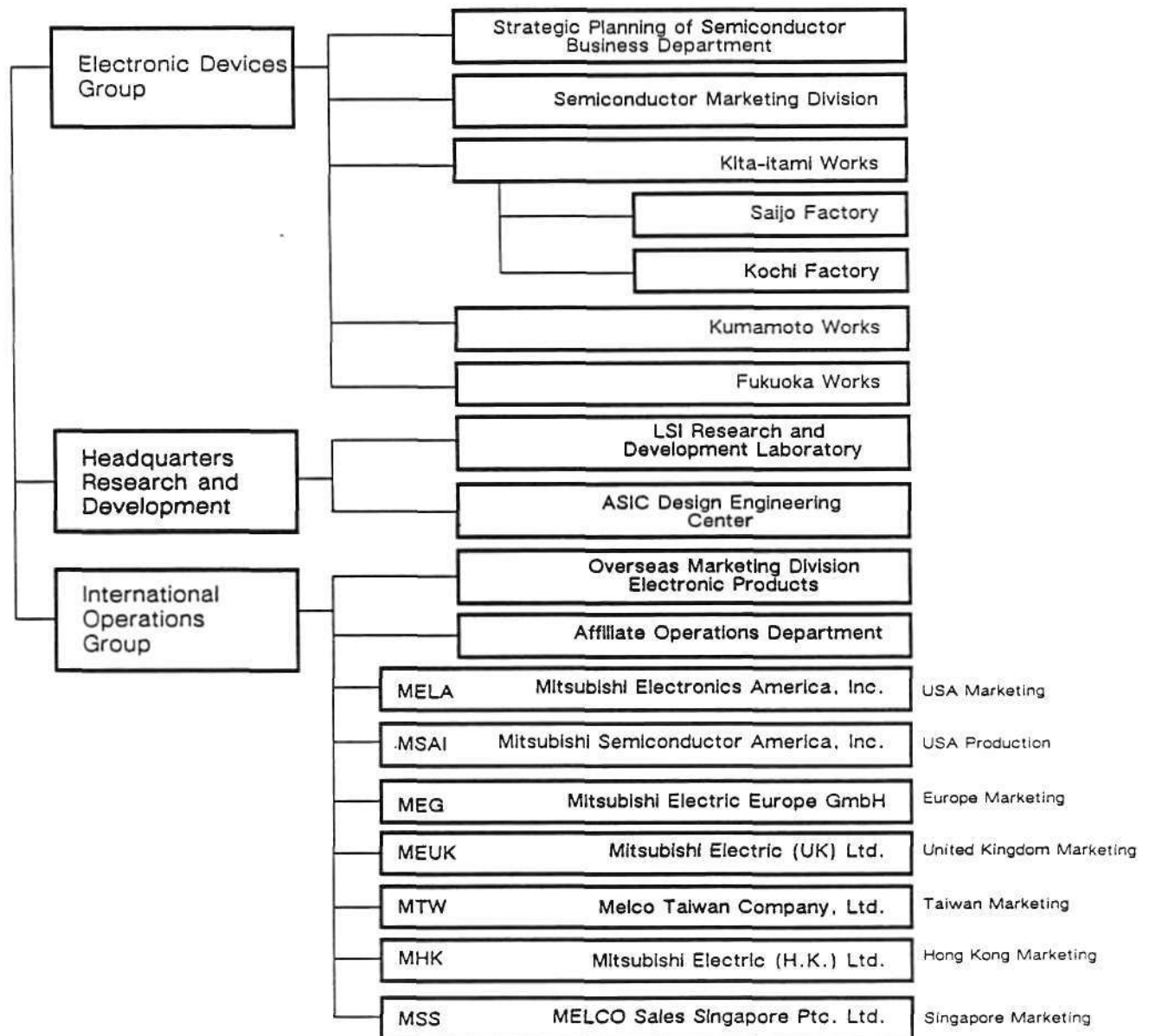
	<u>United States</u>	<u>Japan</u>	<u>Europe</u>	<u>ROW</u>	<u>World</u>
Total Semiconductor	\$114	\$961	\$53	\$12	\$1,140
Total Integrated Circuit	\$106	\$751	\$47	\$ 9	\$ 913
Bipolar Digital	10	120	2	2	134
MOS	94	427	45	3	569
Linear	2	204	0	4	210
Total Discrete	\$ 6	\$184	\$ 4	\$ 3	\$ 197
Total Optoelectronic	\$ 2	\$ 26	\$ 2	0	\$ 30
Exchange Rate (Yen per US\$)	167	167	167	167	167

Source: Dataquest
December 1987

Mitsubishi Electric Corporation

Figure 6

Mitsubishi Electric Corporation Semiconductor Organization



Source: Mitsubishi Electric Corporation

Mitsubishi Electric Corporation

Channels of Distribution

Dataquest believes that approximately 80 percent of Mitsubishi's semiconductor products are sold domestically in Japan through distributors. The Company's major distributors are Ryoyo Electric, Ryoden Shoji Co., Ltd., and Kyoei Sangyo. Approximately 15 percent of Mitsubishi's sales are captive.

In the United States, Mitsubishi sells semiconductors through Mitsubishi Electronics America, Inc., headquartered in Sunnyvale, California, and through distributors. In Europe, Mitsubishi has sales offices in most of the major countries and also sells through distributors.

Semiconductor Products and Technologies

Mitsubishi's semiconductor product line includes the following:

- Bipolar digital logic—Low-power Schottky TTL (LSTTL) and ALSTTL
- MOS memory—64K, 256K, and 1Mb DRAMs; NMOS and CMOS SRAMs; ROMs; and EPROMs
- MOS microcomponents—Second-sourcing of Intel microcontrollers in NMOS and CMOS, 8-bit CMOS and NMOS microperipherals, and original 8-bit microprocessors
- MOS logic—CMOS and ECL gate arrays
- Linear—Transistor arrays, op amps, voltage comparators and regulators, timer ICs, and current drivers

Mitsubishi also manufactures gallium arsenide (GaAs) field-effect transistors (FETs). Recent developments in the Company's semiconductor activities are presented in the following paragraphs.

Memory

Highlights of Mitsubishi's memory activities include the following:

- Two 1Mb CMOS EPROMs (MSM27C100K/101K); 1.5-micron silicon gate process; 150/200/250ns; 263mW power consumption in operation and 6mW at standby
- A 256K CMOS EPROM (MSM27C256K-12) 32Kx8; 1.5-micron process; 120/150/250ns
- A 250ns 4Mb ROM (MSM23C400P/FP) 256Kx16 and 512Kx8; 165mW power consumption during operation and 550mW at standby; eight memory cell layers consisting of eight memory transistors; 1.2-micron process

Mitsubishi Electric Corporation

- A 34ns 1Mb CMOS SRAM using triple polysilicon; announced at ISSCC 1987
- A 480K CMOS field memory (M5M4C500L) that allows a TV or VTR to simultaneously record and play back pictures; 320 x 256 x 6-bit structure; 5.0mm x 10.08mm chip; NTSC and PAL method; also capable of storing one TV screen at a time

ASICs

Highlights of Mitsubishi's ASIC activities include the following:

- An ECL gate array that reduces software error to 1/100 of conventional devices; noise circuit added to reduce error rates
- Two 1.3-micron rule CMOS gate array versions: the M6002X featuring alternating internal gate and wiring, 224 to 1,773 gates; the M6003X featuring 4,778 to 47,376 gates, VTM system (basic cells laid over all internal gates, enlarging built-in ROM and RAM capacity), gate isolation system, 1.1ns per gate, DIP, shoe-link DIP, QFP, PLCC, and PGA packages

Mitsubishi also announced that it is augmenting its ASIC operations by expanding its ASIC Design Engineering Center, where the Company is refining planning techniques and CAD tools to assist electronic equipment designers in the design of LSI devices.

Microcomponents

Highlights of Mitsubishi's microcomponent activities include the following:

- A proprietary 32-bit MPU (HF32/300) developed with Fujitsu and Hitachi as part of the TRON project; 20 Mips and 4-Kbyte cache memory; supports UNIX System 5 and ITRON; commercialization in late 1988
- Three CMOS MCUs: the M50930FP0, with 4 Kbytes of ROM and 128 bytes of RAM; the M50931FP, with 4 Kbytes of RAM; and the M50932FP, with 8 Kbytes of ROM and 512 bytes of RAM
- A CMOS 4-bit MCU with built-in character display function (M50436-SP) for voltage synthesizers, 16 characters x 3 lines for color selection, 6 x 7 dots, 64 character types, and 4 character sizes
- Four MCUs with system reset circuits (M5290P/5292P), +5V and +/-12V power outputs, and 4.2V current

Mitsubishi Electric Corporation

- An 8-bit CMOS parallel-processing MPU (M5M80C85AP/AFP-2) with 2.0-micron rule, 12,000 transistors, and 0.8ms instruction cycle
- An I/O interface LSI (M5M82C255ASP) and four 2K RAMs with built-in I/O port and timer; I/O interface with one general I/O port and two special-purpose ports with 24 I/O lines for transferring data to 8-bit and 16-bit CPUs

Mitsubishi is one of the companies participating in the Japanese government-sponsored Supercomputer and Optoelectronics Projects. These projects involve research and development of gallium arsenide (GaAs) field-effect transistors (FETs) and memory devices. The Company has made several technological innovations in GaAs, including the following:

- Mitsubishi is producing GaAs solar cells at the Kita-itami Works; much of the production will be used in the CS-3, a communications satellite to be launched in 1988 by the National Space Development Agency of Japan.
- In October 1987, Mitsubishi announced that its LSI R&D Laboratory is developing a low-voltage 4Kx4 GaAs SRAM under the MITI Scientific Computing Systems Program. The device uses a 1.0-micron E/D DCFL self-aligned gate (SAG) MESFET process and dual-layer metal.
- The Company has developed a planar-type diode that simplifies the process of producing OEICs; it includes a transverse junction stripe (TJS) laser embedded in a GaAs substrate produced using a reduced pressure and a flat layer of GaAs and AlGaAs films on GaAs substrate.
- Mitsubishi has developed a surface-light-emitting GaAsAl diffraction lattice junction semiconductor laser for optocomputers; it has transverse junction stripe (TJS) structure for transverse mode control and distributed feedback (DFB) structure for vertical mode control, continuous oscillation at 867.2nm wavelength, and 3mW output vertically from the substrate surface.
- The Company has developed five 14-GHz high-output GaAs FETs (MGFK series) with 0.3- to 5.5-watt output, 5.5dB to 0.8dB noise factor, and 14.0- to 14.5-GHz frequency range, using MBE process technology. They are intended for use as signal amplifiers in communications satellites.
- Mitsubishi has developed a high-output GaAs amplifier IC, 2.45W output at 28-GHz band, for use in ground station amplifiers for satellite communications systems.
- Mitsubishi has developed a mass-production technology for HEMT GaAs FETs using e-beam epitaxy and a proprietary low-noise process to deposit thin films of AlGaAs and other III-V compound materials on a GaAs substrate.

Mitsubishi Electric Corporation

Image Sensors

Mitsubishi has developed an infrared CCD sensor with 260,000 elements on a 1.6mm x 1.2mm chip, capable of detecting 3.0- to 5.0-micron wavelengths. It is intended for use in defense equipment and night-vision cameras.

Semiconductor Agreements

Mitsubishi is involved in the following licensing, second-sourcing, and joint-venture agreements:

- **Matsushita, Sanyo, and Sharp**—A joint development agreement has been established with Matsushita, Sanyo, and Sharp to jointly develop micro-processors for parallel-processing computers.
- **General Electric (GE) and Westinghouse**—In 1986, Mitsubishi, GE, and Westinghouse formed a joint venture to manufacture and sell power transistors, diodes, and thyristors. Mitsubishi is financing 10 percent of the venture, named Powerex, while the two U.S. companies are each contributing 45 percent.
- **Dai Nippon Printing Co., Ltd., Hoya Corporation, Toppan Printing Co., Ltd., and ULVAC Coating Corp.**—In June 1986, Mitsubishi's LSI Development Laboratory provided Dai Nippon Printing, Hoya, Toppan Printing, and ULVAC Coating with photomask manufacturing technology using molybdenum silicide. The four companies will pay contract fees and royalties based on their production volumes.
- **Intel Corporation**—In June 1986, Mitsubishi agreed to provide foundry services for Intel. Mitsubishi second-sources Intel's 8086 product line.
- **LSI Logic Corporation**—In June 1986, Mitsubishi agreed to provide foundry services for LSI Logic.
- **Nihon MRC Co., Ltd.**—In October 1986, Mitsubishi invested in Nihon MRC for 25 percent ownership. Nihon MRC is a subsidiary of Materials Research Corporation (MRC) of the United States; Mitsubishi will sell MRC equipment in Japan.
- **Semicon Systems, Inc.**—In June 1986, Mitsubishi invested ¥200 million in Semicon Systems. Mitsubishi sent three directors to Semicon Systems, which will change its name to Dia Semicon Systems.

Mitsubishi Electric Corporation

- Standard Microsystems Corporation (SMC)—In February 1985, Mitsubishi and SMC agreed to a global nonexclusive cross-licensing of each other's semiconductor patents and patent applications.
- Texas Instruments (TI)—In December 1986, Mitsubishi and TI agreed to mutually supply logic ICs on an OEM basis. TI will supply high-speed bipolar TTLs; Mitsubishi will ship low-power CMOS logic. Texas Instruments sells Mitsubishi-made 64K EPROMs in TI packaging.

Semiconductor Portfolio Analysis

Figure 7 is a graphic analysis of Mitsubishi's product portfolio compared with worldwide competition. Figure 8 presents the same analysis, but applied only to the Company's Japanese competition. These figures show the Company's strong and weak product areas.

The y axis is the historical product compound annual growth rate (CAGR) from 1982 to 1986. Mitsubishi's CAGR for each product is marked by a small square. In Figure 7, the worldwide product CAGR is marked by a dot surrounded by a circle that represents the total world market for the product. In Figure 8, the total Japanese company CAGR for each product is marked by a dot surrounded by a circle that represents total Japanese company sales for the product.

The circle around each plotted point represents the total available market (TAM) for the particular product.

The locations of graph points may be interpreted in the following way:

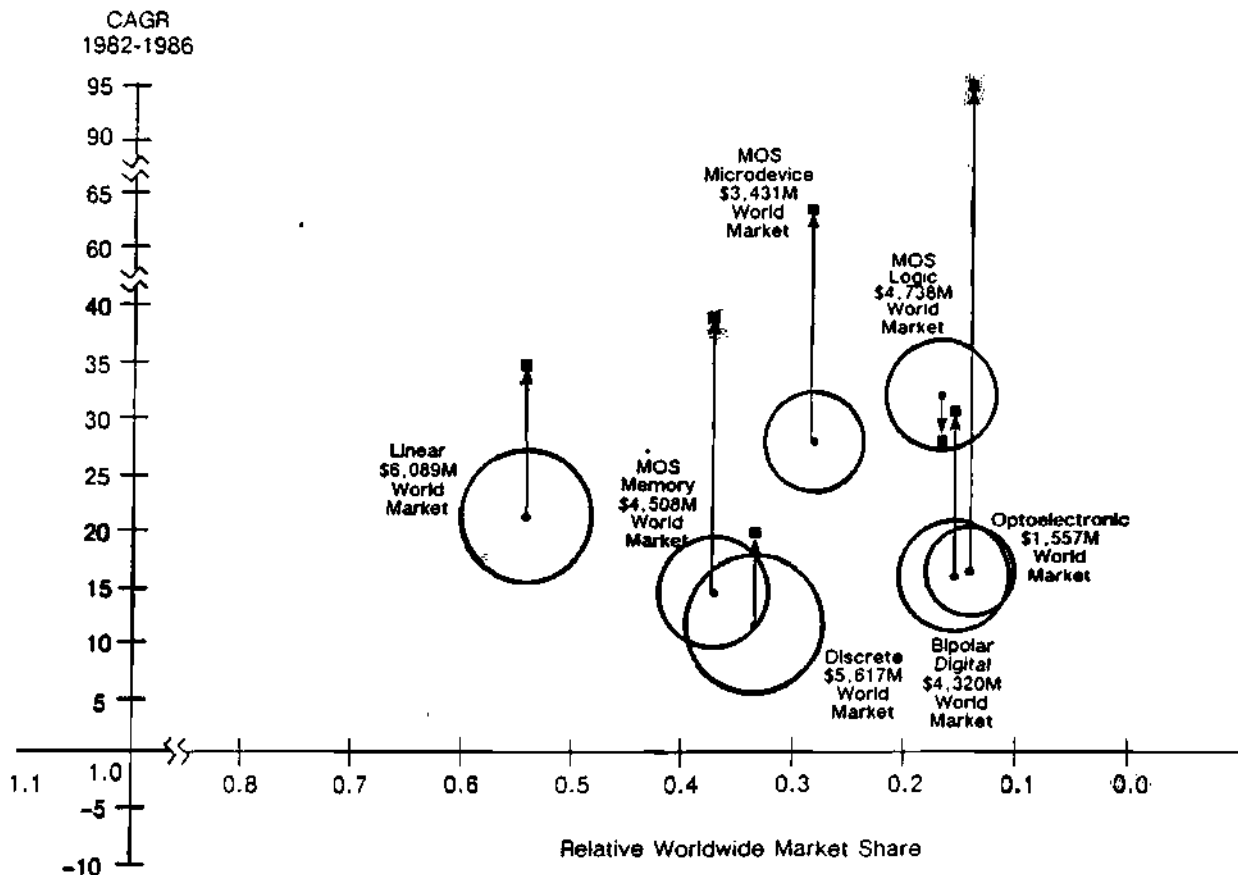
- Upper Right Quadrant—These are the "developing products." The Company is not the leading supplier of these products, but the products exhibit positive growth.
- Upper Left Quadrant—These are the "stars." The Company is the leading supplier of these products, and the products exhibit positive growth.
- Lower Left Quadrant—These are the "cash cows." The Company is the leading supplier in a declining product segment, but there is generally a high profit margin on these products.
- Lower Right Quadrant—These are the "dogs." The TAM for this product area is declining, and the Company is not the leading supplier.

From a worldwide perspective, Mitsubishi has a high relative market share and high growth rate in linear ICs. The Company also shows strength in MOS memory, discretes, and MOS microdevices. With the exception of MOS logic, Mitsubishi's growth rate is higher than the industry average in all product families.

Mitsubishi Electric Corporation

Figure 7

Mitsubishi Electric Corporation Estimated Product Portfolio Compared with Worldwide Competition



Note: Up arrow indicates growth higher than industry average
down arrow indicates the opposite.

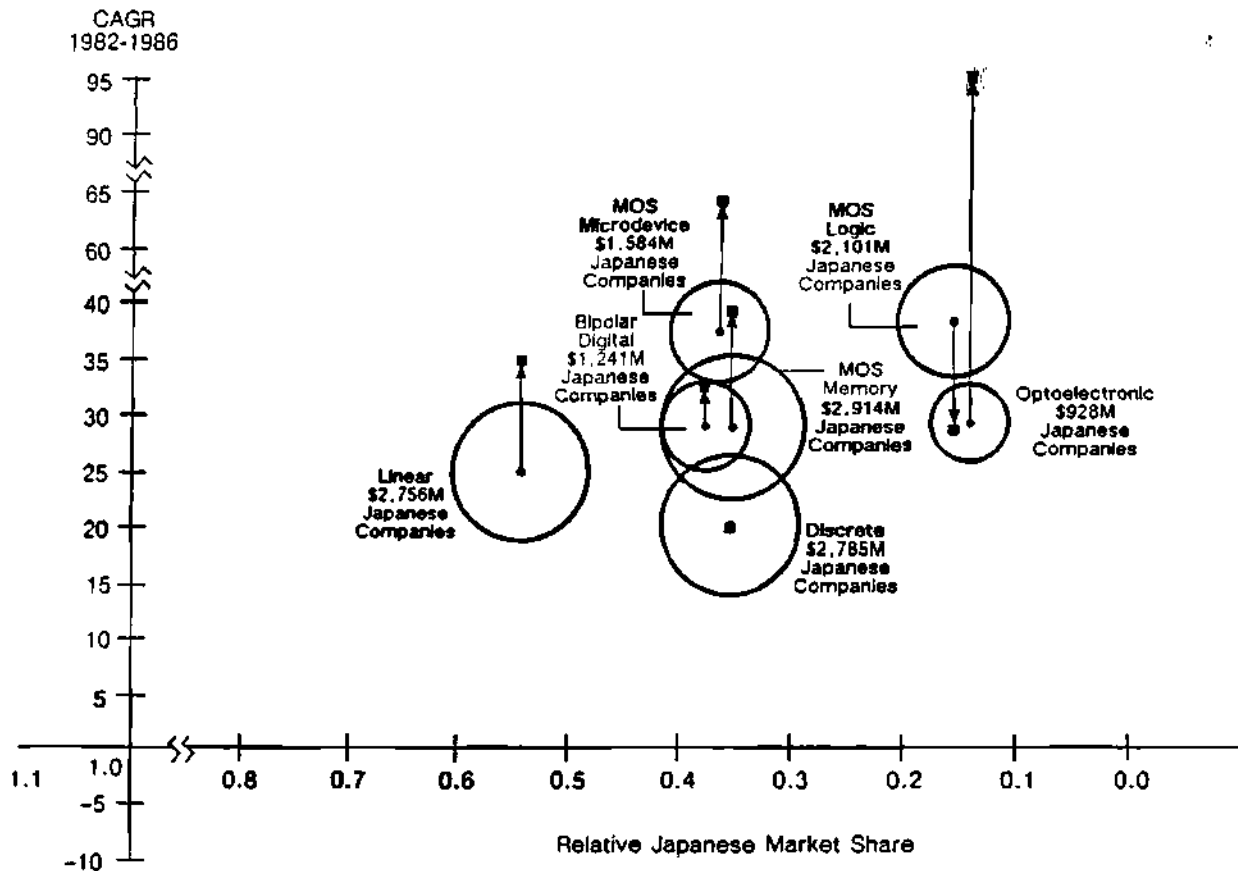
■ Mitsubishi

Source: Dataquest
December 1987

Mitsubishi Electric Corporation

Figure 8

Mitsubishi Electric Corporation Estimated Product Portfolio Compared with Japanese Competition



Note: Up arrow indicates growth higher than Japanese companies' average
down arrow indicates the opposite.

■ Mitsubishi

Source: Dataquest
December 1987

Mitsubishi Electric Corporation

Viewed against other Japanese companies only, Mitsubishi enjoys high relative market share and higher than average growth rates in linear, bipolar digital, MOS microdevices, MOS memory, and discretes. The Company has low relative market share in MOS logic and optoelectronic devices, although its growth rate in optoelectronics is 95 percent, considerably higher than the average Japanese company growth rate of 29 percent.

Nonsemiconductor Products Summary

Information and Communications Systems and Electronic Devices

In addition to semiconductors, major products of this group include office automation equipment, computers and peripherals, satellites, optical fiber communication, local area networks (LANs), and value added networks (VANs).

Mitsubishi considers communications to be its most important field. A key product in this area is a video teleconferencing system. The Company is also marketing satellite communication systems to private companies. Another recent innovation in digital communications is a packet multiplexer that connects computers and terminal units to a switching packet network.

Efforts in electronic products include three satellite projects: the Engineering Test Satellite-V (ETS-V) scheduled to launch in August 1987, two communication satellites (CS-3a and CS-3b) scheduled for launch in February and August 1988, and the Earth Resources Satellite (ERS-1) scheduled for launch in 1991. Mitsubishi is also a founder of the Institute for Unmanned Space Experiment Free Flier, established in 1986, which is constructing Japan's first unmanned space laboratory. Long-term plans involve the development of new materials and biotechnological experiments in space factories, which could lead to the establishment of actual space factories.

Information processing systems include general-purpose, small business, and personal computers in addition to other systems. In small business computers, the Company introduced the M3300 series workstation (an advanced 16-bit personal computer). A 32-bit workstation was developed in fiscal 1987. Mitsubishi also developed an artificial intelligence computer, the MELCOM PSI.

Heavy Machinery

Major products of this group include generators, motors, nuclear power equipment, transformers, circuit breakers, marine and industrial electric equipment and systems, industrial computer systems, railcar electric and electronic equipment and systems, numerical control equipment, electrical discharge and electrochemical machines, lasers, elevators, escalators, moving walks, and automatic building-cleaning systems.

Mitsubishi Electric Corporation

Industrial Products and Automotive Equipment

Major products of this group include small and medium-size motors, controllers, watt-hour meters, relays, chemical products, rafts and boats, electrical automotive equipment and accessories, automobile radios, stereos, air conditioners, refrigeration equipment, factory automation equipment, and robotics. During fiscal 1986, the Company entered into a joint venture with Mikuni Corporation and Robert Bosch GmbH to jointly establish Nippon Injector, a company that will manufacture electronic fuel-injection systems for automobile engines. A new plant, located in Odawara, began production in spring 1987.

Consumer Products

Major products of this group are TVs, VCRs, radios, stereo equipment, air conditioners, heaters, fans, refrigerators and other kitchen appliances, washers and dryers, vacuum cleaners, hair dryers, fluorescent and mercury-vapor lamps, home computers, and home automation equipment.

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo, 100, Japan
Telephone: (03) 218-2111; Telex: J24532
(Billions of Yen)

Balance Sheet (March 31)	1983	1984	1985	1986	1987
Total Current Assets	¥ 994	¥1,089	¥1,248	¥1,205	¥1,285
Cash	¥ 170	¥ 183	¥ 209	¥ 211	¥ 268
Receivables	¥ 415	¥ 432	¥ 483	¥ 460	¥ 456
Inventory	¥ 251	¥ 279	¥ 357	¥ 400	¥ 370
Net Property, Plant, and Equipment	¥ 233	¥ 283	¥ 325	¥ 388	¥ 409
Depreciation	¥ 318	¥ 366	¥ 430	¥ 500	¥ 578
Total Assets	¥1,421	¥1,586	¥1,816	¥1,833	¥1,943
Total Current Liabilities	¥ 864	¥ 980	¥1,088	¥1,064	¥1,133
Long-Term Debt	185	189	257	216	205
Total Liabilities	¥1,116	¥1,242	¥1,430	¥1,370	¥1,433
Total Shareholders' Equity	¥ 305	¥ 343	¥ 386	¥ 463	¥ 507
Conv. Preferred Stock	0	0	0	0	0
Common Stock	¥ 79	¥ 83	¥ 87	¥ 118	¥ 139
Retained Earnings	¥ 151	¥ 184	¥ 219	¥ 234	¥ 230
Income Statement (March 31)	1983	1984	1985	1986	1987
Revenue	¥1,558	¥1,741	¥2,035	¥2,109	¥2,108
Domestic Sales	¥1,190	¥1,271	¥1,461	¥1,518	¥1,596
Overseas Sales	¥ 367	¥ 469	¥ 574	¥ 592	¥ 512
Cost of Sales	¥1,154	¥1,306	¥1,521	¥1,612	¥1,625
Gross Margin (%)	26	25	25	24	23
R&D Expense	¥ 53	¥ 61	¥ 77	¥ 89	¥ 95
SG&A Expense	¥ 251	¥ 278	¥ 312	¥ 324	¥ 319
Operating Income (Loss)	¥ 86	¥ 84	¥ 99	¥ 65	¥ 33
Interest, Net	(¥ 12)	(¥ 2)	¥ 1	¥ 7	¥ 5
Pretax Income	¥ 74	¥ 82	¥ 99	¥ 72	¥ 38
Effective Tax Rate (%)	55	55	55	63	76
Extraordinary Items, Net	¥ 2	¥ 2	¥ 3	¥ 3	¥ 1
Net Income	¥ 35	¥ 39	¥ 47	¥ 30	¥ 11
Avg. Shares Outstanding (Millions)	1,577	1,598	1,620	1,714	1,864
Employees	64,432	65,904	68,745	71,479	73,536
Capital Spending	¥ 73	¥ 115	¥ 133	¥ 154	¥ 126
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
March 1988

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo, 100, Japan
Telephone: (03) 218-2111; Telex: J24532
(Millions of Dollars)

Balance Sheet (March 31)	1983	1984	1985	1986	1987
Total Current Assets	\$3,993	\$4,613	\$5,093	\$5,452	\$ 8,029
Cash	\$ 583	\$ 775	\$ 853	\$ 956	\$ 1,675
Receivables	\$1,666	\$1,833	\$1,970	\$2,080	\$ 2,853
Inventory	\$1,009	\$1,181	\$1,457	\$1,812	\$ 2,314
Net Property, Plant, and Equipment	\$ 934	\$1,201	\$1,326	\$1,758	\$ 2,559
Depreciation	\$1,276	\$1,551	\$1,756	\$2,260	\$ 3,614
Total Assets	\$5,706	\$6,719	\$7,412	\$8,294	\$12,147
Total Current Liabilities	\$3,471	\$4,151	\$4,442	\$4,815	\$ 7,083
Long-Term Debt	\$ 745	\$ 803	\$1,051	\$ 975	\$ 1,278
Total Liabilities	\$4,480	\$5,264	\$5,836	\$6,197	\$ 8,957
Total Shareholders' Equity	\$1,226	\$1,455	\$1,576	\$2,097	\$ 3,166
Conv. Preferred Stock	0	0	0	0	0
Common Stock	\$ 318	\$ 353	\$ 353	\$ 532	\$ 870
Retained Earnings	\$ 606	\$ 782	\$ 893	\$1,058	\$ 1,438
Income Statement (March 31)	1983	1984	1985	1986	1987
Revenue	\$6,255	\$7,376	\$8,305	\$9,545	\$13,172
Domestic Sales	\$4,780	\$5,387	\$5,964	\$6,868	\$ 9,972
Overseas Sales	\$1,475	\$1,989	\$2,341	\$2,677	\$ 3,200
Cost of Sales	\$4,636	\$5,536	\$6,210	\$7,293	\$10,159
Gross Margin (%)	26	25	25	24	23
R&D Expense	\$ 211	\$ 257	\$ 314	\$ 403	\$ 591
SG&A Expense	\$1,010	\$1,176	\$1,275	\$1,468	\$ 1,995
Operating Income (Loss)	\$ 346	\$ 357	\$ 402	\$ 294	\$ 209
Interest, Net	(\$ 49)	(\$ 9)	\$ 2	\$ 34	\$ 30
Pretax Income	\$ 297	\$ 348	\$ 405	\$ 328	\$ 239
Effective Tax Rate	55	55	55	63	76
Extraordinary Items, Net	\$ 7	\$ 7	\$ 11	\$ 15	\$ 9
Net Income	\$ 141	\$ 165	\$ 192	\$ 136	\$ 66
Avg. Shares Outstanding (Millions)	1,577	1,598	1,620	1,714	1,864
Employees	64,432	65,904	68,745	71,479	73,536
Capital Spending	\$ 292	\$ 486	\$ 541	\$ 698	\$ 789
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
March 1988

Mitsubishi Electric Corporation

Table 1

**Mitsubishi Electric Corporation
Revenue by Lines of Business
(Billions of Yen)**

	<u>Fiscal Year Ending March 31</u>				
	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Heavy Machinery	¥ 512	¥ 548	¥ 577	¥ 582	¥ 562
Information and Communications and Electronic Devices	310	401	573	512	564
Industrial Products and Automotive Equipment	315	333	368	405	387
Consumer Products	<u>421</u>	<u>459</u>	<u>517</u>	<u>610</u>	<u>595</u>
Total	¥1,558	¥1,741	¥2,035	¥2,109	¥2,108
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
March 1988

Mitsubishi Electric Corporation

Table 2

Mitsubishi Electric Corporation Estimated Worldwide Semiconductor Revenue (Millions of Dollars)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Total Semiconductor	340	505	964	662	1,140
Total Integrated Circuit	244	384	766	504	913
Bipolar Digital (Technology)	44	68	123	75	134
TTL			99	59	104
ECL			21	14	28
Other Bipolar Digital			3	2	2
Bipolar Digital (Function)	44	68	123	75	134
Bipolar Digital Memory					
Bipolar Digital Logic	44	68	123	75	134
MOS (Technology)	137	247	541	323	569
NMOS	114	186	463	256	449
PMOS	9	12	5	2	3
CMOS	14	49	73	66	117
MOS (Function)	137	247	541	323	569
MOS Memory	81	158	370	147	305
MOS Microdevices	25	54	156	122	180
MOS Logic	31	35	15	55	84
Linear	63	69	102	106	210
MOS (Function)	137	247	541	323	569
MOS Memory	81	158	370	147	305
MOS Microdevices	25	54	156	122	180
MOS Logic	31	35	15	55	84
Linear	63	69	102	106	210
Total Discrete	94	119	185	140	197
Transistor	33	38	56	64	89
Small Signal Transistor			56	64	89
Power Transistor					

(Continued)

Mitsubishi Electric Corporation

Table 2 (Continued)

**Mitsubishi Electric Corporation
Estimated Worldwide Semiconductor Revenue
(Millions of Dollars)**

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Diode	19	15	23	3	4
Small Signal Diode			3	3	4
Power Diode			20		
Zener Diode					
Thyristor	25	15	23	37	52
Other Discrete	17	51	83	35	52
Total Optoelectronic	2	2	13	18	30
LED Lamps			4		
LED Displays					
Optical Couplers					
Other Optoelectronics			9	18	30
Exchange Rate (Yen per US\$)	248	235	237	238	167

Source: Dataquest
March 1988

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-Ku Tokyo 100 Japan
Telephone: (03) 218-2111 Telex: J24532
(Billions of Yen Except Per Share Data)

Balance Sheet (March 31)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Working Capital	¥ 56.5	¥ 64.0	¥ 85.7	¥ 108.1	¥ 113.0
Long-Term Debt	N/A	N/A	¥ 145.2	¥ 148.2	¥ 155.7
Shareholders' Equity	¥137.9	¥ 161.5	¥ 193.5	¥ 237.6	¥ 277.2
After-Tax Return on Average Equity (%)	9.5	14.7	18.4	15.9	13.4

Operating Performance (Fiscal Year Ending March 31)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Sales	¥862.3	¥1,018.7	¥1,189.5*	¥1,338.7*	¥1,441.2*
Japanese Sales	N/A	N/A	¥ 992.2	¥1,084.4	¥1,146.3
Non-Japanese Sales	N/A	N/A	¥ 190.3	¥ 254.3	¥ 294.9
Cost of Sales	¥658.7	¥ 764.7	¥ 924.9	¥1,054.4	¥1,074.9
R&D Expense		¥ 25.7	¥ 30.8	¥ 34.3	¥ 43.2
SG&A Expense	¥162.6	¥ 171.2	¥ 192.6	¥ 213.1	¥ 226.7
Pretax Income	¥ 26.7	¥ 41.9	¥ 64.7	¥ 69.2	¥ 69.3
Pretax Margin (%)	3.1	4.1	5.4	5.2	4.8
Effective Tax Rate (%)	N/A	N/A	52.4	53.1	54.0
Net Income	¥ 12.3	¥ 22.0	¥ 32.6	¥ 34.3	¥ 34.6
Average Shares Outstanding (Millions)	1,284	1,347	1,403	1,467	1,549
Per Share					
Earnings	¥ 9.6	¥ 16.3	¥ 23.2	¥ 23.4	¥ 22.4
Dividends	¥ 5.0	¥ 5.5	¥ 6.0	¥ 7.0	¥ 6.0
Book Value	¥107.4	¥ 119.9	¥ 137.9	¥ 162.0	¥ 179.0
Price Range	N/A	N/A	N/A	N/A	N/A
Capital Expenditures	¥ 29.9	¥ 42.1	¥ 47.8	¥ 55.1	¥ 66.0
Exchange Rate (Yen per US\$)	¥253.1	¥ 200.0	¥ 231.8	¥ 215.7	¥ 228.7

*Mitsubishi also had other income of ¥23.6 billion in 1980, and ¥32.2 billion in 1981, and ¥31.8 billion in 1982. Similar data for 1978 and 1979 are not available.

N/A = Not Available

Source: Mitsubishi Electric Corporation
Annual Reports
DATAQUEST

Mitsubishi Electric Corporation

Table 1

Mitsubishi Electric
REVENUES BY MAJOR LINE OF BUSINESS
(Billions of Yen)

	Fiscal Year Ending March 31				
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Heavy Machinery	¥ 205	¥ 259	¥ 301	¥ 322	¥ 366
Electronic Products and Systems	287	316	378	451	494
Industrial Products	159	183	218	232	238
Consumer Products	<u>211</u>	<u>260</u>	<u>293</u>	<u>334</u>	<u>343</u>
Total Sales	¥ 862	¥1,018	¥1,190	¥1,339	¥1,441
Exchange Rate (Yen per US\$)	<u>253</u>	<u>200</u>	<u>232</u>	<u>216</u>	<u>229</u>
Total Sales (Millions of US\$)	\$3,407	\$5,093	\$5,132	\$6,207	\$6,293

Source: Mitsubishi Electric Corporation
Annual Reports
DATAQUEST

Mitsubishi Electric Corporation

Table 2

Mitsubishi Electric Corporation
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

	1975	1976	1977	1978	1979	1980	1981	1982

Total Semiconductor	56	126	139	147	195	254	321	338
Total Integrated Circuit	25	50	54	70	126	174	212	244
Bipolar Digital (Technology)	7	19	12	15	20	29	38	44
TTL	-	-	-	-	-	-	-	-
DTL	-	-	-	-	-	-	-	-
ECL	-	-	-	-	-	-	-	-
Other Bipolar Digital	-	-	-	-	-	-	-	-
Bipolar Digital (Function)	7	19	12	15	20	29	38	44
Bipolar Digital Memory	-	-	-	-	-	-	-	-
Bipolar Digital Logic	-	-	-	-	20	29	38	44
MOS (Technology)	11	19	24	25	69	86	99	137
NMOS	-	-	-	-	53	66	80	114
PMOS	-	-	-	-	12	12	9	9
CMOS	-	-	-	-	4	8	10	14
MOS (Function)	11	19	24	25	69	86	99	137
MOS Memory	-	-	-	-	10	20	34	73
MOS Microprocessor	-	-	-	-	7	14	20	25
MOS Logic	-	-	-	-	52	52	45	39
Linear	7	12	18	30	37	59	75	63
Total Discrete	31	75	83	77	69	80	109	94
Transistor	-	-	31	30	26	30	39	33
Small Signal Transistor	-	-	-	-	-	-	-	-
Power Transistor	-	-	-	-	-	-	-	-
Diode	-	-	20	18	16	21	22	19
Small Signal Diode	-	-	-	-	-	-	-	-
Power Diode	-	-	-	-	-	-	-	-
Zener Diode	-	-	-	-	-	-	-	-
Thyristor	-	-	21	19	17	21	29	25
Other Discrete	-	-	11	10	10	8	19	17
Total Optoelectronic	-	1	2	-	-	-	-	-
LED Lamps	-	-	-	-	-	-	-	-
LED Displays	-	-	-	-	-	-	-	-
Optical Couplers	-	-	-	-	-	-	-	-
Other Optoelectronics	-	-	-	-	-	-	-	-

Source: DATAQUEST

Mitsubishi Electric Corp.

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-Ku Tokyo 100 Japan
Telephone: (03) 218-2111 Telex: J24532
(Billions of Yen Except Per Share Data)

Balance Sheet (March 31)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Working Capital	¥ 32.4	¥ 56.5	¥ 64.0	¥ 85.7	¥ 108.1
Long-Term Debt	N/A	N/A	N/A	¥ 145.2	¥ 148.0
Shareholders' Equity	¥121.1	¥137.9	¥ 161.5	¥ 193.5	¥ 237.6
After-Tax Return on Average Equity (%)	N/A	9.5	14.7	18.4	15.9

Operating Performance (Fiscal Year Ending March 31)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Sales	¥760.5	¥862.3	¥1,018.7	¥1,189.5*	¥1,338.7*
Japanese Sales	N/A	N/A	N/A	¥ 992.2	¥1,084.4
Non-Japanese Sales	N/A	N/A	N/A	¥ 190.3	¥ 254.3
Cost of Sales	¥558.0	¥658.7	¥ 764.7	¥ 924.9	¥1,054.4
R&D Expense	¥161.9	¥162.6	¥ 25.7	¥ 30.8	¥ 34.3
SG&A Expense			¥ 171.2	¥ 192.6	¥ 213.1
Pretax Income	¥ 21.1	¥ 26.7	¥ 41.9	¥ 64.7	¥ 69.2
Pretax Margin (%)	2.8	3.1	4.1	5.4	5.2
Effective Tax Rate (%)	N/A	N/A	N/A	52.4	53.1
Net Income	¥ 9.4	¥ 12.3	¥ 22.0	¥ 32.6	¥ 34.3
Average Shares Outstanding (Millions)	1,206	1,284	1,347	1,403	1,467
Per Share					
Earnings	¥ 7.8	¥ 9.6	¥ 16.3	¥ 23.2	¥ 23.4
Dividends	¥ 5.0	¥ 5.0	¥ 5.5	¥ 6.0	¥ 7.0
Book Value	¥100.4	¥107.4	¥ 119.9	¥ 137.9	¥ 162.0
Price Range	N/A	N/A	N/A	N/A	N/A
Capital Expenditures	¥ 24.5	¥ 29.9	¥ 42.1	¥ 47.8	¥ 55.1
Exchange Rate (Yen per US\$)	¥291.4	¥253.1	¥ 200.0	¥ 231.8	¥ 215.7

*Mitsubishi also had other income of ¥23.6 Billion in 1980 and ¥32.2 Billion in 1981. Similar data for 1977-1979 is not available.

Source: Mitsubishi Electric Corporation
Annual Reports
DATAQUEST

Mitsubishi Electric Corp.

Table 1

Mitsubishi Electric
REVENUES BY MAJOR LINE OF BUSINESS
(Billions of Yen)

	Fiscal Year Ending March 31				
	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Heavy Machinery	¥ 200	¥ 205	¥ 259	¥ 301	¥ 322
Electronic Products and Systems	223	287	316	378	451
Industrial Products	148	159	183	218	232
Consumer Products	<u>190</u>	<u>211</u>	<u>260</u>	<u>293</u>	<u>334</u>
Total Sales	¥ 761	¥ 862	¥1,018	¥1,190	¥1,339
Exchange Rate (Yen per US\$)	<u>291</u>	<u>253</u>	<u>200</u>	<u>232</u>	<u>216</u>
Total Sales (Millions of US\$)	\$2,610	\$3,407	\$5,093	\$5,132	\$6,207

Source: DATAQUEST

Mitsubishi Electric Corp.

Table 2

Mitsubishi Electric Corporation ESTIMATED SEMICONDUCTOR REVENUES (Millions of Dollars)

	1974	1975	1976	1977	1978	1979	1980	1981
TOTAL SEMICONDUCTOR	72	56	126	139	147	195	254	326
Total Integrated Circuit	26	25	50	54	70	126	174	221
Bipolar Digital	11	7	19	12	15	20	29	45
TTL								
DTL								
ECL								
Other								
Bipolar Digital (Recap)						20	29	45
Memory						0	0	0
Logic						20	29	45
MOS	6	11	19	24	25	69	86	96
NMOS						53	66	77
PMOS						12	12	9
CMOS						4	8	10
MOS (Recap)						69	86	96
Memory						10	20	32
Microprocessor						0	0	0
Logic						59	66	64
Linear	9	7	12	18	30	37	59	80
Total Discrete	46	31	75	83	77	69	80	105
Transistor				31	30	26	30	37
Small Signal								
Power Transistor								
Diode				20	18	16	21	20
Small Signal								
Power								
Zener								
Thyristor				21	19	17	21	29
Other				11	10	10	8	19
Total Optoelectronic	0	0	1	2	0	0	0	0
LED Lamps	0	0	0	0	0	0	0	0
LED Displays	0	0	0	0	0	0	0	0
Optical Couplers	0	0	0	0	0	0	0	0
Other	0	0	1	2	0	0	0	0

Source: DATAQUEST

10.06 Mitsubishi

Table 10.06-1
Mitsubishi
ESTIMATED SEMICONDUCTOR REVENUES
(Dollars in Millions)

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
TOTAL SEMICONDUCTOR		57	84	72	56	126	139	147
TOTAL I C	16	20	32	26	25	50	54	70
BIPOLAR DIGITAL	9	8	11	11	7	19	12	15
TTL								
DTL								
ECL								
OTHER								
MOS	4	6	12	6	11	19	24	25
PMOS								
NMOS								
CMOS								
LINEAR	3	6	9	9	7	12	18	30
INTERFACE								
CONTROL								
ENTERTAINMENT								
OTHER								
HYBRID								
TOTAL DISCRETE		37	52	46	31	75	83	77
TRANSISTOR							31	30
SMALL SIGNAL								
POWER								
DIODE							20	18
SMALL SIGNAL								
POWER								
ZENER								
THYRISTOR							21	19
OTHER								
OPTOELECTRONIC							2	0
LED LAMPS								
LED DISPLAYS								
COUPLERS								
OTHER								

Note: The following exchange rates were used to convert yen to dollars:
 1971: 343 yen = \$1.00; 1972: 302 yen = \$1.00; 1973: 269 yen = \$1.00;
 1974: 292 yen = \$1.00; 1975: 297 yen = \$1.00; 1976: 296 yen = \$1.00;
 1977: 266 yen = \$1.00; 1978: 207 yen = \$1.00

Source: DATAQUEST, Inc.

Mitsubishi Electric Corporation

BACKGROUND AND OVERVIEW

Mitsubishi Electric Corporation was founded in 1921 as the consolidation of electric equipment and shipbuilding support facilities, some of which date back to 1884. Several factories were built in Japan between 1924 and 1943, after a technical cooperation agreement was signed with Westinghouse Electric in 1923. The company began producing consumer goods in the 1930s, and commenced from 1944 active R&D in purpose-built facilities. In 1958, separate groups were established for the various elements of the business, e.g., heavy machinery, electronics, consumer electronics, etc.; and in 1969 extended further. The semiconductor marketing division began operations in 1972, followed by computer marketing in 1976.

Some 16 percent of the electronics and systems revenues are in semiconductors, and 1982 semiconductor revenues were estimated by DATAQUEST at \$338 million worldwide of which \$6 million was achieved in Europe.

Table 1 shows DATAQUEST estimates of Mitsubishi's European semiconductor revenues.

Table 1

Mitsubishi Electric Corporation
ESTIMATED EUROPEAN SEMICONDUCTOR REVENUES BY PRODUCT LINE
(Millions of U.S. Dollars)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Total Semiconductor	\$ 1	\$ 1	\$ 3	\$ 4	\$ 5
Total Integrated Circuit	\$ 1	\$ 1	\$ 3	\$ 4	\$ 5
Bipolar Digital	0	0	0	0	0
MOS	\$ 1	\$ 1	\$ 3	\$ 4	\$ 5
Linear	0	0	0	0	0
Total Discrete	0	0	0	0	0
Transistor	0	0	0	0	0
Diode	0	0	0	0	0
Thyristor	0	0	0	0	0
Other	0	0	0	0	0
Total Optoelectronic	0	0	0	0	0

Source: DATAQUEST
December 1983

Mitsubishi Electric Corporation

PRODUCTS AND MARKETS SERVED

Mitsubishi's main product strengths are in the areas of EPROMs and DRAMs. CMOS and NMOS technologies are in production, and the Company is selling 4K and 16K CMOS static RAMs, 64K DRAMs, the Intel CMOS microprocessor (4-bit and 8-bit) families; as well as TTL compatible logic, power transistors, microwave FETs, and laser diodes. The European market has not been a major thrust area for Mitsubishi, but this is changing, and announcements were made in mid-1983 regarding growth plans in Europe until 1988.

Mitsubishi is continually announcing new products to supplement its range of EPROMs, DRAMs LSTTL types, and static RAMs. There are plans to introduce a 16K x 4 DRAM (4Q 1983 sampling), a 256K DRAM (already in sampling), and a megabit DRAM in 1986/1987. The 256K DRAM is scaled down NMOS 2-micron technology, while it is planned to run the 1M-bit DRAM on 1.5-micron geometry. There is a 45-ns access time 16K NMOS SRAM in development.

Mitsubishi has recently formed a U.S. subsidiary in North Carolina, where it is planning to begin 64K DRAM production early in 1985. It is hoped that following this, a further phase will take place resulting in a wafer fabrication facility for VLSI ICs, by 1988.

A recent technological achievement for the Company was the production, on an experimental basis, of a silicon on insulated (SOI) structure CMOS device with a 280-ps delay. This step marks the progress toward three-dimensional integration, which is a higher level of integration than conventional VLSI. Mitsubishi expects a great future for VLSI, and clearly plans to participate strongly in these markets.

Mitsubishi market penetration goals in Europe are considered extremely aggressive, but the technology is in place to produce marketable products, some are already in volume production and achievement is certainly possible.

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo, 100, Japan
Telephone: (03) 218-2111; Telex: J24532
(Billions of Yen)

Balance Sheet (March 31)	1983	1984	1985	1986	1987
Total Current Assets	¥ 994	¥1,089	¥1,248	¥1,205	¥1,285
Cash	¥ 170	¥ 183	¥ 209	¥ 211	¥ 268
Receivables	¥ 415	¥ 432	¥ 483	¥ 460	¥ 456
Inventory	¥ 251	¥ 279	¥ 357	¥ 400	¥ 370
Net Property, Plant, and Equipment	¥ 233	¥ 283	¥ 325	¥ 388	¥ 409
Depreciation	¥ 318	¥ 366	¥ 430	¥ 500	¥ 578
Total Assets	¥1,421	¥1,586	¥1,816	¥1,833	¥1,943
Total Current Liabilities	¥ 864	¥ 980	¥1,088	¥1,064	¥1,133
Long-Term Debt	185	189	257	216	205
Total Liabilities	¥1,116	¥1,242	¥1,430	¥1,370	¥1,433
Total Shareholders' Equity	¥ 305	¥ 343	¥ 386	¥ 463	¥ 507
Conv. Preferred Stock	0	0	0	0	0
Common Stock	¥ 79	¥ 83	¥ 87	¥ 118	¥ 139
Retained Earnings	¥ 151	¥ 184	¥ 219	¥ 234	¥ 230
Income Statement (March 31)	1983	1984	1985	1986	1987
Revenue	¥1,558	¥1,741	¥2,035	¥2,109	¥2,108
Domestic Sales	¥1,190	¥1,271	¥1,461	¥1,518	¥1,596
Overseas Sales	¥ 367	¥ 469	¥ 574	¥ 592	¥ 512
Cost of Sales	¥1,154	¥1,306	¥1,521	¥1,612	¥1,625
Gross Margin (%)	26	25	25	24	23
R&D Expense	¥ 53	¥ 61	¥ 77	¥ 89	¥ 95
SG&A Expense	¥ 251	¥ 278	¥ 312	¥ 324	¥ 319
Operating Income (Loss)	¥ 86	¥ 84	¥ 99	¥ 65	¥ 33
Interest, Net	(¥ 12)	(¥ 2)	¥ 1	¥ 7	¥ 5
Pretax Income	¥ 74	¥ 82	¥ 99	¥ 72	¥ 38
Effective Tax Rate (%)	55	55	55	63	76
Extraordinary Items, Net	¥ 2	¥ 2	¥ 3	¥ 3	¥ 1
Net Income	¥ 35	¥ 39	¥ 47	¥ 30	¥ 11
Avg. Shares Outstanding (Millions)	1,577	1,598	1,620	1,714	1,864
Employees	64,432	65,904	68,745	71,479	73,536
Capital Spending	¥ 73	¥ 115	¥ 133	¥ 154	¥ 126
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
February 1988

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo, 100, Japan
Telephone: (03) 218-2111; Telex: J24532
(Millions of Dollars)

Balance Sheet (March 31)	1983	1984	1985	1986	1987
Total Current Assets	\$3,993	\$4,613	\$5,093	\$5,452	\$ 8,029
Cash	\$ 683	\$ 775	\$ 853	\$ 956	\$ 1,675
Receivables	\$1,666	\$1,833	\$1,970	\$2,080	\$ 2,853
Inventory	\$1,009	\$1,181	\$1,457	\$1,812	\$ 2,314
Net Property, Plant, and Equipment	\$ 934	\$1,201	\$1,326	\$1,758	\$ 2,559
Depreciation	\$1,276	\$1,551	\$1,756	\$2,260	\$ 3,614
Total Assets	\$5,706	\$6,719	\$7,412	\$8,294	\$12,147
Total Current Liabilities	\$3,471	\$4,151	\$4,442	\$4,815	\$ 7,083
Long-Term Debt	\$ 745	\$ 803	\$1,051	\$ 975	\$ 1,278
Total Liabilities	\$4,480	\$5,264	\$5,836	\$6,197	\$ 8,957
Total Shareholders' Equity	\$1,226	\$1,455	\$1,576	\$2,097	\$ 3,166
Conv. Preferred Stock	0	0	0	0	0
Common Stock	\$ 318	\$ 353	\$ 353	\$ 532	\$ 870
Retained Earnings	\$ 606	\$ 782	\$ 893	\$1,058	\$ 1,438
Income Statement (March 31)	1983	1984	1985	1986	1987
Revenue	\$6,255	\$7,376	\$8,305	\$9,545	\$13,172
Domestic Sales	\$4,780	\$5,387	\$5,964	\$6,868	\$ 9,972
Overseas Sales	\$1,475	\$1,989	\$2,341	\$2,677	\$ 3,200
Cost of Sales	\$4,636	\$5,536	\$6,210	\$7,293	\$10,159
Gross Margin (%)	26	25	25	24	23
R&D Expense	\$ 211	\$ 257	\$ 314	\$ 403	\$ 591
SG&A Expense	\$1,010	\$1,176	\$1,275	\$1,468	\$ 1,995
Operating Income (Loss)	\$ 346	\$ 357	\$ 402	\$ 294	\$ 209
Interest, Net	(\$ 49)	(\$ 9)	\$ 2	\$ 34	\$ 30
Pretax Income	\$ 297	\$ 348	\$ 405	\$ 328	\$ 239
Effective Tax Rate	55	55	55	63	76
Extraordinary Items, Net	\$ 7	\$ 7	\$ 11	\$ 15	\$ 9
Net Income	\$ 141	\$ 165	\$ 192	\$ 136	\$ 66
Avg. Shares Outstanding (Millions)	1,577	1,598	1,620	1,714	1,864
Employees	64,432	65,904	68,745	71,479	73,536
Capital Spending	\$ 292	\$ 486	\$ 541	\$ 698	\$ 789
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
February 1988

Mitsubishi Electric Corporation

THE COMPANY

Overview

Mitsubishi Electric Corporation (hereafter referred to as Mitsubishi) began in 1898 as a heavy electrical equipment plant adjacent to the Nagasaki Shipyard. A related plant was set up in 1905 at Mitsubishi Shipbuilding's Kobe Works. In 1921, these two units were consolidated to form Mitsubishi Electric Manufacturing Company. During the Company's early years, it established heavy electrical equipment factories throughout Japan. In 1923, a technical cooperation agreement was made with Westinghouse Electric International; production of consumer goods began in the 1930s.

In 1958, Mitsubishi established separate groups for heavy machinery, electronics, consumer products, and overseas business. The Semiconductor Marketing Division began in 1972, and the Computer Marketing Division was founded in 1976. Mitsubishi is the fourth largest Japanese electronics company, following Matsushita, Hitachi, and Toshiba.

Mitsubishi has been a major supplier of electronic equipment to the Japan Defense Agency for more than 20 years. The Company produces missiles and electronics for use in land, sea, and air vehicles; active phased-array radar used in fire-control systems; the next-generation warning control radar; and computers for fighter planes. Mitsubishi also was the prime contractor for 9 of the 18 satellites launched by Japan's National Space Development Agency.

Company Organization

Mitsubishi is a member company of the Mitsubishi Group. The Mitsubishi Group is a continuation of the pre-World War II Mitsubishi Zaibatsu, which began in 1870 as a small shipping company called Tsukumo Shokai. By the time the war began, the Mitsubishi Zaibatsu was the second largest in Japan, after the Mitsui Zaibatsu. After the war, the zaibatsu were dissolved; however, the Mitsubishi Zaibatsu companies reorganized into one of the largest and most powerful industrial groups in Japan.

Mitsubishi employs 73,536 people under the leadership of Chairman Nihachiro Katayama and President Moriya Shiki.

Mitsubishi Electric Corporation

Financial Information

Mitsubishi's major shareholders are listed in Table 1.

Table 1

Mitsubishi Electric Corporation Major Shareholders

<u>Shareholders</u>	<u>Percent of Shares</u>
Meiji Mutual Life Insurance Company	4.2%
Mitsubishi Trust & Banking Corporation	3.7%
Nippon Life Insurance Company	3.7%
Mitsubishi Bank, Limited	3.3%
Mitsui Trust & Banking Corporation	2.5%
Daiwa Securities Co., Ltd.	2.4%
Mitsubishi Electric Group Employees Shareholding Union	2.0%
Norin Chukin Bank	1.9%

Source: Japan Company Handbook

Of Mitsubishi's outstanding stock, 7.9 percent is foreign-owned. Mitsubishi is listed on the three major Japanese stock exchanges, as well as on the Amsterdam and Frankfurt stock exchanges.

Net income of the Company decreased to ¥11 billion in fiscal 1987 from ¥30 billion in fiscal 1986. The factors affecting net income were: virtually no change in revenue from fiscal 1986, a ¥13 billion increase in cost of sales, and a ¥16 billion increase in other expenses that reflected heavy foreign exchange losses in the period.

Mitsubishi's main lines of business are the following:

- Heavy Machinery
- Industrial Products and Automotive Equipment
- Information and Communication Systems and Electronic Devices
- Consumer Products

Mitsubishi Electric Corporation

Sales in the Information and Communications Systems and Electronic Devices Groups (including semiconductors) represented about 27 percent of revenue and rose 10 percent to ¥562 billion in fiscal 1987. The increase was attributed to high domestic sales volumes that overcame the depressed sales in exported personal computers.

Sales in the Heavy Machinery Group were ¥562 billion in fiscal 1987, a decrease of 3 percent from fiscal 1986. This group accounted for 27 percent of Mitsubishi's total sales.

The Industrial Products and Automotive Equipment Group had sales of ¥387 billion in fiscal 1987, a decrease of 5 percent from fiscal 1986. The group accounted for 18 percent of total Mitsubishi sales; it is the Company's smallest product group.

Sales in the Consumer Products Group were ¥595 billion in fiscal 1987, a decrease of 2 percent from 1986. This group accounted for 28 percent of Mitsubishi's total sales, and it is the Company's largest product group.

Table 2 shows Matsushita's revenue by lines of business for 1983 through 1987.

Table 2

Mitsubishi Electric Corporation Revenue by Lines of Business (Billions of Yen)

	<u>Fiscal Year Ending March 31</u>				
	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Heavy Machinery	¥ 512	¥ 548	¥ 577	¥ 582	¥ 562
Information and Communications and Electronic Devices	310	401	573	512	564
Industrial Products and Automotive Equipment	315	333	368	405	387
Consumer Products	<u>421</u>	<u>459</u>	<u>517</u>	<u>610</u>	<u>595</u>
Total	¥1,558	¥1,741	¥2,035	¥2,109	¥2,108
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
February 1988

Mitsubishi Electric Corporation

International Operations

Overseas sales, which were ¥512 billion, accounted for 24 percent of Mitsubishi's 1987 sales. This amount represents a decline of 14 percent from 1986. To remain competitive in its overseas markets, the Company is boosting offshore production and is expanding the number of its facilities.

Facilities

Mitsubishi currently maintains four manufacturing plants in North America: a newly constructed color television and cellular mobile telephone plant in Braselton, Georgia; a color television plant in Santa Ana, California; a television picture tube plant in Ontario, Canada; and a semiconductor plant in Durham, North Carolina. A fifth plant in Mason, Ohio, is scheduled to begin production in 1988. This plant will manufacture automotive parts and control units for use in electronics, electrical parts, and audio equipment.

Mitsubishi has nine semiconductor plants in Japan and one in the United States. These plants are listed in Table 3.

Table 3

Mitsubishi Electric Corporation Semiconductor Manufacturing Facilities

<u>Location</u>	<u>Floor Space (Square Meters)</u>	<u>Function and Products</u>
Kita-itami Works, Hyogo Prefecture	116,834	Fab, assembly, test-- MOS logic, discretes
Kumamoto #1-Kumamoto, Kumamoto Prefecture (Kita-itami Works)	13,000	Assembly, test--ICs
Kumamoto #2-Kikuchi, Kumamoto Prefecture (Kita-itami Works)	16,000	Fab, test--ICs
Fukuoka Handotai Factory, Fukuoka Prefecture	13,000	Fab, assembly, and test--bipolar logic discretes
Fukuoka New Plant, Fukuoka Prefecture	10,000	Fab, assembly, test

(Continued)

Mitsubishi Electric Corporation

Table 3 (Continued)

Mitsubishi Electric Corporation Semiconductor Manufacturing Facilities

<u>Location</u>	<u>Floor Space (Square Meters)</u>	<u>Function and Products</u>
Saijo Industrial Park, Ehime Prefecture (Kita-itami Works)	22,000	Fab, test--64K DRAMS
Saijo Factory #2, Ehime Prefecture (Kita-itami Works)	N/A	Fab, assembly, test-- 256K DRAMS
Semiconductor Laboratory, Hyogo Prefecture	N/A	Fab, test--discretes, optoelectronics
Kagami Plant, Kochi Prefecture	N/A	Fab, assembly, test-- CMOS microdevices
Mitsubishi Semiconductor U.S.A., North Carolina	20,000	Assembly, test--MOS 64K and 256K DRAM

N/A = Not Available

Source: Dataquest
February 1988

Capital and R&D Spending

Mitsubishi's corporate capital spending decreased from ¥154 billion to ¥126 billion in fiscal 1987. When combined, capital spending and R&D spending have been consistently running about 10 percent of total revenue, as shown in Table 4. Table 5 shows capital and R&D spending in U.S. dollars.

Mitsubishi Electric Corporation

Table 4

**Mitsubishi Electric Corporation
Capital and R&D Spending—1986
(Billions of Yen)**

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Revenue	¥1,558	¥1,741	¥2,035	¥2,109	¥2,108
Capital Spending	¥ 73	¥ 115	¥ 133	¥ 154	¥ 126
Percent of Revenue	5%	7%	7%	7%	6%
R&D Expense	¥ 53	¥ 61	¥ 77	¥ 89	¥ 95
Percent of Revenue	3%	3%	4%	4%	4%
Combined Capital and R&D Spending	¥ 125	¥ 175	¥ 209	¥ 243	¥ 221
Percent of Revenue	8%	10%	11%	11%	10%
Exchange Rate (Yen per US\$)	249	236	245	221	160

Table 5

**Mitsubishi Electric Corporation
Capital and R&D Spending—1986
(Millions of Dollars)**

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Revenue	\$6,255	\$7,376	\$8,305	\$9,545	\$13,172
Capital Spending	\$ 292	\$ 486	\$ 541	\$ 698	\$ 789
Percent of Revenue	5%	7%	7%	7%	6%
R&D Expense	\$ 211	\$ 257	\$ 314	\$ 403	\$ 591
Percent of Revenue	3%	3%	4%	4%	4%
Combined Capital and R&D Spending	\$ 503	\$ 743	\$ 855	\$1,101	\$ 1,380
Percent of Revenue	8%	10%	11%	11%	10%
Exchange Rate (Yen per US\$)	249	236	245	221	160

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
February 1988

Mitsubishi Electric Corporation

Turning to the semiconductor area, Dataquest estimates that Mitsubishi made capital investments totaling \$120 million in calendar year 1986 (see Table 6). This amount represents 11 percent of Mitsubishi's semiconductor revenue. In recent years, Mitsubishi has built two semiconductor plants at Saijo on Shikoku Island. The facilities were the first semiconductor plants to be built there and are used specifically for producing 64K, 256K, and 1Mb DRAMs.

Table 6

**Mitsubishi Electric Corporation
Semiconductor Capital Spending—1986 Calendar Year
(Millions of Dollars)**

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Semiconductor Revenue	\$340	\$505	\$964	\$662	\$1,140
Semiconductor Capital Spending	\$ 80	\$132	\$274	\$261	\$ 120
Percent of Revenue	24%	26%	28%	39%	11%

Source: Dataquest
February 1988

The Company also built a plant in Durham, North Carolina, which began operation in the first half of 1985. It was built for the assembly of 64K and 256K DRAMs. In January 1987, the Company announced that it will build a full-scale semiconductor production facility in North Carolina in the near future. Plans include employing approximately 40 engineers and investing \$32.1 million in plant construction.

Research and Development

In fiscal 1987, Mitsubishi's research and development (R&D) spending was ¥95 billion, a 6.2 percent increase over fiscal 1986 R&D spending of ¥89 billion.

Mitsubishi maintains nine R&D laboratories, as follows:

- Central Research Laboratory (Hyogo Prefecture)—Basic research in mechanical, electrical, optical, and biological technology
- Product Development Laboratory (Hyogo Prefecture)—Development of new electronic and mechatronic parts
- Consumer Electronics Development Laboratory (Osaka Prefecture)—Development of consumer electronics products and mass-production technologies

Mitsubishi Electric Corporation

- Manufacturing Development Laboratory (Hyogo Prefecture)—Research and development of production-line automation and other technologies; testing of materials and components
- Consumer Products Research Laboratory (Kanagawa Prefecture)—Development of home automation electronic systems; testing of products and packaging
- LSI Development Laboratory (Hyogo Prefecture)—Research and development of ICs and discretes; new product development (A new VLSI Development Wing was added in fiscal 1986.)
- Information Systems and Electronics Development Laboratory (Kanagawa Prefecture)—Overall development of information systems and equipment
- Industrial Design Center (Kanagawa Prefecture)—Industrial design activities concerning all Mitsubishi products
- Materials Engineering Laboratory (Hyogo Prefecture)—Research and development of materials and electronic devices

Mitsubishi has established five target areas for research and development: factory automation, data processing systems, communications, audio visual products, and electronic devices. Recent projects include:

- The MELCOM PSI Computer with inference capability; processes the PROLOG computer language
- A gallium arsenide semiconductor laser capable of switching between two different wave lengths in response to the amount of electrical current input
- A teleconferencing system that can send and receive voice, visual, and facsimile transmissions over a single phone circuit
- A successful continuous test run of a molten carbonate fuel cell for 10,000 hours (The goal is to raise the length of time to between 25,000 and 40,000 hours.)
- Five types of MELCARD IC cards

PRODUCTS AND MARKETS

Semiconductor Product Markets

Mitsubishi, the first commercial Japanese electronics firm to develop an integrated circuit, was the largest 64K DRAM supplier in 1986, with 18 percent of the market. The Company also is one of the top three suppliers of 256K and 1Mb DRAMs.

Mitsubishi Electric Corporation

As shown in Table 7, \$569 million, or 50 percent, of Mitsubishi's 1986 semiconductor sales were MOS devices. By far the largest product family was MOS memory, with sales of \$305 million, or 27 percent of total Mitsubishi semiconductor sales. In addition to DRAMs, Mitsubishi is the third largest supplier of MOS EPROMs, with 14 percent of the market in 1986.

Mitsubishi's semiconductor sales in all product areas showed growth greater than the industry growth rate, as Table 8 illustrates.

In the microcomponent area, Mitsubishi announced that it planned to begin full-scale 16-bit microcontroller (MCU) production at its Kochi plant in September. The Kochi plant, which began operating in late 1986, had been operating only assembly lines for the device. Mitsubishi, which had been using 16-bit MCUs only for internal use, also announced that it will begin producing 16-bit MCUs for industrial use. Plans involved offering a 16-bit single-chip MCU, the 3700 series, on the market late in 1987. A vertically integrated production system for 32-bit MCUs is planned for 1989 at the Kochi plant.

Table 7

Mitsubishi Electric Corporation Estimated Worldwide Semiconductor Revenue (Millions of Dollars)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Total Semiconductor	340	505	964	662	1,140
Total Integrated Circuit	244	384	766	504	913
Bipolar Digital (Technology)	44	68	123	75	134
TTL			99	59	104
ECL			21	14	28
Other Bipolar Digital			3	2	2
Bipolar Digital (Function)	44	68	123	75	134
Bipolar Digital Memory					
Bipolar Digital Logic	44	68	123	75	134
MOS (Technology)	137	247	541	323	569
NMOS	114	186	463	256	449
PMOS	9	12	5	2	3
CMOS	14	49	73	66	117
MOS (Function)	137	247	541	323	569
MOS Memory	81	158	370	147	305
MOS Microdevices	25	54	156	122	180
MOS Logic	31	35	15	55	84
Linear	63	69	102	106	210

(Continued)

Mitsubishi Electric Corporation

Table 7 (Continued)

**Mitsubishi Electric Corporation
Estimated Worldwide Semiconductor Revenue
(Millions of Dollars)**

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
MOS (Function)	137	247	541	323	569
MOS Memory	81	158	370	147	305
MOS Microdevices	25	54	156	122	180
MOS Logic	31	35	15	55	84
Linear	63	69	102	106	210
Total Discrete	94	119	185	140	197
Transistor	33	38	56	64	89
Small Signal Transistor			56	64	89
Power Transistor					
Diode	19	15	23	3	4
Small Signal Diode			3	3	4
Power Diode			20		
Zener Diode					
Thyristor	25	15	23	37	52
Other Discrete	17	51	83	35	52
Total Optoelectronic	2	2	13	18	30
LED Lamps			4		
LED Displays					
Optical Couplers					
Other Optoelectronics			9	18	30
Exchange Rate (Yen per US\$)	248	235	237	238	167

Source: Dataquest
February 1988

Mitsubishi Electric Corporation

Table 8

**Mitsubishi Electric Corporation
Company Growth Rate Compared to Industry Growth Rates
(Millions of Dollars)**

	<u>1985</u>	<u>1986</u>	<u>Company % Change (1985-1986)</u>	<u>Industry % Change (1985-1986)</u>
Total Semiconductor	\$662	\$1,140	72%	25%
Total IC	\$504	\$ 913	81%	24%
Bipolar Digital	75	135	80%	14%
MOS Digital	323	569	76%	25%
Linear	106	210	98%	30%
Total Discrete	\$140	\$ 198	41%	25%
Total Optoelectronic	\$ 18	\$ 29	61%	37%

Source: Dataquest
February 1988

The Company's total MCU production, including 4-bit and 8-bit models and peripheral chips, was recently increased from 10 million units to between 12 million and 13 million units per month. The Company plans to increase MCU production again to 15 million units by year end.

In September 1987, Mitsubishi announced that it plans a full-fledged advance into the power semiconductor market. The Company planned to begin importing thyristors and power diodes from Powerex in late 1987 or early 1988. Powerex is a joint venture between Mitsubishi, General Electric, and Westinghouse. The devices will be used for general-purpose welding machines and sequencers. Sales in the first year are targeted at ¥1 billion to ¥2 billion (\$7 million to \$14 million).

Dataquest believes that approximately 10 percent of Mitsubishi's 1986 semiconductor sales were to the United States, 5 percent were to Europe, 1 percent were to Rest of World, and the remaining 84 percent were domestic sales. Table 9 shows the estimated geographic distribution of Mitsubishi's semiconductor sales.

Mitsubishi Electric Corporation

Table 9

**Mitsubishi Electric Corporation
Estimated Semiconductor Revenue by Region—1986
(Millions of Dollars)**

	<u>United States</u>	<u>Japan</u>	<u>Europe</u>	<u>ROW</u>	<u>World</u>
Total Semiconductor	\$114	\$961	\$53	\$12	\$1,140
Total Integrated Circuit	\$106	\$751	\$47	\$ 9	\$ 913
Bipolar Digital	10	120	2	2	134
MOS	94	427	45	3	569
Linear	2	204	0	4	210
Total Discrete	\$ 6	\$184	\$ 4	\$ 3	\$ 197
Total Optoelectronic	\$ 2	\$ 26	\$ 2	0	\$ 30
Exchange Rate (Yen per US\$)	167	167	167	167	167

Source: Dataquest
February 1988

Channels of Distribution

Dataquest believes that approximately 80 percent of Mitsubishi's semiconductor products are sold domestically in Japan through distributors. The Company's major distributors are Ryoyo Electric, Ryoden Shoji Co., Ltd., and Kyoei Sangyo. Approximately 15 percent of Mitsubishi's sales are captive.

In the United States, Mitsubishi sells semiconductors through Mitsubishi Electronics America, Inc., headquartered in Sunnyvale, California, and through distributors. In Europe, Mitsubishi has sales offices in most of the major countries and also sells through distributors.

Semiconductor Products and Technologies

Mitsubishi's semiconductor product line includes the following:

- Bipolar digital logic—Low-power Schottky TTL (LSTTL) and ALSTTL
- MOS memory—64K, 256K, and 1Mb DRAMs; NMOS and CMOS SRAMs; ROMs; and EPROMs

Mitsubishi Electric Corporation

- MOS microcomponents—Second-sourcing of Intel microcontrollers in NMOS and CMOS, 8-bit CMOS and NMOS microperipherals, and original 8-bit microprocessors
- MOS logic—CMOS and ECL gate arrays
- Linear—Transistor arrays, op amps, voltage comparators and regulators, timer ICs, and current drivers

Mitsubishi also manufactures gallium arsenide (GaAs) field-effect transistors (FETs). Recent developments in the Company's semiconductor activities are presented in the following paragraphs.

Memory

Highlights of Mitsubishi's memory activities include the following:

- Two 1Mb CMOS EPROMs (MSM27C100K/101K); 1.5-micron silicon gate process; 150/200/250ns; 263mW power consumption in operation and 6mW at standby
- A 256K CMOS EPROM (M5M27C256K-12) 32Kx8; 1.5-micron process; 120/150/250ns
- A 250ns 4Mb ROM (MSM23C400P/FP) 256Kx16 and 512Kx8; 165mW power consumption during operation and 550mW at standby; eight memory cell layers consisting of eight memory transistors; 1.2-micron process
- A 34ns 1Mb CMOS SRAM using triple polysilicon; announced at ISSCC 1987
- A 480K CMOS field memory (M5M4C500L) that allows a TV or VTR to simultaneously record and play back pictures; 320 x 256 x 6-bit structure; 5.0mm x 10.08mm chip; NTSC and PAL method; also capable of storing one TV screen at a time

ASICs

Highlights of Mitsubishi's ASIC activities include the following:

- An ECL gate array that reduces software error to 1/100 of conventional devices; noise circuit added to reduce error rates
- Two 1.3-micron rule CMOS gate array versions: the M6002X featuring alternating internal gate and wiring, 224 to 1,773 gates; the M6003X featuring 4,778 to 47,376 gates, VTM system (basic cells laid over all internal gates, enlarging built-in ROM and RAM capacity), gate isolation system, 1.1ns per gate, DIP, shoe-link DIP, QFP, PLCC, and PGA packages

Mitsubishi Electric Corporation

Mitsubishi also announced that it is augmenting its ASIC operations by expanding its ASIC Design Engineering Center, where the Company is refining planning techniques and CAD tools to assist electronic equipment designers in the design of LSI devices.

Microcomponents

Highlights of Mitsubishi's microcomponent activities include the following:

- A proprietary 32-bit MPU (HF32/300) developed with Fujitsu and Hitachi as part of the TRON project; 20 Mips and 4-Kbyte cache memory; supports UNIX System 5 and ITRON; commercialization in late 1988
- Three CMOS MCUs: the M50930FP0, with 4 Kbytes of ROM and 128 bytes of RAM; the M50931FP, with 4 Kbytes of RAM; and the M50932FP, with 8 Kbytes of ROM and 512 bytes of RAM
- A CMOS 4-bit MCU with built-in character display function (M50436-SP) for voltage synthesizers, 16 characters x 3 lines for color selection, 6 x 7 dots, 64 character types, and 4 character sizes
- Four MCUs with system reset circuits (M5290P/S292P), +5V and +/-12V power outputs, and 4.2V current
- An 8-bit CMOS parallel-processing MPU (M5M80C85AP/AFP-2) with 2.0-micron rule, 12,000 transistors, and 0.8ms instruction cycle
- An I/O interface LSI (M5M82C255ASP) and four 2K RAMs with built-in I/O port and timer; I/O interface with one general I/O port and two special-purpose ports with 24 I/O lines for transferring data to 8-bit and 16-bit CPUs

Mitsubishi is one of the companies participating in the Japanese government-sponsored Supercomputer and Optoelectronics Projects. These projects involve research and development of gallium arsenide (GaAs) field-effect transistors (FETs) and memory devices. The Company has made several technological innovations in GaAs, including the following:

- Mitsubishi is producing GaAs solar cells at the Kita-itami Works; much of the production will be used in the CS-3, a communications satellite to be launched in 1988 by the National Space Development Agency of Japan.
- In October 1987, Mitsubishi announced that its LSI R&D Laboratory is developing a low-voltage 4Kx4 GaAs SRAM under the MITI Scientific Computing Systems Program. The device uses a 1.0-micron E/D DCFL self-aligned gate (SAG) MESFET process and dual-layer metal.
- The Company has developed a planar-type diode that simplifies the process of producing OEICs; it includes a transverse junction stripe (TJS) laser embedded in a GaAs substrate produced using a reduced pressure and a flat layer of GaAs and AlGaAs films on GaAs substrate.

Mitsubishi Electric Corporation

- Mitsubishi has developed a surface-light-emitting GaAsAl diffraction lattice junction semiconductor laser for optocomputers; it has transverse junction stripe (TJS) structure for transverse mode control and distributed feedback (DFB) structure for vertical mode control, continuous oscillation at 867.2nm wavelength, and 3mW output vertically from the substrate surface.
- The Company has developed five 14-GHz high-output GaAs FETs (MGFK series) with 0.3- to 5.5-watt output, 5.5dB to 0.8dB noise factor, and 14.0- to 14.5-GHz frequency range, using MBE process technology. They are intended for use as signal amplifiers in communications satellites.
- Mitsubishi has developed a high-output GaAs amplifier IC, 2.45W output at 28-GHz band, for use in ground station amplifiers for satellite communications systems.
- Mitsubishi has developed a mass-production technology for HEMT GaAs FETs using e-beam epitaxy and a proprietary low-noise process to deposit thin films of AlGaAs and other III-V compound materials on a GaAs substrate.

Image Sensors

Mitsubishi has developed an infrared CCD sensor with 260,000 elements on a 1.6mm x 1.2mm chip, capable of detecting 3.0- to 5.0-micron wavelengths. It is intended for use in defense equipment and night-vision cameras.

Semiconductor Agreements

Mitsubishi is involved in the following licensing, second-sourcing, and joint-venture agreements:

- Matsushita, Sanyo, and Sharp—A joint development agreement has been established with Matsushita, Sanyo, and Sharp to jointly develop micro-processors for parallel-processing computers.
- General Electric (GE) and Westinghouse—In 1986, Mitsubishi, GE, and Westinghouse formed a joint venture to manufacture and sell power transistors, diodes, and thyristors. Mitsubishi is financing 10 percent of the venture, named Powerex, while the two U.S. companies are each contributing 45 percent.
- Dai Nippon Printing Co., Ltd., Hoya Corporation, Toppan Printing Co., Ltd., and ULVAC Coating Corp.—In June 1986, Mitsubishi's LSI Development Laboratory provided Dai Nippon Printing, Hoya, Toppan Printing, and ULVAC Coating with photomask manufacturing technology using molybdenum silicide. The four companies will pay contract fees and royalties based on their production volumes.

Mitsubishi Electric Corporation

- Intel Corporation—In June 1986, Mitsubishi agreed to provide foundry services for Intel. Mitsubishi second-sources Intel's 8086 product line.
- LSI Logic Corporation—In June 1986, Mitsubishi agreed to provide foundry services for LSI Logic.
- Nihon MRC Co., Ltd.—In October 1986, Mitsubishi invested in Nihon MRC for 25 percent ownership. Nihon MRC is a subsidiary of Materials Research Corporation (MRC) of the United States; Mitsubishi will sell MRC equipment in Japan.
- Semicon Systems, Inc.—In June 1986, Mitsubishi invested ¥200 million in Semicon Systems. Mitsubishi sent three directors to Semicon Systems, which will change its name to Dia Semicon Systems.
- Standard Microsystems Corporation (SMC)—In February 1985, Mitsubishi and SMC agreed to a global nonexclusive cross-licensing of each other's semiconductor patents and patent applications.
- Texas Instruments (TI)—In December 1986, Mitsubishi and TI agreed to mutually supply logic ICs on an OEM basis. TI will supply high-speed bipolar TTLs; Mitsubishi will ship low-power CMOS logic. Texas Instruments sells Mitsubishi-made 64K EPROMs in TI packaging.

Nonsemiconductor Products Summary

Information and Communications Systems and Electronic Devices

In addition to semiconductors, major products of this group include office automation equipment, computers and peripherals, satellites, optical fiber communication, local area networks (LANs), and value added networks (VANs).

Mitsubishi considers communications to be its most important field. A key product in this area is a video teleconferencing system. The Company is also marketing satellite communication systems to private companies. Another recent innovation in digital communications is a packet multiplexer that connects computers and terminal units to a switching packet network.

Efforts in electronic products include three satellite projects: the Engineering Test Satellite-V (ETS-V) was scheduled to launch in August 1987, two communication satellites (CS-3a and CS-3b) were scheduled for launch in February and August 1988, and the Earth Resources Satellite (ERS-1) was scheduled for launch in 1991. Mitsubishi is also a founder of the Institute for Unmanned Space Experiment Free Flier, established in 1986, which is constructing Japan's first unmanned space laboratory. Long-term plans involve the development of new materials and biotechnological experiments in space factories, which could lead to the establishment of actual space factories.

Mitsubishi Electric Corporation

Information processing systems include general-purpose, small business, and personal computers in addition to other systems. In small business computers, the Company introduced the M3300 series workstation (an advanced 16-bit personal computer). A 32-bit workstation was developed in fiscal 1987. Mitsubishi also developed an artificial intelligence computer, the MELCOM PSI.

Heavy Machinery

Major products of this group include generators, motors, nuclear power equipment, transformers, circuit breakers, marine and industrial electric equipment and systems, industrial computer systems, railcar electric and electronic equipment and systems, numerical control equipment, electrical discharge and electrochemical machines, lasers, elevators, escalators, moving walks, and automatic building-cleaning systems.

Industrial Products and Automotive Equipment

Major products of this group include small and medium-size motors, controllers, watt-hour meters, relays, chemical products, rafts and boats, electrical automotive equipment and accessories, automobile radios, stereos, air conditioners, refrigeration equipment, factory automation equipment, and robotics. During fiscal 1986, the Company entered into a joint venture with Mikuni Corporation and Robert Bosch GmbH to jointly establish Nippon Injector, a company that will manufacture electronic fuel-injection systems for automobile engines. A new plant, located in Odawara, began production in spring 1987.

Consumer Products

Major products of this group are TVs, VCRs, radios, stereo equipment, air conditioners, heaters, fans, refrigerators and other kitchen appliances, washers and dryers, vacuum cleaners, hair dryers, fluorescent and mercury-vapor lamps, home computers, and home automation equipment.

Mitsubishi Electric Corporation

(Page intentionally left blank)

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-ku, Tokyo, 100, Japan
Telephone: (03) 218-2111 Telex: J24532
(Billions of Yen Except Per Share Data)

Balance Sheet (March 31)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Working Capital	¥ 113.0	¥ 130.0	¥ 108.8	¥ 159.5	¥ 140.8
Long-Term Debt	¥ 155.7	¥ 185.4	¥ 189.5	¥ 257.5	¥ 215.5
Shareholders' Equity	¥ 277.2	¥ 305.3	¥ 343.3	¥ 386.1	¥ 463.4
After-Tax Return on Average Equity (%)	13.4	12.0	11.3	12.9	7.1

Operating Performance (Fiscal Year Ending March 31)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Sales	¥1,441.2*	¥1,557.6*	¥1,740.8*	¥2,034.8*	¥2,109.5*
Japanese Sales	¥1,146.3	¥1,190.3	¥1,271.4	¥1,461.2	¥1,517.9
Non-Japanese Sales	¥ 294.9	¥ 367.3	¥ 469.4	¥ 573.6	¥ 591.6
Cost of Sales	¥1,074.9	¥1,154.4	¥1,306.5	¥1,521.5	¥1,611.8
R&D Expense	¥ 43.2	¥ 52.6	¥ 60.6	¥ 76.9	¥ 89.1
SG&A Expense	¥ 226.7	¥ 251.5	¥ 277.6	¥ 312.5	¥ 324.3
Pretax Income	¥ 69.3	¥ 74.0	¥ 82.0	¥ 99.1	¥ 72.5
Pretax Margin (%)	4.8	4.8	4.7	4.8	3.4
Effective Tax Rate (%)	54.0	55.1	54.6	55.2	63.1
Net Income	¥ 34.6	¥ 35.0	¥ 38.9	¥ 47.0	¥ 30.0
Average Shares Outstanding (Millions)	1,549	1,577	1,598	1,620	1,714
Per Share					
Earnings	¥ 22.4	¥ 22.2	¥ 24.3	¥ 29.0	¥ 17.5
Dividends	¥ 6.0	¥ 6.0	¥ 6.5	¥ 7.0	¥ 8.0
Book Value	¥ 179.0	¥ 193.6	¥ 214.8	¥ 225.1	¥ 247.8
Price Range	N/A	N/A	N/A	N/A	N/A
Capital Expenditures	¥ 66.0	¥ 72.8	¥ 114.7	¥ 132.6	¥ 154.2
Employees	60,549	64,432	65,904	68,745	71,479
Exchange Rate (Yen per US\$)	229	249	236	245	221

*Mitsubishi also had other income of ¥31.8 billion in 1982, ¥31.7 billion in 1983, ¥35.8 billion in 1984, ¥40.3 billion in 1985, and ¥48.2 billion in 1986.
N/A = Not Available

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
December 1986

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-Chome
Chiyoda-ku, Tokyo, 100, Japan
Telephone: (03) 218-2111 Telex: J24532
(Millions of Dollars Except Per Share Data)

Balance Sheet (March 31)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Working Capital	\$ 493	\$ 522	\$ 461	\$ 651	\$ 637
Long-Term Debt	\$ 680	\$ 745	\$ 803	\$1,050	\$ 975
Shareholders' Equity	\$1,210	\$1,226	\$1,455	\$1,576	\$2,097
After-Tax Return on Average Equity (%)	13.4	12.0	11.3	12.9	7.1

Operating Performance (Fiscal Year Ending March 31)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Sales	\$6,293*	\$6,255*	\$7,376*	\$8,305*	\$9,545*
Japanese Sales	\$5,006	\$4,780	\$5,387	\$5,964	\$6,868
Non-Japanese Sales	\$1,287	\$1,475	\$1,989	\$2,341	\$2,677
Cost of Revenue	\$4,694	\$4,636	\$5,536	\$6,210	\$7,293
R&D Expense	\$ 189	\$ 211	\$ 257	\$ 314	\$ 403
SG&A Expense	\$ 990	\$1,010	\$1,176	\$1,276	\$1,467
Pretax Income	\$ 303	\$ 297	\$ 347	\$ 404	\$ 328
Pretax Margin (%)	4.8	4.8	4.7	4.8	3.4
Effective Tax Rate (%)	54.0	55.1	54.6	55.2	63.1
Net Income	\$ 151	\$ 141	\$ 165	\$ 192	\$ 136
Average Shares Outstanding (Millions)	1,549	1,577	1,598	1,620	1,714
Per Share					
Earnings	\$ 0.10	\$ 0.09	\$ 0.10	\$ 0.12	\$ 0.08
Dividends	\$ 0.03	\$ 0.02	\$ 0.03	\$ 0.03	\$ 0.04
Book Value	\$ 0.79	\$ 0.78	\$ 0.91	\$ 0.92	\$ 1.12
Price Range	N/A	N/A	N/A	N/A	N/A
Capital Expenditures	\$ 288	\$ 292	\$ 486	\$ 541	\$ 698
Total Employees	60,549	64,432	65,904	68,745	71,479
Exchange Rate (Yen per U.S.)	229	249	236	245	221

*Mitsubishi also had other income of \$139 million in 1982, \$127 million in 1983, \$152 million in 1984, \$164 million in 1985, and \$218 million in 1986.

N/A = Not Available

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
December 1986

Mitsubishi Electric Corporation

THE COMPANY

Background

Mitsubishi Electric Corporation (hereafter referred to as Mitsubishi) began in 1898 as a heavy electrical equipment plant adjacent to the Nagasaki Shipyard. A related plant was set up in 1905 at Mitsubishi Shipbuilding's Kobe Works. In 1921, these two units were consolidated to form Mitsubishi Electric Manufacturing Company. During the Company's early years, it established heavy electrical equipment factories throughout Japan. In 1923, a technical cooperation agreement was made with Westinghouse Electric International; production of consumer goods began in the 1930s.

In 1958, Mitsubishi established separate groups for heavy machinery, electronics, consumer products, and overseas business. The Semiconductor Marketing Division began in 1972, and the Computer Marketing Division was founded in 1976. Mitsubishi is the fourth largest Japanese electronics company, following Matsushita, Hitachi, and Toshiba.

Company Organization

Mitsubishi is a member company of the Mitsubishi Group (see Figure 1). The Mitsubishi Group is a continuation of the pre-World War II Mitsubishi Zaibatsu, which began in 1870 as a small shipping company called Tsukumo Shokai. By the time the war began, the Mitsubishi Zaibatsu was the second largest in Japan, after the Mitsui Zaibatsu. After the war, the zaibatsu were dissolved; however, the Mitsubishi Zaibatsu companies reorganized into one of the largest and most powerful industrial groups in Japan.

Mitsubishi has approximately 71,479 employees under the leadership of Chairman Nihachiro Katayama and President Moriya Shiki.

Figure 2 is a diagram of the Mitsubishi Company organization.

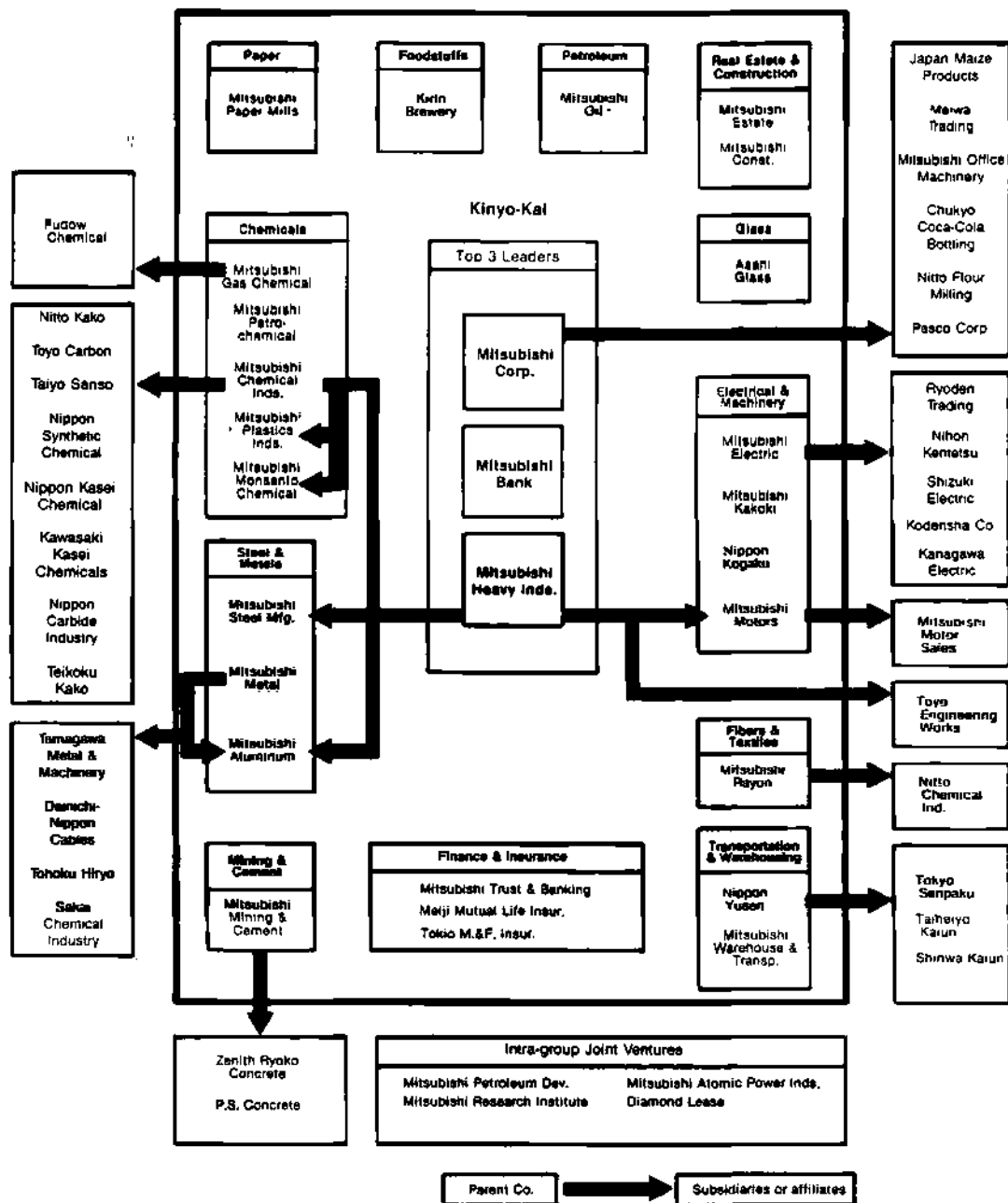
Investment in the Company

Mitsubishi's major shareholders are Meiji Mutual Life Insurance (4.5 percent), Nippon Life Insurance (4.0 percent), Mitsubishi Bank (3.1 percent), Mitsubishi Trust (2.3 percent), Dai-Ichi Mutual Life Insurance (2.0 percent), Company's Group Stockholding (2.0 percent), and Mitsui Trust (1.8 percent). Non-Japanese ownership is 7.9 percent. Mitsubishi is listed on the three major Japanese stock exchanges, as well as on the Amsterdam and Frankfurt exchanges.

Mitsubishi Electric Corporation

Figure 1

MITSUBISHI GROUP

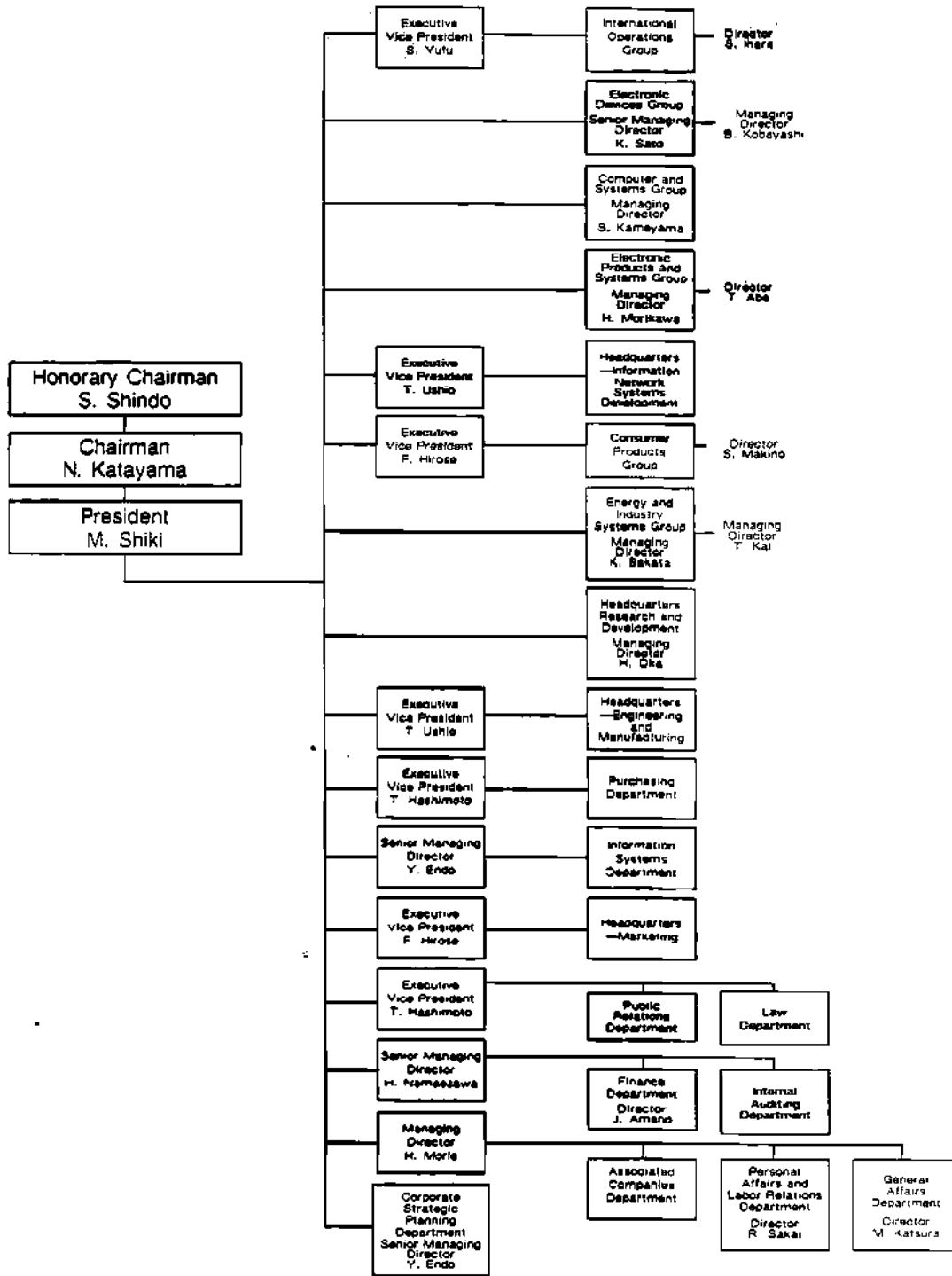


Source: Dodwell Marketing Consultants
Industrial Groupings in Japan
1982/83, Tokyo: 1983

Mitsubishi Electric Corporation

Figure 2

Mitsubishi Electric Corporation
ORGANIZATION CHART



Source: Dataquest
December 1986

Mitsubishi Electric Corporation

OPERATIONS

Mitsubishi reported consolidated fiscal 1986 net earnings of ¥30.0 billion on sales of ¥2,109.5 billion. The Company is one of Japan's major defense contractors.

Mitsubishi's main lines of business are heavy machinery, industrial products and automotive equipment, information and communication systems and electronic devices, and consumer products. This division of business changed in 1984; 1983 figures have been restated to reflect the changed organization. Table 1a shows 1982 and 1983 revenue under the old organization; Table 1b shows 1983 through 1986 revenue under the new categorization. Figure 3 shows each line of business as a percentage of Mitsubishi's total business for 1986.

Table 1a

Mitsubishi Electric Corporation
REVENUE BY MAJOR LINE OF BUSINESS
(Billions of Yen)

	<u>Fiscal Year Ending March 31</u>	
	<u>1982</u>	<u>1983</u>
Heavy Machinery	¥ 366	¥ 350
Electronic Products and Systems	494	564
Industrial Products	238	263
Consumer Products	<u>343</u>	<u>381</u>
Total Sales	¥1,441	¥1,558
Exchange Rate (Yen per US\$)	229	249

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
December 1986

Mitsubishi Electric Corporation

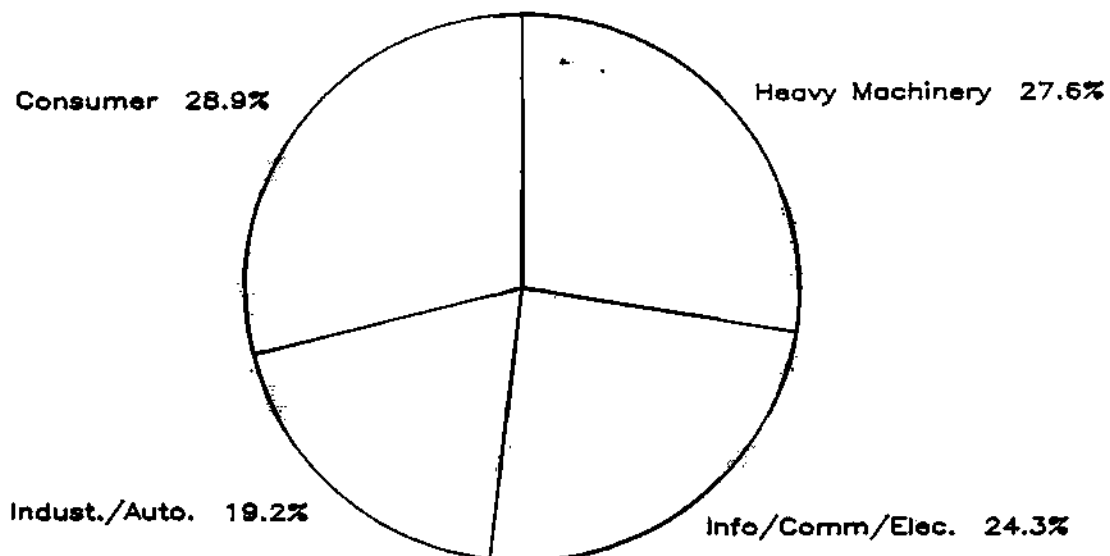
Table 1b

Mitsubishi Electric Corporation
REVENUE BY MAJOR LINE OF BUSINESS
(Billions of Yen)

	<u>Fiscal Year Ending March 31</u>			
	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Heavy Machinery	¥ 512	¥ 548	¥ 577	¥ 582
Information and Communications Systems and Electronic Devices	310	401	573	513
Industrial Products and Automotive Equipment	315	333	368	405
Consumer Products	¥ 421	¥ 459	517	610
Total Sales	¥1,558	¥1,741	¥2,035	¥2,110
Exchange Rate (Yen per US\$)	¥ 249	¥ 236	¥ 245	¥ 221

Figure 3

Mitsubishi Electric Corporation
REVENUE BY LINE OF BUSINESS--1986



Source: Dataquest
December 1986

Mitsubishi Electric Corporation

Semiconductors

Mitsubishi, the first commercial Japanese electronics firm to develop an integrated circuit, was one of the world's top suppliers in the 64K DRAM market, with estimated 1984 shipments of 84.5 million units. 1985 shipments decreased to 59.3 million units. Shipments of 256K DRAMs in 1984 were 1.15 million units, and 1985 shipments grew to 11.4 million units. The Company also began sample shipments of 1Mb DRAMs in the third quarter of 1985. Mitsubishi's DRAMs are available in zigzag-in-line (ZIL) packages, which have been doing extremely well.

Mitsubishi's semiconductor organization is illustrated in Figure 4.

In July 1983, Mitsubishi announced plans to build a 64K DRAM factory in Durham, North Carolina, U.S.A. This assembly and test plant began operations in the first half of 1985; in the third quarter, it was modified to run 256K DRAMs. To date, no plans have been announced to add a fab line at this facility.

As shown in Table 2, \$319 million, or 45 percent, of Mitsubishi's 1985 semiconductor sales were MOS devices. By far the largest product family was MOS memory, with sales of \$168 million, or 24 percent of total Mitsubishi semiconductor sales. Since 1981, sales of MOS memory devices have increased at a compound annual growth rate (CAGR) of 49 percent. This includes a slump of 55 percent from 1984 to 1985. During the same period, sales of MOS microdevices have grown at 48 percent and other MOS logic devices have undergone a CAGR of 5 percent, while bipolar digital logic devices have increased at a CAGR of 20 percent.

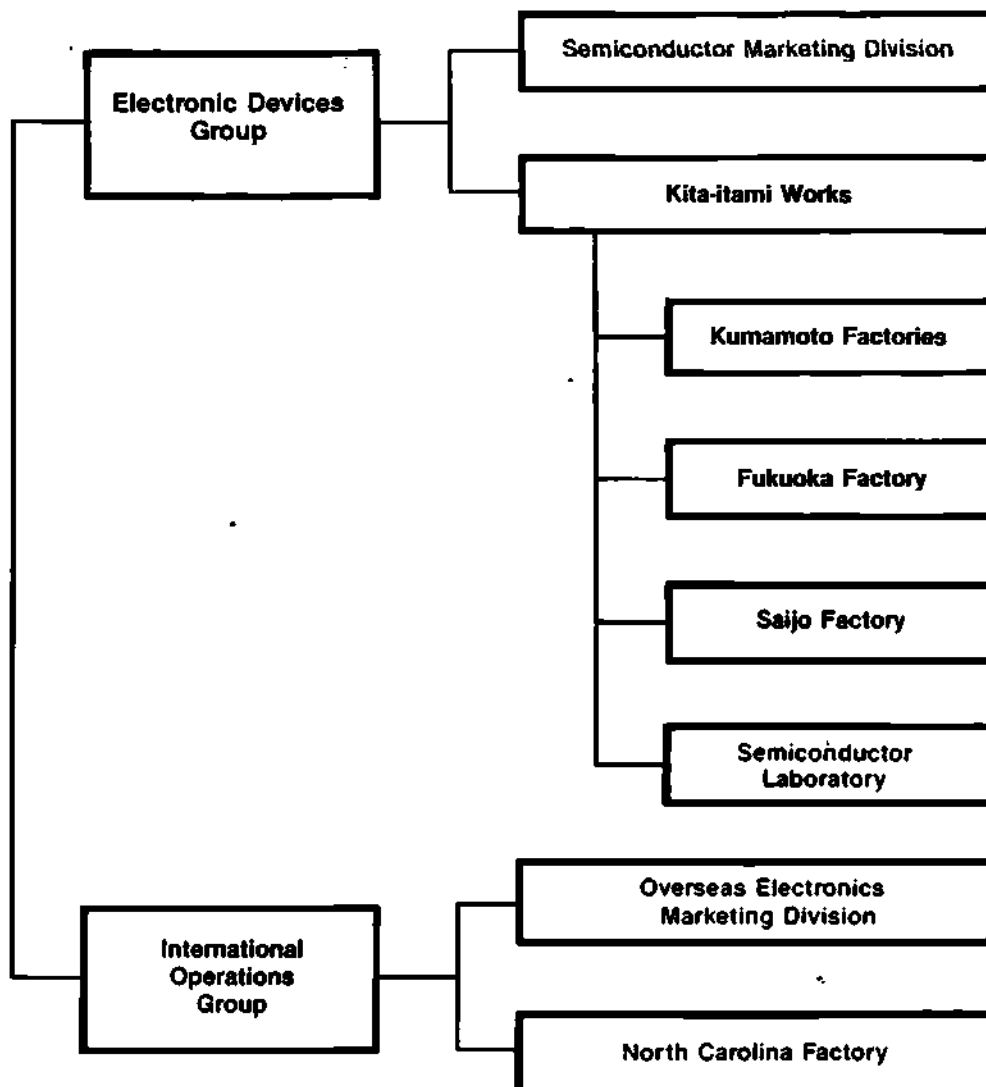
Mitsubishi's 1985 sales of linear ICs and discrete devices grew by 8 percent and negative 4 percent, respectively.

Dataquest believes that approximately 11 percent of Mitsubishi's 1985 semiconductor sales were to the United States, 4 percent were to Europe, 1 percent were to Rest of World, and the remaining 84 percent were domestic sales. Table 3 shows the estimated geographic distribution of Mitsubishi's semiconductor sales.

Mitsubishi Electric Corporation

Figure 4

Mitsubishi Electric Corporation SEMICONDUCTOR ORGANIZATION



Source: Mitsubishi Electric Corporation

Mitsubishi Electric Corporation

Table 2

Mitsubishi Electric Corporation ESTIMATED SEMICONDUCTOR REVENUE (Millions of Dollars)

		WORLDWIDE SEMICONDUCTOR REVENUES (Millions of Dollars)							
COMPANY: MITSUBISHI		1978	1979	1980	1981	1982	1983	1984	1985
Total Semiconductor		147	195	254	321	340	505	964	706
Total Integrated Circuit		70	126	174	212	244	384	766	509
Bipolar Digital (Technology)		15	20	29	38	44	68	123	80
TTL								99	63
ECL								21	15
Other Bipolar Digital								3	2
Bipolar Digital (Function)		15	20	29	38	44	68	123	80
Bipolar Digital Memory									
Bipolar Digital Logic			20	29	38	44	68	123	80
MOS (Technology)		25	69	86	99	137	247	541	319
NMOS			53	66	80	114	186	463	254
PMOS			12	12	9	9	12	5	2
CMOS			4	8	10	14	49	73	63
MOS (Function)		25	69	86	99	137	247	541	319
MOS Memory			10	20	34	81	158	370	168
MOS Micro Devices			7	14	20	25	54	156	97
MOS Logic			52	52	45	31	35	15	54
Linear		30	37	59	75	63	69	102	110
Total Discrete		77	69	80	109	94	119	185	178
Transistor		30	26	30	39	33	38	56	47
Small Signal Transistor								56	47
Power Transistor									
Diode		18	16	21	22	19	15	23	20
Small Signal Diode								3	3
Power Diode								20	17
Zener Diode									
Thyristor		19	17	21	29	25	15	23	22
Other Discrete		10	10	8	19	17	51	83	89
Total Optoelectronic						2	2	13	19
LED Lamps								4	6
LED Displays									
Optical Couplers									
Other Optoelectronics								9	13
Exchange Rate (Yen/US\$)		210	219	227	221	248	235	237	238

Source: Dataquest
December 1986

Mitsubishi Electric Corporation

Table 3

Mitsubishi Electric Corporation
ESTIMATED 1985 SEMICONDUCTOR REVENUES BY GEOGRAPHIC REGION
(Millions of Dollars)

	<u>U.S.</u>	<u>Japan</u>	<u>Europe</u>	<u>ROW</u>	<u>Total</u>
Total Semiconductor	\$ 75	\$595	\$30	\$ 6	\$706
Integrated Circuit	69	410	26	4	509
Bipolar Digital	5	72	2	1	80
MOS	62	232	24	1	319
Linear	2	106	0	2	110
Discrete	5	169	3	1	178
Optoelectronic	1	16	1	1	19

Source: Dataquest
November 1986

Semiconductor Products and Technologies

Mitsubishi's semiconductor product line includes the following:

- Bipolar Digital Logic--Low-power Schottky TTL (LSTTL) and ALSTTL
- MOS Memory--64K, 256K, and 1Mb DRAMs; NMOS and CMOS SRAMs; ROMs; and EPROMs
- MOS Microdevices--Second-sourcing of Intel microcontrollers in NMOS and CMOS, 8-bit CMOS and NMOS microperipherals, and original 8-bit microprocessors
- MOS Logic--CMOS and ECL gate arrays
- Linear--Transistor arrays, op amps, voltage comparators and regulators, timer ICs, and current drivers

Mitsubishi also manufactures gallium arsenide (GaAs) field-effect transistors (FETs). Recent developments in Mitsubishi's semiconductor activities include:

- A CMOS 256K SRAM with 70ns access time and 32Kx8 structure

Mitsubishi Electric Corporation

- A series of current driver ICs with high withstand voltage
- A large-surface defect-free three-dimensional IC manufactured experimentally using lasers for controlling single crystal axes
- Two models of 8-bit MCU with built-in 8-Kbyte EEPROM
- A series of high-withstand voltage, high-current MOSFET modules for use in inverter control and 20-kHz to 100-kHz switching
- A family of CMOS 1Mb DRAMs with 1.2-micron design rule and 256Kx4 structure; the part is available in high-speed page mode or static column mode
- A 512K EPROM in N-channel silicon gate technology, with 1.8-micron geometries
- A 1.55-micron zone long wavelength semiconductor laser that can oscillate at temperatures up to 115 degrees C; threshold current is 10mA

Mitsubishi is one of the companies participating in the Japanese government-sponsored Supercomputer and Optoelectronics Projects. These projects involve research and development of gallium arsenide (GaAs) field-effect transistors (FETs) and memory devices. The Company has made several technological innovations in GaAs.

Mitsubishi presented several papers at the 1986 International Solid State Circuits Conference, including papers on the following subjects:

- An ECL 18,000-gate variable-size cell masterslice
- A basic-cell buffer 440,000-transistor CMOS masterslice, using a "sea of gates" architecture
- An 80 MHz 8-bit CMOS D-A converter with power consumption of only 145mW
- A CMOS pipelined digital signal processor for decoding composite TV signals
- A 256K CMOS static RAM that utilizes short bit line and Schmitt trigger data bus latch circuit architecture; typical access time is 25ns; structure can be 256Kx1 or 64Kx4
- A 47ns 64Kx4 CMOS DRAM with relaxed timing requirements; a 1.2-micron N-well process is used

Mitsubishi Electric Corporation

Licensing and Second-Sourcing Agreements

Mitsubishi is involved in the following licensing, second-sourcing, and joint venture agreements:

- A joint development agreement has been established with Matsushita, Sanyo, and Sharp to jointly develop microprocessors for parallel-processing computers.
- Texas Instruments sells Mitsubishi-made 64K EPROMs in TI packaging.
- Mitsubishi second-sources Intel's 8086 product line.
- Mitsubishi, Westinghouse, and General Electric have formed a joint venture in the manufacture and sale of power transistors, diodes, and thyristors. Mitsubishi is financing 10 percent of the venture, named Powerex, while the two U.S. companies are each contributing 45 percent.
- Mitsubishi plans to buy 25 percent of Nihon MRC Co., Ltd., a subsidiary of Materials Research Corporation (MRC) of the United States; Mitsubishi will sell MRC equipment in Japan.
- Mitsubishi invested ¥200 million in Semicon Systems, Inc. in June 1986. The former Intel Japan sales agent's name will be changed to Dia Semicon Systems.
- Mitsubishi has licensed to Dai Nippon Printing Co., Ltd., Hoya Corporation, Toppan Printing Co., Ltd., and Ulvac Coating Corp., its technology in manufacturing photomasks using molybdenum silicide.
- Mitsubishi is producing GaAs solar cells at Kitaitami Works; much of the production will be used in the CS-3, a communications satellite to be launched in 1988 by the National Space Development Agency of Japan.

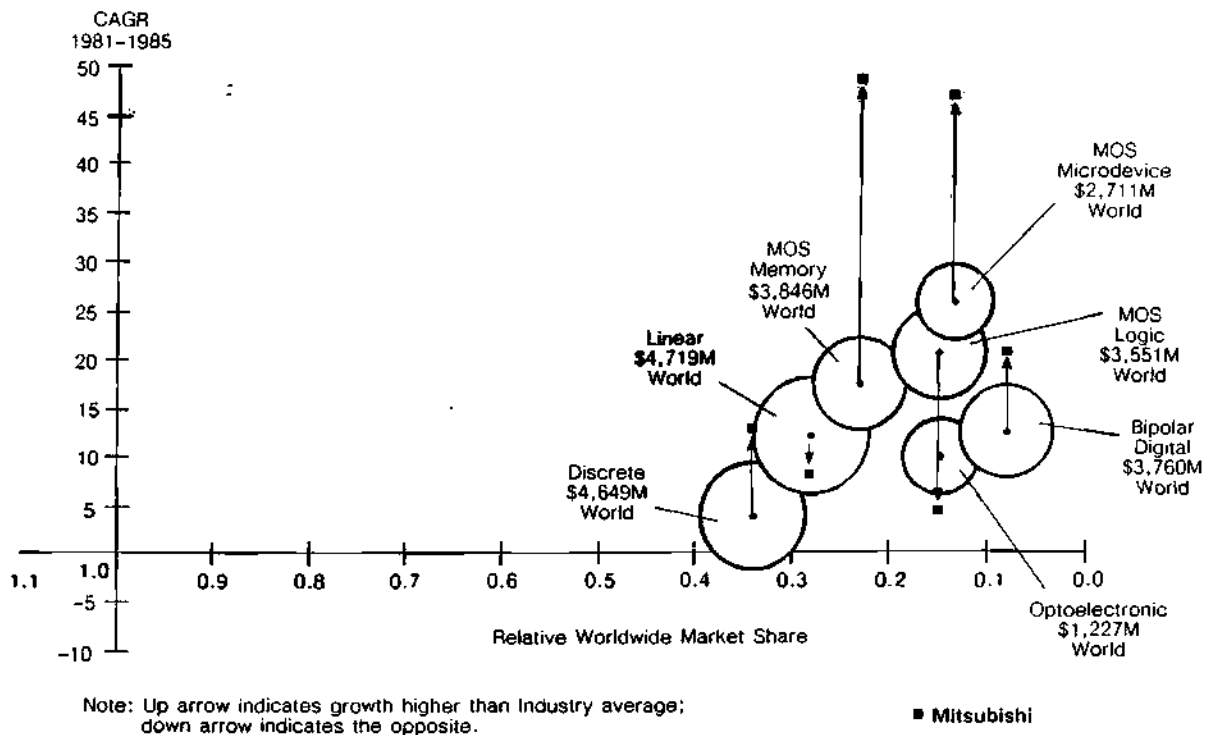
Product Portfolio Analysis

Figure 5 is a graphic analysis of Mitsubishi's product portfolio compared with worldwide competition. Figure 6 presents the same analysis, but applied only to the Company's Japanese competition. These figures show the Company's strong and weak product areas.

Mitsubishi Electric Corporation

Figure 5

Mitsubishi Electric Corporation ESTIMATED PRODUCT PORTFOLIO COMPARED TO WORLDWIDE COMPETITION



The y axis is the historical product compound annual growth rate (CAGR) from 1981 to 1985. Mitsubishi's CAGR for each product is marked by a dot. In Figure 5, the worldwide product CAGR is marked by a dot surrounded by a circle that represents the total world market for the product. In Figure 6, the total Japanese company CAGR for each product is marked by a dot surrounded by a circle that represents total Japanese company sales for the product.

The circle around each plotted point represents the total available market (TAM) for the particular product.

The locations of graph points may be interpreted in the following way:

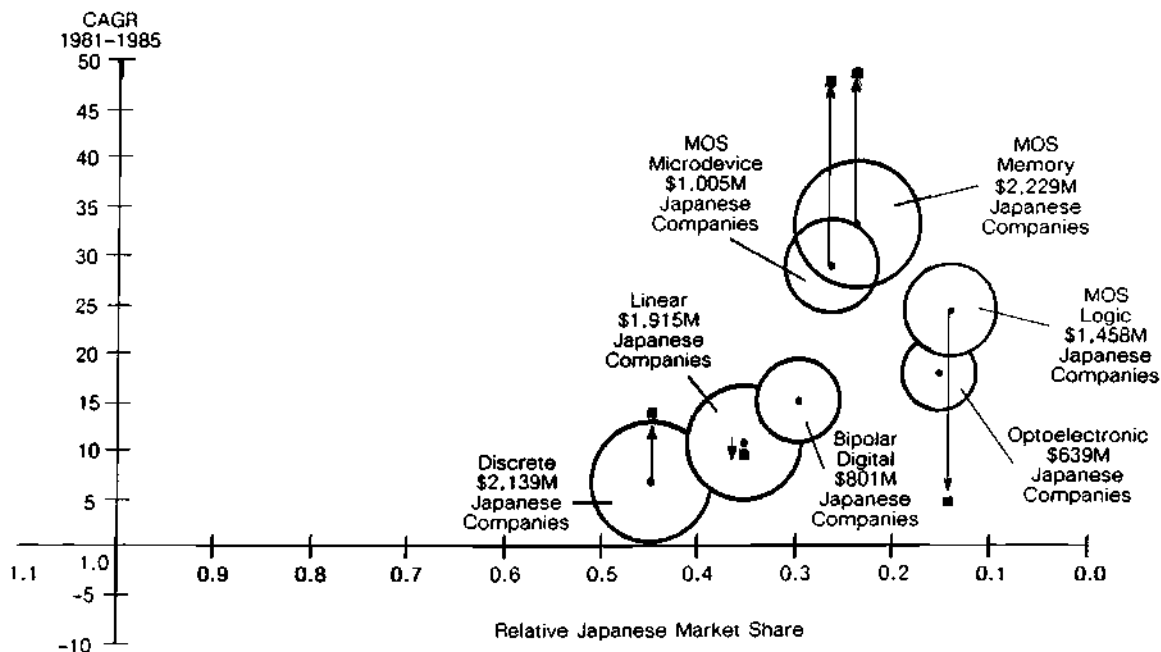
- Upper Right Quadrant--These are the "developing products." The Company is not the leading supplier of these products, but the products exhibit positive growth.

Mitsubishi Electric Corporation

- Upper Left Quadrant--These are the "stars." The Company is the leading supplier of these products, and the products exhibit positive growth.
- Lower Left Quadrant--These are the "cash cows." The Company is the leading supplier in a declining product segment, but there is generally a high profit margin on these products.
- Lower Right Quadrant--These are the "dogs." The TAM for this product area is declining, and the Company is not the leading supplier.

Figure 6

Mitsubishi Electric Corporation ESTIMATED PRODUCT PORTFOLIO COMPARED TO JAPANESE COMPETITION



Note: Up arrow indicates growth higher than Japanese company average; down arrow indicates the opposite.

■ Mitsubishi

Source: Dataquest
December 1986

Mitsubishi Electric Corporation

Viewed against worldwide competition, Mitsubishi's most competitive product area is discrete components. The Company enjoys more than 30 percent relative market share, and its revenue is growing faster than the industry average. In MOS memory, MOS microdevices, and bipolar digital ICs, Mitsubishi's growth is also considerably higher than average industry growth. The Company enjoys a fairly strong market position in linear ICs, but its growth rate is lower than the industry average for that product family.

Viewed against its Japanese competitors only, Mitsubishi occupies an even stronger position in discretes, with 45 percent relative market share and higher than average growth rate. The Company is also quite strong in linear ICs, with a growth rate just slightly under the Japanese company average. The Company's growth rates are considerably higher than average in MOS microdevices and MOS memory, and considerably lower than average in MOS logic.

Information and Communications Systems and Electronic Devices

Sales in the Information and Communications Systems and Electronic Devices Groups (including semiconductors) totaled ¥513 billion in fiscal 1986, a decrease of 10 percent from fiscal 1985. This group accounted for 24 percent of total Mitsubishi sales. In addition to semiconductors, major products of this group include office automation equipment, computers and peripherals, satellites, optical fiber communication, LANs, and VANS.

Fiscal 1986 highlights of this group included the following:

- Construction began on an integrated production facility for personal computers at the Kochi plant.
- A new VLSI development wing was added to the LSI Development Laboratory in Itami, at a cost of ¥18 billion. R&D on 4Mb and above DRAMs will commence there in April 1987.
- The Company began marketing a sequential inference machine developed as part of MITI's Fifth-Generation Computer Project.

Heavy Machinery

Sales in the Heavy Machinery Group were ¥582 billion in fiscal 1986, an increase of 1 percent from fiscal 1985. This group accounted for 28 percent of Mitsubishi's total sales. Major products of this group include generators, motors, nuclear power equipment, transformers, circuit breakers, marine and industrial electric equipment and systems, industrial computer systems, railcar electric and electronic equipment

Mitsubishi Electric Corporation

and systems, numerical control equipment, electrical discharge and electrochemical machines, lasers, elevators, escalators, moving walks, and automatic building cleaning systems.

Fiscal 1986 highlights of this group included:

- Delivery of components for two pressurized water reactor plants to Kansai Electric Power Co. and Kyushu Electric Power Co.
- Development of variable voltage, variable frequency induction-motor drive-control systems for escalators and elevators; these use an AC current generator inverter control subsystem.

Industrial Products and Automotive Equipment

Sales in the Industrial Products and Automotive Equipment Group were ¥405 billion in fiscal 1986, an increase of 10 percent over fiscal 1985. This group accounted for 19 percent of total Mitsubishi sales, and is the Company's smallest product group. Major products of this group include small and medium-size motors, controllers, watt hour meters, relays, chemical products, rafts and boats, electrical automotive equipment and accessories, car radios, stereos, air conditioners, refrigeration equipment, factory automation equipment, and Robotics. During fiscal 1986, the Company entered into an agreement with Mikuni Corp. and Robert Bosch GmbH to jointly manufacture electronic fuel injection systems for auto engines.

Consumer Products

Sales in the Consumer Products Group were ¥610 billion in fiscal 1986, an increase of 18 percent over fiscal 1985. This group accounted for 29 percent of Mitsubishi's total sales and is the Company's largest product group. Major products of this group are TVs, VCRs, radios and stereo equipment, air conditioners, heaters, fans, refrigerators and other kitchen appliances, washers and dryers, vacuum cleaners, hair dryers, fluorescent and mercury-vapor lamps, and home computers and home automation equipment.

Fiscal 1986 highlights included:

- Mass production of the world's largest direct-view TV screen, measuring 35 inches
- A subsidiary was established to produce audio-visual software

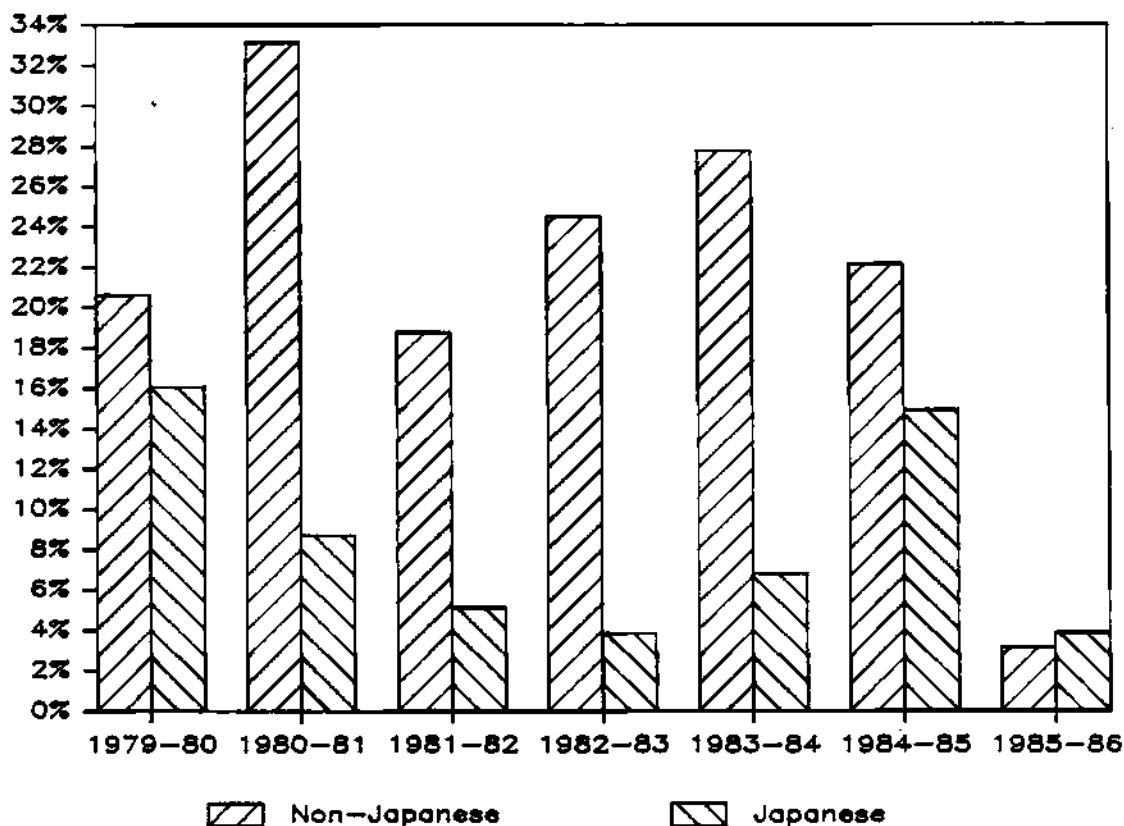
Mitsubishi Electric Corporation

INTERNATIONAL OPERATIONS

Overseas sales accounted for 28 percent of Mitsubishi's 1986 sales, compared with only 20 percent in 1982. The CAGR of overseas sales was 19.0 percent from 1982 to 1986, while domestic sales grew at a CAGR of only 7.3 percent over the same period. Figure 7 shows the year-to-year growth of Mitsubishi's non-Japanese and Japanese sales from 1980 to 1986. One reason for this growth in non-Japanese sales is increased overseas production and overseas subsidiaries.

Figure 7

Mitsubishi Electric Corporation GROWTH OF NON-JAPANESE vs. JAPANESE REVENUE (Percent of Yen)



Source: Dataquest
December 1986

Mitsubishi Electric Corporation

MANUFACTURING FACILITIES

Mitsubishi has eight semiconductor plants in Japan and one in the United States. These plants are listed in Table 4; Figure 8 shows the locations of the plants in Japan. Construction has begun on a new CMOS microdevice plant in Kochi Prefecture, also shown on the table and map.

Table 4

Mitsubishi Electric Corporation JAPANESE SEMICONDUCTOR MANUFACTURING FACILITIES

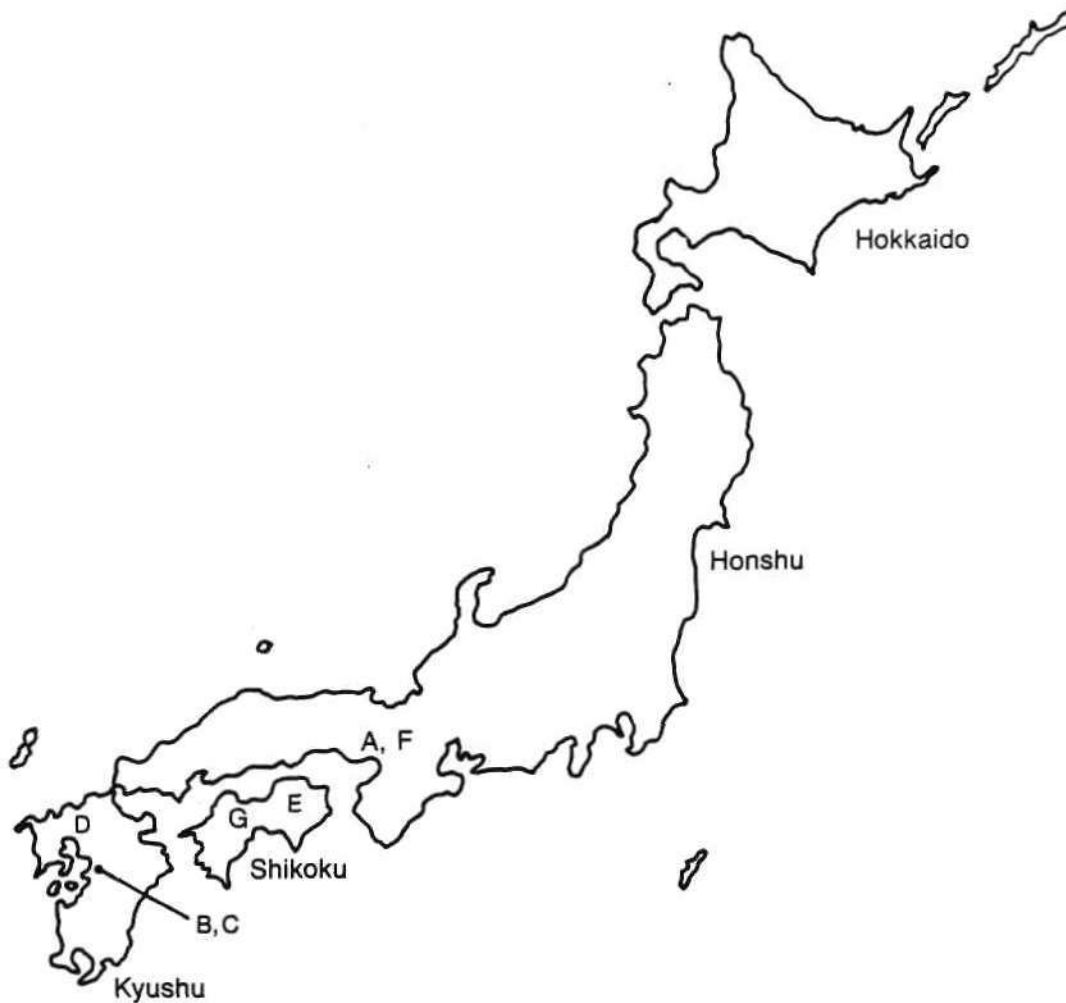
Map Code	Location	Year Established	Floor Space (Square Meters)	Employees	Function & Products
A	Kita-itami Works Hyogo Prefecture	1959	116,834	3,054	Fab, assembly, test-- MOS logic, discretes
B	Kumamoto #1-Kumamoto Kumamoto Prefecture (Kita-itami Works)	1967	13,000	400	Assembly, test--ICs
C	Kumamoto #2-Kikuchi Kumamoto Prefecture (Kita-itami Works)	1970	16,000	1,200	Fab, test--ICs
D	Fukuoka Handotai Factory Fukuoka Prefecture	1944	13,000	N/A	Fab, assembly, and test--bipolar logic, discretes
D	Fukuoka New Plant	1984	10,000	N/A	Fab, assembly, test
E	Saijo Industrial Park Ehime Prefecture (Kita-itami Works)	1984	22,000	N/A	Fab, test--64K DRAMS
E	Saijo Factory #2 (Kita-itami Works)	1985	N/A	N/A	Fab, assembly, test--256K DRAMS
F	Semiconductor Laboratory Hyogo Prefecture	1983	N/A	N/A	Fab, test--discretes, optoelectronics
	Mitsubishi Semiconductor U.S.A., North Carolina	1983	20,000	200	Assembly, test--MOS memory
G	Kagami Plant Kochi Prefecture	1986	N/A	N/A	Fab, assembly, test-- CMOS microdevices

Source: Mitsubishi Electric Corporation
Dataquest
November 1986

Mitsubishi Electric Corporation

Figure 8

Mitsubishi Electric Corporation
SEMICONDUCTOR FACTORY LOCATIONS



Source: Dataquest
December 1986

Mitsubishi Electric Corporation

In the semiconductor area, Mitsubishi made capital investments totaling ¥62 billion in 1985; Dataquest estimates that the Company will spend ¥40 billion in 1986.

The two Saijo semiconductor plants on Shikoku Island were the first semiconductor plants to be built on the island. They were built specifically to produce 64K, 256K DRAMs, and 1Mb DRAMs. The Durham, North Carolina, plant began operation in the first half of 1985; it was built for the assembly of 64K and 256K DRAMs.

For a description of these fully automated facilities at Saijo, please see the JSIA Newsletter, "The New Mitsubishi Saijo Factory--A Fully Automated Facility," dated October 11, 1985.

RESEARCH AND DEVELOPMENT

In fiscal 1986, Mitsubishi's research and development (R&D) expenditure was ¥89.1 billion, a 16 percent increase over fiscal 1985. R&D expenditure was approximately 4.2 percent of sales.

Mitsubishi maintains nine R&D laboratories, listed below:

- Central Research Laboratory (Hyogo prefecture)--Basic research in mechanical, electrical, optical, and biological technology
- Product Development Laboratory (Hyogo prefecture)--Development of new electronic and mechatronic parts
- Consumer Electronics Development Laboratory (Osaka prefecture)--Development of consumer electronics products and mass-production technologies
- Manufacturing Development Laboratory (Hyogo prefecture)--Research and development of production-line automation and other technologies; testing of materials and components
- Consumer Products Research Laboratory (Kanagawa prefecture)--Development of home automation electronic systems; testing of products and packaging
- LSI Development Laboratory (Hyogo prefecture)--Research and development of ICs and discretes; new product development (a new VLSI Development Wing was added in fiscal 1986)
- Information Systems and Electronics Development Laboratory (Kanagawa prefecture)--Overall development of information systems and equipment

Mitsubishi Electric Corporation

- Industrial Design Center (Kanagawa prefecture)--Industrial design activities concerning all Mitsubishi products
- Materials Engineering Laboratory (Hyogo prefecture)--Research and development of materials and electronic devices

Mitsubishi has established five target areas for research and development: factory automation, data processing systems, communications, audio visual products, and electronic devices. Recent projects include:

- The MELCOM PSI Computer with inference capability, that processes the PROLOG computer language
- A teleconferencing system that can send and receive voice, visual, and facsimile transmissions over a single phone circuit
- A successful continuous test run of a molten carbonate fuel cell for 10,000 hours. The goal is to raise the length of time to between 25,000 and 40,000 hours
- Five types of MELCARD IC cards

MARKETING

Dataquest believes that approximately 80 percent of Mitsubishi's semiconductor products are sold domestically in Japan through distributors. The Company's major distributors are Ryoyo Electric, Ryoden Shoji Co., Ltd., and Kyoei Sangyo. Approximately 15 percent of Mitsubishi's sales are captive.

In the United States, Mitsubishi sells semiconductors through Mitsubishi Electronics America, Inc., headquartered in Sunnyvale, California, and through distributors.

In Europe, Mitsubishi has sales offices in most of the major countries and also sells through distributors.

Monsanto Company

Table of Contents

<u>Heading</u>	<u>Page</u>
Financial Summary	1
The Company	3
Background	3
Operations	3
International Operations	6
MEMC International Sales	8
Marketing	9
Research and Development	9
Employees	10
Litigation	10
Operating Groups or Divisions	11
Monsanto Electric Materials Company	11
Agricultural Products	12
Biological Sciences	13
Fibers and Intermediates	13
Industrial Chemicals	13
Polymer Products	14
Electronic Materials and Fabricated Products	14
Fisher Controls International Incorporated	14
Oil and Gas	15

<u>Tables</u>	<u>Title</u>	
Table 1	Operating Unit Segment Data	4
Table 2	International Sales	7
Table 3	Location of Polysilicon Plants	12

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-Chome
Chiyoda-ku, Tokyo, 100, Japan
Telephone: (03) 218-2111 Telex: J24532
(Millions of Dollars Except Per Share Data)

Balance Sheet (March 31)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Working Capital	\$ 493	\$ 522	\$ 461	\$ 651	\$ 637
Long-Term Debt	\$ 680	\$ 745	\$ 803	\$1,050	\$ 975
Shareholders' Equity	\$1,210	\$1,226	\$1,455	\$1,576	\$2,097
After-Tax Return on Average Equity (%)	13.4	12.0	11.3	12.9	7.1

Operating Performance (Fiscal Year Ending March 31)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Sales	\$6,293*	\$6,255*	\$7,376*	\$8,305*	\$9,545*
Japanese Sales	\$5,006	\$4,780	\$5,387	\$5,964	\$6,868
Non-Japanese Sales	\$1,287	\$1,475	\$1,989	\$2,341	\$2,677
Cost of Revenue	\$4,694	\$4,636	\$5,536	\$6,210	\$7,293
R&D Expense	\$ 189	\$ 211	\$ 257	\$ 314	\$ 403
SG&A Expense	\$ 990	\$1,010	\$1,176	\$1,276	\$1,467
Pretax Income	\$ 303	\$ 297	\$ 347	\$ 404	\$ 328
Pretax Margin (%)	4.8	4.8	4.7	4.8	3.4
Effective Tax Rate (%)	54.0	55.1	54.6	55.2	63.1
Net Income	\$ 151	\$ 141	\$ 165	\$ 192	\$ 136
Average Shares Outstanding (Millions)	1,549	1,577	1,598	1,620	1,714
Per Share					
Earnings	\$ 0.10	\$ 0.09	\$ 0.10	\$ 0.12	\$ 0.08
Dividends	\$ 0.03	\$ 0.02	\$ 0.03	\$ 0.03	\$ 0.04
Book Value	\$ 0.79	\$ 0.78	\$ 0.91	\$ 0.92	\$ 1.12
Price Range	N/A	N/A	N/A	N/A	N/A
Capital Expenditures	\$ 288	\$ 292	\$ 486	\$ 541	\$ 698
Total Employees	60,549	64,432	65,904	68,745	71,479
Exchange Rate (Yen per U.S.)	229	249	236	245	221

*Mitsubishi also had other income of \$139 million in 1982, \$127 million in 1983, \$152 million in 1984, \$164 million in 1985, and \$218 million in 1986.

N/A = Not Available

Source: Mitsubishi Electric Corporation
Annual Reports
Dataquest
April 1987

Mitsubishi Electric Corporation

Table 1

Mitsubishi Electric Corporation
REVENUE BY MAJOR LINE OF BUSINESS
(Billions of Yen)

	<u>Fiscal Year Ending March 31</u>			
	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Heavy Machinery	¥ 512	¥ 548	¥ 577	¥ 582
Information and Communications Systems and Electronic Devices	310	401	573	513
Industrial Products and Automotive Equipment	315	333	368	405
Consumer Products	<u>¥ 421</u>	<u>¥ 459</u>	<u>517</u>	<u>610</u>
Total Sales	¥1,558	¥1,741	¥2,035	¥2,110
Exchange Rate (Yen per US\$)	¥ 249	¥ 236	¥ 245	¥ 221

Source: Dataquest
April 1987

Mitsubishi Electric Corporation

Table 2

Mitsubishi Electric Corporation ESTIMATED SEMICONDUCTOR REVENUE (Millions of Dollars)

	1979	1980	1981	1982	1983	1984	1985	1986
Total Semiconductor	195	254	321	340	505	7,464	6,289	8,940
Total Integrated Circuit	126	174	212	244	364	5,563	4,486	6,617
Bipolar Digital (Technology)	20	29	38	44	68	870	715	1,094
TTL	0	0	0	0	0	684	442	683
ECL	0	0	0	0	0	147	221	347
Other Bipolar Digital	0	0	0	0	0	39	53	64
Bipolar Digital (Function)	20	29	38	44	68	870	715	1,092
Bipolar Digital Memory	0	0	0	0	0	211	170	204
Bipolar Digital Logic	20	29	38	44	68	659	546	889
MOS (Technology)	69	86	99	137	247	3,584	2,612	3,913
NMOS	53	66	80	114	186	2,650	1,824	2,715
PMOS	12	12	9	9	12	43	20	18
CMOS	4	8	10	14	49	891	768	1,180
MOS (Function)	69	86	99	137	247	3,584	2,613	3,915
MOS Memory	10	20	34	81	158	2,402	1,499	2,081
MOS Micro Devices	7	14	20	25	54	749	619	1,063
MOS Logic	52	52	45	31	35	433	495	770
Linear	37	59	75	63	69	1,109	1,158	1,611
Total Discrete	69	80	109	94	119	1,529	1,438	1,816
Transistor	26	30	39	33	38	688	622	776
Small Signal Transistor	0	0	0	0	0	451	399	484
Power Transistor	0	0	0	0	0	237	222	293
Diode	16	21	22	19	15	483	444	513
Small Signal Diode	0	0	0	0	0	229	208	241
Power Diode	0	0	0	0	0	200	190	195
Zener Diode	0	0	0	0	0	54	46	76
Thyristor	17	21	29	25	15	123	119	158
Other Discrete	10	8	19	17	51	235	254	369
Total Optoelectronic	0	0	0	2	2	372	365	507
LED Lamps	0	0	0	0	0	109	110	147
LED Displays	0	0	0	0	0	69	69	80
Optical Couplers	0	0	0	0	0	62	54	68
Other Optoelectronics	0	0	0	0	0	132	133	211
Exchange Rate (Yen/US\$)	219	227	221	248	235	237	238	187

Source: Dataquest
April 1987

Mitsubishi Electric Corporation

(Page intentionally left blank)

Mitsubishi Electric Corporation

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-Ku Tokyo 100 Japan
Telephone: (03) 218-2111 Telex: J24532
(Billions of Yen Except Per Share Data)

Balance Sheet (March 31)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Working Capital	¥ 56.5	¥ 64.0	¥ 85.7	¥ 108.1	¥ 113.0
Long-Term Debt	N/A	N/A	¥ 145.2	¥ 148.2	¥ 155.7
Shareholders' Equity	¥137.9	¥ 161.5	¥ 193.5	¥ 237.6	¥ 277.2
After-Tax Return on Average Equity (%)	9.5	14.7	18.4	15.9	13.4

Operating Performance (Fiscal Year Ending March 31)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Sales	¥862.3	¥1,018.7	¥1,189.5*	¥1,338.7*	¥1,441.2*
Japanese Sales	N/A	N/A	¥ 992.2	¥1,084.4	¥1,146.3
Non-Japanese Sales	N/A	N/A	¥ 190.3	¥ 254.3	¥ 294.9
Cost of Sales	¥658.7	¥ 764.7	¥ 924.9	¥1,054.4	¥1,074.9
R&D Expense		¥ 25.7	¥ 30.8	¥ 34.3	¥ 43.2
SG&A Expense	¥162.6	¥ 171.2	¥ 192.6	¥ 213.1	¥ 226.7
Pretax Income	¥ 26.7	¥ 41.9	¥ 64.7	¥ 69.2	¥ 69.3
Pretax Margin (%)	3.1	4.1	5.4	5.2	4.8
Effective Tax Rate (%)	N/A	N/A	52.4	53.1	54.0
Net Income	¥ 12.3	¥ 22.0	¥ 32.6	¥ 34.3	¥ 34.6
Average Shares Outstanding (Millions)	1,284	1,347	1,403	1,467	1,549
Per Share					
Earnings	¥ 9.6	¥ 16.3	¥ 23.2	¥ 23.4	¥ 22.4
Dividends	¥ 5.0	¥ 5.5	¥ 6.0	¥ 7.0	¥ 6.0
Book Value	¥107.4	¥ 119.9	¥ 137.9	¥ 162.0	¥ 179.0
Price Range	N/A	N/A	N/A	N/A	N/A
Capital Expenditures	¥ 29.9	¥ 42.1	¥ 47.8	¥ 55.1	¥ 66.0
Exchange Rate (Yen per US\$)	¥253.1	¥ 200.0	¥ 231.8	¥ 215.7	¥ 228.7

*Mitsubishi also had other income of ¥23.6 billion in 1980, and ¥32.2 billion in 1981, and ¥31.8 billion in 1982. Similar data for 1978 and 1979 are not available.

N/A = Not Available

Source: Mitsubishi Electric Corporation
Annual Reports
DATAQUEST

Mitsubishi Electric Corporation

Table 1

Mitsubishi Electric
REVENUES BY MAJOR LINE OF BUSINESS
(Billions of Yen)

	Fiscal Year Ending March 31				
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Heavy Machinery	¥ 205	¥ 259	¥ 301	¥ 322	¥ 366
Electronic Products and Systems	287	316	378	451	494
Industrial Products	159	183	218	232	238
Consumer Products	<u>211</u>	<u>260</u>	<u>293</u>	<u>334</u>	<u>343</u>
Total Sales	¥ 862	¥1,018	¥1,190	¥1,339	¥1,441
Exchange Rate (Yen per US\$)	<u>253</u>	<u>200</u>	<u>232</u>	<u>216</u>	<u>229</u>
Total Sales (Millions of US\$)	\$3,407	\$5,093	\$5,132	\$6,207	\$6,293

Source: Mitsubishi Electric Corporation
Annual Reports
DATAQUEST

Mitsubishi Electric Corporation

Table 2

Mitsubishi Electric Corporation ESTIMATED SEMICONDUCTOR REVENUES (Millions of Dollars)

	1975	1976	1977	1978	1979	1980	1981	1982
	-----	-----	-----	-----	-----	-----	-----	-----
Total Semiconductor	56	126	139	147	195	254	321	338
Total Integrated Circuit	25	50	54	70	126	174	212	244
Bipolar Digital (Technology)	7	19	12	15	20	29	38	44
TTL	-	-	-	-	-	-	-	-
DTL	-	-	-	-	-	-	-	-
ECL	-	-	-	-	-	-	-	-
Other Bipolar Digital	-	-	-	-	-	-	-	-
Bipolar Digital (Function)	7	19	12	15	20	29	38	44
Bipolar Digital Memory	-	-	-	-	-	-	-	-
Bipolar Digital Logic	-	-	-	-	20	29	38	44
MOS (Technology)	11	19	24	25	69	86	99	137
NMOS	-	-	-	-	53	66	80	114
PMOS	-	-	-	-	12	12	9	9
CMOS	-	-	-	-	4	8	10	14
MOS (Function)	11	19	24	25	69	86	99	137
MOS Memory	-	-	-	-	10	20	34	73
MOS Microprocessor	-	-	-	-	7	14	20	25
MOS Logic	-	-	-	-	52	52	45	39
Linear	7	12	18	30	37	59	75	63
Total Discrete	31	75	83	77	69	80	109	94
Transistor	-	-	31	30	26	30	39	33
Small Signal Transistor	-	-	-	-	-	-	-	-
Power Transistor	-	-	-	-	-	-	-	-
Diode	-	-	20	18	16	21	22	19
Small Signal Diode	-	-	-	-	-	-	-	-
Power Diode	-	-	-	-	-	-	-	-
Zener Diode	-	-	-	-	-	-	-	-
Thyristor	-	-	21	19	17	21	29	25
Other Discrete	-	-	11	10	10	8	19	17
Total Optoelectronic	-	1	2	-	-	-	-	-
LED Lamps	-	-	-	-	-	-	-	-
LED Displays	-	-	-	-	-	-	-	-
Optical Couplers	-	-	-	-	-	-	-	-
Other Optoelectronics	-	-	-	-	-	-	-	-

Source: DATAQUEST

Mitsubishi Electric Corp.

Mitsubishi Electric Corporation
Mitsubishi Denki Bldg., 2-3, Marunouchi 2-chome
Chiyoda-Ku Tokyo 100 Japan
Telephone: (03) 218-2111 Telex: J24532
(Billions of Yen Except Per Share Data)

Balance Sheet (March 31)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Working Capital	¥ 32.4	¥ 56.5	¥ 64.0	¥ 85.7	¥ 108.1
Long-Term Debt	N/A	N/A	N/A	¥ 145.2	¥ 148.0
Shareholders' Equity	¥121.1	¥137.9	¥ 161.5	¥ 193.5	¥ 237.6
After-Tax Return on Average Equity (%)	N/A	9.5	14.7	18.4	15.9

Operating Performance (Fiscal Year Ending March 31)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Sales	¥760.5	¥862.3	¥1,018.7	¥1,189.5*	¥1,338.7*
Japanese Sales	N/A	N/A	N/A	¥ 992.2	¥1,084.4
Non-Japanese Sales	N/A	N/A	N/A	¥ 190.3	¥ 254.3
Cost of Sales	¥558.0	¥658.7	¥ 764.7	¥ 924.9	¥1,054.4
R&D Expense	¥161.9	¥162.6	¥ 25.7	¥ 30.8	¥ 34.3
SG&A Expense			¥ 171.2	¥ 192.6	¥ 213.1
Pretax Income	¥ 21.1	¥ 26.7	¥ 41.9	¥ 64.7	¥ 69.2
Pretax Margin (%)	2.8	3.1	4.1	5.4	5.2
Effective Tax Rate (%)	N/A	N/A	N/A	52.4	53.1
Net Income	¥ 9.4	¥ 12.3	¥ 22.0	¥ 32.6	¥ 34.3
Average Shares Outstanding (Millions)	1,206	1,284	1,347	1,403	1,467
Per Share					
Earnings	¥ 7.8	¥ 9.6	¥ 16.3	¥ 23.2	¥ 23.4
Dividends	¥ 5.0	¥ 5.0	¥ 5.5	¥ 6.0	¥ 7.0
Book Value	¥100.4	¥107.4	¥ 119.9	¥ 137.9	¥ 162.0
Price Range	N/A	N/A	N/A	N/A	N/A
Capital Expenditures	¥ 24.5	¥ 29.9	¥ 42.1	¥ 47.8	¥ 55.1
Exchange Rate (Yen per US\$)	¥291.4	¥253.1	¥ 200.0	¥ 231.8	¥ 215.7

*Mitsubishi also had other income of ¥23.6 Billion in 1980 and ¥32.2 Billion in 1981. Similar data for 1977-1979 is not available.

Source: Mitsubishi Electric Corporation
Annual Reports
DATAQUEST

Mitsubishi Electric Corp.

Table 1

Mitsubishi Electric
REVENUES BY MAJOR LINE OF BUSINESS
(Billions of Yen)

	Fiscal Year Ending March 31				
	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Heavy Machinery	¥ 200	¥ 205	¥ 259	¥ 301	¥ 322
Electronic Products and Systems	223	287	316	378	451
Industrial Products	148	159	183	218	232
Consumer Products	<u>190</u>	<u>211</u>	<u>260</u>	<u>293</u>	<u>334</u>
Total Sales	¥ 761	¥ 862	¥1,018	¥1,190	¥1,339
Exchange Rate (Yen per US\$)	<u>291</u>	<u>253</u>	<u>200</u>	<u>232</u>	<u>216</u>
Total Sales (Millions of US\$)	\$2,610	\$3,407	\$5,093	\$5,132	\$6,207

Source: DATAQUEST

Mitsubishi Electric Corp.

Table 2

Mitsubishi Electric Corporation ESTIMATED SEMICONDUCTOR REVENUES (Millions of Dollars)

	1974	1975	1976	1977	1978	1979	1980	1981
TOTAL SEMICONDUCTOR	72	56	126	139	147	195	254	326
Total Integrated Circuit	26	25	50	54	70	126	174	221
Bipolar Digital	11	7	19	12	15	20	29	45
TTL								
DTL								
ECL								
Other								
Bipolar Digital (Recap)						20	29	45
Memory						0	0	0
Logic						20	29	45
MOS	6	11	19	24	25	69	86	96
NMOS						53	66	77
PMOS						12	12	9
CMOS						4	8	10
MOS (Recap)						69	86	96
Memory						10	20	32
Microprocessor						0	0	0
Logic						59	66	64
Linear	9	7	12	18	30	37	59	80
Total Discrete	46	31	75	83	77	69	80	105
Transistor				31	30	26	30	37
Small Signal								
Power Transistor								
Diode				20	18	16	21	20
Small Signal								
Power								
Zener								
Thyristor				21	19	17	21	29
Other				11	10	10	8	19
Total Optoelectronic	0	0	1	2	0	0	0	0
LED Lamps	0	0	0	0	0	0	0	0
LED Displays	0	0	0	0	0	0	0	0
Optical Couplers	0	0	0	0	0	0	0	0
Other	0	0	1	2	0	0	0	0

Source: DATAQUEST

Mitsubishi Electric Corp.

Mitsubishi Electric Corporation ESTIMATED SEMICONDUCTOR REVENUES (Millions of Dollars)

	1973	1974	1975	1976	1977	1978	1979	1980
TOTAL SEMICONDUCTOR	84	72	56	126	139	147	195	254
Total Integrated Circuit	32	26	25	50	54	70	126	174
Bipolar Digital	11	11	7	19	12	15	20	29
TTL								
DTL								
ECL								
Other								
Bipolar Digital (Recap)							20	29
Memory								
Logic								
MOS	12	6	11	19	24	25	69	96
NMOS							53	76
PMOS							12	12
CMOS							4	8
MOS (Recap)							69	96
Memory							10	20
Microprocessor							0	0
Logic							59	76
Linear	9	9	7	12	18	30	37	49
Total Discrete	52	46	31	75	83	77	69	80
Transistor					31	30	26	30
Small Signal								
Power Transistor								
Diode					20	18	16	21
Small Signal								
Power								
Zener								
Thyristor					21	19	17	21
Other					11	10	10	8
Total Optoelectronic	0	0	0	1	2	0	0	0
LED Lamps								
LED Displays								
Optical Couplers								
Other								

Source: DATAQUEST, Inc.

10.06 Mitsubishi

Table 10.06-1
Mitsubishi
ESTIMATED SEMICONDUCTOR REVENUES
(Dollars in Millions)

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
TOTAL SEMICONDUCTOR		57	84	72	56	126	139	147
TOTAL I C	16	20	32	26	25	50	54	70
BIPOLAR DIGITAL	9	8	11	11	7	19	12	15
TTL								
DTL								
ECL								
OTHER								
MOS	4	6	12	6	11	19	24	25
PMOS								
NMOS								
CMOS								
LINEAR	3	6	9	8	7	12	18	30
INTERFACE								
CONTROL								
ENTERTAINMENT								
OTHER								
HYBRID								
TOTAL DISCRETE		37	52	46	31	75	83	77
TRANSISTOR							31	30
SMALL SIGNAL								
POWER								
DIODE							20	18
SMALL SIGNAL								
POWER								
ZENER								
THYRISTOR							21	19
OTHER								
OPTOELECTRONIC							2	0
LED LAMPS								
LED DISPLAYS								
COUPLERS								
OTHER								

Note: The following exchange rates were used to convert yen to dollars:
 1971: 343 yen = \$1.00; 1972: 302 yen = \$1.00; 1973: 269 yen = \$1.00;
 1974: 292 yen = \$1.00; 1975: 297 yen = \$1.00; 1976: 296 yen = \$1.00;
 1977: 266 yen = \$1.00; 1978: 207 yen = \$1.00

Source: DATAQUEST, Inc.

10.06 Mitsubishi

Table 10.06.2-1
Mitsubishi
ESTIMATED SEMICONDUCTOR REVENUES
(Dollars in Millions)

	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
TOTAL SEMICONDUCTOR	57	72	71	56	116	124
TOTAL I C	20	27	26	25	41	48
BIPOLAR DIGITAL	8	9	11	7	10	11
TTL						
DTL						
ECL						
OTHER						
MOS	6	10	6	11	19	21
PMOS						
NMOS						
CMOS						
LINEAR	6	8	8	7	12	16
INTERFACE						
CONTROL						
ENTERTAINMENT						
OTHER						
HYBRID						
TOTAL DISCRETE	37	45	45	31	74	74
TRANSISTOR						27
SMALL SIGNAL						
POWER						
DIODE						18
SMALL SIGNAL						
POWER						
ZENNER						
THYRISTOR						19
OTHER						10
OPTOELECTRONIC	0	0	0	0	1	2
LED LAMPS						
LED DISPLAYS						
COUPLERS						
OTHER						

Source: DATAQUEST, Inc.

10.06 Mitsubishi

Table 10.06.2-1
Mitsubishi
ESTIMATED SEMICONDUCTOR REVENUES
(Dollars in Millions)

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
TOTAL SEMICONDUCTOR		57	72	71	56	94
TOTAL I C	18	20	27	26	25	41
BIPOLAR DIGITAL	10	8	9	11	7	10
TTL						
DTL						
ECL						
OTHER						
MOS	5	6	10	6	11	19
PMOS						
NMOS						
CMOS						
LINEAR	3	6	8	9	7	12
INTERFACE						
CONTROL						
ENTERTAINMENT						
OTHER						
TOTAL DISCRETE		37	45	45	31	52
TRANSISTOR						
SMALL SIGNAL						
POWER						
DIODE						
SMALL SIGNAL						
POWER						
ZENER						
THYRISTOR						
OTHER						
OPTOELECTRONIC	0	0	0	0	0	1
LED LAMPS						
LED DISPLAYS						
COUPLERS						
OTHER						

Source: DATAQUEST, Inc.

10.06 Mitsubishi

Table 10.06.2-1

**Mitsubishi
ESTIMATED SEMICONDUCTOR REVENUES
(Dollars in Millions)**

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
<i>TOTAL SEMICONDUCTOR</i>		57	72	71
<i>TOTAL I C</i>	18	20	27	26
<i>BIPOLAR DIGITAL</i>	10	8	9	11
<i>TTL</i>				
<i>DTL</i>				
<i>ECL</i>				
<i>OTHER</i>				
<i>MOS</i>	5	6	10	6
<i>PMOS</i>				
<i>NMOS</i>				
<i>CMOS</i>				
<i>LINEAR</i>	3	6	8	9
<i>INTERFACE</i>				
<i>CONTROL</i>				
<i>ENTERTAINMENT</i>				
<i>OTHER</i>				
<i>HYBRID</i>	0	0	0	0
<i>TOTAL DISCRETE</i>		37	45	45
<i>TRANSISTOR</i>				
<i>SMALL SIGNAL</i>				
<i>POWER</i>				
<i>DIODE</i>				
<i>SMALL SIGNAL</i>				
<i>POWER</i>				
<i>ZENER</i>				
<i>THYRISTOR</i>				
<i>OTHER</i>				
<i>OPTOELECTRONIC</i>	0	0	0	0

Source: DATAQUEST, Inc.

Monsanto Company

BACKGROUND AND OVERVIEW

Monsanto Company was founded in 1901 in Saint Louis, Missouri, the United States. Since that time, it has developed into a multinational company engaged in researching, manufacturing, and marketing a diversified range of products, which are reported under six main business segments:

- Agricultural products
- Chemicals
- Electronic materials
- Fisher controls
- NutraSweet
- Pharmaceuticals

As part of its restructuring program over the past year, the Company has divested itself of its oil and gas interests and has taken the opportunity to broaden its base in pharmaceuticals through its recently acquired subsidiary, G.D. Searle.

The company has also identified another business segment—supplying electronic materials to the semiconductor industry as having excellent long-term growth prospects. The Company is already established in this area as a prominent supplier of electronic-grade silicon substrate. Monsanto's electronic materials business now has silicon wafer production facilities in Japan, Malaysia, South Korea, the United Kingdom, and the United States.

Monsanto has invested more than \$3 million in dedicated research equipment at its wafer research and technology facility in Milton Keynes in the United Kingdom. This plant has a production capacity of 20 million square-inches of wafers per year, and the Company states that further opportunities for expansion are being studied.

OPERATIONS

The Monsanto Company has its corporate headquarters in Saint Louis, Missouri, in the United States.

The Company employs an estimated 50,000 persons worldwide with approximately 8 percent in Western Europe, where it also has 6 plants, 28 sales offices, and a major technical center (Belgium).

Monsanto Company

Monsanto Electronic Materials Company handles the manufacturing and marketing of silicon wafer products used in the fabrication of integrated circuits and other semiconductors. Monsanto's headquarters are in Palo Alto, California, in the United States. Plants are located throughout the world as follows:

- The United States—Saint Peters, Missouri, and Spartanburg, South Carolina
- Malaysia—Kuala Lumpur
- South Korea—Gumi
- The United Kingdom—Milton Keynes, Buckinghamshire
- Japan—Utsunomiya, Tochigi

FINANCIAL

Table 1 summarizes the most recent financial information for Monsanto Company, covering the fiscal years ended December 31, 1985 through 1987, by operating business segment.

The Company's sales in 1987 were \$7,639 million, an 11 percent increase over 1986 sales. This was the largest annual increase since 1979. Sales of electronic-grade silicon materials increased by 20 percent in 1987 compared with 1986 sales. This segment benefited from the growth in worldwide semiconductor demand and greater penetration into markets outside the United States.

Table 1

**Monsanto Company
Worldwide Revenue by Business Segment
(Millions of Dollars)**

<u>Segment</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Agricultural Products	\$1,152	\$1,153	\$1,305
Chemicals	4,051	3,548	3,858
Electronic Materials	137	154	185
Fisher Controls	652	649	749
NutraSweet	317	711	722
Pharmaceuticals	262	665	820
Oil and Gas	172	-	-
Corporate	<u>4</u>	<u>3</u>	<u>-</u>
Total Consolidated	\$6,747	\$6,879	\$7,639

Source: Monsanto Company
Annual Accounts 1987

Monsanto Company

Table 2 lists Monsanto's worldwide operating income or loss, by business segment. Monsanto achieved record operating income in 1987 due to successful marketing strategies, aggressive cost-reduction actions taken in earlier years, and the exchange rate movement of the U.S. dollar. Operating income increased 16 percent to \$734 million in 1987 from \$635 million in 1986.

Monsanto's operating performance improved substantially, moving from an operating loss of \$139 million in 1986 to a nearly breakeven performance in 1987. The Company notes that the operating loss in 1986 included a \$90 million asset impairment write-down. Excluding this nonrecurring charge, 1987 profitability improved \$44 million, due to higher sales volumes and reduced operating costs.

Table 3 shows Monsanto's worldwide revenue by geographic region. Sales in all regions showed good growth in 1987, but sales to the Asia-Pacific region showed a spectacular jump of 37 percent over 1986. Sales to Europe-Africa showed an increase of 26 percent in 1987 over 1986.

Monsanto's operating income or loss by geographic region is shown in Table 4. The table reveals large increases in operating income in the Europe-Africa and Asia-Pacific regions.

In its 1987 annual report, the Company noted that overall, 1987 was a good year in which considerable progress was made toward its goal of a 20 percent return on equity. While the agricultural and chemical segments met this standard in 1987, the other business segments did not. Overall, the Company's return on equity was 11 percent, and it remains confident that the 20 percent goal is attainable.

Table 2

Monsanto Company Operating Income (Loss) by Business Segment (Millions of Dollars)

<u>Segment</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Agricultural Products	\$ 85	\$ 283	\$ 316
Chemicals	(480)	613	450
Electronic Materials	(84)	(139)	(5)
Fisher Controls	34	(66)	(26)
NutraSweet	58	142	145
Pharmaceuticals	(139)	(119)	(119)
Oil and Gas	16	-	-
Biotechnology Product Discovery	(31)	(41)	(43)
Corporate	<u>(57)</u>	<u>(38)</u>	<u>(36)</u>
Total Consolidated	\$(598)	\$ 635	\$ 734

Source: Monsanto Company
Annual Accounts 1987

Monsanto Company

Table 3

Monsanto Company Worldwide Revenue by Geographic Region (Millions of Dollars)

<u>Region</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
United States	\$4,795	\$4,638	\$4,883
Europe-Africa	1,076	1,231	1,537
Canada	298	290	329
Latin America	220	283	293
Asia-Pacific	<u>359</u>	<u>437</u>	<u>597</u>
Total Consolidated	\$6,748	\$6,879	\$7,639

Source: Monsanto Company
Annual Accounts 1987

Table 4

Monsanto Company Operating Income (Loss) by Geographic Region (Millions of Dollars)

<u>Region</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
United States	\$(784)	\$ 506	\$ 501
Europe-Africa	191	117	181
Canada	34	26	31
Latin America	(3)	6	2
Asia-Pacific	9	16	49
Inter-area Elimination	12	2	6
Corporate	<u>(57)</u>	<u>(38)</u>	<u>(36)</u>
Total Consolidated	\$(598)	\$ 635	\$ 734

Source: Monsanto Company
Annual Accounts 1987

Monsanto Company

RESEARCH AND DEVELOPMENT

Monsanto's technological expenses were \$615 million in 1987, approximately 3 percent higher than in 1986 and equivalent to 8 percent of net sales. Research and development (R&D) expenses, a component of technological expenses, were 7 percent higher in 1987, as Monsanto's commitment to new products continued. Approximately two-thirds of the current R&D effort is directed toward the life sciences—pharmaceuticals and agriculture.

In the area of electronic materials, Monsanto has recently announced funding for European research projects to study transmission electron microscopy relating to the formation of oxygen and metallic-related defects in silicon, the use of X-ray characterization techniques in the study of microdefects in silicon wafers, and the materials impact on dielectric breakdown in silicon dioxide films.

ORGANIZATION AND ELECTRONIC MATERIALS FACILITIES

During the past few years, Monsanto has invested more than \$1,000 million in silicon wafer fabrication plants and associated equipment. Over the last decade, the Company has increased machine capacity by more than 400 percent, to 530 million square inches. Dataquest estimates that Monsanto now has the capability to supply more than 20 percent of worldwide wafer consumption.

The Company (operating as Monsanto Japan Ltd.) has built a \$100 million silicon wafer manufacturing and research facility in Japan, an area that Monsanto has long since identified as a major growth area. This plant has a capacity of producing 100 million square inches of wafer per year and employs more than 100 persons.

Monsanto has built a manufacturing facility for silicon wafers at Gumi, Korea. Monsanto's investment is about \$20 million and initial capacity to 40 million square inches of wafer.

Monsanto has built a silicon wafer plant at Milton Keynes in the United Kingdom. This plant is well suited to serve the European market either by road or air and will strengthen the Company's position as a major supplier of silicon substrates to the European semiconductor market. The 45,000-square-foot plant represents an investment in excess of \$50 million. It is highly automated, using an advanced clean module that incorporates the latest state-of-the-art robotic wafer-handling techniques. This plant has a capacity of 70 million square inches of silicon substrates per annum.

Monsanto Company

SEMICONDUCTOR PRODUCTS

Monsanto markets three different types of silicon wafers to service the following application series:

- ULSI—Ultra Large Scale Integration
- VLSI—Very Large Scale Integration
- LSI/MSI—Large Scale Integration/Medium-Scale Integration

ULSI Application Series Wafers

The evolution of integrated circuits toward greater circuit density and the smaller design rules of ULSI circuits has required concurrent technological advancements in silicon wafer fabrication.

Monsanto has designed silicon wafers that are multizone systems and focus on specific circuit application requirements. There are three product systems in this series:

- MUS—ULSI polished silicon
- MUG—ULSI enhanced gettering
- MUE—ULSI MOS EPI

VLSI Application Series Wafers

This series consists of circuit-focused wafers for use in VLSI applications and incorporates the specifications best suited to meet the requirements of this level of integration. The series offers the following crystallographic improvements over the former ULSI series.

- O.I.S.F. is now specified at less than $100/\text{cm}^2$
- Oxygen content may now be specified to a target between 28 and 35 ppma and a tolerance of ± 3

These crystallographic improvements are the result of a novel technique in crystal-pulling technology that gives maximum fab line yield and enhanced device parametrics to the silicon user.

Monsanto Company

LSI/MSI Application Series Wafers

These are circuit-focused silicon wafer products to service LSI and MSI applications. Specifications are designed to be cost effective and provide excellent performances for the typically mature processes in which this type of substrate is used.

OUTLOOK

Monsanto is optimistic about the long-term future, particularly in the fields of pharmaceuticals and microelectronics. In the latter, the Company continues a policy of R&D closely related to customer requirements and will capitalize on its ability to design silicon wafer products possessing individual functional zones tailored to individual requirements. Monsanto is well placed to take advantage of improving demand for silicon wafer products.

Monsanto Company

Table of Contents

<u>Heading</u>	<u>Page</u>
Financial Summary	1
The Company	3
Background	3
Operations	3
International Operations	6
MEMC International Sales	8
Marketing	9
Research and Development	9
Employees	10
Litigation	10
Operating Groups or Divisions	11
Monsanto Electric Materials Company	11
Agricultural Products	12
Biological Sciences	13
Fibers and Intermediates	13
Industrial Chemicals	13
Polymer Products	14
Electronic Materials and Fabricated Products	14
Fisher Controls International Incorporated	14
Oil and Gas	15

<u>Tables</u>	<u>Title</u>	
Table 1	Operating Unit Segment Data	4
Table 2	International Sales	7
Table 3	Location of Polysilicon Plants	12

Monsanto Company

Monsanto Company
800 North Lindebergh Boulevard
St. Louis, Missouri 63167
Telephone: (314) 694-1000
(Millions of Dollars Except Per Share Data)

Balance Sheet (December 31)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
Working Capital	\$1,226	\$1,486	\$1,503	\$1,535	\$1,395
Long-Term Debt	\$1,371	\$1,110	\$1,003	\$ 937	\$ 824
Shareholder's Equity	\$3,109	\$3,184	\$3,313	\$3,284	\$3,634
After-Tax Return on Average Equity (%)	5.00	14.50	10.32	11.23	11.74

Operating Performance (Fiscal Year Ending December 31)

	<u>1980</u>	<u>1981</u>	<u>1982¹</u>	<u>1983²</u>	<u>1984</u>
Revenue	\$6,574	\$6,948	\$6,325	\$6,299	\$6,691
U.S. Revenue	\$4,465	\$4,874	\$4,086	\$4,243	\$4,498
Non-U.S. Revenue	\$2,109	\$2,074	\$2,239	\$2,056	\$2,193
Cost of Revenue	\$5,476	\$5,293	\$4,826	\$4,738	\$4,846
Technological Expenses ³	\$ 270	\$ 297	\$ 329	\$ 359	\$ 446
SG&A Expense	\$ 618	\$ 656	\$ 691	\$ 681	\$ 722
Other Expenses (Income)	\$ (5)	\$ 9	\$ (22)	\$ (49)	\$ (30)
Pretax Income	\$ 206	\$ 693	\$ 501	\$ 570	\$ 707
Pretax Margin (%)	3	10	8	9	11
Effective Tax Rate (%)	28	36	30	29	38
Net Income	\$ 149	\$ 445	\$ 352	\$ 402	\$ 439
Average Shares Outstanding (Millions) ⁴	72	79	81	82	78
Per Share					
Earnings	\$ 2.05	\$ 5.75	\$ 4.39	\$ 4.89	\$ 5.42
Dividends	\$ 1.78	\$ 1.88	\$ 1.98	\$ 2.07	\$ 2.25
Book Value	\$38.82	\$42.18	\$42.99	\$44.83	\$46.43
Price Range	\$35.13- 21.13	\$43.75- 29.75	\$44.50- 28.25	\$58.13- 37.13	\$53.88- 40.63
Total Employees	61,836	57,391	52,199	48,835	50,764

N/A = Not Available

¹Net income includes one extraordinary gain of \$23 million or \$0.29 per share from an exchange of debt for common shares.

²Net income includes extraordinary tax benefits of \$33 million or \$0.41 per share from the utilization of non-U.S. loss carryforwards.

³Technological expenses include research, development, engineering, and patent expense.

⁴Per share amounts and shares outstanding have been restated to reflect a June 1984 two-for-one common stock split.

Source: Monsanto Company
1981, 1983, and 1984
Annual Reports and
Forms 10-K
DATAQUEST

Monsanto Company

(Page intentionally left blank)

Monsanto Company

THE COMPANY

Background

Monsanto Company was incorporated in 1933 under Delaware law and is the successor to a Missouri corporation, Monsanto Chemical Works, organized in 1901. Its sales to the semiconductor industry are primarily through the Monsanto Electronic Materials Company (MEMC), which reports its sales through Monsanto's electronic materials and fabricated products segment. MEMC has been producing silicon wafers since 1959.

Operations

Monsanto is engaged in the worldwide manufacture and sale of a widely diversified line of chemicals, plastics, fibers, and other products. Monsanto chemicals, plastics, and fibers are derived principally from petroleum and natural gas and from other raw materials. Its products are marketed as raw materials and as intermediate and finished products.

Monsanto reports its business under eight industry segments: agricultural products, biological sciences, fibers and intermediates, industrial chemicals, polymer products, electronic materials and fabricated products, Fisher Controls International, Inc., and oil and gas. Operating unit segment data are given in Table 1.

Monsanto's first-quarter 1985 sales as a whole were down from first quarter 1984. Monsanto credits the strong dollar for a large part of this decrease.

Monsanto Company

Table 1

OPERATING UNIT SEGMENT DATA (Millions of Dollars)

	<u>Net Sales</u>		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Agricultural Products	\$1,165	\$1,167	\$1,256
Biological Sciences	146	152	168
Fibers and Intermediates	1,257	1,170	1,194
Industrial Chemicals	810	856	937
Polymer Products	1,786	1,830	1,877
Electronic Materials and Fabricated Products	357	355	519
Fisher Controls	588	528	537
Oil and Gas	216	241	203
Corporate Items and Eliminations	<u>0</u>	<u>0</u>	<u>0</u>
Total Consolidated	\$6,325	\$6,299	\$6,691

	<u>Operating Income (Loss)</u>		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Agricultural Products	\$441	\$400	\$438
Biological Sciences	(35)	(54)	(95)
Fibers and Intermediates	(21)	55	79
Industrial Chemicals	101	88	90
Polymer Products	13	70	152
Electronic Materials and Fabricated Products	(64)	(66)	5
Fisher Controls	52	37	35
Oil and Gas	37	41	27
Corporate Items and Eliminations	<u>(45)</u>	<u>(50)</u>	<u>(54)</u>
Total Consolidated	\$479	\$521	\$677

(Continued)

Monsanto Company

Table 1 (Continued)

OPERATING UNIT SEGMENT DATA (Millions of Dollars)

	<u>Research & Development</u>		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Agricultural Products	\$ 65	\$ 78	\$107
Biological Sciences	33	41	66
Fibers and Intermediates	39	41	45
Industrial Chemicals	18	22	35
Polymer Products	44	40	41
Electronic Materials and Fabricated Products	23	24	25
Fisher Controls	14	10	19
Oil and Gas	0	0	0
Corporate Items and Eliminations	<u>28</u>	<u>34</u>	<u>32</u>
Total Consolidated	\$264	\$290	\$370

	<u>Total Assets</u>		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Agricultural Products	\$1,049	\$1,214	\$1,215
Biological Sciences	141	225	339
Fibers and Intermediates	1,150	1,071	992
Industrial Chemicals	777	810	892
Polymer Products	1,135	1,163	1,179
Electronic Materials and Fabricated Products	433	406	437
Fisher Controls	418	487	515
Oil and Gas	549	543	578
Nonoperating Assets	<u>425</u>	<u>508</u>	<u>226</u>
Total Consolidated	\$6,077	\$6,427	\$6,373

(Continued)

Monsanto Company

Table 1 (Continued)

OPERATING UNIT SEGMENT DATA
(Millions of Dollars)

	<u>Capital Expenditures</u>		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Agricultural Products	\$ 89	\$104	\$ 67
Biological Sciences	42	84	75
Fibers and Intermediates	90	79	83
Industrial Chemicals	162	61	90
Polymer Products	72	64	85
Electronic Materials and Fabricated Products	57	37	74
Fisher Controls	27	27	25
Oil and Gas	130	101	107
Nonoperating Assets	<u>4</u>	<u>3</u>	<u>8</u>
Total Consolidated	\$673	\$560	\$614

Source: Monsanto Company
1984 Annual Report
DATAQUEST

International Operations

Monsanto does business in more than 100 countries and has facilities in 164 countries. During 1984, almost one-third of Monsanto's business was outside of the United States. The Company hopes to increase its overseas business, especially in the Asia-Pacific area. To achieve this goal, Monsanto has a two-part strategy. It plans both to increase its overseas investment and to introduce its products more rapidly overseas, especially in the Far East.

Monsanto announced plans in 1984 for several overseas production facilities. The Company has plans for a new production plant for Roundup brand herbicides in Brazil, and, also in Brazil, it is finalizing a joint venture for producing wet phosphoric acid.

In Japan in 1984, Monsanto dedicated the Kawachi Research Station for agriculture. This facility is in addition to its already existing Japanese joint venture (Mitsubishi Monsanto Chemical).

Also in 1984, MEMC announced plans for silicon production facilities in Japan, Korea, and the United Kingdom.

Monsanto Company

Monsanto reports its international sales by the following geographic areas: Asia-Pacific, Europe-Africa, Canada, and Latin America (see Table 2).

Table 2

INTERNATIONAL SALES (Millions of Dollars)

	Net Sales			Operating Income (Loss)		
	1982	1983	1984	1982	1983	1984
United States	\$4,086	\$4,243	\$4,498	\$441	\$453	\$518
Europe-Africa	1,092	943	968	33	44	93
Canada	244	274	292	29	51	61
Latin America	353	305	360	(9)	11	22
Asia-Pacific	550	534	573	19	27	55
Unallocated Corporate Items				(45)	(50)	(54)
Affiliated Equity (Income) Loss						
Included in Individual World Areas				11	(15)	(18)
Total Consolidated	\$6,325	\$6,299	\$6,691	\$479	\$521	\$677

Source: Monsanto Company
1984 Annual Report
DATAQUEST

In spite of the strong U.S. dollar, 1984 Europe-Africa area sales increased 3 percent over 1983 sales as the European economic environment improved. Operating income more than doubled, benefiting from strong intermediate profits from acrylonitrile and nylon.

Monsanto's 1984 Canadian sales increased 7 percent, and operating income increased \$10 million. Monsanto attributes this to sales of crop chemicals and detergent products, and to increased sales to the automotive industry.

Latin American operating profit doubled to \$22 million in 1984 on a sales increase of 18 percent. Of particular note were agricultural products sales in Brazil and higher profitability from Monsanto's Mexican equity affiliate.

Monsanto Company

Monsanto's Asia-Pacific area sales increased 7 percent, and operating income more than doubled. Monsanto reports that these gains were led by agricultural products sales volume growth.

MEMC International Sales

One of MEMC's long-range goals is to expand its production to meet the growing worldwide demand for silicon wafers. It plans to do this by locating facilities close to its worldwide base of customers, even though it could meet this demand from facilities located anywhere in the world. Easy customer access is an important part of Monsanto's long-range strategy.

MEMC points to a sevenfold increase in silicon wafer sales between 1983 and 1984 in Japan as an illustration of the benefits of being close to its customers. In July 1984, MEMC had only a 1 percent share of the Japanese market. In July 1985, it claimed a 2 percent share. MEMC attributes this in part to its Technical Center in Kasai, Japan (near Tokyo), which has been in operation for two years. MEMC is adding facilities in Japan, the United Kingdom, and South Korea.

As part of MEMC's commitment to become a major silicon supplier to the Japanese market, the company began construction in May 1985 of a silicon wafer manufacturing and research facility in Utsunomiya, Tochigi, Japan. The first phase of the project will involve an investment of \$20 million. The ultimate investment is currently expected to be more than \$100 million. Wafer production is scheduled to begin in mid-1986. The facility will eventually have a total capacity of 100 million square inches per year.

The initial phase of the manufacturing facility is scheduled to be completed in mid-1986 and will employ 100 people. The research center will initially hire a staff of 15.

MEMC has begun construction of a facility in Milton Keynes, United Kingdom, about 60 miles north of London. First-phase completion is planned for early 1986. MEMC hopes that the facility will strengthen its position as the second largest supplier of Czochralski silicon wafers to the IC market in Europe. MEMC estimates that its present share of the European wafer market exceeds 20 percent.

Capacity at start-up of the Milton Keynes facility is expected to be 20 million square inches per year and is planned to reach as high as 60 million square inches after four years of operation. Total cost of the facility is expected to be in excess of \$50 million.

Monsanto Company

MEMC is the largest (it claims well over 50 percent) supplier of silicon wafer products in South Korea. It is presently building a manufacturing facility in the Gumi Industrial Estate, about 150 miles south of Seoul in an area designated by the government of South Korea to be the future center of its semiconductor industry. It is building this facility through a joint venture with Dongbu.

MEMC and Dongbu are reportedly each investing \$20 million in this facility. The new company is Korea Silicon Company, Ltd., called Korsil. The Korsil facility is scheduled to go on-line in early 1986. Capacity at start-up will be 20 million square inches per year and is expected to reach 40 million square inches after 5 years.

Marketing

Monsanto sells its products directly to various industries, to distributors and jobbers, and to the ultimate consumer, principally through its own sales force, except for Fisher Controls, which primarily uses independent sales representatives.

MEMC markets its products through a direct sales force from offices in eight countries.

Research and Development

Companywide, Monsanto has dedicated approximately 6 percent of sales, or \$370 million in 1984, to R&D. One of its chief goals is to discover engineering and process improvements that will improve quality and reduce costs. It is working on developing new catalysts for chemical operations and in finding new uses for electrochemistry.

In 1984, Monsanto dedicated its new Life Science Research Center, near St. Louis, Missouri. It is the single largest research investment in Monsanto's history, and it underscores the Company's commitment to biological research.

Monsanto reports that research is on schedule for methionyl bovine somatotropin, a genetically engineered analog of a natural protein that is intended to increase efficiency and reduce costs in milk production.

Among many research and development projects in its traditional business, Monsanto is working on developing advanced polymers and polymeric films using chemistry, electron beams, and ultraviolet light.

Monsanto Company

MEMC has more than 200 professionals involved in R&D on silicon wafers. MEMC reports that its \$20 million 1984 R&D budget was the largest of any silicon supplier. MEMC has averaged \$20 million a year for silicon wafer R&D for the last several years. It plans to spend that amount in 1985.

MEMC also has a joint MEMC/customer audit team. This team is structured so that it can sample, identify, and help implement silicon-related improvements to the customer's fab lines.

Employees

As of December 31, 1984, Monsanto had 50,764 employees worldwide. The Company reports that relations with its employees are satisfactory. MEMC had 1,750 employees worldwide and reportedly has excellent employee relations.

Litigation

Monsanto is a party to numerous legal proceedings. Monsanto does not believe that these proceedings or their ultimate dispositions will have a materially adverse effect on the Company's financial position.

Monsanto is one of several defendants in a number of lawsuits arising out of the use by the U.S. government of an herbicide known as Agent Orange during the Vietnam War.

Monsanto has been joined as a defendant in a number of lawsuits arising out of a tank car derailment that occurred on January 10, 1979, in Sturgeon, Missouri.

Monsanto has been involved in litigation with Stauffer Chemical Company concerning Monsanto's patents covering the herbicidal use of glyphosate and salts thereof and glyphosate salts as compounds per se.

Since January 9, 1985, the Company's Lasso herbicide has been under Special Review by the EPA. This special examination of the risks and benefits of the herbicide's use could take a year or more.

Suit has also been filed against Monsanto by several former and present employees, claiming that the Company willfully and intentionally exposed the employees to harmful chemical substances.

Monsanto Company

OPERATING GROUPS OR DIVISIONS

Monsanto Electronic Materials Company

Monsanto has identified silicon as one of its major growth opportunities for the years ahead.

MEMC has a goal of zero defects and has invested significantly in plant automation to achieve this, particularly in wafer-polishing facilities. MEMC claims that it is already the most automated wafer manufacturer in the world.

MEMC has invested more than a quarter of a billion dollars over the past five years in fabrication plants and equipment. A new world-class plant at Spartanburg, South Carolina, and major expansions at St. Peters, Missouri, and Kuala Lumpur, Malaysia, bring Monsanto's total machine capacity to 330 million square inches per year, which is a 400 percent increase since 1978 (see Table 3). MEMC plans to add to this capacity with new plants in Europe, Japan, and Korea by 1986.

MEMC provides a controlled inventory for its customers. After joint QC sampling to specifications, Monsanto stocks the wafers at its service facilities and at its own expense to provide its customers with a just-in-time shipment.

MEMC does not report its sales separately from Monsanto. Company sources do report that 1984 was an exceptional year for MEMC, and that the first quarter of 1985 was higher than the first quarter of 1984. DATAQUEST has learned, however, that coincident with the rest of the semiconductor industry, MEMC's sales since the first quarter are down.

MEMC has three different wafer application series, one for ULSI, one for VLSI, and one for LSI/MSI. Each member of this series, or family, has three options: polished, enhanced gettering/backside gettering, or epitaxial wafers with enhanced gettering.

In May 1985, MEMC introduced the first in its series of 6-inch wafers for ULSI. The Company claims that the wafer meets the highest cleanliness standards and that it is flatter than any other 6-inch wafer produced.

MEMC's wafers are circuit-focused. The Company is able to design its wafer products to meet the needs of specific device integration levels by engineering wafers with distinct, functional zones. Wafer characteristics are engineered to individual circuit requirements through the design of each of these zones.

Monsanto Company

Table 3

LOCATION OF POLYSILICON PLANTS (Capacity in Millions of Square Inches)

EXISTING CAPACITY

<u>Location</u>	<u>Capacity</u>
Spartanburg, South Carolina	N/A
St. Peters, Missouri	N/A
Kuala Lumpur, Malaysia	<u>N/A</u>
Subtotal, Existing Capacity	330

EXPANSION CAPACITY

<u>Location</u>	<u>Capacity</u>
Gumi Industrial Estate, Korea	40
Utsunomiya, Tochigi, Japan	100
Milton Keynes, United Kingdom	<u>60</u>
Subtotal, Expansion Capacity	200
Total	530

N/A = Not Available

Source: DATAQUEST

Agricultural Products

Monsanto reports that herbicide sales, this segment's profit mainstay, rebounded in 1984. Sales of Roundup herbicide increased 6 percent, for example, and sales of Rodeo herbicide, approved by the EPA for use in aquatic sites, increased 40 percent.

The Company expects more Rodeo sales growth in 1985. Monsanto plans to enter a new market in 1985 with the introduction of Limit turf regulator. Limit would restrict the rate of growth of grasses grown in the northern United States and will be available for nonresidential uses.

Monsanto Company

Biological Sciences

Monsanto claims that during 1984, it became a leading supplier of synthetic methionine supplementation to the U.S. poultry industry with its Alimet liquid feed supplement. However, prices for Alimet were adversely affected by lower-cost imports into the United States from Western Europe.

Put together from two acquisitions, HybriTech Seed International, Inc., a Monsanto subsidiary, is focusing on the hybrid wheat and soybean seed markets. During 1984, HybriTech introduced four proprietary hybrid hard red winter wheats under the Quantum trademark and four new proprietary lines of soybean seeds. HybriTech has announced that it will form a joint venture with The Cooperative de Pau, a leading French agricultural cooperative, to develop and market new wheat and barley seeds for the Western European market.

Monsanto's plan for the future is to integrate traditional seed breeding techniques with new biotechnology methods to develop seeds with greater yields and special traits, or with resistance to insects, disease, and other environmental factors.

Monsanto also has plans to expand in the pharmaceutical industry through a combination of internal development programs, acquisitions, and joint ventures. In 1984, as part of this strategy, Monsanto acquired Continental Pharma, S.A., a Belgian pharmaceutical company.

Fibers and Intermediates

The fibers and intermediates segment experienced strong sales during 1984. Monsanto claims that, worldwide, mills introduced more carpets made from Monsanto nylon staple products in 1984 than from those of any other fiber manufacturer. The Company's apparel fiber businesses did not do as well, however. Monsanto attributes this primarily to competition from imports. Monsanto is responding to this challenge by developing high-value acrylic products with special properties and cost advantages. Cost-reduction programs have also been instituted, and the Company reports that they have begun to bear fruit in increased earnings from the sales of both fibers and intermediates.

Industrial Chemicals

Sales of industrial chemicals increased across most product lines during 1984, but earnings were affected by soft prices toward year-end, imports, and the strong U.S. dollar. Monsanto is planning for future growth through a combination of new capacity, process improvement,

Monsanto Company

international investment, and new product development. Research and development spending has increased approximately 100 percent in the past two years.

Polymer Products

Sales in the automotive, construction, and home appliance industries led the polymer products businesses to what Monsanto claims was an outstanding year in 1984. New products in electronics, telecommunications, and custom molding added to this segment's sales growth in 1984.

Electronic Materials and Fabricated Products

Electronic materials were covered above under Monsanto Electronic Materials Company.

Prism separators, a Monsanto technology that uses hollow fibers to recover valuable gases, nearly doubled in sales in 1984. Sales of systems using Prism are opening up outside the United States, including in the People's Republic of China, the Soviet Union, Korea, Japan, and Norway.

Monsanto tested plastic bottles capable of holding hot liquids in 1984. The Company is now studying potential markets for Cycle-Safe, its soft drink bottle that received U.S. government regulatory clearance in 1984. Also in 1984, Monsanto introduced Cloud Nine, an energy-saving greenhouse film that cuts heating costs 20 percent.

Fisher Controls International, Inc.

Fisher is a worldwide leader in the development of control valves, measurement instrumentation, and process controls. Sales in all product categories improved for all geographic areas except for Europe, where capital spending has remained depressed.

Fisher acquired Posi-Seal International, Inc., early this year. Posi-Seal manufactures high-performance rotary valves.

Fisher opened a new electronic instrumentation research facility in Austin, Texas, in 1984. With this facility, it plans to accelerate the development of measurement instrumentation and process control systems. To further strengthen its measurement instrumentation product development, Fisher purchased quartz technology rights from Novex and Techlogics Associates in 1984.

Monsanto Company

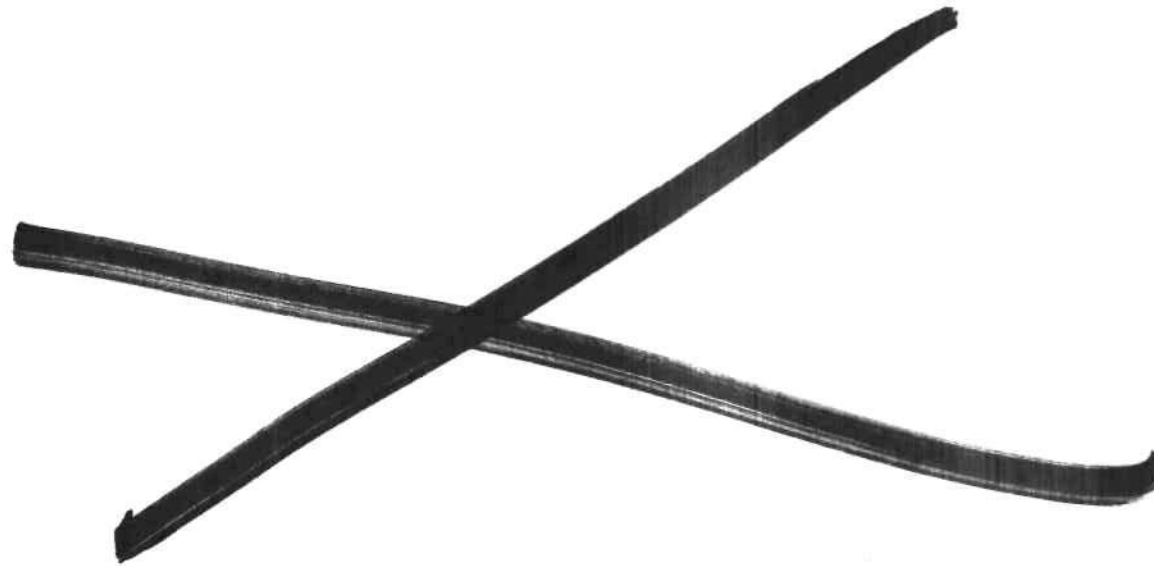
Fisher also announced in 1984 plans to accelerate the growth of PROVox instrumentation and has set a goal of tripling the size of this business during the next four years. It will invest more than \$100 million in R&D and fixed capital to achieve this goal.

Oil and Gas

Monsanto Oil Company was able to meet its income goals for 1984 by offsetting its declining sales with lower exploration expenses. The Company's strategy balances cash flow from current production in Canada, the Gulf of Mexico, and 14 states in the United States with expenditures for new exploration and development opportunities.

Monsanto Company

(Page intentionally left blank)



Monolithic Memories, Inc.

Monolithic Memories, Inc.
2175 Mission College Blvd.
Santa Clara, California 95050
Telephone: (408) 970-9700
(Millions of Dollars Except Per Share Data)

Balance Sheet (October 2)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Working Capital	\$29.07	\$19.99	\$ 82.04	\$ 80.37	\$ 65.64	\$117.96
Long-Term Debt	\$ 3.52	\$ 2.34	\$ 1.29	\$ 0.41	\$ 2.32	\$ 1.17
Shareholders' Equity	\$50.29	\$53.83	\$124.35	\$156.15	\$169.63	\$ 224.7
After-Tax Return on Average Equity (%)	15.41	5.38	11.39	19.18	6.42	4.52

Operating Performance (Fiscal Year Ending October 2)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Revenue	\$76.31	\$68.60	\$105.39	\$187.29	\$177.69	\$204.88
U.S. Revenue	\$50.36	\$50.94	\$ 81.21	\$148.80	\$133.37	\$149.16
Non-U.S. Revenue	\$25.95	\$17.66	\$ 24.18	\$ 38.49	\$ 44.32	\$ 55.72
Cost of Revenue	\$47.48	\$46.66	\$ 60.20	\$ 91.28	\$107.48	\$120.63
R&D Expense	\$ 5.89	\$ 9.83	\$ 13.73	\$ 19.78	\$ 24.45	\$ 35.24
Marketing Expense	\$ 8.70	\$10.18	\$ 14.78	\$ 24.48	\$ 24.16	\$ 29.73
G&A Expense	\$ 5.97	\$ 4.97	\$ 8.19	\$ 17.63	\$ 15.32	\$ 15.96
Pretax Income	\$11.24	\$ 0.80	\$ 11.35	\$ 41.07	\$ 12.08	\$ 8.91
Pretax Margin (%)	14.7	1.2	10.8	21.9	6.8	4.3
Effective Tax Rate (%)	38.0	N/A	10.6	34.5	13.4	N/A
Net Income	\$ 6.97	\$ 2.80	\$ 10.15	\$ 26.90	\$ 10.46	\$ 8.91
Average Shares Outstanding (Millions)	10.72	13.05	13.49	16.83	18.98	20.74
Per Share						
Earnings	\$ 0.53	\$ 0.21	\$ 0.60	\$ 1.42	\$ 0.55	\$ 0.43
Dividends	0	0	0	0	0	0
Book Value	\$ 3.85	\$ 3.99	\$ 7.39	\$ 8.23	\$ 8.99	\$ 10.83
Price Range	\$ 5.13- 16.13	\$ 4.88- 8.00	\$ 6.38- 31.13	\$ 13.00- 29.75	\$ 10.38- 18.38	\$ 10.38- 22.38
Total Employees	2,241	2,700	3,000	3,800	3,700	4,000
Capital Expenditures*	\$16.86	\$27.52	\$ 15.60	\$ 52.52	\$ 53.09	\$ 39.01

N/A = Not Available

*Includes additions to equipment under capital leases

Source: Monolithic Memories, Inc.,
Annual Report and Forms 10-K
Dataquest
May 1987

Monolithic Memories, Inc.

Table 1

Monolithic Memories, Inc.
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

	<u>Fiscal Year Ending October 2</u>					
	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
PROMs*	\$45	\$31	\$ 26	\$ 41	\$ 32	\$ 33
PAL ^R	10	20	60	118	118	140
FIFOs	7	8	12	21	23	28
Interface	8	4	4	4	3	2
Arithmetic Elements	1	2	1	1	1	1
Other**	<u>5</u>	<u>4</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>1</u>
Total	\$76	\$69	\$105	\$187	\$178	\$205

*Includes bipolar PROMs and read-only memories

**Includes various memory and logic circuits and subcontract assembly services

Source: Monolithic Memories, Inc.,
Forms 10-K
Dataquest
May 1987

Monolithic Memories, Inc.

Table 2

Monolithic Memories, Inc. FINANCIAL STATEMENT HISTORY 1979-1986 (Millions of Dollars)

	Fiscal Year Ending October 2									
	1979	1980	1981	1982	1983	1984	1985	1986	CAGR	LSOR
BALANCE SHEET										
1 CASH & LIQUID SECURITIES	3.55	65.70	46.76	11.93	134.76	143.90	51.13	106.40	62.55	40.14
2 NEAR CASH	0.00	0.00	0.00	0.00	0.00	0.00	24.17	0.00	0.00	0.00
3 RECEIVABLES	14.34	26.80	18.59	21.34	43.42	57.40	0.00	30.49	11.38	0.00
4 INVENTORY	9.22	16.02	22.57	31.00	32.25	46.43	19.94	23.98	14.63	12.63
5 PREPAID EXPENSES	0.40	4.04	4.74	14.48	1.92	2.25	9.17	9.14	56.25	29.49
6 PREPAID INC TX/TX CREDITS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	27.51	112.55	92.66	78.75	212.35	249.99	104.40	170.01	29.72	21.48
9 GROSS P P E	14.38	20.84	75.31	128.92	158.64	261.66	182.17	287.68	46.44	48.96
10 ACCUMULATED DEPRECIATION	6.46	8.98	25.87	37.32	53.17	77.85	58.52	80.83	43.46	44.14
11 NET P P E	7.92	11.86	49.43	91.60	105.47	183.80	123.65	126.85	48.62	52.09
12 MISC ASSETS	0.26	0.32	1.56	1.82	1.93	1.72	0.96	5.34	54.33	38.10
13 ACCTS RECBL > ONE YR	16.31	13.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 INVESTMENTS	0.00	0.00	8.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 *TOTAL ASSETS*	51.99	138.66	151.93	172.17	319.75	435.51	229.01	302.20	28.59	24.80
16 DEFERRED INC DISTRIB	2.30	1.90	9.32	7.74	6.58	15.13	8.40	7.66	18.77	22.67
17 ACCOUNTS PAYABLE	3.91	11.26	7.59	14.10	16.49	26.19	5.92	15.15	21.36	12.83
18 ACCRUED TAXES	0.00	11.90	1.29	0.13	0.00	4.55	0.00	0.00	0.00	0.00
19 ACCRUED LIABILITIES	3.71	9.53	9.31	10.43	21.12	40.98	22.67	27.68	33.26	32.37
20 CURR MAT LONG TERM DEBT	2.47	1.13	2.28	2.24	2.01	0.98	1.11	0.40	(22.95)	(16.87)
21 OTHER CURRENT LIABILITIES	3.95	4.66	4.73	4.11	2.06	1.41	0.66	1.16	(16.04)	(23.66)
22 TOTAL CURRENT LIABILITIES	16.33	40.38	34.52	38.77	48.27	69.24	38.76	52.05	18.01	13.96
23 LONG TERM DEBT	9.74	3.31	7.03	4.68	2.58	0.82	2.32	1.17	(26.09)	(24.52)
24 DEFERRED CREDITS	0.57	5.23	5.08	9.62	10.83	25.18	14.98	18.48	64.20	50.75
25 MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.06	0.00	0.00
26 MINORITY INTEREST	11.96	9.39	4.73	11.45	9.38	7.97	3.33	5.76	(9.92)	(10.10)
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	38.61	58.32	51.35	64.51	71.05	123.21	59.38	78.52	10.67	9.71
29 PREFERRED STOCK	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30 COMMON STOCK	0.26	0.49	0.51	0.52	0.71	0.73	0.37	0.00	0.00	0.00
31 CAPITAL SURPLUS	10.30	60.11	65.17	66.64	187.18	196.96	181.50	0.43	(36.49)	(16.63)
32 RETAINED EARNINGS	1.85	28.96	34.89	40.50	60.80	114.60	67.76	146.59	86.79	61.87
33 CUM TRANSL ADJ	0.95	(1.21)	0.00	0.00	0.00	0.00	0.00	76.66	87.30	0.00
34 TOTAL EQUITY	13.39	80.34	100.57	107.65	248.70	312.30	169.63	223.68	49.52	39.04
35 *TOTAL LIAB & EQUITY*	52.00	138.66	151.93	172.17	319.75	435.51	229.01	302.20	28.58	24.80
36 NET WORKING CAPITAL	11.17	72.17	58.14	39.98	164.00	160.74	65.64	117.96	40.03	27.62
INCOME & EXPENSES										
38 SALES	73.55	154.07	152.62	137.20	210.78	374.59	177.96	204.88	15.76	14.01
40 COST OF GOODS	52.21	78.90	79.00	72.81	98.15	142.85	80.83	86.26	7.44	7.04
41 GROSS PROFITS	21.34	75.17	73.62	64.38	112.63	231.74	97.13	118.62	27.77	22.85
42 S G & A EXPENSE	14.87	27.29	29.34	30.30	45.93	84.22	39.47	45.70	17.40	17.13
43 R&D EXPENSE	4.21	8.00	11.78	19.66	27.47	39.55	24.45	35.24	35.47	33.75
45 OPERATING PROFIT	2.26	39.87	32.50	14.43	39.24	107.97	33.20	37.68	49.46	32.09
46 DEPRECIATION	4.81	7.25	10.03	12.83	16.53	25.82	21.12	28.77	29.10	28.33
47 LEASE PAYMENTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48 INTEREST EXPENSE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49 MISC EXPENSE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50 OTHER NON-OP EXPENSES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51 DISCONT OPNS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
53 PRETAX PROFIT	(2.55)	32.62	22.48	1.60	22.71	82.15	12.08	8.90	0.00	0.00
54 INCOME TAXES	(0.76)	13.37	8.54	(4.00)	2.40	28.35	1.62	0.00	0.00	0.00
55 LOSS (GAIN) DISC OPNS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
56 NET PROFIT	(1.80)	19.25	13.94	5.60	28.31	53.80	10.46	8.90	0.00	0.00
57 EPS AFTER PFD DIVIDENDS	(0.14)	0.90	0.53	0.21	0.60	1.42	0.55	0.43	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: Dataquest
May 1987

Monolithic Memories, Inc.

Table 3

Monolithic Memories, Inc. FINANCIAL STATEMENT HISTORY 1979-1986 (Percent)

	Fiscal Year Ending October 2									
	1979	1980	1981	1982	1983	1984	1985	1986	CAGR	LSQR
BALANCE SHEET										
1 CASH & LIQUID SECURITIES	6.82	47.38	30.78	6.93	42.15	33.04	22.33	35.21	26.42	12.38
2 NEAR CASH	0.00	0.00	0.00	0.00	0.00	0.00	10.55	0.00	0.00	0.00
3 RECEIVABLES	27.58	19.33	12.24	12.39	13.58	13.18	0.00	10.09	(13.38)	0.00
4 INVENTORY	17.73	11.56	14.85	18.01	10.09	10.66	8.70	7.93	(10.85)	(9.75)
5 OTHER CURRENT ASSETS	0.77	2.91	3.12	8.41	0.60	0.52	4.00	3.02	21.51	3.76
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	52.91	81.17	60.99	45.74	66.41	57.40	45.59	56.26	0.88	(2.66)
9 GROSS P P E	27.66	15.03	49.57	74.88	49.82	60.08	79.55	68.72	13.88	19.36
10 ACCUMULATED DEPRECIATION	12.43	6.48	17.03	21.66	16.63	17.88	25.55	26.75	11.57	15.50
11 NET P P E	15.23	8.55	32.54	53.20	32.99	42.20	53.99	41.98	15.58	21.87
12 MISC ASSETS	0.49	0.23	1.03	1.06	0.60	0.40	0.42	1.77	20.02	10.66
13 GOODWILL	31.37	10.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 INVESTMENTS	0.00	0.00	5.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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 PAYBLE & CURR LTD	4.42	1.37	6.13	4.58	2.06	3.48	3.67	2.54	(7.63)	(1.70)
17 ACCOUNTS PAYABLE	7.52	8.12	5.00	8.19	5.16	6.01	2.58	5.01	(5.62)	(9.59)
18 ACCRUED TAXES	0.00	8.58	0.85	0.00	0.00	1.05	0.00	0.00	0.00	0.00
19 ACCRUED LIABILITIES	7.13	6.88	6.13	6.06	6.61	9.41	9.90	9.16	3.64	6.07
20 CURR OBL CAP LEASE	4.75	0.82	1.50	1.30	0.63	0.22	0.49	0.13	(40.08)	(33.39)
21 OTHER CURRENT LIABILITIES	7.60	3.36	3.11	2.39	0.64	0.32	0.29	0.38	(34.71)	(30.83)
22 TOTAL CURRENT LIABILITIES	31.42	29.12	22.72	22.52	15.10	20.49	16.92	17.22	(8.23)	(8.68)
23 LTD & NONCURR CAP LSES	18.73	2.39	4.63	2.72	0.81	0.19	1.01	0.39	(42.52)	(39.52)
24 DEFERRED TAXES	1.10	3.77	3.34	5.59	3.39	5.78	6.54	6.11	27.70	20.86
25 MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00
26 MINORITY INTEREST	23.01	6.77	3.11	6.65	2.93	1.83	1.45	1.90	(29.95)	(27.97)
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	74.26	42.06	33.80	37.47	22.22	28.29	25.93	25.90	(13.93)	(12.09)
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	0.50	0.35	0.33	0.30	0.22	0.17	0.16	0.00	0.00	0.00
31 CAPITAL SURPLUS	19.80	43.35	42.90	38.71	58.54	45.23	44.32	0.14	(50.61)	(33.19)
32 RETAINED EARNINGS	3.55	15.11	22.97	23.52	19.02	26.31	29.59	48.51	45.26	29.71
33 TREASURY STOCK	1.82	(0.87)	0.00	0.00	0.00	0.00	0.00	25.37	45.66	0.00
34 TOTAL EQUITY	25.75	57.94	66.20	62.53	77.78	71.71	74.07	74.02	16.28	11.41
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	21.49	52.05	38.27	23.22	51.32	36.91	28.66	39.03	8.90	2.26
INCOME & EXPENSES										
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	70.98	51.21	51.76	53.07	46.56	38.13	45.42	42.10	(7.19)	(6.12)
41 GROSS PROFITS	29.02	48.79	48.24	46.93	53.44	61.87	54.58	57.90	10.37	7.75
42 S G & A EXPENSE	20.22	17.72	19.22	22.06	21.79	22.48	22.18	22.31	1.41	2.74
43 R&D EXPENSE	5.72	5.19	7.72	14.33	13.03	10.56	13.74	17.20	17.03	17.32
45 OPERATING PROFIT	3.08	25.80	21.30	10.52	18.62	28.82	18.66	18.39	29.11	15.85
46 DEPRECIATION	6.55	4.71	6.57	9.35	7.84	6.89	11.87	14.04	11.52	12.56
47 LEASE PAYMENTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48 INTEREST EXPENSE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49 MISC EXPENSE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
53 PRETAX PROFIT	(3.47)	21.17	14.73	1.17	10.77	21.93	6.79	4.35	0.00	0.00
54 INCOME TAXES	(1.03)	8.68	5.60	(2.92)	1.14	7.57	0.91	0.00	0.00	0.00
56 NET PROFIT	(2.44)	12.49	9.13	4.08	9.63	14.36	5.88	4.35	0.00	0.00
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	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	(0.00)

Source: Dataquest
May 1987

Monolithic Memories, Inc.

Table 4

Monolithic Memories, Inc. FUNDS FLOW HISTORY 1979-1986 (Millions of Dollars)

		Fiscal Year Ending October 2									
		1979	1980	1981	1982	1983	1984	1985	1986	CAGR	LSQR
SOURCES											
56	NET PROFIT	(1.80)	19.25	13.94	5.60	20.31	53.80	10.46	8.90	0.00	0.00
46	DEPRECIATION	4.81	7.25	10.03	12.83	16.53	25.82	21.12	28.77	29.10	28.33
61	NEW LONG TERM DEBT	11.45	0.00	6.00	0.00	0.00	0.00	2.61	0.00	0.00	0.00
62	NEW EQUITY	0.03	47.71	6.29	1.48	120.74	9.88	(153.12)	45.15	184.40	0.00
63	INCR OTHER LIABILITIES	4.87	2.09	(4.82)	11.26	(0.86)	12.94	(14.84)	6.98	5.29	0.00
66	TOTAL SOURCES	19.36	76.30	31.44	31.17	156.71	102.36	(133.78)	89.81	24.51	0.00
USES											
67	P P E EXPENDITURES	6.61	11.19	47.61	55.00	30.40	104.15	(39.03)	31.97	25.25	0.00
68	REPAYMENT LONG TERM DEBT	0.43	7.76	1.13	2.39	2.33	2.79	0.98	1.86	23.43	3.18
69	PREFERRED DIVIDENDS	0.00	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	0.00
71	INCR OTHER ASSETS	8.73	(2.31)	(4.42)	(8.01)	0.11	(0.20)	(0.76)	4.38	(9.40)	0.00
72	INCR WORKING CAPITAL	3.59	59.66	(12.88)	(18.21)	123.87	(4.37)	(94.96)	51.60	46.33	0.00
74	TOTAL USES	19.36	76.30	31.44	31.17	156.71	102.36	(133.78)	89.81	24.51	0.00
75	EXCESS/DEFICIT	0.00	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	0.00

Source: Dataquest
May 1987

Monolithic Memories, Inc.

Table 5

Monolithic Memories, Inc. FINANCIAL RATIO HISTORY 1979-1986

	Fiscal Year Ending October 2								ST AVG	WT AVG
	1979	1980	1981	1982	1983	1984	1985	1986		
LIQUIDITY										
1 CURRENT RATIO	1.684	2.787	2.684	2.031	4.399	2.801	2.694	3.266	2.793	2.979
2 QUICK RATIO	1.095	2.290	1.893	0.858	3.691	2.256	1.943	2.630	2.082	2.262
3 CASH RATIO	0.217	1.627	1.355	0.308	2.792	1.613	1.319	2.044	1.409	1.611
4 WORKING CAPITAL/SALES	0.152	0.468	0.381	0.291	0.778	0.429	0.369	0.576	0.431	0.474
6 DAYS RECEIVABLES	71.162	63.408	44.464	56.768	75.185	55.935	0.000	54.322	52.665	47.353
7 DAYS INVENTORY	64.443	74.131	104.258	155.420	119.926	118.641	90.016	101.457	103.537	108.345
LEVERAGE										
8 LONG TERM DEBT/CAPITALIZ	0.421	0.040	0.065	0.042	0.010	0.003	0.013	0.005	0.075	0.030
11 LONG TERM DEBT/EQUITY	0.728	0.041	0.070	0.043	0.010	0.003	0.014	0.005	0.114	0.039
12 TOTAL DEBT/EQUITY	1.084	0.079	0.185	0.136	0.045	0.054	0.070	0.041	0.212	0.103
COVERAGE										
13 EBIT/INTEREST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14 FIXED CHARGE COVERAGE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16 REPAY LTD+FIX CHARGE COV	(5.991)	4.201	19.855	0.670	9.738	29.423	12.374	4.790	9.383	11.523
OPER PERFORMANCE										
17 GROSS PROFIT/SALES	0.290	0.488	0.482	0.469	0.534	0.619	0.546	0.579	0.501	0.540
18 OPER PROFIT/SALES	0.031	0.259	0.213	0.105	0.186	0.288	0.187	0.184	0.182	0.195
21 PRETAX PROFIT/SALES	(0.035)	0.212	0.147	0.012	0.100	0.219	0.068	0.043	0.097	0.099
22 NET PROFIT/SALES	(0.024)	0.125	0.091	0.041	0.096	0.144	0.059	0.043	0.072	0.077
23 NET PROFIT/AVG EQUITY	(0.126)	0.411	0.154	0.054	0.114	0.192	0.043	0.045	0.111	0.104
24 NET PROFIT/AVG CAPITALIZ	(0.092)	0.360	0.146	0.051	0.112	0.191	0.043	0.045	0.107	0.101
26 NET PROFIT/AVG TOT ASSETS	(0.042)	0.202	0.096	0.035	0.083	0.142	0.031	0.034	0.073	0.071
27 E P S GROWTH RATE	(2.061)	(7.510)	(0.405)	(0.611)	1.905	1.349	(0.609)	(1.000)	(1.118)	(0.427)
28 SALES GROWTH RATE	0.133	1.095	(0.009)	(0.101)	0.536	0.777	(0.525)	0.151	0.257	0.188
TURNOVER										
31 SALES/AVG EQUITY	5.155	3.288	1.687	1.318	1.183	1.335	0.739	1.042	1.968	1.375
32 SALES/AVG CAPITALIZ	3.768	2.886	1.596	1.248	1.159	1.327	0.734	1.033	1.719	1.291
33 SALES/AVG TOT DEBT + EQTY	3.239	2.609	1.483	1.136	1.103	1.272	0.697	0.989	1.576	1.210
34 SALES/AVG TOTAL ASSETS	1.708	1.616	1.050	0.847	0.857	0.992	0.536	0.771	1.047	0.879
35 SALES/AVG OPER ASSETS	2.383	1.928	1.145	0.878	0.864	0.997	0.538	0.781	1.189	0.930
36 SALES/AVG GROSS P P E	5.894	8.748	3.175	1.344	1.466	1.782	0.802	1.051	3.033	1.954
BALANCE SHEET										
37 CASH/SALES	0.048	0.426	0.306	0.087	0.639	0.384	0.287	0.519	0.337	0.384
38 RECEIVABLES/SALES	0.195	0.174	0.122	0.156	0.206	0.153	0.000	0.149	0.144	0.130
41 INVENTORY/SALES	0.125	0.104	0.148	0.226	0.153	0.124	0.112	0.117	0.139	0.136
42 OTH CURR ASSETS/SALES	0.005	0.026	0.031	0.106	0.009	0.006	0.052	0.045	0.035	0.038
44 GROSS P P E/SALES	0.196	0.135	0.493	0.940	0.753	0.699	1.024	1.014	0.657	0.804
45 LINE 13/SALES	0.222	0.090	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.011
46 MISC ASSETS/SALES	0.003	0.002	0.010	0.013	0.009	0.005	0.005	0.026	0.009	0.011
47 ACCOUNTS PAYABLE/SALES	0.053	0.073	0.050	0.103	0.070	0.070	0.033	0.074	0.067	0.067
48 ACCRUED TAXES/SALES	0.000	0.077	0.000	0.001	0.000	0.012	0.000	0.000	0.012	0.007
51 ACCRUED LIABILITY/SALES	0.050	0.062	0.061	0.076	0.100	0.109	0.127	0.135	0.090	0.105
53 DEFERRED TAXES/SALES	0.008	0.034	0.033	0.070	0.051	0.067	0.064	0.090	0.055	0.067
54 MISC LIABILITIES/SALES	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.001	0.001
56 LINE 26/SALES	0.163	0.061	0.031	0.083	0.044	0.021	0.019	0.028	0.056	0.039
MISCELLANEOUS										
57 EQUITY PER COMMON SHARE	1.025	3.747	3.855	3.991	7.390	8.228	8.994	0.000	4.654	5.148
58 RETIRE/PREV GROSS P P E	(0.265)	(0.329)	0.329	(0.018)	(0.005)	(0.007)	(0.155)	(0.035)	(0.061)	(0.040)
61 DEPREC/PREV GROSS P P E	0.455	0.504	0.481	0.170	0.128	0.163	0.081	0.158	0.268	0.195
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	0.296	0.410	0.300	(2.497)	0.106	0.345	0.134	0.000	(0.103)	(0.116)
64 COST OF GOODS/SALES	0.710	0.512	0.518	0.531	0.486	0.381	0.454	0.421	0.499	0.460

Source: Dataquest
May 1987

Monolithic Memories, Inc.

Monolithic Memories, Inc.
1165 E. Arques Ave.
Sunnyvale, California 94086
Telephone: (408) 739-3535
(Millions of Dollars Except Per Share Data)

Balance Sheet (September 28)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Working Capital	\$ 4.81	\$ 5.59	\$36.09	\$29.07	\$19.99
Long-Term Debt	\$ 0.38	\$ 4.87	\$ 1.66	\$ 3.52	\$ 2.34
Shareholders' Equity	\$ 7.58	\$ 6.69	\$40.17	\$50.29	\$53.83
After-Tax Return on Average Equity (%)	14.53	(12.58)	41.49	15.41	5.38

Operating Performance (Fiscal Year Ending September 28)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Revenue	\$32.84	\$37.00	\$77.90	\$76.31	\$68.60
U.S. Revenue	\$22.99	\$25.16	\$49.86	\$50.22	\$45.28
Non-U.S. Revenue	\$ 9.85	\$11.84	\$28.04	\$26.09	\$23.32
Cost of Revenue	\$19.83	\$27.43	\$42.53	\$47.48	\$46.66
R&D Expense	\$ 4.48	\$ 2.10	\$ 4.00	\$ 5.89	\$ 9.83
Marketing Expense	\$ 4.98	\$ 4.87	\$ 7.51	\$ 8.70	\$10.18
G&A Expense	\$ 1.80	\$ 2.56	\$ 6.13	\$ 5.97	\$ 4.97
Pretax Income	\$ 1.51	\$(1.28)	\$16.31	\$11.24	\$ 0.80
Pretax Margin (%)	4.6	(3.4)	20.9	14.7	1.2
Effective Tax Rate (%)	32.1	N/A	41.0	38.0	N/A
Net Income	\$ 1.02	\$(0.90)	\$ 9.62	\$ 6.97	\$ 2.80
Average Shares Outstanding (Millions)	3.94	3.26	5.17	6.52	6.74
Per Share Data					
Earnings	\$ 0.26	\$(0.30)	\$ 1.80	\$ 1.07	\$ 0.42
Dividends	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Book Value	\$ 1.92	\$ 2.05	\$ 7.49	\$ 7.71	\$ 7.99
Price Range	N/A	N/A	\$21.00-	\$10.25-	9.75-
	N/A	N/A	28.50	32.25	16.00
Total Employees	1,627	N/A	2,578	2,241	2,700
Capital Expenditures*	\$ 4.50	\$ 7.68	\$ 4.82	\$16.86	\$27.52

*Includes additions to equipment under capital leases
N/A = Not Applicable

Source: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST

Monolithic Memories, Inc.

Table 1A

Monolithic Memories, Inc.
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

	Fiscal Year Ending September 30				
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
PROMs*	\$27.02	\$24.71	\$47.26	\$45.0	\$34.0
PAL™	.01	1.77	6.34	10.0	20.0
FIFOs	1.95	2.16	7.33	6.6	5.0
Interface	0.68	4.30	10.98	8.5	4.5
Arithmetic Elements	0.27	0.71	1.45	1.5	1.6
Other**	<u>2.52</u>	<u>3.12</u>	<u>3.67</u>	<u>4.7</u>	<u>3.5</u>
Total	\$32.45	\$36.77	\$77.03	\$76.3	\$68.6

Table 1B

Monolithic Memories, Inc.
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

	Calendar Years				
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
PROMs*	\$27.0	\$30.0	\$55.0	\$40.0	\$31.0
PAL™	0.5	2.5	8.0	12.0	22.0
FIFOs	2.0	3.0	8.5	5.5	5.0
Interface	1.5	7.0	10.5	5.5	4.0
Arithmetic Elements	0.5	1.0	1.5	1.5	1.5
Other**	<u>2.5</u>	<u>3.0</u>	<u>3.4</u>	<u>3.3</u>	<u>3.5</u>
Total	\$34.0	\$46.5	\$86.9	\$67.8	\$67.0

*Includes bipolar PROMs and read-only memories, the latter accounting for approximately 27%, 27%, 22%, and 11% for such amounts from 1977 to 1980.

**Includes various memory and logic circuits and subcontract assembly services.

Source: Monolithic Memories, Inc.
Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Table 2

Monolithic Memories, Inc. FINANCIAL STATEMENT HISTORY 1975-1982* (Millions of Dollars)

	Fiscal Year Ending 30 September									
	1975	1976	1977	1978	1979	1980	1981	1982	TREND	CHG. GR.
BALANCE SHEET										
1 CASH & LIQUID SECURITIES	1.20	1.01	1.51	1.35	1.77	32.85	23.38	5.98	2.85	54.32
2 RECEIVABLES	2.70	2.83	4.12	5.17	7.17	13.40	9.30	10.67	1.40	26.03
3 INVENTORY	2.14	4.84	2.74	3.19	4.61	8.01	11.28	15.50	1.70	29.42
4 OTHER CURRENT ASSETS	1.35	0.21	0.38	0.38	0.20	2.02	2.37	7.24	0.68	40.20
5 EXCESS FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 TOTAL CURRENT ASSETS	7.39	8.89	8.75	10.09	13.75	56.28	46.33	39.37	6.64	36.05
7 GROSS P P E	3.15	3.50	3.68	5.29	7.19	10.42	27.18	64.46	6.78	51.36
8 ACCUMULATED DEPRECIATION	1.09	1.44	1.80	2.23	3.23	4.49	7.12	18.66	1.91	44.63
9 NET P P E	2.06	2.06	1.87	3.06	3.96	5.93	20.06	45.80	4.87	54.99
10 MISC ASSETS	0.14	0.11	0.11	0.13	0.13	0.16	0.78	0.91	0.11	32.82
11 LEASED EQUIPMENT-NET	0.00	0.00	0.24	3.79	8.16	8.97	4.66	0.00	0.57	328.06
12 CASH TRUST FOR CONST	0.00	0.00	0.00	0.00	0.00	0.00	4.13	0.00	0.25	273.60
13 *TOTAL ASSETS*	9.59	11.06	10.98	17.07	26.00	69.33	75.96	86.08	12.43	44.55
14 NOTES PAYABLE	0.24	0.16	0.40	0.60	1.15	0.95	4.66	3.87	0.60	60.11
15 ACCOUNTS PAYABLE	1.32	1.34	1.53	2.22	1.95	5.63	3.80	7.05	0.77	27.98
16 ACCRUED TAXES	0.00	0.00	0.13	0.01	0.00	5.95	0.64	0.07	0.25	384.87
17 ACCRUED LIABILITIES	0.90	1.16	1.19	1.46	1.85	4.77	4.66	5.22	0.70	32.56
18 CURR MAT LONG TERM DEBT	0.36	0.17	0.31	0.21	1.23	0.57	1.14	1.12	0.14	28.53
19 CURR OBL CAP LEASE	0.00	0.00	0.06	0.78	1.98	2.33	2.36	2.06	0.41	2389.71
20 TOTAL CURR LIABILITIES	2.82	2.90	3.62	5.27	8.17	20.19	17.26	19.38	2.86	39.57
21 LONG TERM DEBT	1.61	2.80	0.28	0.38	4.87	1.66	3.52	2.34	0.21	14.78
22 DEFERRED TAXES	0.00	0.00	0.37	0.74	0.29	2.82	2.54	4.81	0.63	2367.53
23 MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 NON-CURR OBL CAP LEASE	0.00	0.00	0.19	3.09	5.98	4.70	2.36	5.72	0.81	2556.64
25 DEFICIT FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26 TOTAL LIABILITIES	4.44	5.70	4.46	9.49	19.30	29.16	25.68	32.26	4.51	39.16
27 PREFERRED STOCK	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	(94.83)
28 COMMON STOCK	0.13	0.13	0.13	0.13	0.13	0.24	0.25	0.26	0.02	12.84
29 CAPITAL SURPLUS	5.09	5.10	5.10	5.14	5.15	30.05	32.59	33.32	4.88	39.14
30 RETAINED EARNINGS	(0.24)	(0.11)	0.96	1.90	0.92	10.48	17.45	20.25	3.08	*****
31 DIVIDENDS PAYABLE	0.15	0.23	0.31	0.39	0.47	(0.61)	0.00	0.00	(0.06)	*****
32 TOTAL EQUITY	5.15	5.36	6.52	7.58	6.69	40.17	50.29	53.83	7.92	48.03
33 *TOTAL LIAB & EQUITY*	9.59	11.06	10.98	17.07	26.00	69.33	75.96	86.08	12.43	44.55
34 NET WORKING CAPITAL	4.57	5.99	5.13	4.81	5.59	36.09	29.07	19.99	3.77	33.45
INCOME & EXPENSE										
35 SALES	16.77	19.13	23.43	32.45	36.78	77.03	76.31	68.60	9.69	27.60
36 COST OF GOODS	12.87	9.08	12.61	18.76	24.29	38.26	41.80	39.55	5.15	25.51
37 GROSS PROFIT	3.90	10.05	10.82	13.69	12.48	38.77	34.50	29.05	4.54	33.01
38 S G & A EXPENSE	2.72	3.84	5.21	6.78	7.44	13.65	14.67	15.15	1.99	29.48
39 R & D EXPENSE	1.17	1.24	1.85	3.41	2.10	4.00	5.89	9.83	1.06	33.91
40 OPERATING PROFIT	0.01	4.97	3.76	3.50	2.94	21.12	13.95	4.07	1.49	81.09
41 DEPRECIATION	0.48	0.59	0.61	0.76	2.41	3.63	5.01	6.42	0.89	52.46
42 LEASE PAYMENTS	1.17	1.41	1.54	1.38	0.73	0.64	0.66	0.70	(0.12)	(11.96)
43 INTEREST EXPENSE	0.09	0.22	0.24	0.24	1.30	1.42	1.15	1.76	0.25	53.45
44 MISC EXPENSE	0.62	1.70	0.00	0.00	0.00	0.00	(3.03)	(5.60)	(0.80)	*****
45 DISCONT OPNS	0.20	0.63	0.00	0.00	0.00	0.00	0.00	0.00	(0.05)	(93.91)
46 MISC INCOME	0.10	0.07	0.04	0.39	0.22	0.87	1.08	0.00	0.08	(71.86)
47 PRETAX PROFIT	(2.43)	0.48	1.40	1.51	(1.28)	18.31	11.24	0.80	1.41	*****
48 INCOME TAXES	(1.02)	0.30	0.32	0.48	(0.38)	6.69	4.27	(2.00)	0.37	*****
49 EXTRAORD LOSS (GAIN)	0.00	(0.03)	(0.07)	0.00	0.00	0.00	0.00	0.00	0.00	*****
50 NET PROFIT	(1.41)	0.21	1.15	1.02	(0.90)	9.62	6.97	2.80	1.03	*****
51 EPS AFTER PFD DIVIDENDS	(0.47)	0.05	0.29	0.26	(0.30)	1.80	1.07	0.42	0.18	*****
52 COMMON DIV PER SHARE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*Beginning 1982, gross value of leased equipment and accumulated depreciation thereon have been rolled into lines 9 and 10, respectively.

Source: Monolithic Memories, Inc.
Annual Reports and Forms 10-K
DATAQUEST

Monolithic Memories, Inc.

Table 3

Monolithic Memories, Inc. FINANCIAL STATEMENT HISTORY 1975-1982* (Percent)

	Fiscal Year Ending 30 September									
	1975	1976	1977	1978	1979	1980	1981	1982	TREND	CHG CR
BALANCE SHEET										
1 CASH & LIQUID SECURITIES	12.48	9.18	13.76	7.90	6.82	47.38	30.78	6.93	2.01	6.76
3 RECEIVABLES	28.16	25.55	37.50	30.27	27.58	19.33	12.24	12.39	(2.79)	(12.80)
4 INVENTORY	22.35	43.78	24.99	18.72	17.73	11.56	14.65	18.01	(2.57)	(10.46)
5 OTHER CURRENT ASSETS	14.09	1.85	3.44	2.21	0.77	2.91	3.12	8.41	(0.43)	(3.01)
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	77.07	80.36	79.69	59.11	52.91	81.17	60.99	45.74	(3.70)	(5.88)
9 GROSS P P E	32.84	31.62	33.49	30.99	27.66	15.03	35.78	74.88	3.05	4.71
10 ACCUMULATED DEPRECIATION	11.35	13.01	16.43	13.05	12.43	6.48	9.37	21.68	0.28	0.06
11 NET P P E	21.49	18.61	17.06	17.94	15.23	8.55	26.41	53.20	2.77	7.22
12 MISC ASSETS	1.44	1.03	1.03	0.77	0.48	0.23	1.03	1.06	(0.06)	(8.11)
13 LEASED EQUIPMENT-NET	0.00	0.00	2.21	22.18	31.37	10.05	6.13	0.00	0.75	305.36
14 CASH TRUST FOR CONST	0.00	0.00	0.00	0.00	0.00	0.00	5.44	0.00	0.32	279.76
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	2.53	1.43	3.65	3.49	4.42	1.37	6.13	4.50	0.37	10.76
17 ACCOUNTS PAYABLE	13.78	12.09	13.92	13.03	7.52	8.12	5.00	0.19	(1.16)	(11.46)
18 ACCRUED TAXES	0.00	0.70	1.22	0.03	0.00	8.58	0.85	0.08	0.28	301.33
19 ACCRUED LIABILITIES	9.37	10.45	10.86	6.58	7.13	6.88	6.13	6.06	(0.69)	(8.29)
20 CURR NAT LONG TERM DEBT	3.75	1.54	2.80	1.25	4.74	0.82	1.50	1.30	(0.23)	(11.08)
21 CURR OBL CAP LEASE	0.00	0.00	0.53	4.56	7.60	3.36	3.11	2.39	0.52	2287.34
22 TOTAL CURR LIABILITIES	29.43	26.20	32.90	30.90	31.41	29.12	22.72	22.52	(0.91)	(3.44)
23 LONG TERM DEBT	16.85	25.31	2.58	2.23	18.73	2.39	4.63	2.72	(2.22)	(20.59)
24 DEFERRED TAXES	0.00	0.00	3.33	4.34	1.10	3.77	3.34	5.59	0.64	2266.06
25 MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26 NON-CURR OBL CAP LEASE	0.00	0.00	1.72	18.13	23.01	6.77	3.11	6.65	0.98	2447.40
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	46.28	51.51	40.62	55.61	74.25	42.06	33.80	37.47	(1.51)	(3.73)
29 PREFERRED STOCK	0.17	0.14	0.15	0.09	0.06	0.00	0.00	0.00	(0.03)	(96.57)
30 COMMON STOCK	1.35	1.17	1.18	0.76	0.50	0.35	0.33	0.30	(0.17)	(21.94)
31 CAPITAL SURPLUS	53.14	46.09	46.47	30.09	19.80	43.35	42.90	34.71	(1.63)	(3.74)
32 RETAINED EARNINGS	(2.48)	(0.99)	8.75	11.15	3.55	15.11	22.97	23.52	3.73	*****
33 DIVIDENDS PAYABLE	1.55	2.08	2.83	2.30	1.82	(0.87)	0.00	0.00	(0.39)	*****
34 TOTAL EQUITY	53.72	48.49	59.38	44.39	25.75	57.94	66.20	62.53	1.51	2.41
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	47.64	54.16	46.71	28.20	21.49	52.05	38.27	23.22	(2.87)	(7.68)
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	76.75	47.43	53.82	57.81	66.06	49.67	54.78	57.65	(1.21)	(1.64)
41 GROSS PROFIT	23.25	52.55	46.18	42.19	33.94	50.33	45.22	42.35	1.21	4.24
42 S G & A EXPENSE	16.21	20.09	22.23	20.90	20.22	17.72	19.22	22.08	0.27	1.47
43 R & D EXPENSE	6.96	6.44	7.92	10.51	5.72	5.19	7.72	14.33	0.53	4.94
45 OPERATING PROFIT	0.08	25.97	16.04	10.78	8.00	27.42	18.28	5.94	0.40	41.92
46 DEPRECIATION	2.83	3.07	2.62	2.33	6.55	4.71	6.57	9.35	0.88	19.48
47 LEASE PAYMENTS	0.96	7.38	6.58	4.27	1.98	0.83	0.86	1.02	(1.12)	(31.01)
48 INTEREST EXPENSE	0.54	1.17	1.02	0.74	3.54	1.84	1.51	2.56	0.25	20.26
49 MISC EXPENSE	3.67	6.90	0.00	0.00	0.00	0.00	(3.97)	(8.16)	(1.75)	*****
50 DISCONT OWS	1.19	3.29	0.00	0.00	0.00	0.00	0.00	0.00	(0.30)	95.25
51 MISC INCOME	0.62	0.34	0.17	1.21	0.60	1.13	1.42	0.00	0.04	78.63
53 PRETAX PROFIT	(14.49)	2.50	5.99	4.64	(3.47)	21.17	14.73	1.17	2.48	*****
54 INCOME TAXES	(6.11)	1.58	1.38	1.49	(1.03)	8.68	5.60	(2.92)	0.74	*****
55 EXTRAORD LOSS (GAIN)	0.00	(0.17)	(0.30)	0.00	0.00	0.00	0.00	0.00	0.02	*****
56 NET PROFIT	(8.38)	1.09	4.31	3.16	(2.44)	12.49	9.13	4.08	1.72	*****
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

*Beginning 1982, gross value of leased equipment and accumulated depreciation thereon have been rolled into lines 9 and 10, respectively.

Source: Monolithic Memories, Inc.
Annual Reports and Forms 10-K
DATAQUEST

Monolithic Memories, Inc.

Table 4

Monolithic Memories, Inc.
FUNDS FLOW HISTORY 1976-1982*
(Millions of Dollars)

	Fiscal Year Ending 30 September								
	1976	1977	1978	1979	1980	1981	1982	TREND	CNPD GR
SOURCES									
56 NET PROFIT	0.21	1.15	1.02	(0.90)	9.62	6.97	2.80	1.00	*****
46 DEPRECIATION	0.59	0.61	0.76	2.41	3.63	5.01	6.42	1.04	58.74
61 NEW LONG TERM DEBT	1.35	0.00	0.31	5.72	0.00	3.00	0.00	0.06	(75.16)
62 NEW EQUITY	(0.06)	(0.08)	(0.05)	(0.07)	24.93	2.54	0.74	1.17	*****
63 INCR OTHER LIABILITIES	0.00	0.56	3.28	2.43	1.05	(2.41)	5.63	0.31	*****
66 TOTAL SOURCES	2.08	2.24	5.32	9.60	39.23	15.11	15.59	3.58	52.75
USES									
67 P F E EXPENDITURES	0.59	0.43	1.94	3.31	5.59	19.15	32.16	4.65	109.24
68 REPAYMENT LONG TERM DEBT	0.36	2.38	0.31	0.21	3.88	0.57	1.20	0.09	12.42
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	1.23	(0.73)	(0.41)	1.79	29.63	(6.44)	(9.10)	(0.44)	*****
71 INCR OTHER ASSETS	(0.02)	0.24	3.56	4.36	(1.16)	2.45	(8.66)	(0.94)	*****
74 TOTAL USES	2.16	2.32	5.41	9.68	38.15	15.72	15.59	3.57	51.94
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

*Beginning 1982, gross value of leased equipment and accumulated depreciation thereon have been rolled into lines 9 and 10, respectively.

Source: Monolithic Memories, Inc.
Annual Reports and Forms 10-K
DATAQUEST

Monolithic Memories, Inc.

Table 5

Monolithic Memories, Inc. FINANCIAL RATIO HISTORY 1975-1982*

	Fiscal Year Ending 30 September											
	1975	1976	1977	1978	1979	1980	1981	1982	ST AV	WTD AVG		
LIQUIDITY												
1	CURRENT RATIO	2.619	3.087	2.416	1.913	1.684	2.787	2.684	2.031	2.400	2.329	
2	QUICK RATIO	1.381	1.325	1.554	1.235	1.095	2.290	1.893	0.858	1.454	1.471	
3	CASH RATIO	0.424	0.350	0.417	0.256	0.217	1.627	1.355	0.308	0.619	0.727	
4	WORKING CAPITAL/SALES	0.272	0.313	0.219	0.148	0.152	0.468	0.381	0.291	0.281	0.298	
6	DAYS RECEIVABLES	58.744	53.928	64.112	58.117	71.162	63.488	44.464	56.768	58.848	58.154	
7	DAYS INVENTORY	60.744	194.786	79.391	62.153	69.250	76.428	98.512	143.072	98.040	99.335	
LEVERAGE												
8	LONG TERM DEBT/CAPITALIZ	0.239	0.343	0.042	0.048	0.421	0.040	0.065	0.042	0.155	0.122	
11	LONG TERM DEBT/EQUITY	0.314	0.522	0.043	0.050	0.728	0.041	0.070	0.043	0.226	0.178	
12	TOTAL DEBT/EQUITY	0.430	0.583	0.152	0.157	1.084	0.079	0.185	0.136	0.351	0.304	
COVERAGE												
13	EBIT/INTEREST	(25.703)	3.148	6.899	7.305	0.021	12.510	10.772	1.456	2.051	5.354	
14	FIXED CHARGE COVERAGE	(0.932)	1.293	1.788	1.929	0.372	8.944	7.219	1.326	2.782	3.650	
16	REPAY LTD-FIX CHARGE COV	*****	1.060	1.632	1.622	0.337	5.588	5.497	0.905	2.377	2.779	
OPER PERFORMANCE												
17	GROSS PROFIT/SALES	0.232	0.525	0.462	0.422	0.339	0.503	0.452	0.423	0.420	0.434	
18	OPER PROFIT/SALES	0.001	0.260	0.160	0.108	0.080	0.274	0.183	0.059	0.141	0.145	
21	PRETAX PROFIT/SALES	(0.145)	0.025	0.080	0.046	(0.035)	0.212	0.147	0.012	0.040	0.068	
22	NET PROFIT/SALES	(0.084)	0.011	0.049	0.032	(0.024)	0.125	0.091	0.041	0.030	0.050	
23	NET PROFIT/AVG EQUITY	*****	0.040	0.194	0.145	(0.126)	0.411	0.154	0.054	0.124	0.133	
24	NET PROFIT/AVG CAPITALIZ	*****	0.028	0.154	0.139	(0.092)	0.360	0.146	0.051	0.112	0.122	
26	NET PROFIT/AVG TOT ASSETS	*****	0.020	0.104	0.073	(0.042)	0.202	0.096	0.035	0.070	0.075	
27	E P S GROWTH RATE	*****	*****	4.504	(0.111)	*****	*****	(0.407)	(0.611)	*****	*****	
28	SALES GROWTH RATE	*****	0.141	0.225	0.385	0.133	1.095	(0.009)	(0.101)	0.267	0.250	
TURNOVER												
31	SALES/AVG EQUITY	*****	3.638	3.944	4.804	5.155	3.288	1.687	1.318	3.376	2.919	
32	SALES/AVG CAPITALIZ	*****	2.562	3.132	4.397	3.768	2.886	1.596	1.248	2.798	2.494	
33	SALES/AVG TOT DEBT + EQUITY	*****	2.412	2.929	3.907	3.239	2.689	1.483	1.136	2.554	2.267	
34	SALES/AVG TOTAL ASSETS	*****	1.853	2.127	2.314	1.708	1.616	1.050	0.847	1.645	1.435	
35	SALES/AVG OPER ASSETS	*****	1.876	2.173	2.730	2.383	1.928	1.187	0.905	1.883	1.680	
36	SALES/AVG GROSS P P E	*****	5.756	6.533	7.239	5.894	8.748	4.059	1.497	5.675	5.096	
BALANCE SHEET												
37	CASH/SALES	0.071	0.053	0.064	0.042	0.048	0.426	0.306	0.087	0.137	0.172	
38	RECEIVABLES/SALES	0.161	0.148	0.176	0.159	0.195	0.174	0.122	0.156	0.181	0.159	
41	INVENTORY/SALES	0.128	0.253	0.117	0.098	0.125	0.104	0.144	0.226	0.150	0.152	
42	OTH CURR ASSETS/SALES	0.081	0.011	0.016	0.012	0.005	0.026	0.031	0.106	0.036	0.040	
44	GROSS P P E/SALES	0.188	0.183	0.157	0.163	0.196	0.135	0.356	0.940	0.290	0.374	
45	LINE 13/SALES	0.000	0.000	0.010	0.117	0.222	0.090	0.061	0.000	0.063	0.072	
46	MISC ASSETS/SALES	0.008	0.006	0.005	0.004	0.003	0.002	0.010	0.013	0.007	0.007	
47	ACCOUNTS PAYABLE/SALES	0.079	0.070	0.065	0.069	0.053	0.073	0.050	0.103	0.070	0.071	
48	ACCRUED TAXES/SALES	0.000	0.004	0.006	0.000	0.000	0.077	0.008	0.001	0.012	0.015	
51	ACCRUED LIABILITY/SALES	0.054	0.060	0.051	0.045	0.050	0.062	0.061	0.076	0.057	0.060	
52	LINE 21/SALES	0.000	0.000	0.002	0.024	0.054	0.030	0.031	0.030	0.021	0.028	
53	DEFERRED TAXES/SALES	0.000	0.000	0.016	0.023	0.008	0.034	0.033	0.070	0.023	0.033	
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	0.008	0.095	0.163	0.061	0.031	0.083	0.055	0.069	
MISCELLANEOUS												
57	EQUITY PER COMMON SHARE	1.733	1.359	1.652	1.920	2.226	7.514	7.709	7.983	4.012	5.309	
58	RETIRE/PREV GROSS P P E	*****	(0.075)	(0.071)	(0.091)	(0.265)	(0.329)	(0.229)	0.189	(0.125)	(0.116)	
61	DEPREC/PREV GROSS P P E	*****	0.187	0.175	0.206	0.455	0.504	0.481	0.236	0.321	0.358	
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	0.422	0.630	0.231	0.321	0.296	0.410	0.380	(2.497)	0.024	(0.270)	
64	COST OF GOODS/SALES	0.768	0.475	0.538	0.578	0.661	0.497	0.548	0.577	0.580	0.566	
65	S G & A/SALES	0.162	0.201	0.222	0.209	0.202	0.177	0.192	0.221	0.198	0.201	

*Beginning 1982, gross value of leased equipment and accumulated depreciation thereon have been rolled into lines 9 and 10, respectively.

Source: Monolithic Memories, Inc.
Annual Reports and Forms 10-K
DATAQUEST

Monolithic Memories, Inc.

Monolithic Memories, Inc.
1165 E. Arques Ave.
Sunnyvale, California 94086
Telephone: (408) 739-3535
(Millions of Dollars Except Per Share Data)

Balance Sheet (September 28)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Working Capital	\$ 5.13	\$ 4.81	\$ 5.59	\$36.09	\$29.07
Long-Term Debt	\$ 0.28	\$ 0.38	\$ 4.87	\$ 1.66	\$ 3.52
Shareholders' Equity	\$ 6.52	\$ 7.58	\$ 6.69	\$40.17	\$50.29
After-Tax Return on Average Equity (%)	19.35	14.53	(12.58)	41.49	15.41

Operating Performance (Fiscal Year Ending September 28)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Revenue	\$23.47	\$32.84	\$37.00	\$77.90	\$76.31
U.S. Revenue	\$16.43	\$22.99	\$25.16	\$49.86	\$50.22
Non-U.S. Revenue	\$ 7.04	\$ 9.85	\$11.84	\$28.04	\$26.09
Cost of Revenue	\$14.77	\$19.83	\$27.43	\$42.53	\$47.48
R&D Expense	\$ 1.89	\$ 4.48	\$ 2.10	\$ 4.00	\$ 5.89
Marketing Expense	\$ 3.66	\$ 4.98	\$ 4.87	\$ 7.51	\$ 8.70
G&A Expense	\$ 1.55	\$ 1.80	\$ 2.56	\$ 6.13	\$ 5.97
Pretax Income	\$ 1.40	\$ 1.51	\$(1.28)	\$16.31	\$11.24
Pretax Margin (%)	6.0	4.6	(3.4)	20.9	14.7
Effective Tax Rate (%)	23.1	32.1	N/A	41.0	38.0
Net Income	\$ 1.08	\$ 1.02	\$(0.90)	\$ 9.62	\$ 6.97
Average Shares Outstanding (Millions)	3.94	3.94	3.26	5.17	6.523
Per Share Data					
Earnings	\$ 0.29	\$ 0.26	\$(0.30)	\$ 1.80	\$ 1.07
Dividends	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Book Value	\$ 1.65	\$ 1.92	\$ 2.05	\$ 7.49	\$ 7.71
Price Range	N/A	N/A	N/A	\$21.00-	\$10.25-
	N/A	N/A	N/A	28.50	32.25
Total Employees	N/A	1,627	N/A	2,578	2,241
Capital Expenditures*	\$ 0.69	\$ 4.50	\$ 7.68	\$ 4.82	\$16.86

*Includes additions to equipment under capital leases

N/A = Not Available

Source: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Table 1

Monolithic Memories, Inc.
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

Table 1A - Fiscal Years

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
PROMs*	\$21.22	\$27.02	\$24.71	\$47.26	\$45.0
PAL™		.01	1.77	6.34	10.0
FIFOs	0.53	1.95	2.16	7.33	6.6
Interface	0.03	0.68	4.30	10.98	8.5
Arithmetic Elements	0.13	0.27	0.71	1.45	1.5
Other**	<u>1.52</u>	<u>2.52</u>	<u>3.12</u>	<u>3.67</u>	<u>4.7</u>
Total	\$23.43	\$32.45	\$36.77	\$77.03	\$76.3

Table 1B - Calendar Years

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
PROMs*	\$22.5	\$27.0	\$30.0	\$55.0	\$40.0
PAL™	-	0.5	2.5	8.0	12.0
FIFOs	0.5	2.0	3.0	8.5	5.5
Interface	-	1.5	7.0	10.5	5.5
Arithmetic Elements	-	0.5	1.0	1.5	1.5
Other**	<u>2.0</u>	<u>2.5</u>	<u>3.0</u>	<u>3.4</u>	<u>3.3</u>
Total	\$25.0	\$34.0	\$46.5	\$86.9	\$67.8

*Includes bipolar PROMs and read-only memories, the latter accounting for approximately 27%, 27%, 22%, and 11% for such amounts from 1977 to 1980.

**Includes various memory and logic circuits and subcontract assembly services.

Source: Monolithic Memories, Inc.
Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Table 2

Monolithic Memories, Inc. FINANCIAL STATEMENT HISTORY 1974-1981 (Millions of Dollars)

	Fiscal Year Ending Sept 28									
	1974	1975	1976	1977	1978	1979	1980	1981	TREND	CMPO GR

BALANCE SHEET										
1 CASH & LIQUID SECURITIES	1.88	1.20	1.01	1.51	1.35	1.77	32.85	23.38	3.70	53.06
2 RECEIVABLES	3.65	2.70	2.83	4.12	5.17	7.17	13.40	9.30	1.27	23.27
3 INVENTORY	3.10	2.14	4.84	2.74	3.19	4.61	8.01	11.28	1.03	20.45
4 OTHER CURRENT ASSETS	0.28	1.35	0.21	0.38	0.36	0.20	2.02	2.37	0.21	22.36
5 EXCESS FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 TOTAL CURRENT ASSETS	8.92	7.39	8.89	8.75	10.09	13.75	56.28	46.33	6.22	31.71
7 GROSS P P E	3.36	3.15	3.50	3.68	5.29	7.19	10.42	27.18	2.57	31.65
8 ACCUMULATED DEPRECIATION	1.25	1.09	1.44	1.80	2.23	3.23	4.49	7.12	0.76	29.79
9 NET P P E	2.13	2.06	2.06	1.87	3.06	3.96	5.93	20.06	1.81	32.18
10 MISC ASSETS	0.19	0.14	0.11	0.11	0.13	0.13	0.16	0.78	0.05	14.14
11 LEASED EQUIPMENT	0.00	0.00	0.00	0.24	3.79	8.16	6.97	4.66	1.14	5651.06
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.13	0.34	532.94
13 *TOTAL ASSETS*	11.24	9.59	11.06	10.98	17.07	26.00	69.33	75.96	9.56	36.72
14 NOTES PAYABLE	0.25	0.24	0.16	0.40	0.60	1.15	0.95	4.66	0.45	48.28
15 ACCOUNTS PAYABLE	1.83	1.32	1.34	1.53	2.22	1.95	5.63	3.80	0.45	17.96
16 ACCRUED TAXES	1.17	0.00	0.08	0.13	0.01	0.00	5.95	0.64	0.31	82.67
17 ACCRUED LIABILITIES	0.77	0.90	1.16	1.19	1.46	1.85	4.77	4.66	0.58	30.83
18 CURR MAT LONG TERM DEBT	0.18	0.36	0.17	0.31	0.21	1.23	0.57	1.14	0.13	28.14
19 CURR OBL CAP LEASE	0.00	0.00	0.00	0.06	0.78	1.98	2.33	2.36	0.41	4731.90
20 TOTAL CURR LIABILITIES	4.19	2.82	2.90	3.52	5.27	6.17	20.19	17.26	2.33	31.86
21 LONG TERM DEBT	0.32	1.61	2.80	0.28	0.38	4.87	1.66	3.52	0.34	25.01
22 DEFERRED TAXES	0.18	0.00	0.00	0.37	0.74	0.29	2.62	2.54	0.37	818.54
23 MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 NON-CURR OBL CAP LEASE	0.00	0.00	0.00	0.19	3.09	5.98	4.70	2.36	0.72	5153.69
25 DEFICIT FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26 TOTAL LIABILITIES	4.69	4.44	5.70	4.46	9.48	19.30	29.16	25.68	3.77	35.84
27 PREFERRED STOCK	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	(90.65)
28 COMMON STOCK	0.13	0.13	0.13	0.13	0.13	0.13	0.24	0.25	0.02	9.92
29 CAPITAL SURPLUS	5.09	5.09	5.10	5.10	5.14	5.15	30.05	32.59	3.78	29.80
30 RETAINED EARNINGS	1.25	(0.24)	(0.11)	0.96	1.90	0.92	10.44	17.45	2.04	*****
31 DIVIDENDS PAYABLE	0.07	0.15	0.23	0.31	0.39	0.47	(0.61)	0.00	(0.04)	*****
32 TOTAL EQUITY	6.55	5.15	5.36	6.52	7.58	6.69	40.17	50.29	5.79	35.23
33 *TOTAL LIAB & EQUITY*	11.24	9.59	11.06	10.98	17.07	26.00	69.33	75.96	9.56	36.72
34 NET WORKING CAPITAL	4.73	4.57	5.99	5.13	4.81	5.59	36.09	29.07	3.89	31.15
INCOME & EXPENSE										
35 SALES	20.11	16.77	19.13	23.43	32.45	36.78	77.03	76.31	9.01	25.75
36 COST OF GOODS	11.63	12.87	9.08	12.61	18.76	24.29	38.26	41.80	4.64	23.54
37 GROSS PROFIT	8.48	3.90	10.05	10.82	13.69	12.48	38.77	34.50	4.37	30.24
38 S G & A EXPENSE	2.57	2.72	3.84	5.21	6.78	7.44	13.65	14.67	1.81	30.74
39 R & D EXPENDITURES	1.44	1.17	1.24	1.85	3.41	2.10	4.00	5.89	0.59	24.23
40 OPERATING PROFIT	4.48	0.01	4.97	3.76	3.50	2.94	21.12	13.95	1.97	66.67
41 DEPRECIATION	0.51	0.48	0.59	0.61	0.76	2.41	3.63	5.01	0.63	44.04
42 LEASE PAYMENTS	0.73	1.17	1.41	1.54	1.38	0.73	0.64	0.66	(0.06)	(6.75)
43 INTEREST EXPENSE	0.02	0.09	0.22	0.24	0.24	1.30	1.42	(3.36)	(0.16)	*****
44 MISC EXPENSE	0.13	0.62	1.70	0.00	0.00	0.00	0.00	1.48	0.02	(82.82)
45 DISCONTIN OPNS	0.00	0.20	0.63	0.00	0.00	0.00	0.00	0.00	(0.03)	(84.45)
46 MISC INCOME	0.10	0.10	0.07	0.04	0.39	0.22	0.87	1.08	0.14	48.01
47 PRETAX PROFIT	3.19	(2.43)	0.48	1.40	1.51	(1.28)	16.31	11.24	1.72	*****
48 INCOME TAXES	1.54	(1.02)	0.30	0.32	0.48	(0.38)	6.69	4.27	0.66	*****
49 EXTRAORD LOSS (GAIN)	(0.11)	0.00	(0.03)	(0.07)	0.00	0.00	0.00	0.00	0.01	*****
50 NET PROFIT	1.76	(1.41)	0.21	1.15	1.02	(0.90)	9.62	6.97	1.05	*****
51 EPS AFTER PFD DIVIDENDS	0.44	(0.47)	0.05	0.29	0.26	(0.30)	1.80	1.07	0.17	*****
52 COMMON DIV PER SHARE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Sources: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Table 3

Monolithic Memories, Inc. FINANCIAL STATEMENT HISTORY 1974-1981 (Percent)

	Fiscal Year Ending Sept 26									
	1974	1975	1976	1977	1978	1979	1980	1981	TREND	CMPD GR

BALANCE SHEET										
1 CASH & LIQUID SECURITIES	16.76	12.48	9.18	13.76	7.90	6.82	47.38	30.78	3.09	11.95
3 RECEIVABLES	32.49	28.16	25.55	37.50	30.27	27.58	19.33	12.24	(2.23)	(9.84)
4 INVENTORY	27.62	22.35	49.78	24.99	18.72	17.73	11.56	14.85	(2.71)	(11.90)
5 OTHER CURRENT ASSETS	2.47	14.09	1.85	3.44	2.21	0.77	2.91	3.12	(0.66)	(10.50)
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	79.35	77.07	80.36	79.69	59.11	52.91	81.17	60.99	(2.51)	(3.66)
9 GROSS P P E	30.08	32.84	31.62	33.49	30.99	27.66	15.03	35.78	(0.76)	(3.71)
10 ACCUMULATED DEPRECIATION	11.13	11.35	13.01	16.43	13.05	12.43	6.48	9.37	(0.50)	(5.07)
11 NET P P E	18.95	21.49	18.61	17.06	17.94	15.23	8.55	26.41	(0.26)	(3.32)
12 MISC ASSETS	1.70	1.44	1.03	1.03	0.77	0.49	0.23	1.03	(0.15)	(16.52)
13 LEASED EQUIPMENT	0.00	0.00	0.00	2.21	22.18	31.37	10.05	6.13	2.47	6177.38
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.44	0.45	547.61
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	2.22	2.53	1.43	3.65	3.49	4.42	1.37	6.13	0.36	9.19
17 ACCOUNTS PAYABLE	16.26	13.78	12.09	13.92	13.03	7.52	8.12	5.00	(1.45)	(13.72)
18 ACCRUED TAXES	10.37	0.00	0.70	1.22	0.03	0.00	8.58	0.85	(0.32)	46.41
19 ACCRUED LIABILITIES	6.84	9.37	10.45	10.86	8.56	7.13	6.88	6.13	(0.35)	(4.31)
20 CURR MAT LONG TERM DEBT	1.59	3.75	1.54	2.40	1.25	4.74	0.82	1.50	(0.09)	(6.28)
21 CURR OBL CAP LEASE	0.00	0.00	0.00	0.53	4.56	7.60	3.36	3.11	0.78	5174.11
22 TOTAL CURR LIABILITIES	37.79	29.43	26.20	32.98	30.90	31.41	29.12	22.72	(1.07)	(3.55)
23 LONG TERM DEBT	2.89	16.85	25.31	2.58	2.23	18.73	2.39	4.63	(0.95)	(8.56)
24 DEFERRED TAXES	1.56	0.00	0.00	3.33	4.34	1.10	3.77	3.34	0.42	735.66
25 MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26 NON-CURR OBL CAP LEASE	0.00	0.00	0.00	1.72	18.13	23.01	6.77	3.11	1.68	5634.49
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	41.73	46.28	51.51	40.62	55.61	74.25	42.06	33.80	0.08	(0.64)
29 PREFERRED STOCK	0.14	0.17	0.14	0.15	0.09	0.06	0.00	0.00	(0.03)	(93.46)
30 COMMON STOCK	1.15	1.35	1.17	1.18	0.76	0.50	0.35	0.33	(0.16)	(19.60)
31 CAPITAL SURPLUS	45.27	53.14	46.09	46.47	30.09	19.80	43.35	42.90	(1.91)	(5.06)
32 RETAINED EARNINGS	11.10	(2.48)	(0.99)	8.75	11.15	3.55	15.11	22.97	2.23	*****
33 DIVIDENDS PAYABLE	0.60	1.55	2.08	2.83	2.30	1.82	(0.87)	0.00	(0.21)	*****
34 TOTAL EQUITY	58.27	53.72	48.49	59.38	44.39	25.75	57.94	66.20	(0.08)	(1.09)
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	42.06	47.64	54.16	46.71	28.20	21.49	52.05	38.27	(1.44)	(4.08)
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	57.83	76.75	47.45	53.82	57.81	66.06	49.67	54.78	(1.15)	(1.76)
41 GROSS PROFIT	42.17	23.25	52.55	46.18	42.19	33.94	50.33	45.22	1.15	3.57
42 S G & A EXPENSE	12.76	16.21	20.09	22.23	20.90	20.22	17.72	19.22	0.62	3.97
43 R & D EXPENDITURES	7.15	6.36	6.48	7.92	10.51	5.72	5.19	7.72	(0.05)	(1.21)
45 OPERATING PROFIT	22.25	0.08	25.97	16.04	10.78	8.00	27.42	18.26	0.59	32.54
46 DEPRECIATION	2.52	2.83	3.07	2.62	2.33	6.55	4.71	6.57	0.57	14.55
47 LEASE PAYMENTS	3.64	6.96	7.38	6.58	4.27	1.98	0.83	0.86	(0.82)	(25.85)
48 INTEREST EXPENSE	0.10	0.54	1.17	1.02	0.74	3.54	1.84	(4.40)	(0.22)	*****
49 MISC EXPENSE	0.65	3.67	8.90	0.00	0.00	0.00	0.00	1.94	(0.43)	(86.97)
50 DISCONTIN OPNS	0.00	1.19	3.29	0.00	0.00	0.00	0.00	0.00	(0.19)	(86.82)
51 MISC INCOME	0.52	0.62	0.34	0.17	1.21	0.60	1.13	1.42	0.13	17.70
53 PRETAX PROFIT	15.86	(14.49)	2.50	5.99	8.64	(3.47)	21.17	14.73	1.80	*****
54 INCOME TAXES	7.67	(6.11)	1.58	1.38	1.49	(1.03)	8.68	5.60	0.62	*****
55 EXTRAORD LOSS (GAIN)	(0.57)	0.00	(0.17)	(0.30)	0.00	0.00	0.00	0.00	0.06	*****
56 NET PROFIT	6.76	(8.38)	1.09	4.91	3.16	(2.44)	12.49	9.13	1.13	*****
57 EPS AFTER PPD 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: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Table 4

Monolithic Memories, Inc.
FUNDS FLOW HISTORY 1975-1981
(Millions of Dollars)

	Fiscal Year Ending Sept 28								
	1975	1976	1977	1978	1979	1980	1981	TREND	CHNG GR

SOURCES									
56 NET PROFIT	(1.41)	0.21	1.15	1.02	(0.90)	9.62	6.97	1.50	*****
48 DEPRECIATION	0.48	0.59	0.61	0.76	2.41	3.63	5.01	0.77	53.92
61 NEW LONG TERM DEBT	1.65	1.35	0.00	0.31	5.72	0.00	3.00	0.25	(47.02)
62 NEW EQUITY	(0.07)	(0.08)	(0.08)	(0.05)	(0.07)	24.93	2.54	2.07	*****
63 INCR OTHER LIABILITIES	(0.18)	0.00	0.56	3.28	2.43	1.05	(2.41)	(0.10)	*****
64 TOTAL SOURCES	0.47	2.08	2.24	5.32	9.60	39.23	15.11	4.49	88.51
USES									
67 P P E EXPENDITURES	0.40	0.59	0.43	1.94	3.31	5.39	19.15	2.47	91.03
68 REPAYMENT LONG TERM DEBT	0.18	0.36	2.38	0.31	0.21	3.88	0.57	0.22	23.02
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	0.02	1.23	(0.73)	(0.41)	1.79	29.83	(6.44)	1.44	*****
71 INCR OTHER ASSETS	(0.05)	(0.02)	0.24	3.56	4.36	(1.16)	2.45	0.33	*****
74 TOTAL USES	0.55	2.16	2.32	5.41	9.68	38.15	15.72	4.46	85.04
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: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Table 5

Monolithic Memories, Inc. FINANCIAL RATIO HISTORY 1974-1981

Fiscal Year Ending Sept 28										
	1974	1975	1976	1977	1978	1979	1980	1981	ST AV	WTD AVG

LIQUIDITY										
1 CURRENT RATIO	2.128	2.619	3.067	2.416	1.913	1.684	2.787	2.684	2.412	2.414
2 QUICK RATIO	1.321	1.381	1.325	1.554	1.235	1.095	2.290	1.893	1.512	1.617
3 CASH RATIO	0.450	0.424	0.350	0.417	0.256	0.217	1.627	1.355	0.637	0.801
4 WORKING CAPITAL/SALES	0.235	0.272	0.313	0.219	0.148	0.152	0.468	0.381	0.274	0.294
6 DAYS RECEIVABLES	56.288	58.744	53.828	64.112	58.117	71.162	63.488	44.464	60.038	58.880
7 DAYS INVENTORY	97.448	60.744	194.766	79.391	62.153	69.250	76.428	98.512	92.336	88.060
LEVERAGE										
8 LONG TERM DEBT/CAPITALIZ	0.047	0.239	0.343	0.042	0.048	0.421	0.040	0.065	0.156	0.147
11 LONG TERM DEBT/EQUITY	0.050	0.314	0.322	0.043	0.050	0.728	0.041	0.070	0.227	0.219
12 TOTAL DEBT/EQUITY	0.115	0.430	0.583	0.152	0.157	1.084	0.079	0.185	0.348	0.351
COVERAGE										
13 EBIT/INTEREST	152.905	(25.703)	3.148	6.899	7.305	0.021	12.510	(2.344)	19.343	6.778
14 FIXED CHARGE COVERAGE	5.242	(0.932)	1.293	1.788	1.929	0.372	8.944	(3.156)	1.935	1.768
16 REPAY LTD+FIX CHARGE COV	*****	(0.816)	1.060	1.632	1.622	0.337	5.588	(3.992)	0.776	0.713
OPER PERFORMANCE										
17 GROSS PROFIT/SALES	0.422	0.232	0.525	0.462	0.422	0.339	0.503	0.452	0.420	0.433
18 OPER PROFIT/SALES	0.223	0.001	0.260	0.160	0.108	0.080	0.274	0.183	0.161	0.168
21 PRETAX PROFIT/SALES	0.159	(0.145)	0.025	0.060	0.046	(0.035)	0.212	0.147	0.059	0.080
22 NET PROFIT/SALES	0.088	(0.084)	0.011	0.049	0.032	(0.024)	0.125	0.091	0.036	0.049
23 NET PROFIT/AVG EQUITY	*****	(0.240)	0.040	0.194	0.145	(0.126)	0.411	0.154	0.082	0.140
24 NET PROFIT/AVG CAPITALIZ	*****	(0.206)	0.028	0.154	0.139	(0.092)	0.360	0.146	0.076	0.128
26 NET PROFIT/AVG TOT ASSETS	*****	(0.135)	0.020	0.104	0.073	(0.042)	0.202	0.096	0.046	0.078
27 E P S GROWTH RATE	*****	*****	4.504	(0.111)	*****	*****	*****	(0.407)	*****	*****
28 SALES GROWTH RATE	*****	(0.166)	0.141	0.225	0.385	0.133	1.095	(0.009)	0.258	0.339
TURNOVER										
31 SALES/AVG EQUITY	*****	2.867	3.638	3.944	4.604	5.155	3.288	1.687	3.598	3.489
32 SALES/AVG CAPITALIZ	*****	2.459	2.562	3.132	4.397	3.768	2.866	1.596	2.971	2.925
33 SALES/AVG TOT DEBT + EQTY	*****	2.286	2.412	2.929	3.987	3.239	2.689	1.483	2.718	2.663
34 SALES/AVG TOTAL ASSETS	*****	1.610	1.853	2.127	2.314	1.708	1.616	1.050	1.754	1.662
35 SALES/AVG OPER ASSETS	*****	1.636	1.876	2.173	2.730	2.383	1.928	1.187	1.988	1.951
36 SALES/AVG GROSS P P E	*****	5.137	5.756	6.533	7.239	5.894	6.748	4.059	6.195	6.272
BALANCE SHEET										
37 CASH/SALES	0.094	0.071	0.053	0.064	0.042	0.048	0.426	0.306	0.138	0.183
38 RECEIVABLES/SALES	0.182	0.161	0.148	0.176	0.159	0.195	0.174	0.122	0.164	0.161
41 INVENTORY/SALES	0.154	0.128	0.253	0.117	0.098	0.125	0.104	0.148	0.141	0.133
42 OTH CURR ASSETS/SALES	0.014	0.081	0.011	0.016	0.012	0.005	0.026	0.031	0.024	0.022
44 GROSS P P E/SALES	0.168	0.188	0.183	0.157	0.163	0.196	0.135	0.356	0.193	0.208
45 LINE 13/SALES	0.000	0.000	0.000	0.010	0.117	0.222	0.090	0.061	0.063	0.085
46 MISC ASSETS/SALES	0.009	0.008	0.006	0.005	0.004	0.003	0.002	0.010	0.006	0.006
47 ACCOUNTS PAYABLE/SALES	0.091	0.079	0.070	0.065	0.069	0.053	0.073	0.050	0.069	0.064
48 ACCRUED TAXES/SALES	0.058	0.000	0.004	0.006	0.000	0.000	0.077	0.008	0.019	0.019
51 ACCRUED LIABILITY/SALES	0.038	0.054	0.060	0.051	0.045	0.050	0.062	0.061	0.053	0.055
52 LINE 21/SALES	0.000	0.000	0.000	0.002	0.024	0.054	0.030	0.031	0.018	0.025
53 DEFERRED TAXES/SALES	0.009	0.000	0.000	0.016	0.023	0.008	0.034	0.033	0.015	0.020
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	0.008	0.095	0.163	0.061	0.031	0.045	0.060
MISCELLANEOUS										
57 EQUITY PER COMMON SHARE	1.624	1.733	1.359	1.652	1.920	2.226	7.514	7.709	3.217	4.250
58 RETIRE/PREV GROSS P P E	*****	(0.189)	(0.075)	(0.071)	(0.091)	(0.265)	(0.329)	(0.229)	(0.178)	(0.208)
61 DEPREC/PREV GROSS P P E	*****	0.140	0.187	0.175	0.206	0.455	0.504	0.481	0.307	0.376
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	0.484	0.422	0.630	0.231	0.321	0.296	0.410	0.380	0.397	0.373
64 COST OF GOODS/SALES	0.578	0.768	0.475	0.538	0.578	0.661	0.497	0.548	0.580	0.567
65 S G & A/SALES	0.128	0.162	0.201	0.222	0.209	0.202	0.177	0.192	0.187	0.194

Source: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Monolithic Memories, Inc.

1165 E. Arques Ave.

Sunnyvale, CA 94086

(408) 739-3535

(Millions of Dollars Except Per Share Data)

Balance Sheet (September 28)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Working Capital	\$ 5.13	\$ 4.81	\$ 5.59	\$36.09
Long-Term Debt	\$ 0.28	\$ 0.38	\$ 4.87	\$ 1.66
Shareholders' Equity	\$ 6.52	\$ 7.58	\$ 6.69	\$40.17
After-Tax Return on Average Equity (%)				

Operating Performance (Fiscal Year Ending September 28)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Revenue	\$23.47	\$32.84	\$37.00	\$77.90
U.S. Revenue	\$16.43	\$22.99	\$25.16	\$49.86
Non-U.S. Revenue	\$ 7.04	\$ 9.85	\$11.84	\$28.04
Cost of Revenue	\$14.77	\$19.83	\$27.43	\$42.53
R&D Expense	\$ 1.89	\$ 4.48	\$ 2.10	\$ 4.00
Marketing Expense	\$ 3.66	\$ 4.98	\$ 4.87	\$ 7.51
G&A Expense	\$ 1.55	\$ 1.80	\$ 2.56	\$ 6.13
Pretax Income	\$ 1.40	\$ 1.51	\$(1.28)	\$16.31
Pretax Margin (%)	6.0	4.6	(3.4)	20.9
Effective Tax Rate (%)	23.1	32.1	N/A	41.0
Net Income	\$ 1.08	\$ 1.02	\$ (0.90)	\$ 9.62
Average Shares Outstanding (Millions)	3.94	3.94	3.26	5.17
Per Share Data				
Earnings	\$ 0.29	\$ 0.26	\$ (0.30)	\$ 1.86
Dividends	\$ 0	\$ 0	\$ 0	\$ 0
Book Value	\$ 1.65	\$ 1.92	\$ 2.05	\$ 7.51
Price Range	N/A	N/A	N/A	N/A
Total Employees	N/A	1,627	N/A	2,578
Capital Expenditures*	\$ 0.69	\$ 4.50	\$ 7.68	\$ 4.82

*Includes additions to equipment under capital leases

N/A = Not Available

Source: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Table 1

Monolithic Memories, Inc.
ESTIMATED SEMICONDUCTORS REVENUES
(Millions of Dollars)

	Fiscal Years					Calendar
	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1980</u>
PROMs*	\$18.30	\$21.22	\$27.02	\$24.71	\$47.26	\$55.0
PAL™			.01	1.77	6.34	8.0
FIFOs		0.53	1.95	2.16	7.33	8.5
Interface		0.03	0.68	4.30	10.98	11.5
Arithmetic Elements		0.13	0.27	0.71	1.45	1.5
Other**	<u>1.02</u>	<u>1.52</u>	<u>2.52</u>	<u>3.12</u>	<u>3.67</u>	<u>4.0</u>
Total\$	\$19.32	\$23.43	\$32.45	\$36.77	\$77.03	\$88.5

*Includes bipolar PROMs and read-only memories, the latter accounting for approximately 34%, 27%, 27%, 22%, and 11% for such amounts from 1976.

**Includes various memory and logic circuits and subcontract assembly services.

Source: Monolithic Memories, Inc.,
Forms 10-K
DATAQUEST, Inc.
(1980 calendar year only)

Monolithic Memories, Inc.

Table 2

Monolithic Memories, Inc. FINANCIAL STATEMENT HISTORY 1974-1980 (Millions of Dollars)

		Fiscal Year Ending September 30						TREND	CMPD GR	
		1974	1975	1976	1977	1978	1979			1980
BALANCE SHEET										
1	CASH & LIQUID SECURITIES	1.88	1.20	1.01	1.51	1.35	1.77	32.85	3.37	41.14
3	RECEIVABLES	3.65	2.70	2.83	4.12	5.17	7.17	13.40	1.45	25.94
4	INVENTORY	3.10	2.14	4.84	2.74	3.19	4.61	8.01	0.64	15.19
5	OTHER CURRENT ASSETS	0.28	1.35	0.21	0.38	0.38	0.20	2.02	0.11	10.31
7	EXCESS FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	TOTAL CURRENT ASSETS	8.92	7.39	8.89	8.75	10.09	13.75	56.28	5.57	27.93
9	GROSS P P E	3.98	3.15	3.50	3.68	5.29	7.18	10.42	1.11	21.45
10	ACCUMULATED DEPRECIATION	1.25	1.09	1.44	1.80	2.23	3.23	4.49	0.53	25.90
11	NET P P E	2.13	2.06	2.06	1.87	3.06	3.96	5.93	0.58	18.59
12	MISC ASSETS	0.19	0.14	0.11	0.11	0.13	0.13	0.16	0.00	(1.89)
13	LEASED EQUIPMENT	0.00	0.00	0.00	0.24	3.79	8.16	6.97	1.46	*****
15	*TOTAL ASSETS*	11.24	9.59	11.06	10.98	17.07	26.00	69.33	7.61	32.54
16	NOTES PAYABLE	0.25	0.24	0.16	0.40	0.60	1.15	0.95	0.16	35.20
17	ACCOUNTS PAYABLE	1.83	1.32	1.34	1.53	2.22	1.85	5.63	0.48	18.13
18	ACCRUED TAXES	1.17	0.00	0.08	0.13	0.01	0.00	5.95	0.51	8.00
19	ACCRUED LIABILITIES	0.77	0.90	1.16	1.19	1.46	1.85	4.77	0.51	28.12
20	CURR MAT LONG TERM DEBT	0.18	0.36	0.17	0.31	0.21	1.23	0.57	0.11	24.55
21	CURR OBL CAP LEASE	0.00	0.00	0.00	0.06	0.78	1.98	2.33	0.42	9564.18
22	TOTAL CURR LIABILITIES	4.19	2.82	2.90	3.62	5.27	8.17	20.19	2.18	30.44
23	LONG TERM DEBT	0.32	1.61	2.80	0.28	0.38	4.87	1.66	0.29	19.97
24	DEFERRED TAXES	0.18	0.00	0.00	0.37	0.74	0.29	2.62	0.31	1013.73
25	MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	NON-CURR OBL CAP LEASE	0.00	0.00	0.00	0.19	3.09	5.98	4.70	1.04	*****
27	DEFICIT FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	TOTAL LIABILITIES	4.69	4.44	5.70	4.46	9.49	19.30	29.16	3.82	37.58
29	PREFERRED STOCK	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	(83.09)
30	COMMON STOCK	0.13	0.13	0.13	0.13	0.13	0.13	0.24	0.01	7.21
31	CAPITAL SURPLUS	5.09	5.09	5.10	5.10	5.14	5.15	30.05	2.68	21.08
32	RETAINED EARNINGS	1.25	(0.24)	(0.11)	0.96	1.90	0.92	10.48	1.14	*****
33	DIVIDENDS PAYABLE	0.07	0.15	0.23	0.31	0.39	0.47	(0.61)	(0.04)	*****
34	TOTAL EQUITY	6.55	5.15	5.36	6.52	7.58	6.69	40.17	3.79	25.28
35	*TOTAL LIAB & EQUITY*	11.24	9.59	11.06	10.98	17.07	26.00	69.33	7.61	32.54
36	NET WORKING CAPITAL	4.73	4.57	5.99	5.13	4.81	5.59	36.09	3.39	25.15
INCOME & EXPENSE										
38	SALES	20.11	16.77	19.13	23.43	32.45	36.78	77.03	8.00	24.47
40	COST OF GOODS	11.63	12.87	9.08	12.61	18.76	24.29	38.26	4.02	22.01
41	GROSS PROFIT	8.48	3.90	10.05	10.82	13.69	12.48	38.77	3.99	29.31
42	S G & A EXPENSE	2.57	2.72	3.84	5.21	6.78	7.44	13.65	1.63	31.16
43	R & D EXPENDITURES	1.44	1.17	1.24	1.85	3.41	2.10	4.00	0.42	20.67
45	OPERATING PROFIT	4.48	0.01	4.97	3.76	3.50	2.94	21.12	1.94	70.87
46	DEPRECIATION	0.51	0.48	0.59	0.81	0.76	2.41	3.63	0.48	39.93
47	LEASE PAYMENTS	0.73	1.17	1.41	1.54	1.38	0.73	0.64	(0.04)	(4.80)
48	INTEREST EXPENSE	0.02	0.09	0.22	0.24	0.24	1.30	1.42	0.24	90.38
49	MISC EXPENSE	0.13	0.62	1.70	0.00	0.00	0.00	0.00	(0.12)	(98.51)
50	DISCONTIN OWNS	0.00	0.20	0.63	0.00	0.00	0.00	0.00	(0.04)	(87.62)
51	MISC INCOME	0.10	0.10	0.07	0.04	0.39	0.22	0.87	0.10	41.17
53	PRETAX PROFIT	3.19	(2.43)	0.48	1.40	1.51	(1.28)	16.31	1.52	*****
54	INCOME TAXES	1.54	(1.02)	0.30	0.32	0.48	(0.38)	6.69	0.60	*****
55	EXTRAORD LOSS (GAIN)	(0.11)	0.00	(0.03)	(0.07)	0.00	0.00	0.00	0.01	*****
56	NET PROFIT	1.76	(1.41)	0.21	1.15	1.02	(0.90)	9.62	0.91	*****
57	EPS AFTER PRD DIVIDENDS	0.44	(0.47)	0.05	0.29	0.26	(0.30)	1.80	0.17	*****
58	COMMON DIV PER SHARE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Table 3

Monolithic Memories, Inc. FINANCIAL STATEMENT HISTORY 1974-1980 (Percent)

	Fiscal Year Ending September 30								
	1974	1975	1976	1977	1978	1979	1980	TREND	CMPD GR
BALANCE SHEET									
1 CASH & LIQUID SECURITIES	16.76	12.48	9.18	13.76	7.90	6.82	47.38	2.83	6.49
3 RECEIVABLES	32.49	28.16	25.55	37.50	30.27	27.58	19.33	(1.28)	(4.98)
4 INVENTORY	27.62	22.35	43.78	24.99	18.72	17.73	11.56	(2.95)	(13.09)
5 OTHER CURRENT ASSETS	2.47	14.09	1.85	3.44	2.21	0.77	2.91	(0.89)	(16.77)
7 EXCESS FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 TOTAL CURRENT ASSETS	79.35	77.07	80.36	79.69	59.11	52.91	81.17	(2.29)	(3.48)
9 GROSS P P E	30.08	32.84	31.62	33.49	30.99	27.66	15.03	(2.01)	(8.36)
10 ACCUMULATED DEPRECIATION	11.13	11.35	13.01	16.43	13.05	12.43	6.48	(0.42)	(5.01)
11 NET P P E	18.95	21.49	18.61	17.06	17.94	15.23	8.55	(1.59)	(10.52)
12 MISC ASSETS	1.70	1.44	1.03	1.03	0.77	0.49	0.23	(0.23)	(25.98)
13 LEASED EQUIPMENT	0.00	0.00	0.00	2.21	22.18	31.37	10.05	4.11	*****
15 *TOTAL ASSETS*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
16 NOTES PAYABLE	2.22	2.53	1.43	3.65	3.49	4.42	1.37	0.12	2.01
17 ACCOUNTS PAYABLE	16.26	13.78	12.09	13.92	13.03	7.52	8.12	(1.29)	(10.87)
18 ACCRUED TAXES	10.37	0.00	0.70	1.22	0.03	0.00	8.58	(0.22)	(12.49)
19 ACCRUED LIABILITIES	6.84	9.37	10.45	10.86	8.56	7.13	6.88	(0.22)	(2.58)
20 CURR MAT LONG TERM DEBT	1.59	3.75	1.54	2.80	1.25	4.74	0.82	(0.02)	(6.03)
21 CURR OBL CAP LEASE	0.00	0.00	0.00	0.53	4.56	7.60	3.36	1.07	*****
22 TOTAL CURR LIABILITIES	37.29	29.43	26.20	32.98	30.90	31.41	29.12	(0.57)	(1.58)
23 LONG TERM DEBT	2.89	16.85	25.31	2.58	2.23	18.73	2.39	(0.74)	(9.48)
24 DEFERRED TAXES	1.56	0.00	0.00	3.33	4.34	1.10	3.77	0.47	974.82
25 MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26 NON-CURR OBL CAP LEASE	0.00	0.00	0.00	1.72	18.13	23.01	6.77	3.02	*****
27 DEFICIT FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28 TOTAL LIABILITIES	41.73	46.28	51.51	40.62	55.61	74.25	42.06	2.18	3.80
29 PREFERRED STOCK	0.14	0.17	0.14	0.15	0.09	0.06	0.00	(0.02)	(87.73)
30 COMMON STOCK	1.15	1.35	1.17	1.18	0.76	0.50	0.35	(0.16)	(19.11)
31 CAPITAL SURPLUS	45.27	53.14	46.09	46.47	30.09	19.80	43.35	(3.16)	(8.64)
32 RETAINED EARNINGS	11.10	(2.48)	(0.99)	8.75	11.15	3.55	15.11	1.29	*****
33 DIVIDENDS PAYABLE	0.60	1.55	2.08	2.83	2.30	1.82	(0.87)	(0.13)	*****
34 TOTAL EQUITY	58.27	53.72	48.49	59.38	44.39	25.75	57.94	(2.18)	(5.47)
35 *TOTAL LIAB & EQUITY*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
36 NET WORKING CAPITAL	42.06	47.64	54.16	46.71	28.20	21.49	52.05	(1.72)	(5.57)
INCOME & EXPENSE									
38 SALES	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00
40 COST OF GOODS	57.83	76.75	47.45	53.82	57.81	66.06	49.67	(1.27)	(1.98)
41 GROSS PROFIT	42.17	23.25	52.55	46.18	42.19	33.94	50.33	1.27	3.89
42 S G & A EXPENSE	12.76	16.21	20.09	22.23	20.90	20.22	17.72	0.85	5.38
43 R & D EXPENDITURES	7.15	6.96	6.48	7.92	10.51	5.72	5.19	(0.15)	(3.05)
45 OPERATING PROFIT	22.25	0.08	25.97	16.04	10.78	8.00	27.42	0.58	37.28
46 DEPRECIATION	2.52	2.83	3.07	2.62	2.33	6.55	4.71	0.47	12.42
47 LEASE PAYMENTS	3.64	6.96	7.38	6.58	4.27	1.98	0.83	(0.77)	(23.52)
48 INTEREST EXPENSE	0.10	0.54	1.17	1.02	0.74	3.54	1.84	0.38	52.96
49 MISC EXPENSE	0.65	3.67	8.90	0.00	0.00	0.00	0.00	(0.65)	(98.96)
50 DISCONTIN OPNS	0.00	1.19	3.28	0.00	0.00	0.00	0.00	(0.20)	(89.72)
51 MISC INCOME	0.52	0.62	0.34	0.17	1.21	0.60	1.13	0.09	13.42
53 PRETAX PROFIT	15.86	(14.49)	2.50	5.99	4.64	(3.47)	21.17	1.43	*****
54 INCOME TAXES	7.67	(6.11)	1.58	1.38	1.49	(1.03)	8.68	0.47	*****
55 EXTRAORD LOSS (GAIN)	(0.57)	0.00	(0.17)	(0.30)	0.00	0.00	0.00	0.07	*****
56 NET PROFIT	8.76	(8.38)	1.09	4.91	3.16	(2.44)	12.49	0.90	*****
57 EPS AFTER PFD DIVIDENDS	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

Source: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Table 4

**Monolithic Memories, Inc.
FUNDS FLOW HISTORY 1975-1980
(Millions of Dollars)**

	Fiscal Year Ending September 30							
	1975	1976	1977	1978	1979	1980	TREND	CHNG GR
SOURCES								
56 NET PROFIT	(1.41)	0.21	1.15	1.02	(0.90)	9.62	1.48	*****
46 DEPRECIATION	0.48	0.59	0.61	0.76	2.41	3.63	0.61	51.77
61 NEW LONG TERM DEBT	1.65	1.35	0.00	0.31	5.72	0.00	0.15	(90.46)
62 NEW EQUITY	(0.07)	(0.08)	(0.08)	(0.05)	(0.07)	24.93	3.57	*****
63 INCR OTHER LIABILITIES	(0.18)	0.00	0.56	3.28	2.43	1.05	0.46	*****
66 TOTAL SOURCES	0.47	2.08	2.24	5.32	9.60	39.23	6.27	119.97
USES								
67 P P E EXPENDITURES	0.40	0.59	0.43	1.94	3.31	5.59	1.02	76.22
68 REPAYMENT LONG TERM DEBT	0.18	0.36	2.38	0.31	0.21	3.88	0.46	39.97
69 PREFERRED DIVIDENDS	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
72 INCR WORKING CAPITAL	0.02	1.23	(0.73)	(0.41)	1.79	29.83	4.32	*****
71 INCR OTHER ASSETS	(0.05)	(0.02)	0.24	3.56	4.36	(1.16)	0.31	*****
74 TOTAL USES	0.55	2.16	2.32	5.41	9.68	38.15	6.10	113.50
75 EXCESS/DEFICIT	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

Source: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Table 5

Monolithic Memories, Inc. FINANCIAL RATIO HISTORY 1974-1980

Fiscal Year Ending September 30									
	1974	1975	1976	1977	1978	1979	1980	ST AV	WTD AVG
LIQUIDITY									
1 CURRENT RATIO	2.128	2.619	3.067	2.416	1.913	1.684	2.787	2.374	2.336
2 QUICK RATIO	1.321	1.381	1.325	1.554	1.235	1.095	2.290	1.457	1.538
3 CASH RATIO	0.450	0.424	0.350	0.417	0.256	0.217	1.627	0.534	0.642
4 WORKING CAPITAL/SALES	0.235	0.272	0.313	0.219	0.148	0.152	0.468	0.258	0.269
6 DAYS RECEIVABLES	66.288	58.744	53.928	64.112	58.117	71.162	63.488	62.263	62.999
7 DAYS INVENTORY	97.448	60.744	194.766	79.391	62.153	69.250	76.428	91.454	85.074
LEVERAGE									
8 LONG TERM DEBT/CAPITALIZ	0.047	0.239	0.343	0.042	0.048	0.421	0.040	0.168	0.170
11 LONG TERM DEBT/EQUITY	0.050	0.314	0.522	0.043	0.050	0.728	0.041	0.250	0.262
12 TOTAL DEBT/EQUITY	0.115	0.430	0.583	0.152	0.157	1.084	0.079	0.371	0.399
COVERAGE									
13 EBIT/INTEREST	152.905	(25.703)	3.148	6.899	7.305	0.021	12.510	22.441	9.384
14 FIXED CHARGE COVERAGE	5.242	(0.932)	1.293	1.788	1.929	0.372	8.944	2.662	3.175
16 REPAY LTD+PIX CHARGE COV *****		(0.816)	1.060	1.632	1.622	0.337	5.588	1.571	2.281
OPER PERFORMANCE									
17 GROSS PROFIT/SALES	0.422	0.232	0.525	0.462	0.422	0.339	0.503	0.415	0.428
18 OPER PROFIT/SALES	0.223	0.001	0.260	0.160	0.108	0.080	0.274	0.158	0.164
21 PRETAX PROFIT/SALES	0.159	(0.145)	0.025	0.060	0.046	(0.035)	0.212	0.046	0.060
22 NET PROFIT/SALES	0.088	(0.084)	0.011	0.049	0.032	(0.024)	0.125	0.028	0.037
23 NET PROFIT/AVG EQUITY *****		(0.240)	0.040	0.194	0.145	(0.126)	0.411	0.071	0.135
24 NET PROFIT/AVG CAPITALIZ *****		(0.206)	0.028	0.154	0.139	(0.092)	0.360	0.064	0.122
26 NET PROFIT/AVG TOT ASSETS*****		(0.135)	0.020	0.104	0.073	(0.042)	0.202	0.037	0.072
27 E P S GROWTH RATE *****		*****	*****	4.504	(0.111)	*****	*****	*****	*****
28 SALES GROWTH RATE *****		(0.166)	0.141	0.225	0.385	0.133	1.095	0.302	0.455
TURNOVER									
31 SALES/AVG EQUITY *****		2.867	3.638	3.944	4.604	5.155	3.288	3.916	4.090
32 SALES/AVG CAPITALIZ *****		2.459	2.562	3.132	4.397	3.768	2.886	3.201	3.368
33 SALES/AVG TOT DEBT + EQTY*****		2.286	2.412	2.929	3.987	3.239	2.689	2.924	3.056
34 SALES/AVG TOTAL ASSETS *****		1.610	1.853	2.127	2.314	1.708	1.616	1.871	1.866
35 SALES/AVG OPER ASSETS *****		1.636	1.876	2.173	2.730	2.383	1.928	2.121	2.205
36 SALES/AVG GROSS P P E *****		5.137	5.756	6.533	7.239	5.894	8.748	6.551	7.008
BALANCE SHEET									
37 CASH/SALES	0.094	0.071	0.053	0.064	0.042	0.048	0.426	0.114	0.148
38 RCEIVABLES/SALES	0.182	0.161	0.148	0.176	0.159	0.195	0.174	0.171	0.173
41 INVENTORY/SALES	0.154	0.128	0.253	0.117	0.098	0.125	0.104	0.140	0.129
42 OTH CURR ASSETS/SALES	0.014	0.081	0.011	0.016	0.012	0.005	0.026	0.024	0.020
44 GROSS P P E/SALES	0.168	0.188	0.183	0.157	0.163	0.196	0.135	0.170	0.165
45 LINE 13/SALES	0.000	0.000	0.000	0.010	0.117	0.222	0.090	0.063	0.092
46 MISC ASSETS/SALES	0.009	0.008	0.006	0.005	0.004	0.003	0.002	0.005	0.004
47 ACCOUNTS PAYABLE/SALES	0.091	0.079	0.070	0.065	0.069	0.053	0.073	0.071	0.068
48 ACCRUED TAXES/SALES	0.058	0.000	0.004	0.006	0.000	0.000	0.077	0.021	0.023
51 ACCRUED LIABILITY/SALES	0.038	0.054	0.060	0.051	0.045	0.050	0.062	0.051	0.053
52 LINE 21/SALES	0.000	0.000	0.000	0.002	0.024	0.054	0.030	0.016	0.024
53 DEFERRED TAXES/SALES	0.009	0.000	0.000	0.016	0.023	0.008	0.034	0.013	0.017
54 MISC LIABILITIES/SALES	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	0.008	0.095	0.163	0.061	0.047	0.068
MISCELLANEOUS									
57 EQUITY PER COMMON SHARE	1.624	1.733	1.359	1.652	1.920	2.051	7.514	2.550	3.224
58 RETIRE/PREV GROSS P P E *****		(0.189)	(0.075)	(0.071)	(0.091)	(0.265)	(0.329)	(0.170)	(0.201)
61 DEPREC/PREV GROSS P P E *****		0.140	0.187	0.175	0.206	0.455	0.504	0.278	0.341
62 COM DIVS/ERN-PFD DIVS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
63 TAX RATE	0.484	0.422	0.630	0.231	0.321	0.296	0.410	0.399	0.371
64 COST OF GOODS/SALES	0.578	0.768	0.475	0.538	0.578	0.661	0.497	0.585	0.572
65 S G & A/SALES	0.128	0.162	0.201	0.222	0.209	0.202	0.177	0.186	0.194

Source: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Monolithic Memories, Inc.
1165 E. Arques Ave.
Sunnyvale, California 94086
Telephone: (408) 739-3535
(Millions of Dollars Except Per Share Data)

Balance Sheet (September 28)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Working Capital	\$ 4.81	\$ 5.59	\$36.09	\$29.07	\$19.99
Long-Term Debt	\$ 0.38	\$ 4.87	\$ 1.66	\$ 3.52	\$ 2.34
Shareholders' Equity	\$ 7.58	\$ 6.69	\$40.17	\$50.29	\$53.83
After-Tax Return on Average Equity (%)	14.53	(12.58)	41.49	15.41	5.38

Operating Performance (Fiscal Year Ending September 28)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Revenue	\$32.84	\$37.00	\$77.90	\$76.31	\$68.60
U.S. Revenue	\$22.99	\$25.16	\$49.86	\$50.22	\$45.28
Non-U.S. Revenue	\$ 9.85	\$11.84	\$28.04	\$26.09	\$23.32
Cost of Revenue	\$19.83	\$27.43	\$42.53	\$47.48	\$46.66
R&D Expense	\$ 4.48	\$ 2.10	\$ 4.00	\$ 5.89	\$ 9.83
Marketing Expense	\$ 4.98	\$ 4.87	\$ 7.51	\$ 8.70	\$10.18
G&A Expense	\$ 1.80	\$ 2.56	\$ 6.13	\$ 5.97	\$ 4.97
Pretax Income	\$ 1.51	\$(1.28)	\$16.31	\$11.24	\$ 0.80
Pretax Margin (%)	4.6	(3.4)	20.9	14.7	1.2
Effective Tax Rate (%)	32.1	N/A	41.0	38.0	N/A
Net Income	\$ 1.02	\$(0.90)	\$ 9.62	\$ 6.97	\$ 2.80
Average Shares Outstanding (Millions)	3.94	3.26	5.17	6.52	6.74
Per Share Data					
Earnings	\$ 0.26	\$(0.30)	\$ 1.80	\$ 1.07	\$ 0.42
Dividends	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Book Value	\$ 1.92	\$ 2.05	\$ 7.49	\$ 7.71	\$ 7.99
Price Range	N/A	N/A	\$21.00-	\$10.25-	9.75-
	N/A	N/A	28.50	32.25	16.00
Total Employees	1,627	N/A	2,578	2,241	2,700
Capital Expenditures*	\$ 4.50	\$ 7.68	\$ 4.82	\$16.86	\$27.52

*Includes additions to equipment under capital leases
N/A = Not Applicable

Source: Monolithic Memories, Inc.,
Annual Reports and Forms 10-K
DATAQUEST

Monolithic Memories, Inc.

Table 1A

Monolithic Memories, Inc.
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

	Fiscal Year Ending September 30				
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
PROMs*	\$27.02	\$24.71	\$47.26	\$45.0	\$34.0
PAL™	.01	1.77	6.34	10.0	20.0
FIFOs	1.95	2.16	7.33	6.6	5.0
Interface	0.68	4.30	10.98	8.5	4.5
Arithmetic Elements	0.27	0.71	1.45	1.5	1.6
Other**	<u>2.52</u>	<u>3.12</u>	<u>3.67</u>	<u>4.7</u>	<u>3.5</u>
Total	\$32.45	\$36.77	\$77.03	\$76.3	\$68.6

Table 1B

Monolithic Memories, Inc.
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

	Calendar Years				
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
PROMs*	\$27.0	\$30.0	\$55.0	\$40.0	\$31.0
PAL™	0.5	2.5	8.0	12.0	22.0
FIFOs	2.0	3.0	8.5	5.5	5.0
Interface	1.5	7.0	10.5	5.5	4.0
Arithmetic Elements	0.5	1.0	1.5	1.5	1.5
Other**	<u>2.5</u>	<u>3.0</u>	<u>3.4</u>	<u>3.3</u>	<u>3.5</u>
Total	\$34.0	\$46.5	\$86.9	\$67.8	\$67.0

*Includes bipolar PROMs and read-only memories, the latter accounting for approximately 27%, 27%, 22%, and 11% for such amounts from 1977 to 1980.

**Includes various memory and logic circuits and subcontract assembly services.

Source: Monolithic Memories, Inc.
Forms 10-K
DATAQUEST, Inc.

Monolithic Memories, Inc.

Table 2

Monolithic Memories, Inc. FINANCIAL STATEMENT HISTORY 1975-1982* (Millions of Dollars)

	Fiscal Year Ending 30 September									
	1975	1976	1977	1978	1979	1980	1981	1982	TREND	CHG. GR.
BALANCE SHEET										
1 CASH & LIQUID SECURITIES	1.20	1.01	1.51	1.35	1.77	32.85	23.38	5.96	2.85	54.32
2 RECEIVABLES	2.70	2.83	4.12	5.17	7.17	13.40	9.30	10.67	1.40	26.05
3 INVENTORY	2.14	4.84	2.74	3.19	4.61	8.01	11.28	15.50	1.70	29.42
4 OTHER CURRENT ASSETS	1.35	0.21	0.38	0.38	0.20	2.02	2.37	7.24	0.68	40.20
5 EXCESS FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 TOTAL CURRENT ASSETS	7.39	8.89	8.75	10.09	13.75	56.28	46.33	39.37	6.64	36.05
7 GROSS P P S	3.15	3.50	3.68	5.29	7.19	10.42	27.18	64.46	6.78	51.36
8 ACCUMULATED DEPRECIATION	1.09	1.44	1.80	2.23	3.23	4.49	7.12	18.66	1.91	44.63
9 NET P P S	2.06	2.06	1.87	3.06	3.96	5.93	20.06	45.80	4.87	54.99
10 MISC ASSETS	0.14	0.11	0.11	0.13	0.13	0.16	0.78	0.91	0.11	32.82
11 LEASED EQUIPMENT-NET	0.00	0.00	0.24	3.79	8.16	6.97	4.66	0.00	0.57	328.06
12 CASH TRUST FOR CONST	0.00	0.00	0.00	0.00	0.00	0.00	4.13	0.00	0.25	273.60
13 *TOTAL ASSETS*	9.59	11.06	10.98	17.07	26.00	69.33	75.96	86.08	12.43	44.55
14 NOTES PAYABLE	0.24	0.16	0.40	0.60	1.15	0.95	4.66	3.87	0.60	60.11
15 ACCOUNTS PAYABLE	1.32	1.34	1.53	2.22	1.95	5.63	3.80	7.05	0.77	27.98
16 ACCRUED TAXES	0.00	0.08	0.13	0.01	0.00	5.95	0.64	0.07	0.25	384.87
17 ACCRUED LIABILITIES	0.90	1.16	1.19	1.46	1.85	4.77	4.66	5.22	0.70	32.56
18 CURR MAT LONG TERM DEBT	0.36	0.17	0.31	0.21	1.23	0.57	1.14	1.12	0.14	28.53
19 CURR OBL CAP LEASE	0.00	0.00	0.06	0.27	1.98	2.33	2.36	2.06	0.41	2349.71
20 TOTAL CURR LIABILITIES	2.82	2.90	3.62	5.77	8.17	20.19	17.26	19.38	2.66	39.57
21 LONG TERM DEBT	1.61	2.80	0.28	0.38	4.87	1.66	3.52	2.34	0.21	14.78
22 DEFERRED TAXES	0.00	0.00	0.37	0.74	0.29	2.62	2.54	4.81	0.63	2367.53
23 MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 NON-CURR OBL CAP LEASE	0.00	0.00	0.19	3.09	5.98	4.70	2.36	5.72	0.81	2556.64
25 DEFICIT FUNDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26 TOTAL LIABILITIES	4.44	5.70	4.46	9.48	19.30	29.16	25.68	32.26	4.51	39.16
27 PREFERRED STOCK	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	(94.83)
28 COMMON STOCK	0.13	0.13	0.13	0.13	0.13	0.24	0.25	0.26	0.02	12.84
29 CAPITAL SURPLUS	5.09	5.10	5.10	5.14	5.15	30.05	32.59	33.32	4.88	39.14
30 RETAINED EARNINGS	(0.24)	(0.11)	0.96	1.90	0.92	10.48	17.45	20.25	3.08	*****
31 DIVIDENDS PAYABLE	0.15	0.23	0.31	0.39	0.47	(0.61)	0.00	0.00	(0.06)	*****
32 TOTAL EQUITY	5.15	5.36	6.52	7.58	6.69	40.17	50.29	53.83	7.92	48.03
33 *TOTAL LIAB & EQUITY*	9.59	11.06	10.98	17.07	26.00	69.33	75.96	86.08	12.43	44.55
34 NET WORKING CAPITAL	4.57	5.99	5.13	4.81	5.59	36.09	29.07	19.99	3.77	33.45
INCOME & EXPENSE										
35 SALES	16.77	19.13	23.43	32.45	36.78	77.03	76.31	68.60	9.69	27.60
36 COST OF GOODS	12.87	9.08	12.61	18.76	24.29	38.26	41.80	39.55	5.15	25.51
37 GROSS PROFIT	3.90	10.05	10.82	13.69	12.49	38.77	34.50	29.05	4.54	33.01
38 S G & A EXPENSE	2.72	3.84	5.21	6.78	7.44	13.65	14.67	15.15	1.99	29.48
39 R & D EXPENSE	1.17	1.24	1.85	3.41	2.10	4.00	5.89	9.83	1.06	33.91
40 OPERATING PROFIT	0.01	4.97	3.76	3.50	2.94	21.12	13.95	4.07	1.49	81.09
41 DEPRECIATION	0.48	0.59	0.61	0.76	2.41	3.63	5.01	6.42	0.89	52.46
42 LEASE PAYMENTS	1.17	1.41	1.54	1.38	0.73	0.64	0.66	0.70	(0.12)	(11.98)
43 INTEREST EXPENSE	0.09	0.22	0.24	0.24	1.30	1.42	1.15	1.76	0.25	53.45
44 MISC EXPENSE	0.62	1.70	0.00	0.00	0.00	0.00	(3.03)	(5.60)	(0.80)	*****
45 DISCONT OPNS	0.20	0.63	0.00	0.00	0.00	0.00	0.00	0.00	(0.05)	(93.91)
46 MISC INCOME	0.10	0.07	0.04	0.39	0.22	0.87	1.08	0.00	0.08	(71.86)
47 PRETAX PROFIT	(2.43)	0.48	1.40	1.51	(1.28)	16.31	11.24	0.80	1.41	*****
48 INCOME TAXES	(1.02)	0.30	0.32	0.48	(0.38)	6.69	4.27	(2.00)	0.37	*****
49 EXTRAORD LOSS (GAIN)	0.00	(0.03)	(0.07)	0.00	0.00	0.00	0.00	0.00	0.00	*****
50 NET PROFIT	(1.41)	0.21	1.15	1.02	(0.90)	9.62	6.97	2.80	1.03	*****
51 EPS AFTER PFD DIVIDENDS	(0.47)	0.05	0.29	0.26	(0.30)	1.80	1.07	0.42	0.18	*****
52 COMMON DIV PER SHARE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*Beginning 1982, gross value of leased equipment and accumulated depreciation thereon have been rolled into lines 9 and 10, respectively.

Source: Monolithic Memories, Inc.
Annual Reports and Forms 10-K
DATAQUEST

Monolithic Memories, Inc.

Table 3

Monolithic Memories, Inc. FINANCIAL STATEMENT HISTORY 1975-1982* (Percent)

	Fiscal Year Ending 30 September									
	1975	1976	1977	1978	1979	1980	1981	1982	TREND	CHGD CR
BALANCE SHEET										
1 CASH & LIQUID SECURITIES	12.48	9.18	13.76	7.90	6.82	47.38	30.78	6.93	2.01	6.76
3 RECEIVABLES	28.16	25.55	37.50	30.27	27.58	19.33	12.24	12.39	(2.79)	(12.80)
4 INVENTORY	22.35	43.78	24.99	18.72	17.73	11.56	14.65	18.01	(2.57)	(10.46)
5 OTHER CURRENT ASSETS	14.09	1.85	3.44	2.21	0.77	2.91	3.12	8.41	(0.43)	(3.01)
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	77.07	80.36	79.69	58.11	52.91	81.17	60.99	45.74	(3.78)	(5.88)
9 GROSS P P & E	32.84	31.62	33.49	30.99	27.66	15.03	35.78	74.88	3.05	4.71
10 ACCUMULATED DEPRECIATION	11.35	13.01	16.43	13.05	12.43	6.48	9.37	21.68	0.28	0.06
11 NET P P & E	21.49	18.61	17.06	17.94	15.23	8.55	26.41	53.20	2.77	7.22
12 MISC ASSETS	1.44	1.03	1.03	0.77	0.49	0.23	1.03	1.06	(0.06)	(8.11)
13 LEASED EQUIPMENT-NET	0.00	0.00	2.21	22.18	31.37	10.05	6.13	0.00	0.75	305.36
14 CASH TRUST FOR CONST	0.00	0.00	0.00	0.00	0.00	0.00	5.44	0.00	0.32	279.78
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	2.53	1.43	3.65	3.49	4.42	1.37	6.13	4.50	0.37	10.76
17 ACCOUNTS PAYABLE	13.78	12.09	13.92	13.03	7.52	8.12	5.00	8.19	(1.16)	(11.46)
18 ACCRUED TAXES	0.00	0.70	1.22	0.03	0.00	8.58	0.85	0.08	0.28	301.33
19 ACCRUED LIABILITIES	9.37	10.45	10.86	8.56	7.13	8.68	6.13	6.06	(0.69)	(8.29)
20 CURR MAT LONG TERM DEBT	3.75	1.54	2.80	1.25	4.74	0.82	1.50	1.30	(0.23)	(11.08)
21 CURR OBL CAP LEASE	0.00	0.00	0.53	4.56	7.80	3.36	3.11	2.39	0.52	2287.34
22 TOTAL CURR LIABILITIES	29.43	26.20	32.98	30.90	31.41	29.12	22.72	22.52	(0.91)	(3.44)
23 LONG TERM DEBT	16.85	25.31	2.58	2.23	18.73	2.39	4.63	2.72	(2.22)	(20.59)
24 DEFERRED TAXES	0.00	0.00	3.33	4.34	1.10	3.77	3.34	5.59	0.84	2266.06
25 MISC LIABILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26 NON-CURR OBL CAP LEASE	0.00	0.00	1.72	18.13	23.01	6.77	3.11	6.65	0.98	2447.40
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	46.28	51.51	40.82	55.61	74.25	42.06	33.80	37.47	(1.51)	(3.73)
29 PREFERRED STOCK	0.17	0.14	0.15	0.09	0.06	0.00	0.00	0.00	(0.03)	(98.57)
30 COMMON STOCK	1.35	1.17	1.18	0.76	0.50	0.35	0.33	0.30	(0.17)	(21.94)
31 CAPITAL SURPLUS	53.14	46.09	46.47	30.09	19.80	43.35	42.90	38.71	(1.63)	(3.74)
32 RETAINED EARNINGS	(2.48)	(0.99)	8.75	11.15	3.55	15.11	22.97	23.52	3.73	*****
33 DIVIDENDS PAYABLE	1.55	2.08	2.83	2.30	1.82	(0.87)	0.00	0.00	(0.39)	*****
34 TOTAL EQUITY	53.72	48.49	59.38	44.39	25.75	57.94	66.20	62.53	1.51	2.41
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	47.64	54.16	46.71	28.20	21.49	52.05	38.27	23.22	(2.87)	(7.68)
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	76.75	47.45	53.82	57.81	66.06	49.67	54.78	57.65	(1.21)	(1.64)
41 GROSS PROFIT	23.25	52.55	46.18	42.19	33.94	50.33	45.22	42.35	1.21	4.24
42 S G & A EXPENSE	16.21	20.09	22.23	20.90	20.22	17.72	19.22	22.08	0.27	1.47
43 R & D EXPENSE	6.96	6.44	7.92	10.51	5.72	5.19	7.72	14.33	0.53	4.94
45 OPERATING PROFIT	0.08	25.97	16.04	10.78	8.00	27.42	18.28	5.94	0.40	41.92
46 DEPRECIATION	2.83	3.07	2.62	2.33	6.55	4.71	6.57	9.35	0.88	19.48
47 LEASE PAYMENTS	6.96	7.38	8.58	4.27	1.98	0.83	0.86	1.02	(1.12)	(31.01)
48 INTEREST EXPENSE	0.54	1.17	1.02	0.74	3.54	1.84	1.51	2.56	0.25	20.26
49 MISC EXPENSE	3.67	8.90	0.00	0.00	0.00	0.00	(3.97)	(8.16)	(1.75)	*****
50 DISCONT OPS	1.18	3.29	0.00	0.00	0.00	0.00	0.00	0.00	(0.30)	(95.25)
51 MISC INCOME	0.62	0.34	0.17	1.21	0.60	1.13	1.42	0.00	0.04	(78.63)
53 PRETAX PROFIT	(14.49)	2.50	5.99	4.64	(3.47)	21.17	14.73	1.17	2.48	*****
54 INCOME TAXES	(6.11)	1.58	1.38	1.49	(1.03)	8.68	5.60	(2.92)	0.74	*****
55 EXTRAORD LOSS (GAIN)	0.00	(0.17)	(0.30)	0.00	0.00	0.00	0.00	0.00	0.02	*****
56 NET PROFIT	(8.38)	1.09	4.91	3.16	(2.44)	12.49	9.13	4.08	1.72	*****
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

*Beginning 1982, gross value of leased equipment and accumulated depreciation thereon have been rolled into lines 9 and 10, respectively.

Source: Monolithic Memories, Inc.
Annual Reports and Forms 10-K
DATAQUEST

Monolithic Memories, Inc.

Table 4

Monolithic Memories, Inc. FUNDS FLOW HISTORY 1976-1982* (Millions of Dollars)

	Fiscal Year Ending 30 September								
	1976	1977	1978	1979	1980	1981	1982	TREND	CNPD GR
SOURCES									
56 NET PROFIT	0.21	1.15	1.02	(0.90)	9.62	6.97	2.80	1.00	*****
46 DEPRECIATION	0.59	0.61	0.78	2.41	3.63	5.01	6.42	1.04	58.74
61 NEW LONG TERM DEBT	1.35	0.00	0.31	5.72	0.00	3.00	0.00	0.06	(75.16)
62 NEW EQUITY	(0.08)	(0.08)	(0.05)	(0.07)	24.93	2.54	0.74	1.17	*****
63 INCR OTHER LIABILITIES	0.00	0.56	3.28	2.43	1.05	(2.41)	5.63	0.31	*****
66 TOTAL SOURCES	2.08	2.24	5.32	9.60	39.23	15.11	15.59	3.58	52.75
USES									
67 P P E EXPENDITURES	0.59	0.43	1.94	3.31	5.59	19.15	32.16	4.65	109.24
68 REPAYMENT LONG TERM DEBT	0.36	2.38	0.31	0.21	3.68	0.57	1.20	0.09	12.42
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	1.23	(0.73)	(0.41)	1.79	29.83	(6.44)	(9.10)	(0.44)	*****
71 INCR OTHER ASSETS	(0.02)	0.24	3.56	4.36	(1.16)	2.45	(8.66)	(0.94)	*****
74 TOTAL USES	2.16	2.32	5.41	9.68	38.15	15.72	15.59	3.57	51.94
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

*Beginning 1982, gross value of leased equipment and accumulated depreciation thereon have been rolled into lines 9 and 10, respectively.

Source: Monolithic Memories, Inc.
Annual Reports and Forms 10-K
DATAQUEST

Monolithic Memories, Inc.

Table 5

Monolithic Memories, Inc. FINANCIAL RATIO HISTORY 1975-1982*

	Fiscal Year Ending 30 September									
	1975	1976	1977	1978	1979	1980	1981	1982	ST AV	WTD AVG
LIQUIDITY										
1 CURRENT RATIO	2.619	3.067	2.416	1.913	1.694	2.787	2.684	2.031	2.400	2.329
2 QUICK RATIO	1.381	1.325	1.554	1.235	1.095	2.290	1.893	0.858	1.454	1.471
3 CASH RATIO	0.424	0.350	0.417	0.256	0.217	1.627	1.355	0.308	0.619	0.727
4 WORKING CAPITAL/SALES	0.272	0.313	0.219	0.148	0.152	0.468	0.381	0.291	0.281	0.298
6 DAYS RECEIVABLES	58.744	53.928	64.112	58.117	71.162	63.488	44.464	56.768	58.848	56.154
7 DAYS INVENTORY	60.744	194.766	79.391	62.153	69.250	76.428	98.512	143.072	98.040	99.335
LEVERAGE										
8 LONG TERM DEBT/CAPITALIZ	0.239	0.343	0.042	0.048	0.421	0.040	0.065	0.042	0.135	0.122
11 LONG TERM DEBT/EQUITY	0.314	0.522	0.043	0.050	0.728	0.041	0.070	0.043	0.226	0.178
12 TOTAL DEBT/EQUITY	0.430	0.583	0.152	0.157	1.084	0.079	0.185	0.136	0.351	0.304
COVERAGE										
13 EBIT/INTEREST (25.703)	3.148	6.099	7.305	0.021	12.510	10.772	1.456	2.051	5.354	
14 FIXED CHARGE COVERAGE (0.932)	1.293	1.788	1.929	0.372	8.944	7.219	1.326	2.792	3.650	
16 REPAY LTD-FIX CHARGE COV	1.060	1.632	1.622	0.337	5.588	5.497	0.905	2.377	2.779	
OPER PERFORMANCE										
17 GROSS PROFIT/SALES	0.232	0.525	0.462	0.422	0.339	0.503	0.452	0.423	0.420	0.434
18 OPER PROFIT/SALES	0.001	0.260	0.160	0.108	0.080	0.274	0.183	0.059	0.141	0.145
21 PRETAX PROFIT/SALES (0.145)	0.025	0.060	0.060	0.046	(0.035)	0.212	0.147	0.012	0.040	0.069
22 NET PROFIT/SALES (0.084)	0.011	0.049	0.032	(0.024)	0.125	0.091	0.041	0.030	0.050	
23 NET PROFIT/AVG EQUITY	0.040	0.194	0.145	(0.126)	0.411	0.154	0.034	0.124	0.133	
24 NET PROFIT/AVG CAPITALIZ	0.028	0.154	0.139	(0.092)	0.360	0.146	0.051	0.112	0.122	
26 NET PROFIT/AVG TOT ASSETS	0.020	0.104	0.073	(0.042)	0.202	0.096	0.035	0.070	0.075	
27 S P S GROWTH RATE	4.504	(0.111)	(0.111)	(0.407)	(0.407)	(0.407)	(0.407)	(0.407)	(0.407)	
28 SALES GROWTH RATE	0.141	0.225	0.385	0.133	1.095	(0.009)	(0.101)	0.267	0.250	
TURNOVER										
31 SALES/AVG EQUITY	3.638	3.944	4.604	5.155	3.288	1.687	1.318	3.376	2.919	
32 SALES/AVG CAPITALIZ	2.562	3.132	4.397	3.768	2.888	1.596	1.248	2.798	2.494	
33 SALES/AVG TOT DEBT + EQUITY	2.412	2.929	3.987	3.239	2.589	1.483	1.136	2.554	2.267	
34 SALES/AVG TOTAL ASSETS	1.853	2.127	2.314	1.708	1.616	1.050	0.847	1.645	1.435	
35 SALES/AVG OPER ASSETS	1.876	2.173	2.730	2.383	1.928	1.187	0.905	1.883	1.680	
36 SALES/AVG GROSS P P E	5.756	6.533	7.239	5.894	8.748	4.059	1.497	5.675	5.096	
BALANCE SHEET										
37 CASH/SALES	0.071	0.053	0.064	0.042	0.048	0.426	0.306	0.087	0.137	0.172
38 RECEIVABLES/SALES	0.161	0.148	0.176	0.159	0.195	0.174	0.122	0.156	0.161	0.159
41 INVENTORY/SALES	0.128	0.253	0.117	0.098	0.125	0.104	0.148	0.226	0.150	0.152
42 OTH CURR ASSETS/SALES	0.081	0.011	0.016	0.012	0.005	0.026	0.031	0.106	0.036	0.040
44 GROSS P P E/SALES	0.188	0.183	0.157	0.163	0.196	0.135	0.356	0.940	0.290	0.374
45 LINE 13/SALES	0.000	0.000	0.010	0.117	0.222	0.090	0.061	0.000	0.063	0.072
46 MISC ASSETS/SALES	0.008	0.006	0.005	0.004	0.003	0.002	0.010	0.013	0.007	0.007
47 ACCOUNTS PAYABLE/SALES	0.079	0.070	0.065	0.068	0.053	0.073	0.050	0.103	0.070	0.071
48 ACCRUED TAXES/SALES	0.000	0.004	0.006	0.000	0.000	0.077	0.008	0.001	0.012	0.015
51 ACCRUED LIABILITY/SALES	0.054	0.060	0.051	0.045	0.050	0.062	0.061	0.076	0.057	0.060
52 LINE 21/SALES	0.000	0.000	0.002	0.024	0.054	0.030	0.031	0.030	0.021	0.028
53 DEFERRED TAXES/SALES	0.000	0.000	0.016	0.023	0.008	0.034	0.033	0.070	0.023	0.033
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	0.008	0.095	0.163	0.061	0.031	0.083	0.055	0.069
MISCELLANEOUS										
57 EQUITY PER COMMON SHARE	1.733	1.359	1.652	1.920	2.226	7.514	7.709	7.983	4.012	5.309
58 RETIRE/PREV GROSS P P E	(0.075)	(0.071)	(0.071)	(0.091)	(0.265)	(0.329)	(0.229)	0.189	(0.125)	(0.116)
61 DEPREC/PREV GROSS P P E	0.187	0.175	0.206	0.206	0.455	0.504	0.441	0.236	0.321	0.358
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	0.422	0.630	0.231	0.321	0.296	0.410	0.380	(2.497)	0.024	(0.270)
64 COST OF GOODS/SALES	0.768	0.475	0.538	0.578	0.661	0.497	0.548	0.577	0.580	0.566
65 S G & A/SALES	0.162	0.201	0.222	0.209	0.202	0.177	0.192	0.221	0.198	0.201

*Beginning 1982, gross value of leased equipment and accumulated depreciation thereon have been rolled into lines 9 and 10, respectively.

Source: Monolithic Memories, Inc.
Annual Reports and Forms 10-K
DATAQUEST

Monsanto Company

THE COMPANY

Background and Overview

Monsanto Company was founded in 1901 in Saint Louis, Missouri, U.S.A. Since that time, it has developed into a multinational company engaged in researching, manufacturing, and marketing a widely diversified range of products, which are reported under the following eight business segments:

- Agricultural products
- Biological sciences
- Electronic materials and fabricated products
- Fibers and intermediates
- Industrial chemicals
- Polymer products
- Fisher controls
- Oil and gas

The Company has worldwide sales representation through district offices or sales agents in more than 65 countries, selling to approximately 100 nations.

Monsanto has 136 manufacturing plants placed in strategic locations around the world. In Western Europe, the Company operates 6 plants, has 28 sales offices, has a major technical center in Belgium, and employs some 4,000 people.

As part of a current restructuring program, the Company is now broadening its base in the drug and health-care business. It recently announced that it had entered into an agreement to acquire G.D. Searle and Co., a transaction valued at some \$2,800 million. In doing this, Monsanto will be obtaining an important and established pharmaceutical business not only for research and development, but also in terms of its existing distribution network and regulatory approval organization, which could efficiently commercialize drugs being researched by the Company. To help finance this purchase, Monsanto intends to accelerate its present rationalization program, including the sale of the Company's oil and gas assets.

Monsanto Company

Another business segment that Monsanto is stressing is the micro-electronics industry, where the Company is a prominent supplier of electronic-grade silicon substrate material to the semiconductor industry. The Company has begun construction of a new manufacturing and research facility in the United Kingdom and a new manufacturing facility in Korea, and it has announced plans for manufacturing and research investment in Japan. All three facilities are scheduled to be completed in 1986, thus making Monsanto a local supplier of silicon in these major world regions.

Operations

The Monsanto Company has its corporate headquarters in Saint Louis, Missouri, U.S.A.

In 1984, the Company employed approximately 50,000 persons worldwide. An estimated 26 percent were employed outside the United States, with 9 percent working in Western Europe.

Monsanto Electronic Materials Company (MEMC) handles the manufacturing and marketing of silicon-wafer products used in the fabrication of integrated circuits and other semiconductors. The headquarters of MEMC are in Palo Alto, California, U.S.A. Plants and laboratories/technical centers are located throughout the world, as follows:

- United States
 - Plants
 - Saint Peters, Missouri
 - Spartanburg, South Carolina
 - Labs/Tech. Centers
 - Saint Louis, Missouri
 - Saint Peters, Missouri
 - Service Center
 - Oakmead, California
- Malaysia
 - Plant
 - Kuala Lumpur
- South Korea
 - Plant
 - Gumi (1986 completion)

Monsanto Company

- Japan
 - Plant and Lab/Tech. Center
 - . Utsunomiya, Tochigi (1986 completion)
- United Kingdom
 - Plant and Lab/Tech. Center
 - . Milton Keynes (1986 completion)

Financial

Table 1 summarizes the most recent financial information for Monsanto Company, covering the full fiscal year ended December 31, 1984, and the first six months of 1985, split by operating business segments.

Table 1

Monsanto Company
WORLDWIDE REVENUES BY BUSINESS SEGMENT
(Millions of Dollars)

	Total Year <u>1983</u>	Total Year <u>1984</u>	<u>Six months ended June 30</u>	
			<u>1984</u>	<u>1985</u>
Agricultural Products	\$1,167	\$1,256	\$ 731	\$ 669
Biological Sciences	152	168	76	86
Fibers and Intermediates	1,170	1,194	652	550
Industrial Chemicals	856	937	485	467
Polymer Products	1,830	1,877	980	877
Electronic Materials and Fabricated Products	355	519	232	224
Fisher Controls	528	537	268	284
Oil and Gas	<u>241</u>	<u>203</u>	<u>109</u>	<u>94</u>
Total Consolidated	\$6,299	\$6,691	\$3,533	\$3,251

Source: Monsanto Company
Annual Accounts 1984,
First Half Report 1985
DATAQUEST
January 1986

Monsanto Company

Revenues of all products fell 8 percent in the first half of 1985 compared with first half 1984.

Sales of Electronic Materials and Fabricated Products declined 3 percent for the same period. The Company attributes this to the worldwide slump in the semiconductor industry, resulting in a significant decline in orders for electronic-grade silicon wafers.

Table 2 lists Monsanto's worldwide operating income or losses by business segment, including the first six months of 1985.

Table 2

Monsanto Company
OPERATING INCOME (LOSS) BY BUSINESS SEGMENT
(Millions of Dollars)

	Total Year <u>1983</u>	Total Year <u>1984</u>	<u>Six months ended June 30</u>	
			<u>1984</u>	<u>1985</u>
Agricultural Products	\$400	\$438	\$304	\$255
Biological Sciences	(54)	(95)	(38)	(54)
Fibers and Intermediates	55	79	76	20
Industrial Chemicals	88	90	67	39
Polymer Products	70	152	96	57
Electronic Materials and Fabricated Products	(66)	5	(13)	(11)
Fisher Controls	37	35	20	15
Oil and Gas	41	27	18	11
Corporate Items and Eliminations	<u>(50)</u>	<u>(54)</u>	<u>(26)</u>	<u>(31)</u>
Total Consolidated	\$521	\$677	\$504	\$301

Source: Monsanto Company
Annual Accounts 1984,
First Half Report 1985
DATAQUEST
January 1986

Monsanto Company

Table 2 reveals that at the half-year ended June 30, 1985, operating income worldwide had fallen 40 percent compared with the same period in 1984.

Table 3 expresses, by geographic region, the revenue figures given in Table 1.

Table 3

**Monsanto Company
WORLDWIDE REVENUES BY GEOGRAPHIC REGION
(Millions of Dollars)**

<u>Region</u>	<u>Total</u>	<u>Total</u>	<u>Six months ended June 30</u>	
	<u>Year</u>	<u>Year</u>		
	<u>1983</u>	<u>1984</u>	<u>1984</u>	<u>1985</u>
United States	\$4,243	\$4,498	\$2,636	\$2,402
Europe and Africa	943	968	481	458
Canada	274	292	155	152
Latin America	305	360	74	73
Asia and Pacific	<u>534</u>	<u>573</u>	<u>187</u>	<u>166</u>
Total Consolidated	\$6,299	\$6,691	\$3,533	\$3,251

Source: Monsanto Company
Annual Accounts 1984,
First Half Report 1985
DATAQUEST
January 1986

For the first six months of 1985, compared with the same period for 1984, sales to the Asia-Pacific region showed the sharpest fall (11 percent). This was followed by the United States (9 percent) and the Europe-Africa region (5 percent).

Monsanto Company

Monsanto's operating income (loss) by geographic region is shown in Table 4.

Table 4

Monsanto Company
OPERATING INCOME (LOSS) BY GEOGRAPHIC REGION
(Millions of Dollars)

<u>Region</u>	Total Year <u>1983</u>	Total Year <u>1984</u>	<u>Six months ended June 30</u>	
			<u>1984</u>	<u>1985</u>
United States	\$434	\$477	\$398	\$213
Europe-Africa	137	192	104	96
Canada	24	25	18	18
Latin America	(4)	4	(5)	2
Asia-Pacific	15	31	16	8
Corporate expenses and eliminations	<u>(85)</u>	<u>(52)</u>	<u>(27)</u>	<u>(36)</u>
Total Consolidated	\$521	\$677	\$504	\$301

Source: Monsanto Company
Annual Accounts 1984,
First Half Report 1985
DATAQUEST
January 1986

Table 4 shows that, comparing the first half of 1985 with the first half of 1984, there was a 50 percent decline in operating income in the Asia-Pacific region, a 46 percent decrease in the United States, and an 8 percent decline in the Europe-Africa region.

Monsanto Company

Monsanto notes in its First Half Report for 1985 that the figures reflect the continuing difficult economic environment for chemical-based industries, a situation that has persisted since mid-1984 in spite of the modest economic growth experienced in the U.S. manufacturing sector in general. Comment is also made on the strength of the U.S. dollar in the first half of 1985 and the distortions that arise when other currencies are converted into the U.S. dollar.

The Company also notes that, as a result of the current environment, it is intensifying its efforts to achieve a restructured and more efficient company--one better able to turn technological leadership into profits. Thus, cost containment programs are being accelerated and businesses are being evaluated.

Research and Development

Monsanto's overall expenditure on research and development (R&D) in 1984 reached a record level at \$370 million, approximately 6 percent of revenue. This is an increase of \$80 million over the 1983 figure. Emphasis is being placed on the following three main areas:

- Life Sciences--A new Research Center near Saint Louis has been opened for the study of products for agriculture, animal nutrition, and human health, underlining the Company's commitment to biotechnology.
- Chemical Services--Research is devoted to the development of high-value fibers, plastics, and chemicals.
- Engineered Materials and Products--Engineering, applications technology, high quality, and specialized skills provide customers with finished goods and equipment for a wide range of industries.

In the area of microelectronics, Monsanto is devoting an increasing amount of R&D to the area of advanced silicon technology. The Company takes the view that as logic and memory geometries become more dense, now approaching one micron feature size, electronic circuitry interacts more dynamically with the physical properties of the silicon. This necessitates a deeper understanding of silicon phenomena in relationship to IC process engineering models. To this end, Monsanto has spent some \$25 million on R&D in this area over the past two years, with a support staff of more than 180 professional engineers, some of whom work in the field at the customer's fabrication line. In this way, knowledge and experience are shared on a two-way confidential basis to achieve gains in circuit performance and product yield.

Monsanto Company

The Company also offers ongoing technical analysis using a Monsanto proprietary approach to laser-marking of polished silicon products, thus providing positive in-process identification of each wafer for fabrication-line tracking and analysis.

ORGANIZATION AND MANUFACTURING FACILITIES

Monsanto Electronic Materials Company (MEMC)

Over the past five years, MEMC has invested more than \$1,000 million in silicon wafer fabrication plants and associated equipment. Since 1978, the Company has increased machine capacity by approximately 400 percent to some 330 million square inches (2,128 million cm²) of silicon in 1984. It has a new plant at Spartanburg, South Carolina, and major expansions at Saint Peters, Missouri, and at Kuala Lumpur in Malaysia.

In Japan, an area that MEMC has identified for major growth, the Company operating as Monsanto Japan Ltd. is building a major silicon wafer manufacturing and research facility scheduled to be operational in mid-1986. When fully operational, this plant, which will represent an investment in excess of \$100 million, will have capacity of 100 million square inches per annum (645 million cm²) and employ some 100 to 120 people.

In Korea, MEMC, through a 50 percent holding via the parent company in Korsil Co. Ltd., is building a manufacturing facility for silicon wafers at Gumi, adjacent to the country's developing semiconductor industry. MEMC's share of the investment is about \$20 million, and the plant is due to commence manufacture early in 1986. Initial capacity will be some 20 million square inches (129 million cm²) of wafer material, increasing to about 40 million square inches (258 million cm²) over the next few years.

In Western Europe, MEMC now has under construction a Czochralski silicon wafer plant at Milton Keynes in the United Kingdom. This plant is well suited to serve the European market either by road or air and will strengthen the Company's position as the second largest supplier of silicon substrates to the European semiconductor market. The plant, occupying 45,000 square feet, will represent an investment in excess of \$50 million. It will be highly automated and employ the latest state-of-the-art techniques. Production will be phased, with samples available in Spring 1986 and production reaching full capacity of 60 to 70 million square inches (387-452 million cm²) by 1988.

Monsanto Company

MEMC estimates that its share of the European market is currently in excess of 20 percent. Based on DATAQUEST's forecast of European wafer consumption of 200 million square inches (1,290 million cm²) in 1988, MEMC's capability will be to supply 30 percent to 35 percent of the Western European market.

Worldwide, DATAQUEST estimates that with existing capacity of some 330 million square inches (2,128 million cm²) plus new capacity amounting to 200 million square inches (1,290 million cm²) becoming available in the United Kingdom, Japan and Korea MEMC will have a worldwide capacity by 1988 of 530 million square inches (3,418 million cm²).

Based on DATAQUEST's forecast of worldwide consumption of silicon wafer substrates for 1988 at 2.5 times that attained in 1983, the indication is that by the end of 1985 MEMC will have a capability of supplying approximately 21 percent of worldwide consumption.

SEMICONDUCTOR PRODUCTS

MEMC markets three different types of silicon wafer to service the following applications series:

- ULSI--Ultra Large Scale Integration
- VLSI--Very Large Scale Integration
- LSI/MSI--Large Scale Integration/Medium-Scale Integration

ULSI Application Series Wafer

The evolution of integrated circuits toward greater circuit density and the smaller design rules of ULSI circuits has required concurrent technological advancements in silicon wafers.

MEMC has designed silicon wafers that are multizone systems and focus on specific circuit application requirements. There are three product systems in this series:

- MUS--ULSI polished silicon
- MUG--ULSI enhanced gettering

Monsanto Company

- MUE--ULSI MOS EPI

Key features of ULSI application series wafers are:

- Offered on 150mm diameter only
- Ultra Flat--1.0um local site flatness (95 percent UA on 150mm diameter)
- Controlled Oxygen--Target ± 3 (ppma), internal gettering.
- Low level of oxidation induced stacking faults, $< 100/\text{cm}^2$
- Surface particles-- < 10 under bright light
- Micro-smooth Edge Profile
- Superior Parametrics
- Laser Mark
- Enhanced Gettering System--Deposited polysilicon on back surface for improved gettering efficiency, Microdefects (S-Pits) $\leq 100/\text{cm}^2$
- MOS EPI Wafer System--CMOS latch-up malfunction control; enhanced gettering and autodoping protection with oxide back surface seal

VLSI Application Series Wafer

The series consists of circuit-focused wafers for use in VLSI applications and incorporates the specifications best suited to meet the requirements of this level of integration.

The series offers the following crystallographic improvements over the former ULSI series.

- O.I.S.F. is now specified at less than $100/\text{cm}^2$
- Oxygen content may now be specified to a target between 28 and 35 ppma with a tolerance of ± 3

These crystallographic improvements have come about by a novel technique in crystal-pulling technology that gives maximum fab line yield and enhanced device parametrics to the silicon user.

Monsanto Company

This application series consists of three product systems:

- MVS--VLSI Polished Silicon
- MVG--VLSI Enhanced Gettering
- MVE--VLSI MOS EPI

Key features of the VLSI application series wafers are:

- Offered on 100mm, 125mm, and 150mm diameters
- Local site flatness-- $< 2.0\mu\text{m}$ in 20mm x 20mm sites

Other features are as for the ULSI application series.

LSI/MSI Application Series Wafers

These are circuit-focused silicon wafer products to service LSI and MSI applications. Specifications are designed to be cost effective and provide excellent performances for the typically mature processes in which this type of substrate is used.

This is a new application series and offers the following improvements over its predecessor:

- 100mm and 125mm diameter tolerances reduced to $\pm 0.5\text{mm}$
- Carbon content reduced to 1.0 ppma maximum

In this series there are four product systems, identified as follows:

- MLS--LSI/MSI polished silicon
- MLB--LSI/MSI external gettering
- MLE--LSI/MSI, MOS, EPI
- MME--LSI/MSI, MOS, EPI

Key features of this application series are:

- Offered on 76.2mm, 100mm, and 125mm diameters
- Global flatness--TIR typically $3.0\mu\text{m}$ with maximum of $5.0\mu\text{m}$

Monsanto Company

- Controlled oxygen ranges--Medium (26 to 35 ppma) and high (30 to 40 ppma)
- Carbon content ≤ 1.0 ppma
- Surface particles ≤ 12 under bright light
- Diameter tolerance-- ± 0.5 mm maximum
- Laser mark available
- External gettering system--Mechanically abraded back surface, microdefects (S-Pits) $\leq 300/\text{cm}^2$
- MOS EPI Wafer System--CMOS latch-up malfunction control; enhanced gettering (MLE) and autodoping protection with oxide back surface seal (P-type only)

In addition to these application series wafer products, MEMC offers MON-X(R) silicon rods. (MON-X(R) is a Registered Trademark of Monsanto Company.)

OUTLOOK

Monsanto is optimistic about the future, particularly in the fields of biotechnology and microelectronics.

In the latter, through MEMC, the Company continues a policy of R&D closely related to customer requirements and will capitalize on its ability to design silicon wafer products possessing individual functional zones tailored to individual circuit requirements.

Although currently the semiconductor market is in recession, DATAQUEST and MEMC are confident that demand for silicon wafers will, over the medium/longer term, show major growth. Plans are well advanced to meet the upturn, with new capacity coming on stream in the United Kingdom to meet demand in Western Europe and in the Far East, where MEMC plans to become a major supplier to the Japanese market over the next two to three years.

Monsanto Company

THE COMPANY

Background and Overview

Monsanto Company was founded in 1901 in Saint Louis, Missouri, U.S.A. Since that time, it has developed into a multinational company engaged in researching, manufacturing, and marketing a widely diversified range of products, which are reported under the following eight business segments:

- Agricultural products
- Biological sciences
- Electronic materials and fabricated products
- Fibers and intermediates
- Industrial chemicals
- Polymer products
- Fisher controls
- Oil and gas

The Company has worldwide sales representation through district offices or sales agents in more than 65 countries, selling to approximately 100 nations.

Monsanto has 136 manufacturing plants placed in strategic locations around the world. In Western Europe, the Company operates 6 plants, has 28 sales offices, has a major technical center in Belgium, and employs some 4,000 people.

As part of a current restructuring program, the Company is now broadening its base in the drug and health-care business. It recently announced that it had entered into an agreement to acquire G.D. Searle and Co., a transaction valued at some \$2,800 million. In doing this, Monsanto will be obtaining an important and established pharmaceutical business not only for research and development, but also in terms of its existing distribution network and regulatory approval organization, which could efficiently commercialize drugs being researched by the Company. To help finance this purchase, Monsanto intends to accelerate its present rationalization program, including the sale of the Company's oil and gas assets.

Monsanto Company

Another business segment that Monsanto is stressing is the micro-electronics industry, where the Company is a prominent supplier of electronic-grade silicon substrate material to the semiconductor industry. The Company has begun construction of a new manufacturing and research facility in the United Kingdom and a new manufacturing facility in Korea, and it has announced plans for manufacturing and research investment in Japan. All three facilities are scheduled to be completed in 1986, thus making Monsanto a local supplier of silicon in these major world regions.

Operations

The Monsanto Company has its corporate headquarters in Saint Louis, Missouri, U.S.A.

In 1984, the Company employed approximately 50,000 persons worldwide. An estimated 26 percent were employed outside the United States, with 9 percent working in Western Europe.

Monsanto Electronic Materials Company (MEMC) handles the manufacturing and marketing of silicon-wafer products used in the fabrication of integrated circuits and other semiconductors. The headquarters of MEMC are in Palo Alto, California, U.S.A. Plants and laboratories/technical centers are located throughout the world, as follows:

- United States
 - Plants
 - . Saint Peters, Missouri
 - . Spartanburg, South Carolina
 - Labs/Tech. Centers
 - . Saint Louis, Missouri
 - . Saint Peters, Missouri
 - Service Center
 - . Oakmead, California
- Malaysia
 - Plant
 - . Kuala Lumpur
- South Korea
 - Plant
 - . Gumi (1986 completion)

Monsanto Company

- Japan
 - Plant and Lab/Tech. Center
 - Utsunomiya, Tochigi (1986 completion)
- United Kingdom
 - Plant and Lab/Tech. Center
 - Milton Keynes (1986 completion)

Financial

Table 1 summarizes the most recent financial information for Monsanto Company, covering the full fiscal year ended December 31, 1984, and the first six months of 1985, split by operating business segments.

Table 1

Monsanto Company
WORLDWIDE REVENUES BY BUSINESS SEGMENT
(Millions of Dollars)

	Total Year <u>1983</u>	Total Year <u>1984</u>	<u>Six months ended June 30</u>	
			<u>1984</u>	<u>1985</u>
Agricultural Products	\$1,167	\$1,256	\$ 731	\$ 669
Biological Sciences	152	168	76	86
Fibers and Intermediates	1,170	1,194	652	550
Industrial Chemicals	856	937	485	467
Polymer Products	1,830	1,877	980	877
Electronic Materials and Fabricated Products	355	519	232	224
Fisher Controls	528	537	268	284
Oil and Gas	<u>241</u>	<u>203</u>	<u>109</u>	<u>94</u>
Total Consolidated	\$6,299	\$6,691	\$3,533	\$3,251

Source: Monsanto Company
Annual Accounts 1984,
First Half Report 1985
DATAQUEST
January 1986

Monsanto Company

Revenues of all products fell 8 percent in the first half of 1985 compared with first half 1984.

Sales of Electronic Materials and Fabricated Products declined 3 percent for the same period. The Company attributes this to the worldwide slump in the semiconductor industry, resulting in a significant decline in orders for electronic-grade silicon wafers.

Table 2 lists Monsanto's worldwide operating income or losses by business segment, including the first six months of 1985.

Table 2

Monsanto Company
OPERATING INCOME (LOSS) BY BUSINESS SEGMENT
(Millions of Dollars)

	Total Year <u>1983</u>	Total Year <u>1984</u>	<u>Six months ended June 30</u>	
			<u>1984</u>	<u>1985</u>
Agricultural Products	\$400	\$438	\$304	\$255
Biological Sciences	(54)	(95)	(38)	(54)
Fibers and Intermediates	55	79	76	20
Industrial Chemicals	88	90	67	39
Polymer Products	70	152	96	57
Electronic Materials and Fabricated Products	(66)	5	(13)	(11)
Fisher Controls	37	35	20	15
Oil and Gas	41	27	18	11
Corporate Items and Eliminations	<u>(50)</u>	<u>(54)</u>	<u>(26)</u>	<u>(31)</u>
Total Consolidated	\$521	\$677	\$504	\$301

Source: Monsanto Company
Annual Accounts 1984,
First Half Report 1985
DATAQUEST
January 1986

Monsanto Company

Table 2 reveals that at the half-year ended June 30, 1985, operating income worldwide had fallen 40 percent compared with the same period in 1984.

Table 3 expresses, by geographic region, the revenue figures given in Table 1.

Table 3

**Monsanto Company
WORLDWIDE REVENUES BY GEOGRAPHIC REGION
(Millions of Dollars)**

<u>Region</u>	<u>Total</u>	<u>Total</u>	<u>Six months ended June 30</u>	
	<u>Year</u>	<u>Year</u>		
	<u>1983</u>	<u>1984</u>	<u>1984</u>	<u>1985</u>
United States	\$4,243	\$4,498	\$2,636	\$2,402
Europe and Africa	943	968	481	458
Canada	274	292	155	152
Latin America	305	360	74	73
Asia and Pacific	<u>534</u>	<u>573</u>	<u>187</u>	<u>166</u>
Total Consolidated	\$6,299	\$6,691	\$3,533	\$3,251

Source: Monsanto Company
Annual Accounts 1984,
First Half Report 1985
DATAQUEST
January 1986

For the first six months of 1985, compared with the same period for 1984, sales to the Asia-Pacific region showed the sharpest fall (11 percent). This was followed by the United States (9 percent) and the Europe-Africa region (5 percent).

Monsanto Company

Monsanto's operating income (loss) by geographic region is shown in Table 4.

Table 4

Monsanto Company
OPERATING INCOME (LOSS) BY GEOGRAPHIC REGION
(Millions of Dollars)

<u>Region</u>	Total Year <u>1983</u>	Total Year <u>1984</u>	<u>Six months ended June 30</u>	
			<u>1984</u>	<u>1985</u>
United States	\$434	\$477	\$398	\$213
Europe-Africa	137	192	104	96
Canada	24	25	18	18
Latin America	(4)	4	(5)	2
Asia-Pacific	15	31	16	8
Corporate expenses and eliminations	<u>(85)</u>	<u>(52)</u>	<u>(27)</u>	<u>(36)</u>
Total Consolidated	\$521	\$677	\$504	\$301

Source: Monsanto Company
Annual Accounts 1984,
First Half Report 1985
DATAQUEST
January 1986

Table 4 shows that, comparing the first half of 1985 with the first half of 1984, there was a 50 percent decline in operating income in the Asia-Pacific region, a 46 percent decrease in the United States, and an 8 percent decline in the Europe-Africa region.

Monsanto Company

Monsanto notes in its First Half Report for 1985 that the figures reflect the continuing difficult economic environment for chemical-based industries, a situation that has persisted since mid-1984 in spite of the modest economic growth experienced in the U.S. manufacturing sector in general. Comment is also made on the strength of the U.S. dollar in the first half of 1985 and the distortions that arise when other currencies are converted into the U.S. dollar.

The Company also notes that, as a result of the current environment, it is intensifying its efforts to achieve a restructured and more efficient company--one better able to turn technological leadership into profits. Thus, cost containment programs are being accelerated and businesses are being evaluated.

Research and Development

Monsanto's overall expenditure on research and development (R&D) in 1984 reached a record level at \$370 million, approximately 6 percent of revenue. This is an increase of \$80 million over the 1983 figure. Emphasis is being placed on the following three main areas:

- Life Sciences--A new Research Center near Saint Louis has been opened for the study of products for agriculture, animal nutrition, and human health, underlining the Company's commitment to biotechnology.
- Chemical Services--Research is devoted to the development of high-value fibers, plastics, and chemicals.
- Engineered Materials and Products--Engineering, applications technology, high quality, and specialized skills provide customers with finished goods and equipment for a wide range of industries.

In the area of microelectronics, Monsanto is devoting an increasing amount of R&D to the area of advanced silicon technology. The Company takes the view that as logic and memory geometries become more dense, now approaching one micron feature size, electronic circuitry interacts more dynamically with the physical properties of the silicon. This necessitates a deeper understanding of silicon phenomena in relationship to IC process engineering models. To this end, Monsanto has spent some \$25 million on R&D in this area over the past two years, with a support staff of more than 180 professional engineers, some of whom work in the field at the customer's fabrication line. In this way, knowledge and experience are shared on a two-way confidential basis to achieve gains in circuit performance and product yield.

Monsanto Company

The Company also offers ongoing technical analysis using a Monsanto proprietary approach to laser-marking of polished silicon products, thus providing positive in-process identification of each wafer for fabrication-line tracking and analysis.

ORGANIZATION AND MANUFACTURING FACILITIES

Monsanto Electronic Materials Company (MEMC)

Over the past five years, MEMC has invested more than \$1,000 million in silicon wafer fabrication plants and associated equipment. Since 1978, the Company has increased machine capacity by approximately 400 percent to some 330 million square inches (2,128 million cm^2) of silicon in 1984. It has a new plant at Spartanburg, South Carolina, and major expansions at Saint Peters, Missouri, and at Kuala Lumpur in Malaysia.

In Japan, an area that MEMC has identified for major growth, the Company operating as Monsanto Japan Ltd. is building a major silicon wafer manufacturing and research facility scheduled to be operational in mid-1986. When fully operational, this plant, which will represent an investment in excess of \$100 million, will have capacity of 100 million square inches per annum (645 million cm^2) and employ some 100 to 120 people.

In Korea, MEMC, through a 50 percent holding via the parent company in Korsil Co. Ltd., is building a manufacturing facility for silicon wafers at Gumi, adjacent to the country's developing semiconductor industry. MEMC's share of the investment is about \$20 million, and the plant is due to commence manufacture early in 1986. Initial capacity will be some 20 million square inches (129 million cm^2) of wafer material, increasing to about 40 million square inches (258 million cm^2) over the next few years.

In Western Europe, MEMC now has under construction a Czochralski silicon wafer plant at Milton Keynes in the United Kingdom. This plant is well suited to serve the European market either by road or air and will strengthen the Company's position as the second largest supplier of silicon substrates to the European semiconductor market. The plant, occupying 45,000 square feet, will represent an investment in excess of \$50 million. It will be highly automated and employ the latest state-of-the-art techniques. Production will be phased, with samples available in Spring 1986 and production reaching full capacity of 60 to 70 million square inches (387-452 million cm^2) by 1988.

Monsanto Company

MEMC estimates that its share of the European market is currently in excess of 20 percent. Based on DATAQUEST's forecast of European wafer consumption of 200 million square inches (1,290 million cm²) in 1988, MEMC's capability will be to supply 30 percent to 35 percent of the Western European market.

Worldwide, DATAQUEST estimates that with existing capacity of some 330 million square inches (2,128 million cm²) plus new capacity amounting to 200 million square inches (1,290 million cm²) becoming available in the United Kingdom, Japan and Korea MEMC will have a worldwide capacity by 1988 of 530 million square inches (3,418 million cm²).

Based on DATAQUEST's forecast of worldwide consumption of silicon wafer substrates for 1988 at 2.5 times that attained in 1983, the indication is that by the end of 1985 MEMC will have a capability of supplying approximately 21 percent of worldwide consumption.

SEMICONDUCTOR PRODUCTS

MEMC markets three different types of silicon wafer to service the following applications series:

- ULSI--Ultra Large Scale Integration
- VLSI--Very Large Scale Integration
- LSI/MSI--Large Scale Integration/Medium-Scale Integration

ULSI Application Series Wafer

The evolution of integrated circuits toward greater circuit density and the smaller design rules of ULSI circuits has required concurrent technological advancements in silicon wafers.

MEMC has designed silicon wafers that are multizone systems and focus on specific circuit application requirements. There are three product systems in this series:

- MUS--ULSI polished silicon
- MUG--ULSI enhanced gettering

Monsanto Company

- MUE--ULSI MOS EPI

Key features of ULSI application series wafers are:

- Offered on 150mm diameter only
- Ultra Flat--1.0um local site flatness (95 percent UA on 150mm diameter)
- Controlled Oxygen--Target ± 3 (ppma), internal gettering.
- Low level of oxidation induced stacking faults, $< 100/\text{cm}^2$
- Surface particles-- < 10 under bright light
- Micro-smooth Edge Profile
- Superior Parametrics
- Laser Mark
- Enhanced Gettering System--Deposited polysilicon on back surface for improved gettering efficiency, Microdefects (S-Pits) $\leq 100/\text{cm}^2$
- MOS EPI Wafer System--CMOS latch-up malfunction control; enhanced gettering and autodoping protection with oxide back surface seal

VLSI Application Series Wafer

The series consists of circuit-focused wafers for use in VLSI applications and incorporates the specifications best suited to meet the requirements of this level of integration.

The series offers the following crystallographic improvements over the former ULSI series.

- O.I.S.F. is now specified at less than $100/\text{cm}^2$
- Oxygen content may now be specified to a target between 28 and 35 ppma with a tolerance of ± 3

These crystallographic improvements have come about by a novel technique in crystal-pulling technology that gives maximum fab line yield and enhanced device parametrics to the silicon user.

Monsanto Company

This application series consists of three product systems:

- MVS--VLSI Polished Silicon
- MVG--VLSI Enhanced Gettering
- MVE--VLSI MOS EPI

Key features of the VLSI application series wafers are:

- Offered on 100mm, 125mm, and 150mm diameters
- Local site flatness-- $< 2.0\mu\text{m}$ in 20mm x 20mm sites

Other features are as for the ULSI application series.

LSI/MSI Application Series Wafers

These are circuit-focused silicon wafer products to service LSI and MSI applications. Specifications are designed to be cost effective and provide excellent performances for the typically mature processes in which this type of substrate is used.

This is a new application series and offers the following improvements over its predecessor:

- 100mm and 125mm diameter tolerances reduced to $\pm 0.5\text{mm}$
- Carbon content reduced to 1.0 ppma maximum

In this series there are four product systems, identified as follows:

- MLS--LSI/MSI polished silicon
- MLB--LSI/MSI external gettering
- MLE--LSI/MSI, MOS, EPI
- MME--LSI/MSI, MOS, EPI

Key features of this application series are:

- Offered on 76.2mm, 100mm, and 125mm diameters
- Global flatness--TIR typically $3.0\mu\text{m}$ with maximum of $5.0\mu\text{m}$

Monsanto Company

- Controlled oxygen ranges--Medium (26 to 35 ppma) and high (30 to 40 ppma)
- Carbon content ≤ 1.0 ppma
- Surface particles ≤ 12 under bright light
- Diameter tolerance-- ± 0.5 mm maximum
- Laser mark available
- External gettering system--Mechanically abraded back surface, microdefects (S-Pits) $\leq 300/\text{cm}^2$
- MOS EPI Wafer System--CMOS latch-up malfunction control; enhanced gettering (MLE) and autodoping protection with oxide back surface seal (P-type only)

In addition to these application series wafer products, MEMC offers MON-X(R) silicon rods. (MON-X(R) is a Registered Trademark of Monsanto Company.)

OUTLOOK

Monsanto is optimistic about the future, particularly in the fields of biotechnology and microelectronics.

In the latter, through MEMC, the Company continues a policy of R&D closely related to customer requirements and will capitalize on its ability to design silicon wafer products possessing individual functional zones tailored to individual circuit requirements.

Although currently the semiconductor market is in recession, DATAQUEST and MEMC are confident that demand for silicon wafers will, over the medium/longer term, show major growth. Plans are well advanced to meet the upturn, with new capacity coming on stream in the United Kingdom to meet demand in Western Europe and in the Far East, where MEMC plans to become a major supplier to the Japanese market over the next two to three years.

Monsanto Company

Monsanto Company
800 North Lindebergh Boulevard
St. Louis, Missouri 63167
Telephone: (314) 694-1000
(Millions of Dollars Except Per Share Data)

Balance Sheet (December 31)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
Working Capital	\$1,226	\$1,486	\$1,503	\$1,535	\$1,395
Long-Term Debt	\$1,371	\$1,110	\$1,003	\$ 937	\$ 824
Shareholder's Equity	\$3,109	\$3,184	\$3,313	\$3,284	\$3,634
After-Tax Return on Average Equity (%)	5.00	14.50	10.32	11.23	11.74

Operating Performance (Fiscal Year Ending December 31)

	<u>1980</u>	<u>1981</u>	<u>1982</u> ¹	<u>1983</u> ²	<u>1984</u>
Revenue	\$6,574	\$6,948	\$6,325	\$6,299	\$6,691
U.S. Revenue	\$4,465	\$4,874	\$4,086	\$4,243	\$4,498
Non-U.S. Revenue	\$2,109	\$2,074	\$2,239	\$2,056	\$2,193
Cost of Revenue	\$5,476	\$5,293	\$4,826	\$4,738	\$4,846
Technological Expenses ³	\$ 270	\$ 297	\$ 329	\$ 359	\$ 446
SG&A Expense	\$ 618	\$ 656	\$ 691	\$ 681	\$ 722
Other Expenses (Income)	\$ (5)	\$ 9	\$ (22)	\$ (49)	\$ (30)
Pretax Income	\$ 206	\$ 693	\$ 501	\$ 570	\$ 707
Pretax Margin (%)	3	10	8	9	11
Effective Tax Rate (%)	28	36	30	29	38
Net Income	\$ 149	\$ 445	\$ 352	\$ 402	\$ 439
Average Shares Outstanding (Millions) ⁴	72	79	81	82	78
Per Share					
Earnings	\$ 2.05	\$ 5.75	\$ 4.39	\$ 4.89	\$ 5.42
Dividends	\$ 1.78	\$ 1.88	\$ 1.98	\$ 2.07	\$ 2.25
Book Value	\$38.82	\$42.18	\$42.99	\$44.83	\$46.43
Price Range	\$35.13- 21.13	\$43.75- 29.75	\$44.50- 28.25	\$58.13- 37.13	\$53.88- 40.63
Total Employees	61,836	57,391	52,199	48,835	50,764

N/A = Not Available

¹Net income includes one extraordinary gain of \$23 million or \$0.29 per share from an exchange of debt for common shares.

²Net income includes extraordinary tax benefits of \$33 million or \$0.41 per share from the utilization of non-U.S. loss carryforwards.

³Technological expenses include research, development, engineering, and patent expense.

⁴Per share amounts and shares outstanding have been restated to reflect a June 1984 two-for-one common stock split.

Source: Monsanto Company
1981, 1983, and 1984
Annual Reports and
Forms 10-K
DATAQUEST

Monsanto Company

THE COMPANY

Background

Monsanto Company was incorporated in 1933 under Delaware law and is the successor to a Missouri corporation, Monsanto Chemical Works, organized in 1901. Its sales to the semiconductor industry are primarily through the Monsanto Electronic Materials Company (MEMC), which reports its sales through Monsanto's electronic materials and fabricated products segment. MEMC has been producing silicon wafers since 1959.

Operations

Monsanto is engaged in the worldwide manufacture and sale of a widely diversified line of chemicals, plastics, fibers, and other products. Monsanto chemicals, plastics, and fibers are derived principally from petroleum and natural gas and from other raw materials. Its products are marketed as raw materials and as intermediate and finished products.

Monsanto reports its business under eight industry segments: agricultural products, biological sciences, fibers and intermediates, industrial chemicals, polymer products, electronic materials and fabricated products, Fisher Controls International, Inc., and oil and gas. Operating unit segment data are given in Table 1.

Monsanto's first-quarter 1985 sales as a whole were down from first quarter 1984. Monsanto credits the strong dollar for a large part of this decrease.

Monsanto Company

Table 1

OPERATING UNIT SEGMENT DATA (Millions of Dollars)

	<u>Net Sales</u>		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Agricultural Products	\$1,165	\$1,167	\$1,256
Biological Sciences	146	152	168
Fibers and Intermediates	1,257	1,170	1,194
Industrial Chemicals	810	856	937
Polymer Products	1,786	1,830	1,877
Electronic Materials and Fabricated Products	357	355	519
Fisher Controls	588	528	537
Oil and Gas	216	241	203
Corporate Items and Eliminations	<u>0</u>	<u>0</u>	<u>0</u>
Total Consolidated	\$6,325	\$6,299	\$6,691

	<u>Operating Income (Loss)</u>		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Agricultural Products	\$441	\$400	\$438
Biological Sciences	(35)	(54)	(95)
Fibers and Intermediates	(21)	55	79
Industrial Chemicals	101	88	90
Polymer Products	13	70	152
Electronic Materials and Fabricated Products	(64)	(66)	5
Fisher Controls	52	37	35
Oil and Gas	37	41	27
Corporate Items and Eliminations	<u>(45)</u>	<u>(50)</u>	<u>(54)</u>
Total Consolidated	\$479	\$521	\$677

(Continued)

Monsanto Company

Table 1 (Continued)

OPERATING UNIT SEGMENT DATA (Millions of Dollars)

	<u>Research & Development</u>		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Agricultural Products	\$ 65	\$ 78	\$107
Biological Sciences	33	41	66
Fibers and Intermediates	39	41	45
Industrial Chemicals	18	22	35
Polymer Products	44	40	41
Electronic Materials and Fabricated Products	23	24	25
Fisher Controls	14	10	19
Oil and Gas	0	0	0
Corporate Items and Eliminations	<u>28</u>	<u>34</u>	<u>32</u>
Total Consolidated	\$264	\$290	\$370

	<u>Total Assets</u>		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Agricultural Products	\$1,049	\$1,214	\$1,215
Biological Sciences	141	225	339
Fibers and Intermediates	1,150	1,071	992
Industrial Chemicals	777	810	892
Polymer Products	1,135	1,163	1,179
Electronic Materials and Fabricated Products	433	406	437
Fisher Controls	418	487	515
Oil and Gas	549	543	578
Nonoperating Assets	<u>425</u>	<u>508</u>	<u>226</u>
Total Consolidated	\$6,077	\$6,427	\$6,373

(Continued)

Monsanto Company

Table 1 (Continued)

OPERATING UNIT SEGMENT DATA
(Millions of Dollars)

	<u>Capital Expenditures</u>		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Agricultural Products	\$ 89	\$104	\$ 67
Biological Sciences	42	84	75
Fibers and Intermediates	90	79	83
Industrial Chemicals	162	61	90
Polymer Products	72	64	85
Electronic Materials and Fabricated Products	57	37	74
Fisher Controls	27	27	25
Oil and Gas	130	101	107
Nonoperating Assets	<u>4</u>	<u>3</u>	<u>8</u>
Total Consolidated	\$673	\$560	\$614

Source: Monsanto Company
1984 Annual Report
DATAQUEST

International Operations

Monsanto does business in more than 100 countries and has facilities in 164 countries. During 1984, almost one-third of Monsanto's business was outside of the United States. The Company hopes to increase its overseas business, especially in the Asia-Pacific area. To achieve this goal, Monsanto has a two-part strategy. It plans both to increase its overseas investment and to introduce its products more rapidly overseas, especially in the Far East.

Monsanto announced plans in 1984 for several overseas production facilities. The Company has plans for a new production plant for Roundup brand herbicides in Brazil, and, also in Brazil, it is finalizing a joint venture for producing wet phosphoric acid.

In Japan in 1984, Monsanto dedicated the Kawachi Research Station for agriculture. This facility is in addition to its already existing Japanese joint venture (Mitsubishi Monsanto Chemical).

Also in 1984, MEMC announced plans for silicon production facilities in Japan, Korea, and the United Kingdom.

Monsanto Company

Monsanto reports its international sales by the following geographic areas: Asia-Pacific, Europe-Africa, Canada, and Latin America (see Table 2).

Table 2

INTERNATIONAL SALES (Millions of Dollars)

	Net Sales			Operating Income (Loss)		
	1982	1983	1984	1982	1983	1984
United States	\$4,086	\$4,243	\$4,498	\$441	\$453	\$518
Europe-Africa	1,092	943	968	33	44	93
Canada	244	274	292	29	51	61
Latin America	353	305	360	(9)	11	22
Asia-Pacific	550	534	573	19	27	55
Unallocated Corporate Items				(45)	(50)	(54)
Affiliated Equity (Income) Loss Included in Individual World Areas				11	(15)	(18)
Total Consolidated	\$6,325	\$6,299	\$6,691	\$479	\$521	\$677

Source: Monsanto Company
1984 Annual Report
DATAQUEST

In spite of the strong U.S. dollar, 1984 Europe-Africa area sales increased 3 percent over 1983 sales as the European economic environment improved. Operating income more than doubled, benefiting from strong intermediate profits from acrylonitrile and nylon.

Monsanto's 1984 Canadian sales increased 7 percent, and operating income increased \$10 million. Monsanto attributes this to sales of crop chemicals and detergent products, and to increased sales to the automotive industry.

Latin American operating profit doubled to \$22 million in 1984 on a sales increase of 18 percent. Of particular note were agricultural products sales in Brazil and higher profitability from Monsanto's Mexican equity affiliate.

Monsanto Company

Monsanto's Asia-Pacific area sales increased 7 percent, and operating income more than doubled. Monsanto reports that these gains were led by agricultural products sales volume growth.

MEMC International Sales

One of MEMC's long-range goals is to expand its production to meet the growing worldwide demand for silicon wafers. It plans to do this by locating facilities close to its worldwide base of customers, even though it could meet this demand from facilities located anywhere in the world. Easy customer access is an important part of Monsanto's long-range strategy.

MEMC points to a sevenfold increase in silicon wafer sales between 1983 and 1984 in Japan as an illustration of the benefits of being close to its customers. In July 1984, MEMC had only a 1 percent share of the Japanese market. In July 1985, it claimed a 2 percent share. MEMC attributes this in part to its Technical Center in Kasai, Japan (near Tokyo), which has been in operation for two years. MEMC is adding facilities in Japan, the United Kingdom, and South Korea.

As part of MEMC's commitment to become a major silicon supplier to the Japanese market, the company began construction in May 1985 of a silicon wafer manufacturing and research facility in Utsunomiya, Tochigi, Japan. The first phase of the project will involve an investment of \$20 million. The ultimate investment is currently expected to be more than \$100 million. Wafer production is scheduled to begin in mid-1986. The facility will eventually have a total capacity of 100 million square inches per year.

The initial phase of the manufacturing facility is scheduled to be completed in mid-1986 and will employ 100 people. The research center will initially hire a staff of 15.

MEMC has begun construction of a facility in Milton Keynes, United Kingdom, about 60 miles north of London. First-phase completion is planned for early 1986. MEMC hopes that the facility will strengthen its position as the second largest supplier of Czochralski silicon wafers to the IC market in Europe. MEMC estimates that its present share of the European wafer market exceeds 20 percent.

Capacity at start-up of the Milton Keynes facility is expected to be 20 million square inches per year and is planned to reach as high as 60 million square inches after four years of operation. Total cost of the facility is expected to be in excess of \$50 million.

Monsanto Company

MEMC is the largest (it claims well over 50 percent) supplier of silicon wafer products in South Korea. It is presently building a manufacturing facility in the Gumi Industrial Estate, about 150 miles south of Seoul in an area designated by the government of South Korea to be the future center of its semiconductor industry. It is building this facility through a joint venture with Dongbu.

MEMC and Dongbu are reportedly each investing \$20 million in this facility. The new company is Korea Silicon Company, Ltd., called Korsil. The Korsil facility is scheduled to go on-line in early 1986. Capacity at start-up will be 20 million square inches per year and is expected to reach 40 million square inches after 5 years.

Marketing

Monsanto sells its products directly to various industries, to distributors and jobbers, and to the ultimate consumer, principally through its own sales force, except for Fisher Controls, which primarily uses independent sales representatives.

MEMC markets its products through a direct sales force from offices in eight countries.

Research and Development

Companywide, Monsanto has dedicated approximately 6 percent of sales, or \$370 million in 1984, to R&D. One of its chief goals is to discover engineering and process improvements that will improve quality and reduce costs. It is working on developing new catalysts for chemical operations and in finding new uses for electrochemistry.

In 1984, Monsanto dedicated its new Life Science Research Center, near St. Louis, Missouri. It is the single largest research investment in Monsanto's history, and it underscores the Company's commitment to biological research.

Monsanto reports that research is on schedule for methionyl bovine somatotropin, a genetically engineered analog of a natural protein that is intended to increase efficiency and reduce costs in milk production.

Among many research and development projects in its traditional business, Monsanto is working on developing advanced polymers and polymeric films using chemistry, electron beams, and ultraviolet light.

Monsanto Company

MEMC has more than 200 professionals involved in R&D on silicon wafers. MEMC reports that its \$20 million 1984 R&D budget was the largest of any silicon supplier. MEMC has averaged \$20 million a year for silicon wafer R&D for the last several years. It plans to spend that amount in 1985.

MEMC also has a joint MEMC/customer audit team. This team is structured so that it can sample, identify, and help implement silicon-related improvements to the customer's fab lines.

Employees

As of December 31, 1984, Monsanto had 50,764 employees worldwide. The Company reports that relations with its employees are satisfactory. MEMC had 1,750 employees worldwide and reportedly has excellent employee relations.

Litigation

Monsanto is a party to numerous legal proceedings. Monsanto does not believe that these proceedings or their ultimate dispositions will have a materially adverse effect on the Company's financial position.

Monsanto is one of several defendants in a number of lawsuits arising out of the use by the U.S. government of an herbicide known as Agent Orange during the Vietnam War.

Monsanto has been joined as a defendant in a number of lawsuits arising out of a tank car derailment that occurred on January 10, 1979, in Sturgeon, Missouri.

Monsanto has been involved in litigation with Stauffer Chemical Company concerning Monsanto's patents covering the herbicidal use of glyphosate and salts thereof and glyphosate salts as compounds per se.

Since January 9, 1985, the Company's Lasso herbicide has been under Special Review by the EPA. This special examination of the risks and benefits of the herbicide's use could take a year or more.

Suit has also been filed against Monsanto by several former and present employees, claiming that the Company willfully and intentionally exposed the employees to harmful chemical substances.

Monsanto Company

OPERATING GROUPS OR DIVISIONS

Monsanto Electronic Materials Company

Monsanto has identified silicon as one of its major growth opportunities for the years ahead.

MEMC has a goal of zero defects and has invested significantly in plant automation to achieve this, particularly in wafer-polishing facilities. MEMC claims that it is already the most automated wafer manufacturer in the world.

MEMC has invested more than a quarter of a billion dollars over the past five years in fabrication plants and equipment. A new world-class plant at Spartanburg, South Carolina, and major expansions at St. Peters, Missouri, and Kuala Lumpur, Malaysia, bring Monsanto's total machine capacity to 330 million square inches per year, which is a 400 percent increase since 1978 (see Table 3). MEMC plans to add to this capacity with new plants in Europe, Japan, and Korea by 1986.

MEMC provides a controlled inventory for its customers. After joint QC sampling to specifications, Monsanto stocks the wafers at its service facilities and at its own expense to provide its customers with a just-in-time shipment.

MEMC does not report its sales separately from Monsanto. Company sources do report that 1984 was an exceptional year for MEMC, and that the first quarter of 1985 was higher than the first quarter of 1984. DATAQUEST has learned, however, that coincident with the rest of the semiconductor industry, MEMC's sales since the first quarter are down.

MEMC has three different wafer application series, one for ULSI, one for VLSI, and one for LSI/MSI. Each member of this series, or family, has three options: polished, enhanced gettering/backside gettering, or epitaxial wafers with enhanced gettering.

In May 1985, MEMC introduced the first in its series of 6-inch wafers for ULSI. The Company claims that the wafer meets the highest cleanliness standards and that it is flatter than any other 6-inch wafer produced.

MEMC's wafers are circuit-focused. The Company is able to design its wafer products to meet the needs of specific device integration levels by engineering wafers with distinct, functional zones. Wafer characteristics are engineered to individual circuit requirements through the design of each of these zones.

Monsanto Company

Table 3

LOCATION OF POLYSILICON PLANTS (Capacity in Millions of Square Inches)

EXISTING CAPACITY

<u>Location</u>	<u>Capacity</u>
Spartanburg, South Carolina	N/A
St. Peters, Missouri	N/A
Kuala Lumpur, Malaysia	<u>N/A</u>
Subtotal, Existing Capacity	330

EXPANSION CAPACITY

<u>Location</u>	<u>Capacity</u>
Gumi Industrial Estate, Korea	40
Utsunomiya, Tochigi, Japan	100
Milton Keynes, United Kingdom	<u>60</u>
Subtotal, Expansion Capacity	200
Total	530

N/A = Not Available

Source: DATAQUEST

Agricultural Products

Monsanto reports that herbicide sales, this segment's profit mainstay, rebounded in 1984. Sales of Roundup herbicide increased 6 percent, for example, and sales of Rodeo herbicide, approved by the EPA for use in aquatic sites, increased 40 percent.

The Company expects more Rodeo sales growth in 1985. Monsanto plans to enter a new market in 1985 with the introduction of Limit turf regulator. Limit would restrict the rate of growth of grasses grown in the northern United States and will be available for nonresidential uses.

Monsanto Company

Biological Sciences

Monsanto claims that during 1984, it became a leading supplier of synthetic methionine supplementation to the U.S. poultry industry with its Alimet liquid feed supplement. However, prices for Alimet were adversely affected by lower-cost imports into the United States from Western Europe.

Put together from two acquisitions, HybriTech Seed International, Inc., a Monsanto subsidiary, is focusing on the hybrid wheat and soybean seed markets. During 1984, HybriTech introduced four proprietary hybrid hard red winter wheats under the Quantum trademark and four new proprietary lines of soybean seeds. HybriTech has announced that it will form a joint venture with The Cooperative de Pau, a leading French agricultural cooperative, to develop and market new wheat and barley seeds for the Western European market.

Monsanto's plan for the future is to integrate traditional seed breeding techniques with new biotechnology methods to develop seeds with greater yields and special traits, or with resistance to insects, disease, and other environmental factors.

Monsanto also has plans to expand in the pharmaceutical industry through a combination of internal development programs, acquisitions, and joint ventures. In 1984, as part of this strategy, Monsanto acquired Continental Pharma, S.A., a Belgian pharmaceutical company.

Fibers and Intermediates

The fibers and intermediates segment experienced strong sales during 1984. Monsanto claims that, worldwide, mills introduced more carpets made from Monsanto nylon staple products in 1984 than from those of any other fiber manufacturer. The Company's apparel fiber businesses did not do as well, however. Monsanto attributes this primarily to competition from imports. Monsanto is responding to this challenge by developing high-value acrylic products with special properties and cost advantages. Cost-reduction programs have also been instituted, and the Company reports that they have begun to bear fruit in increased earnings from the sales of both fibers and intermediates.

Industrial Chemicals

Sales of industrial chemicals increased across most product lines during 1984, but earnings were affected by soft prices toward year-end, imports, and the strong U.S. dollar. Monsanto is planning for future growth through a combination of new capacity, process improvement,

Monsanto Company

international investment, and new product development. Research and development spending has increased approximately 100 percent in the past two years.

Polymer Products

Sales in the automotive, construction, and home appliance industries led the polymer products businesses to what Monsanto claims was an outstanding year in 1984. New products in electronics, telecommunications, and custom molding added to this segment's sales growth in 1984.

Electronic Materials and Fabricated Products

Electronic materials were covered above under Monsanto Electronic Materials Company.

Prism separators, a Monsanto technology that uses hollow fibers to recover valuable gases, nearly doubled in sales in 1984. Sales of systems using Prism are opening up outside the United States, including in the People's Republic of China, the Soviet Union, Korea, Japan, and Norway.

Monsanto tested plastic bottles capable of holding hot liquids in 1984. The Company is now studying potential markets for Cycle-Safe, its soft drink bottle that received U.S. government regulatory clearance in 1984. Also in 1984, Monsanto introduced Cloud Nine, an energy-saving greenhouse film that cuts heating costs 20 percent.

Fisher Controls International, Inc.

Fisher is a worldwide leader in the development of control valves, measurement instrumentation, and process controls. Sales in all product categories improved for all geographic areas except for Europe, where capital spending has remained depressed.

Fisher acquired Posi-Seal International, Inc., early this year. Posi-Seal manufactures high-performance rotary valves.

Fisher opened a new electronic instrumentation research facility in Austin, Texas, in 1984. With this facility, it plans to accelerate the development of measurement instrumentation and process control systems. To further strengthen its measurement instrumentation product development, Fisher purchased quartz technology rights from Novex and Techlogics Associates in 1984.

Monsanto Company

Fisher also announced in 1984 plans to accelerate the growth of PROVOX instrumentation and has set a goal of tripling the size of this business during the next four years. It will invest more than \$100 million in R&D and fixed capital to achieve this goal.

Oil and Gas

Monsanto Oil Company was able to meet its income goals for 1984 by offsetting its declining sales with lower exploration expenses. The Company's strategy balances cash flow from current production in Canada, the Gulf of Mexico, and 14 states in the United States with expenditures for new exploration and development opportunities.

Company Backgrounder by Dataquest

The Monotype Corporation plc

Honeycrook Lane, Salfords
Redhill, RH1 5JP
England

Telephone: (0737) 765959

Fax: (0737) 769243

Dun's Number: 21-625-9341

Date Founded: 1897

CORPORATE STRATEGIC DIRECTION

The Monotype Corporation plc is a leading developer, manufacturer, and supplier of advanced imagesetting systems and machines. The Company also licenses and supplies digitized typefaces to the information technology and communications industries. Founded in 1897 to develop the potential of semiautomatic typesetting machines, Monotype began as an American organization with a British subsidiary, but became a British company known as The Monotype Corporation in 1931.

The business grew and expanded until the early 1970s. Monotype established itself as one of the world's leading producers of both hot metal composing systems and photocomposing systems and had developed an extensive library of typefaces. The Company's systems were particularly suited to high-quality and commercial printing. International sales contributed a significant portion of revenue, and Monotype created a directly controlled, international network of offices providing service and support.

During the early 1970s, the Company suffered significant losses due to a lack of capital and outdated products and technology. In 1975, Monotype began development on the Lasercomp range of products as typefaces needed to be converted into digital format for electronic typesetting. The development of Lasercomp, the world's first high-resolution raster typesetter, was a major achievement. This led to typeface licensing at various levels of resolution to be used by other manufacturers. During the early 1980s, a number of financial institutions provided capital to restructure the business due to Monotype's massive debts.

In 1986, Monotype led an Offer for Sale on the Unlisted Securities Market, which raised capital for various expansion activities including the acquisition of several businesses related to the printing industry. In 1988, the Company was admitted to the Official List of the London Stock Exchange. No additional money was raised since the objective was to improve the market for the Company's shares and increase its international status.

In early 1990, Monotype became a private corporation as a result of a purchase by Pointplus, an English holding company of King, Black and Associates (KBA). KBA provides operating expertise, technical support, and capital for a variety of companies and has major investments in the prepress industry through minority shareholdings in Archetype, ECRM, and Raster Image Processing Systems (RIPS).

Financial tables are not included in this backgrounder because Monotype is a privately held corporation.

BUSINESS SEGMENT STRATEGIC DIRECTION

Monotype is controlled by a board through an executive director and operates under separately managed groups. The Monotype Group designs, produces, sells, and services the Group's established product lines. Composing systems are sold internationally into three major market segments: commercial printers, newspapers, and corporate clients. The United Kingdom Market Group markets and supports the complete composing system products within the United Kingdom. The International Group is responsible for all of the internationally based subsidiaries,

the majority of which are wholly owned. Monotype Typography includes the typeface library, which covers more than 1,000 languages and dialects. Over 1.1 million characters including signs and symbols from mathematical, scientific and special subjects are available. Many of the typefaces have been digitized and are held in the Company's central font data bank. In addition to use on Monotype systems, the typefaces are licensed on a royalty basis to other companies.

Monotype recently introduced two new Prism imagesetters, the Prism PS Plus and the Prism Series 3 Plus. Both Prism models offer an enhanced roll film unit for material handling, increasing the accuracy of imaging and yielding higher quality halftone screens and tints. The Prism PS Plus, Monotype's PostScript-compatible imagesetter, offers 105 typefaces and an automatic film-saving device. The Prism Series 3 Plus uses Monotype's native language raster image processor and can be driven by over 60 typesetting front-end systems. Series 3 uses the Monotype Qubic font technology and offers smooth outline shapes and curves through advanced Bezier curve descriptions. The Monotype Qubic font library contains over 800 fonts.

Monotype recently announced its plan to sell the PaperMaster, a high-resolution plain paper typesetter based on a new 600 x 600 laser engine. The typesetter will image at true 600 x 600 output resolution on letter-size, 11 x 17-inch, A3, and A4 paper sizes and is rated at a 12,000-pages-per-month duty cycle. The Monotype PaperMaster has 43 standard PostScript fonts.

Further Information

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

1989 SALES OFFICE LOCATIONS

Information is not available.

MANUFACTURING LOCATIONS

Europe

Salfords, England

SUBSIDIARIES

North America

Monotype Inc. (United States)

Europe

Chelgraph Products Ltd. (England)
Commercial Monotype Espanola SA (Spain)
Computer Textsysteme (Austria)
Electrotype Trading & Technical Co. Ltd. (Greece)
GB Techniques Ltd. (England)
Graphic Systems Equipment SA (France)
Hugo V Larsen A/S (Denmark)
Hyphen SpA (Italy)
Jon Brynjolfsson Ltd (Iceland)
Monotype AG (Switzerland)
Monotype (Benelux) Ltd. (Belgium)
Monotype (Benelux) Ltd. (Netherlands)
Monotype GmbH (Germany)
Monotype Portuguesa Ltda. (Portugal)
Owema AB (Sweden)
Owema Oy (Finland)
Owema Raaness (Norway)
Przedstawicielstwo (Poland)
Societe Anonyme Monotype (France)

Asia/Pacific

Monotype (Australia) Pty. Ltd. (Australia)
Monotype Corporation (Far East) Ltd. (Hong Kong)
Monotype Corporation plc (Bangladesh)
Monotype Corporation plc (Pakistan)
Monotype KK (Japan)
Monotype (Malaysia) Sdn. Bhd. (Malaysia)
MT Systems Pty. Ltd. (Australia)
The Monotype Corporation (South East Asia)
Pte. Ltd. (Singapore)

ROW

Alpha Enterprises (Egypt)
Mainmark SRL (Argentina)
Monotype Corporation (Nigeria) Ltd. (Nigeria)
Monotype do Brasil Ltda (Brazil)
Monotype India Ltd. (India)
Mosbez Private Co. Ltd. (Ethiopia)
Panamericana de Sistemas Graficos Ltda. (Colombia)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

1989

MonoText

Monotype founded MonoText with TextData of Sweden.

Harlequin Ltd.

Sun Microsystems Inc. has sublicensed its Type-Scaler program to Harlequin for incorporation into Harlequin's ScriptWorks product. Monotype has licensed to Harlequin typefaces from the Monotype Typeface Library.

MERGERS AND ACQUISITIONS

Monotype has not participated in any recent mergers or acquisitions.

KEY OFFICERS

Roger Day
Chairman

Dr. David Hedgeland
Director

Jack Hart
Vice president of Sales

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

Company Backgrounder by Dataquest

Monroe Systems for Business, Inc.

The American Road
Morris Plains, New Jersey 07950
Telephone: (201) 993-2000
Fax: (201) 993-2302
Dun's Number: 01 272 3128

Date Founded: 1912

CORPORATE STRATEGIC DIRECTION

Monroe Systems for Business, Inc., manufactures, distributes, services, and provides supplies for office equipment such as copiers, facsimile machines, and personal computers. The Company has over 200 branches in the United States employing over 600 sales employees and more than 1,000 technicians. Monroe Systems is a private company with 1989 revenue estimated at approximately US\$300 million.

Monroe's territories are split into five geographic regions, each region being self-sufficient and responsible for a staff of sales, service, support, and administrative personnel.

The Company's distribution channel is a direct channel, with all personnel being direct corporate employees. This reliance on the direct channel provides consistency in pricing, support, and service.

Dataquest believes that as products in the document processing industry become more similar, companies will be forced to differentiate themselves from competitors through aftersales support. As part of a growing service program, Monroe Systems has expanded its maintenance capabilities to include service on typewriters, personal computers, copiers, and many other high-tech office equipment products.

No financial statements are included because Monroe Systems for Business, Inc., is a privately held company.

BUSINESS SEGMENT STRATEGIC DIRECTION

Office Copiers

Monroe Systems offers a full product line of application-specific copiers ranging from Segment 1

models to Segment 5 console models. Monroe is an original equipment manufacturer (OEM) for Mita Inc., which manufactures all of Monroe's copiers. Most models are modular in design; many provide features and accessories such as sorters, document feeders, reduction, enlargement, and duplexing, as well as editing, hole-punching, finishing, and large-capacity paper cassettes.

Dataquest estimates that Monroe Systems shipped 13,200 units in the United States for 1989 and had less than 1 percent of the plain paper copier market. The Company is most active in Segment 1, selling 9,600 units for a 2 percent market share in the United States. Dataquest defines Segment 1 as low-end, low-speed machines with few features. Dataquest believes that the Company sells nearly 73 percent of its copiers in Segment 1.

Monroe recently announced three new copiers: RL-922Z, RL-945DX, and RL-970DX. All three models are manufactured by Mita and are equivalent to Mita's DC-2254, DC-4585, and DC-7085, respectively. The RL-922Z became available in June; the RL-945DX and the RL-970DX became available in August.

Other Monroe copiers made on an OEM basis for Mita include the RL-912, RL-916Z, RL-916ZMR, RL-920, RL-922CE, RL-925, RL-925DX, RL-932, RL-932DX, RL-940, RL-940DX, and RL-955DX.

Facsimile Machines

Monroe distributes a full line of fax equipment ranging from low-end fax machines to hub machines with high-speed transmission and relay broadcasting. These machines are manufactured by Matsushita and Nitsuko and distributed by Monroe in the United States. Dataquest estimates that Monroe had less than 1 percent market share in 1989 in the United States.

Monroe's facsimile machines include the MX-3030, the MX-3040, the MX-3060, and the UF-620.

Other Products

The Company offers a full line of desktop calculators ranging from medium-duty models to heavy-duty units incorporating both common and unique functionality. Monroe also offers a complete line of paper shredders.

Further Information

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

1989 SALES OFFICE LOCATIONS

Asia/Pacific—1
ROW—4

MANUFACTURING LOCATIONS

North America

Lexington, South Carolina
Calculators

SUBSIDIARIES

Asia/Pacific

Monroe Systems for Business (Hong Kong)

ROW

Monroe Systems for Business (Puerto Rico)
Monroe Systems for Business (Venezuela)

ALLIANCES, JOINT VENTURES, AND LICENSING AGREEMENTS

Information is not available.

MERGERS AND ACQUISITIONS

Information is not available.

KEY OFFICERS

Jeffry M. Picower
Chairman of the board, chief executive officer

Richard Kelsky
Executive vice president and general counsel

Joseph V. Fusco
Vice president, chief financial officer

Harry M. Short
Vice president, Field Engineering

PRINCIPAL INVESTORS

Information is not available.

FOUNDERS

Information is not available.

X

Mostek Corporation

Mostek Corporation ESTIMATED SEMICONDUCTOR REVENUES (Millions of Dollars)

	1978	1979	1980	1981	1982	1983	1984	1985
Total Semiconductor	125	213	330	210	220	315	467	125
Total Integrated Circuit	125	213	330	210	220	315	467	125
Bipolar Digital (Technology)	0	0	0	0	0	0	0	0
TTL	0	0	0	0	0	0	0	0
ECL	0	0	0	0	0	0	0	0
Other Bipolar Digital	0	0	0	0	0	0	0	0
Bipolar Digital (Function)	0	0	0	0	0	0	0	0
Bipolar Digital Memory	0	0	0	0	0	0	0	0
Bipolar Digital Logic	0	0	0	0	0	0	0	0
MOS (Technology)	125	213	330	210	220	315	467	125
NMOS	117	194	310	189	197	281	416	75
PMOS	3	10	7	3	3	0	0	0
CMOS	5	9	13	18	20	34	51	50
MOS (Function)	125	213	330	210	220	315	467	125
MOS Memory	0	167	259	150	152	215	350	45
MOS Micro Devices	0	26	41	26	28	42	55	40
MOS Logic	0	20	30	34	40	58	62	40
Linear	0	0	0	0	0	0	0	0
Total Discrete	0	0	0	0	0	0	0	0
Transistor	0	0	0	0	0	0	0	0
Small Signal Transistor	0	0	0	0	0	0	0	0
Power Transistor	0	0	0	0	0	0	0	0
Diode	0	0	0	0	0	0	0	0
Small Signal Diode	0	0	0	0	0	0	0	0
Power Diode	0	0	0	0	0	0	0	0
Zener Diode	0	0	0	0	0	0	0	0
Thyristor	0	0	0	0	0	0	0	0
Other Discrete	0	0	0	0	0	0	0	0
Total Optoelectronic	0	0	0	0	0	0	0	0
LED Lamps	0	0	0	0	0	0	0	0
LED Displays	0	0	0	0	0	0	0	0
Optical Couplers	0	0	0	0	0	0	0	0
Other Optoelectronics	0	0	0	0	0	0	0	0

Source: Dataquest
August 1986

Mostek Corporation

(Page intentionally left blank)

Mostek Corporation

Mostek Corporation ESTIMATED SEMICONDUCTOR REVENUES (Millions of Dollars)

	1974	1975	1976	1977	1978	1979	1980	1981	1982
	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total Semiconductor	48	38	56	83	125	213	330	210	220
Total Integrated Circuit	48	38	56	83	125	213	330	210	220
Bipolar Digital (Technology)	-	-	-	-	-	-	-	-	-
TTL	-	-	-	-	-	-	-	-	-
DTL	-	-	-	-	-	-	-	-	-
ECL	-	-	-	-	-	-	-	-	-
Other Bipolar Digital	-	-	-	-	-	-	-	-	-
Bipolar Digital (Function)	-	-	-	-	-	-	-	-	-
Bipolar Digital Memory	-	-	-	-	-	-	-	-	-
Bipolar Digital Logic	-	-	-	-	-	-	-	-	-
MOS (Technology)	48	38	56	83	125	213	330	210	220
NMOS	-	-	-	-	117	194	310	189	197
PMOS	-	-	-	-	3	10	7	3	3
CMOS	-	-	-	-	5	9	13	18	20
MOS (Function)	48	38	56	83	125	213	330	210	220
MOS Memory	-	-	-	-	-	147	259	150	152
MOS Microprocessor	-	-	-	-	-	24	41	24	28
MOS Logic	-	-	-	-	-	20	30	34	40
Linear	-	-	-	-	-	-	-	-	-
Total Discrete	-	-	-	-	-	-	-	-	-
Transistor	-	-	-	-	-	-	-	-	-
Small Signal Transistor	-	-	-	-	-	-	-	-	-
Power Transistor	-	-	-	-	-	-	-	-	-
Diode	-	-	-	-	-	-	-	-	-
Small Signal Diode	-	-	-	-	-	-	-	-	-
Power Diode	-	-	-	-	-	-	-	-	-
Zener Diode	-	-	-	-	-	-	-	-	-
Thyristor	-	-	-	-	-	-	-	-	-
Other Discrete	-	-	-	-	-	-	-	-	-
Total Optoelectronic	-	-	-	-	-	-	-	-	-
LED Lamps	-	-	-	-	-	-	-	-	-
LED Displays	-	-	-	-	-	-	-	-	-
Optical Couplers	-	-	-	-	-	-	-	-	-
Other Total Optoelectronics	-	-	-	-	-	-	-	-	-

Source: DATAQUEST

Mostek Corporation

Mostek Corporation ESTIMATED SEMICONDUCTOR REVENUES (Millions of Dollars)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
RAMs					
Dynamic	\$56	\$ 81	\$123	\$189	\$ 80
Static	5	8	13	22	18
ROMs	2	7	12	16	29
EPROMs	<u>3</u>	<u>6</u>	<u>19</u>	<u>32</u>	<u>16</u>
Total Memory	\$66	\$102	\$167	\$259	\$143
MPUs	\$ 1	\$ 3	\$ 10	\$ 16	\$ 12
Peripheral, I/O	<u>2</u>	<u>6</u>	<u>16</u>	<u>25</u>	<u>16</u>
Total MPUs	\$ 3	\$ 9	\$ 26	\$ 41	\$ 28
Telecom Circuits	\$ 1	\$ 5	\$ 12	\$ 22	\$ 34
Calculator	5	1	1	0	0
Other	<u>8</u>	<u>7</u>	<u>7</u>	<u>8</u>	<u>5</u>
Total Other Components	\$14	\$ 13	\$ 20	\$ 30	\$ 39
Total MOS Semiconductor	\$83	\$124	\$213	\$330	\$210
Memory Systems	\$ 1	\$ 5	\$ 8	\$ 15	\$ 18
Microprocessor Systems	<u>2</u>	<u>5</u>	<u>8</u>	<u>15</u>	<u>22</u>
Total Systems	\$ 3	\$ 10	\$ 16	\$ 30	\$ 40
Total Revenues	\$86	\$134	\$229	\$360	\$250

Source: DATAQUEST, Inc.

8.40 Mostek Corporation

NOTE: In 1979, Mostek was acquired by United Technologies Corp. (UTC) for \$356 million (plus up to \$30 million for repurchase of outstanding stock options) and ceased publishing independent financial data at that time. This page is the only page of Mostek which has been updated in 1980.

Table 8.40-2

Mostek Corporation
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
Integrated Circuits						
Memory Applications	\$29.7	\$22.3	\$38.4	\$ 66.3	\$102.4	\$167
Microcomputer Applications	0.3	1.1	1.1	3.2	8.9	26
Telecommunications Applications	-	-	0.3	0.5	4.7	12
Calculator Applications	15.4	8.7	7.8	4.9	1.4	1
Other Applications	<u>3.7</u>	<u>5.1</u>	<u>8.3</u>	<u>7.7</u>	<u>6.7</u>	<u>7</u>
Subtotal	\$49.1	\$37.1	\$55.9	\$82.6	\$124.1	\$213
Microcomputer Systems	-	0.1	0.5	2.2	4.6	8
Memory Systems	-	-	-	0.8	5.3	8
Other*	<u>10.9</u>	<u>9.8</u>	<u>1.2</u>	<u>-</u>	<u>-</u>	<u>-</u>
Total	\$60.1	\$47.1	\$57.6	\$85.6	\$134.0	\$229

*Includes assembled consumer products phased out in 1976.

Source: 1974-1978 Mostek Corporation Form 10-K
1979 DATAQUEST, Inc.

DATAQUEST RESEARCH NEWSLETTER

A Subsidiary of A.C. Nielsen Co. INCORPORATED

SIS Code: Newsletters

March 9, 1979

MOSTEK ANALYSTS' MEETING February 26, 1979

DATAQUEST attended an Analysts' Meeting given by Mostek on February 26. Our observation of the meeting was that it was a forthright, upbeat meeting. Among those present were Vin Pothro, President; Berry Cash, Vice President of Marketing; Robert Palmer, Vice President of Wafer Fabrication/R&D; Jim Peoples, Vice President, Manufacturing; and Chuck Barker, Vice President of Finance.

The beginning of the meeting was devoted to a discussion of 1978 results and the impact of the Fab IV start-up problems on 1978 results.

Looking into 1979, some interesting data were presented.

1. Financial

Mostek's long-term goal is to achieve a 14 percent net profit before taxes. In light of the Company's 11.8 percent NPBT in 1978, DATAQUEST is assuming that Mostek's NPBT will improve slightly this year.

DATAQUEST expects that the first quarter will continue to show to some extent the financial effect of the Fab IV yield problem which was resolved in late 1978-early 1979.

Sales per employee increased to \$29,000 in 1978 from \$26,000 in 1977.

2. Capital and Capacity

Mostek expects capital expenditures to reach \$32 million in 1979 of which \$7 million will be for new facilities. DATAQUEST anticipates that a significant portion of this capital will be expended on its new facilities in Colorado Springs. We understand that the initial facility will be about 150,000 square feet. It will contain one wafer fabrication module which will be roughly equivalent in capacity and technology to Fab IV, which began processing silicon in mid-1978.

Copyright © 9 March 1979 by DATAQUEST - Reproduction Prohibited

The content of this report represents our interpretation and analysis of information generally available to the public or released by responsible individuals in the subject companies, but is not guaranteed as to accuracy or completeness. It does not contain material provided to us in confidence by our clients. This information is not furnished in connection with a sale or offer to sell securities or in connection with the solicitation of an offer to buy securities. This firm and its parent and/or their officers, stockholders, or members of their families may, from time to time, have a long or short position in the securities mentioned and may sell or buy such securities.

3. 1977-1978 Comparisons

Mostek displayed several charts showing the shift of business mix between 1977 and 1978 and also data relative to unit shipments on various key products. Table 1 represents DATAQUEST's estimates of dollar shipments by major business segment. This table was constructed by using the slide presented by Mostek showing major segments and DATAQUEST's estimates within the Miscellaneous category.

Table 2 was presented at the meeting.

Table 1

MOSTEK CORPORATION
ESTIMATED REVENUES BY MAJOR CATEGORY
(\$ in Millions)

	<u>1978</u>	<u>1979</u>
Memory	\$105	\$119
Memory Systems	5	12
Microprocessors & Systems	5	20
Telecommunications	8	12
Miscellaneous	<u>11</u>	<u>12</u>
Total Revenues	\$134	\$175

Source: Mostek Corporation
DATAQUEST, Inc., Estimates
March 1979

Table 2

MOSTEK CORPORATION
KEY PRODUCT SALES COMPARISONS
(Units in Millions)

<u>Product Type</u>	<u>1978</u>	<u>1979</u>
16K Dynamic RAM	5.0	13.0
4K Dynamic RAM	16.0	10.0
4K Static RAM	0.8	3.5
Microprocessors	1.2	3.5
Telecommunications	3.0	4.4

Source: Mostek Corporation
March 1979

4. Corporate Focus/New Products

Mostek then commented on its areas of concentration:

Memory

In 1978, the Company introduced four new products. In 1979, the plan is for eleven new memory products—four dynamic, five static, one EPROM, and one ROM. The 64K dynamic MOS RAM is scheduled for sampling in the second quarter.

Telecommunications

In 1978, the Company introduced four new products. In 1979, Mostek expects to introduce seven new products including a filter utilizing CCD technology. The part number is MK5200. It will be a rather small chip, 88x201 mils.

Microcomputers

In 1979, Mostek expects to introduce eight new products.

Miscellaneous

- Mostek's backlog of orders for dynamic and static RAMs is scheduled into the third quarter.
- Distributor shipments in 1978 were about 15 percent of total sales.

The outlook for Mostek in 1979 appears quite good. If DATAQUEST's sales estimate of \$175 million is achieved, along with a retention of the 40 percent tax rate, Mostek should earn between \$2.55 and \$2.65 per share in 1979 (based on 12 percent NPBT).

James F. Riley

Mostek International

BACKGROUND AND OVERVIEW

Mostek International was founded in 1969 by L. J. Sevin and L. Sharif. Mr. Sevin and Mr. Sharif were previously with Texas Instruments; they took with them several others from the Texas Instruments MOS program. The prime motivation at that time was brought about by Texas Instruments' preoccupation with discretionary wiring, preferring to push the limits of bipolar rather than MOS in search of higher orders of integration. Funding for Mostek was arranged by Richard Petritz, another former Texas Instruments employee. Sprague Electric subsequently took a 49 percent ownership in Mostek.

In the mid-seventies, Mostek established itself as a technical innovator in dynamic RAMs with the announcement of its 16-pin multiplexed 4K dynamic RAM, the MK 4096. This product was followed shortly after by a much-improved second-generation device, the MK 4027. The MK 4027 was to set a new standard for dynamic RAM design that lasted the Company throughout that and the subsequent generation of 16K devices. Mostek maintained this leadership position until the Japanese companies took the lead with the introduction of 64K dynamic RAM devices in the late seventies.

In 1979, coincident with the strong Japanese competitive thrust in dynamic memory devices, Mostek suffered a series of problems associated with the defection of some of its key employees. Mostek also fought a takeover bid from Gould, Inc., a major multinational electronic equipment manufacturer. Later that year, United Technologies Corporation bought Mostek for \$345 million. After some internal restructuring, Mostek formed five strategic business units that would market a wide range of products to various industry segments.

As a result of RAM prices collapsing in 1981 and the subsequent loss of revenues and profits, Mostek embarked upon what was considered to be a most ambitious diversification effort under the direction of newly appointed president H.L. Ergott Jr. The clear intent was to reduce Mostek's dependence on recession-sensitive products, like dynamic RAM devices.

In March 1982, Mostek and two other U.S. semiconductor manufacturers, Motorola and Signetics, joined forces to announce 15 new microprocessor peripheral integrated circuits. The three companies were to jointly develop and market these products over the following two years. By so doing, they hoped to strengthen the position of U.S. suppliers in the high-performance microprocessor market, a sector in which U.S. companies had so far maintained a lead over the Japanese.

Mostek International

In February 1984, Mostek and American Microsystems Inc. (AMI) signed a five-year alternate source and technology exchange agreement for a range of CMOS gate array and standard cell library products. Within the terms of this agreement, AMI transferred to Mostek the technology for the range of 1,000- to 4,000-gate arrays in 3-micron geometries and the technology for a range of 1,000- to 4,000-gate arrays in 2-micron geometries.

In April 1984, Mostek announced the split of its Semiconductor Operation into two divisions: the Storage Advanced Products division, focusing on high-performance memory devices and special products; and the Diversified Products division, concentrating on semicustom, communication, and military components and the microprocessor products.

In September 1984, Mostek announced the opening of a semicustom design center at its headquarters in Carrollton, Texas.

As shown in Table 1, DATAQUEST estimates that Mostek's European revenues in 1984 were \$98 million, an increase of 72 percent over 1983.

Table 1

Mostek International
ESTIMATED EUROPEAN SEMICONDUCTOR REVENUES BY PRODUCT LINE
(Millions of U.S. Dollars)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
Total Semiconductor	\$ 40	\$ 60	\$ 88	\$ 50	\$ 52	\$ 57	\$ 98
Total Integrated Circuit	40	60	88	50	52	57	98
Bipolar Digital	0	0	0	0	0	0	0
MOS	40	60	88	50	52	57	98
Linear	0	0	0	0	0	0	0
Total Discrete	0	0	0	0	0	0	0
Transistor	0	0	0	0	0	0	0
Diode	0	0	0	0	0	0	0
Thyristor	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Total Optoelectronic	0	0	0	0	0	0	0

Source: DATAQUEST
July 1985

Mostek International

PRODUCTS AND MARKETS SERVED

Mostek, still innovative in memory products with the recent announcement of a 1-Megabit CMOS ROM, has phased out a number of old product lines and is now concentrating on 16-bit microprocessors and peripheral chips; local network chips; gate array products; and specialized telecommunications devices, which include repertory and tone pulse dialer chips and a PCM filter/codec combo chip.

OUTLOOK

Mostek's growing production base is one of the results of United Technologies' interest in the European market. Early in 1983, United Technologies formed a European advisory council to provide guidance in the development of business opportunities in Europe. A new venture that will be Mostek's responsibility is the formation of an agreement between AEG-Telefunken of Frankfurt, the Diehl group of Nuremberg, and United Technologies, whereby the three partners will develop, produce, and market custom MOS circuits in a joint venture called Eurosil Electronic GmbH in Munich, West Germany. Mostek is expected to supply the advanced technology needed for the project with the wafers to be manufactured at the existing (upgraded) Eurosil facility in West Germany.

However, in May 1985, Mostek closed the U.S. facility at Colorado Springs, Colorado, which was diffusing 64K and 256K dynamic RAM devices. This resulted in a substantial reduction in Mostek's staff. The plant closing and staff reduction are indicative not only of poor market economic conditions, but also of Mostek's continued dependence on recession-sensitive products.

DATAQUEST believes that Mostek will soon be entering into a technology transfer agreement with Korean manufacturer Samsung. DATAQUEST further believes that in the cash deal, which would be a welcomed infusion of funds for Mostek, Samsung will get Mostek's 256K dynamic RAM design, while Mostek will get the right to purchase from Samsung finished product at preferential prices. DATAQUEST considers this beneficial to Mostek in helping to effectively bring its double metal process to market, currently one year behind schedule, particularly when competitors are shipping this product in volume.

Mostek Corporation

Mostek Corporation ESTIMATED SEMICONDUCTOR REVENUES (Millions of Dollars)

	1974	1975	1976	1977	1978	1979	1980	1981	1982
	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total Semiconductor	48	38	56	83	125	213	330	210	220
Total Integrated Circuit	48	38	56	83	125	213	330	210	220
Bipolar Digital (Technology)	-	-	-	-	-	-	-	-	-
TTL	-	-	-	-	-	-	-	-	-
DTL	-	-	-	-	-	-	-	-	-
ECL	-	-	-	-	-	-	-	-	-
Other Bipolar Digital	-	-	-	-	-	-	-	-	-
Bipolar Digital (Function)	-	-	-	-	-	-	-	-	-
Bipolar Digital Memory	-	-	-	-	-	-	-	-	-
Bipolar Digital Logic	-	-	-	-	-	-	-	-	-
MOS (Technology)	48	38	56	83	125	213	330	210	220
NMOS	-	-	-	-	117	194	310	189	197
PMOS	-	-	-	-	3	10	7	3	3
CMOS	-	-	-	-	5	9	13	18	20
MOS (Function)	48	38	56	83	125	213	330	210	220
MOS Memory	-	-	-	-	-	167	259	150	152
MOS Microprocessor	-	-	-	-	-	26	41	26	28
MOS Logic	-	-	-	-	-	20	30	34	40
Linear	-	-	-	-	-	-	-	-	-
Total Discrete	-	-	-	-	-	-	-	-	-
Transistor	-	-	-	-	-	-	-	-	-
Small Signal Transistor	-	-	-	-	-	-	-	-	-
Power Transistor	-	-	-	-	-	-	-	-	-
Diode	-	-	-	-	-	-	-	-	-
Small Signal Diode	-	-	-	-	-	-	-	-	-
Power Diode	-	-	-	-	-	-	-	-	-
Zener Diode	-	-	-	-	-	-	-	-	-
Thyristor	-	-	-	-	-	-	-	-	-
Other Discrete	-	-	-	-	-	-	-	-	-
Total Optoelectronic	-	-	-	-	-	-	-	-	-
LED Lamps	-	-	-	-	-	-	-	-	-
LED Displays	-	-	-	-	-	-	-	-	-
Optical Couplers	-	-	-	-	-	-	-	-	-
Other Total Optoelectronics	-	-	-	-	-	-	-	-	-

Source: DATAQUEST

Mostek Corporation

Mostek Corporation ESTIMATED SEMICONDUCTOR REVENUES (Millions of Dollars)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
RAMs					
Dynamic	\$56	\$ 81	\$123	\$189	\$ 80
Static	5	8	13	22	18
ROMs	2	7	12	16	29
EPROMs	<u>3</u>	<u>6</u>	<u>19</u>	<u>32</u>	<u>16</u>
Total Memory	\$66	\$102	\$167	\$259	\$143
MPUs	\$ 1	\$ 3	\$ 10	\$ 16	\$ 12
Peripheral, I/O	<u>2</u>	<u>6</u>	<u>16</u>	<u>25</u>	<u>16</u>
Total MPUs	\$ 3	\$ 9	\$ 26	\$ 41	\$ 28
Telecom Circuits	\$ 1	\$ 5	\$ 12	\$ 22	\$ 34
Calculator	5	1	1	0	0
Other	<u>8</u>	<u>7</u>	<u>7</u>	<u>8</u>	<u>5</u>
Total Other Components	\$14	\$ 13	\$ 20	\$ 30	\$ 39
Total MOS Semiconductor	\$83	\$124	\$213	\$330	\$210
Memory Systems	\$ 1	\$ 5	\$ 8	\$ 15	\$ 18
Microprocessor Systems	<u>2</u>	<u>5</u>	<u>8</u>	<u>15</u>	<u>22</u>
Total Systems	\$ 3	\$ 10	\$ 16	\$ 30	\$ 40
Total Revenues	\$86	\$134	\$229	\$360	\$250

Source: DATAQUEST, Inc.

8.40 Mostek Corporation

Mostek Corporation
1215 West Crosby Road
Carrollton, Texas 75006
(214) 242-0444

Balance Sheet (December 31)

	<u>1977</u>	<u>1978</u>	<u>Percent Change 1977-78</u>
Working Capital (\$ Millions)	\$25.4	\$ 42.6	67.3%
Long-Term Debt (\$ Millions)	\$13.0	\$ 26.2	101.1%
Shareholders' Equity (\$ Millions)	\$49.3	\$ 60.2	22.1%
After-Tax Return on Average Equity (%)	13.4%	17.3%	

Operating Performance (Fiscal Year Ending December 31)

	<u>1977</u>	<u>1978</u>	<u>Percent Change 1977-78</u>
Revenue (\$ Millions)	\$85.6	\$134.0	56.6%
Cost of Revenues (\$ Millions)	\$47.2	\$ 71.6	51.5%
R&D Expense (\$ Millions)	\$ 4.8	\$ 9.8	103.8%
Marketing, S G&A Expense (\$ Millions)	\$16.2	\$ 25.1	55.3%
Pretax Income (\$ Millions)	\$ 9.5	\$ 15.9	67.1%
Pretax Margin (%)	11.1%	11.9%	
Net Income (\$ Millions)	\$ 5.7	\$ 9.5	66.0%
Per Share Data ¹			
Earnings (\$)	\$ 1.30	\$ 1.94	49.2%
Dividend (\$)	\$ 0.00	0.00	
Book Value (\$)	\$10.59	\$ 12.64	19.4%
Average Shares Outstanding (Millions)	4.38	4.89	
Capital Expenditures (\$ Millions)	\$24.2	\$ 18.8	(22.3%)
Total Employees	3,930	5,044	28.3%

¹Fully diluted

Source: Mostek Annual Reports
DATAQUEST, Inc.

8.40 Mostek Corporation

NOTE: In 1979, Mostek was acquired by United Technologies Corp. (UTC) for \$356 million (plus up to \$30 million for repurchase of outstanding stock options) and ceased publishing independent financial data at that time. This page is the only page of Mostek which has been updated in 1980.

Table 8.40-2

Mostek Corporation
ESTIMATED SEMICONDUCTOR REVENUES
(Millions of Dollars)

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
Integrated Circuits						
Memory Applications	\$29.7	\$22.3	\$38.4	\$ 66.3	\$102.4	\$167
Microcomputer Applications	0.3	1.1	1.1	3.2	8.9	26
Telecommunications Applications	-	-	0.3	0.5	4.7	12
Calculator Applications	15.4	8.7	7.8	4.9	1.4	1
Other Applications	<u>3.7</u>	<u>5.1</u>	<u>8.3</u>	<u>7.7</u>	<u>6.7</u>	<u>7</u>
Subtotal	\$49.1	\$37.1	\$55.9	\$82.6	\$124.1	\$213
Microcomputer Systems	-	0.1	0.5	2.2	4.6	8
Memory Systems	-	-	-	0.8	5.3	8
Other*	<u>10.9</u>	<u>9.8</u>	<u>1.2</u>	<u>-</u>	<u>-</u>	<u>-</u>
Total	\$60.1	\$47.1	\$57.6	\$85.6	\$134.0	\$229

*Includes assembled consumer products phased out in 1976.

Source: 1974-1978 Mostek Corporation Form 10-K
1979 DATAQUEST, Inc.

8.40 Mostek Corporation

Table 8.40.1
Mostek
ESTIMATED REVENUES BY DEPARTMENT
(Dollars in Millions)

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Semiconductors	\$4	\$18	\$39	\$48	\$38	\$56	\$83	\$125
Integrated Circuits	4	18	39	48	38	56	83	125
MOS	4	18	39	48	38	56	83	125
Memory & MPU Systems							3	9
Calculators	<u>0</u>	<u>0</u>	<u>3</u>	<u>12</u>	<u>9</u>	<u>2</u>	<u>0</u>	<u>0</u>
Total Revenues	\$3.7	\$17.7	\$41.9	\$60.1	\$47.1	\$57.6	\$85.6	\$134.0

Fiscal year ends December 31

Source: DATAQUEST, Inc.

8.40 Mostek Corporation

Table 8.40.2

Mostek
ESTIMATED SEMICONDUCTOR REVENUES
(Dollars in Millions)

	<u>1977</u>	<u>1978</u>
Memory Components	\$71	\$105
Memory Systems	1	5
Microprocessors and MPU Systems	2	5
Telecommunications Components	3	8
Other (Calculator Circuits, Timer Circuits, etc.)	<u>9</u>	<u>11</u>
Total	\$86	\$134

Source: DATAQUEST, Inc.

① Her, see prospectus and 10-K for earlier data.

② These are not all % revenues.

8.40 Mostek Corporation

Table 8.40.3
Mostek
FINANCIAL STATEMENT HISTORY 1971-78
(Dollars in Millions)

Fiscal Year Ending December 31										
	1971	1972	1973	1974	1975	1976	1977	1978	TREND	CMPO GR
BALANCE SHEET										
1 CASH & LIQUID SECURITIES	1.17	5.81	4.07	2.76	3.03	5.44	2.49	4.31	0.12	7.19
3 RECEIVABLES	1.03	4.91	8.21	12.69	12.66	12.65	17.54	31.45	3.44	45.65
4 INVENTORY	1.09	3.37	8.94	13.68	8.51	9.39	18.35	28.32	3.12	44.55
5 OTHER CURRENT ASSETS	0.01	0.02	0.10	0.10	0.10	0.16	0.25	0.37	0.05	61.64
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	3.30	14.11	21.32	29.23	24.31	27.64	38.62	64.45	6.72	36.97
9 GROSS P P E	0.95	2.93	8.38	20.64	23.22	29.41	53.10	69.93	9.52	78.06
10 ACCUMULATED DEPRECIATION	0.19	0.53	1.42	3.39	6.46	8.59	13.81	21.04	2.82	93.05
11 NET P P E	0.76	2.40	6.96	17.25	16.76	20.81	39.28	48.89	6.69	73.73
12 MISC ASSETS	0.04	0.08	0.39	0.56	0.15	0.90	0.52	0.28	0.06	34.96
15 *TOTAL ASSETS*	4.10	16.59	28.67	47.05	41.22	49.36	78.43	113.62	13.48	47.28
16 NOTES PAYABLE	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	(0.01)	(21.86)
17 ACCOUNTS PAYABLE	0.48	2.99	4.40	5.65	3.00	3.52	7.81	12.06	1.19	36.36
18 ACCRUED TAXES	0.00	1.14	4.23	0.80	0.14	1.47	1.33	2.96	0.15	486.15
19 ACCRUED LIABILITIES	0.17	0.65	1.15	1.72	1.40	2.10	3.77	6.57	0.75	53.70
20 CURR MAT LONG TERM DEBT	0.00	0.00	0.00	0.04	0.04	0.05	0.27	0.31	0.04	2940.73
22 TOTAL CURR LIABILITIES	0.65	4.78	9.79	9.21	4.58	7.13	13.19	21.90	2.12	39.68
23 LONG TERM DEBT	2.66	0.21	0.21	3.46	3.42	3.38	13.04	26.22	2.84	70.68
24 DEFERRED TAXES	0.00	0.49	1.02	1.52	1.31	2.23	2.35	4.73	0.55	621.27
25 MISC LIABILITIES	0.00	0.56	0.46	0.11	0.07	0.48	0.53	0.55	0.04	431.96
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	3.31	6.04	11.48	14.30	9.38	13.22	29.12	53.90	5.55	38.46
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	0.09	0.33	0.33	0.40	0.40	0.41	0.47	0.48	0.04	18.65
31 CAPITAL SURPLUS	1.62	8.98	9.02	20.13	20.45	21.14	28.53	29.94	3.96	40.82
32 RETAINED EARNINGS	(0.84)	1.32	7.92	12.30	11.06	14.67	20.39	29.87	3.92	*****
33 TREASURY STOCK	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	0.00	0.00
34 TOTAL EQUITY	0.79	10.55	17.18	32.75	31.84	36.14	49.31	60.22	7.93	61.49
35 *TOTAL LIAB & EQUITY*	4.10	16.59	28.67	47.05	41.22	49.36	78.43	113.62	13.48	47.28
36 NET WORKING CAPITAL	2.66	9.33	11.53	20.02	19.73	20.51	25.43	42.55	4.60	36.51
INCOME & EXPENSE										
38 SALES	3.63	17.73	41.91	60.06	47.12	57.63	85.59	134.01	15.31	49.60
40 COST OF GOODS	1.76	9.65	20.48	36.59	32.09	32.27	47.23	71.57	8.42	51.91
41 GROSS PROFIT	1.88	8.09	21.43	23.47	15.02	25.36	38.36	62.45	6.89	47.02
42 S G & A EXPENSE	0.96	2.27	5.39	9.62	8.59	10.10	16.20	25.15	3.00	50.76
43 R & D EXPENSE	0.47	1.10	2.58	4.29	4.14	3.81	4.79	9.76	1.04	42.58
45 OPERATING PROFIT	0.45	4.72	13.45	9.56	2.29	11.35	17.37	27.53	2.85	48.79
46 DEPRECIATION	0.13	0.35	0.91	2.07	2.83	3.49	5.68	8.09	1.08	75.07
47 LEASE PAYMENTS	0.03	0.21	0.29	0.71	0.57	0.68	1.20	1.89	0.23	60.54
48 INTEREST EXPENSE	0.10	0.02	0.02	0.27	0.00	0.00	0.00	2.19	0.17	(78.90)
49 MISC EXPENSE	0.02	0.00	(0.01)	(0.13)	1.15	0.94	0.87	0.00	0.10	*****
51 MISC INCOME	0.06	0.14	0.34	0.36	0.00	0.00	0.00	0.55	0.02	(84.50)
52 EQUITY IN AFFILIATE ENCS	0.00	0.00	0.00	0.00	0.00	0.34	(0.09)	0.00	0.01	*****
53 PRETAX PROFIT	0.23	4.28	12.58	6.99	(2.26)	6.59	9.52	15.91	1.29	*****
54 INCOME TAXES	0.10	2.02	5.99	3.09	(1.02)	2.98	3.81	6.42	0.48	*****
55 EXTRAORDINARY ITEM	(0.10)	(0.40)	0.00	0.00	0.00	0.00	0.00	0.00	0.03	*****
56 NET PROFIT	0.23	2.66	6.59	3.89	(1.24)	3.61	5.71	9.49	0.79	*****
57 EPS AFTER PFD DIVIDENDS	0.10	0.81	1.80	0.97	(0.31)	0.85	1.30	1.94	0.13	*****
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: Mostek Annual Reports and Form 10-K
DATAQUEST, Inc.

8.40 Mostek Corporation

Table 8.40.4
Mostek
FINANCIAL STATEMENT HISTORY 1971-78
(Percent)

Fiscal Year Ending December 31										
	1971	1972	1973	1974	1975	1976	1977	1978	TREND	CMPD GR
BALANCE SHEET										
1 CASH & LIQUID SECURITIES	28.63	35.04	14.19	5.87	7.36	11.02	3.17	3.80	(4.06)	(27.22)
3 RECEIVABLES	25.16	29.60	28.63	26.97	30.72	25.64	22.36	27.68	(0.28)	(1.11)
4 INVENTORY	26.60	20.30	31.19	29.07	20.66	19.02	23.40	24.92	(0.49)	(1.85)
5 OTHER CURRENT ASSETS	0.24	0.10	0.36	0.22	0.25	0.33	0.31	0.33	0.02	9.75
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	80.64	85.04	74.37	62.13	58.99	56.00	49.24	56.73	(4.82)	(7.00)
9 GROSS P P E	23.16	17.68	29.24	43.87	56.32	59.58	67.70	61.54	7.41	20.90
10 ACCUMULATED DEPRECIATION	4.69	3.18	4.95	7.19	15.67	17.41	17.61	18.52	2.56	31.07
11 NET P P E	18.48	14.50	24.28	36.67	40.66	42.17	50.09	43.03	4.85	17.96
12 MISC ASSETS	0.88	0.46	1.35	1.20	0.36	1.83	0.67	0.25	(0.03)	(8.37)
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	0.00	0.00	2.13	0.00	0.00	0.00	0.00	(0.03)	(22.56)
17 ACCOUNTS PAYABLE	11.74	18.03	15.35	12.01	7.27	7.13	8.96	10.62	(0.92)	(7.42)
18 ACCRUED TAXES	0.00	6.85	14.76	1.70	0.34	2.97	1.70	2.81	(0.53)	419.38
19 ACCRUED LIABILITIES	4.08	3.91	4.03	3.65	3.40	4.26	4.81	5.78	0.20	4.35
20 CURR NAT LONG TERM DEBT	0.00	0.00	0.00	0.09	0.10	0.09	0.35	0.27	0.05	3035.26
22 TOTAL CURR LIABILITIES	15.82	28.79	34.14	19.58	11.11	14.45	16.82	19.27	(1.23)	(5.16)
23 LONG TERM DEBT	64.93	1.28	0.74	7.35	8.30	6.84	16.63	23.08	(2.34)	15.88
24 DEFERRED TAXES	0.00	2.96	3.56	3.24	3.18	4.52	3.00	4.16	0.38	\$39.11
25 MISC LIABILITIES	0.00	3.38	1.62	0.23	0.17	0.98	0.68	0.49	(0.14)	371.36
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	80.74	36.41	40.05	30.40	22.77	26.78	37.13	47.00	(3.33)	(5.99)
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	2.17	1.97	1.14	0.84	0.98	0.83	0.60	0.42	(0.24)	(19.44)
31 CAPITAL SURPLUS	39.64	54.12	31.47	42.79	49.61	42.82	36.38	26.35	(1.68)	(4.39)
32 RETAINED EARNINGS	(20.60)	7.99	27.61	26.14	26.84	29.73	25.99	26.29	5.06	*****
33 TREASURY STOCK	(1.95)	(0.48)	(0.28)	(0.17)	(0.19)	(0.16)	(0.10)	(0.07)	0.18	(32.10)
34 TOTAL EQUITY	19.26	63.59	59.95	69.60	77.23	73.22	62.87	53.00	3.33	9.64
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	64.83	56.25	40.23	42.55	47.87	41.56	32.42	37.45	(3.59)	(7.31)
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	48.35	54.40	48.87	60.92	68.11	56.00	55.18	53.40	0.81	1.54
41 GROSS PROFIT	51.65	45.60	51.13	39.08	31.89	44.00	44.82	46.60	(0.81)	(1.72)
42 S G & A EXPENSE	26.33	12.78	12.87	16.02	18.24	17.52	18.93	18.77	(0.07)	0.77
43 R & D EXPENSE	12.93	6.21	6.16	7.14	8.79	6.78	5.60	7.29	(0.47)	(4.70)
45 OPERATING PROFIT	12.38	26.60	32.10	15.91	4.86	19.70	20.30	20.55	(0.27)	(0.55)
46 DEPRECIATION	3.63	1.99	2.17	3.45	6.01	6.05	6.64	6.04	0.65	17.02
47 LEASE PAYMENTS	0.85	1.18	0.70	1.18	1.20	1.17	1.41	1.41	0.08	7.31
48 INTEREST EXPENSE	2.70	0.10	0.04	0.46	0.00	0.00	0.00	1.64	(0.10)	(86.42)
49 MISC EXPENSE	0.69	0.00	(0.02)	(0.21)	2.44	1.63	1.02	0.00	0.09	*****
51 MISC INCOME	1.68	0.80	0.82	0.60	0.00	0.00	0.00	0.41	(0.19)	(90.09)
52 EQUITY IN AFFILIATE ENGS	0.00	0.00	0.00	0.00	0.00	0.58	(0.11)	0.00	0.01	*****
53 PRETAX PROFIT	6.19	24.13	30.02	11.64	(4.79)	11.43	11.13	11.87	(1.16)	*****
54 INCOME TAXES	2.81	11.42	14.29	5.15	(2.16)	5.16	4.45	4.79	(0.66)	*****
55 EXTRAORDINARY ITEM	(2.81)	(2.28)	0.00	0.00	0.00	0.00	0.00	0.00	0.37	*****
56 NET PROFIT	6.19	14.99	15.73	6.48	(2.63)	6.27	6.68	7.08	(0.87)	*****
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: Mostek Annual Reports and Form 10-K
DATAQUEST, Inc.

8.40 Mostek Corporation

Table 8.40.5
Mostek
FUNDS FLOW HISTORY 1972-78
(Dollars in Millions)

	Fiscal Year Ending December 31								
	1972	1973	1974	1975	1976	1977	1978	TREND	CMPD GR
SOURCES									
56 NET PROFIT	2.66	6.59	3.89	(1.24)	3.61	5.71	9.49	0.66	*****
46 DEPRECIATION	0.35	0.91	2.07	2.83	3.49	5.68	8.09	1.22	62.40
61 NEW LONG TERM DEBT	0.00	0.00	3.29	0.00	0.00	9.94	13.49	2.04	2781.12
62 NEW EQUITY	7.10	0.04	11.67	0.32	0.69	7.45	1.42	(0.47)	9.63
63 INCR OTHER LIABILITIES	1.05	0.43	0.15	(0.25)	1.33	0.17	2.40	0.17	*****
66 TOTAL SOURCES	11.16	7.96	21.07	1.67	9.12	28.96	34.89	3.61	20.23
USES									
67 P P E EXPENDITURES	2.00	5.47	12.37	2.34	7.54	24.15	17.70	2.84	37.99
68 REPAYMENT LONG TERM DEBT	2.45	0.00	0.00	0.04	0.04	0.05	0.27	(0.23)	420.56
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	6.67	2.20	8.53	(0.29)	0.78	5.14	17.16	1.06	*****
71 INCR OTHER ASSETS	0.04	0.31	0.18	(0.42)	0.75	(0.38)	(0.24)	(0.06)	*****
74 TOTAL USES	11.16	7.96	21.07	1.67	9.12	28.96	34.89	3.61	20.23
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: Mostek Annual Reports and Form 10-K
DATAQUEST, Inc.

8.40 Mostek Corporation

Table 8.40.6

Mostek

FINANCIAL RATIO HISTORY 1971-78

Fiscal Year Ending December 31

	1971	1972	1973	1974	1975	1976	1977	1978	ST. AV	MTD. AVG
LIQUIDITY										
1 CURRENT RATIO	5.099	2.954	2.179	3.173	5.308	3.877	2.927	2.943	3.557	3.446
2 QUICK RATIO	3.401	2.245	1.254	1.677	3.426	2.538	1.518	1.633	2.212	2.067
3 CASH RATIO	1.810	1.217	0.416	0.300	0.662	0.763	0.188	0.197	0.694	0.985
4 WORKING CAPITAL/SALES	0.731	0.526	0.275	0.333	0.419	0.356	0.297	0.318	0.407	0.355
6 DAYS RECEIVABLES	103.554	101.057	71.484	77.120	98.084	80.141	74.794	95.652	86.486	83.574
7 DAYS INVENTORY	226.437	127.379	159.374	136.457	96.837	106.179	141.833	144.423	142.365	132.628
LEVERAGE										
8 LONG TERM DEBT/CAPITALIZ	0.771	0.020	0.012	0.096	0.097	0.085	0.209	0.303	0.199	0.170
11 LONG TERM DEBT/EQUITY	3.371	0.020	0.012	0.106	0.107	0.093	0.264	0.435	0.551	0.286
12 TOTAL DEBT/EQUITY	3.371	0.020	0.012	0.137	0.109	0.095	0.270	0.441	0.557	0.292
COVERAGE										
13 EBIT/INTEREST	3.296	252.765	787.313	26.411	0.000	0.000	0.030	8.258	134.755	84.513
14 FIXED CHARGE COVERAGE	2.744	19.855	41.453	8.123	(2.993)	10.757	8.909	4.997	11.718	9.734
16 REPAY LTD-FIX CHARGE COV	*****	19.855	41.453	8.123	(2.790)	10.141	8.588	4.590	12.852	8.941
OPER PERFORMANCE										
17 GROSS PROFIT/SALES	0.517	0.456	0.511	0.381	0.319	0.440	0.448	0.466	0.443	0.434
18 OPER PROFIT/SALES	0.124	0.266	0.321	0.159	0.049	0.197	0.203	0.205	0.190	0.187
21 PRETAX PROFIT/SALES	0.062	0.241	0.300	0.116	(0.048)	0.114	0.111	0.119	0.127	0.113
22 NET PROFIT/SALES	0.062	0.150	0.157	0.085	(0.026)	0.063	0.067	0.071	0.076	0.066
23 NET PROFIT/AVG EQUITY	*****	0.469	0.475	0.156	(0.038)	0.106	0.134	0.173	0.211	0.153
24 NET PROFIT/AVG CAPITALIZ	*****	0.374	0.468	0.145	(0.035)	0.097	0.112	0.128	0.184	0.131
26 NET PROFIT/AVG TOT ASSETS	*****	0.257	0.291	0.103	(0.028)	0.080	0.089	0.099	0.127	0.095
27 E P S GROWTH RATE	*****	6.947	1.228	(0.459)	*****	*****	0.532	0.490	*****	*****
28 SALES GROWTH RATE	*****	3.880	1.363	0.493	(0.215)	0.223	0.485	0.566	0.962	0.537
TURNOVER										
31 SALES/AVG EQUITY	*****	3.129	3.022	2.406	1.459	1.696	2.003	2.447	2.309	2.138
32 SALES/AVG CAPITALIZ	*****	2.496	2.977	2.241	1.319	1.542	1.680	1.801	2.008	1.816
33 SALES/AVG TOT DEBT + EQUITY	*****	2.496	2.977	2.198	1.299	1.540	1.675	1.794	1.997	1.805
34 SALES/AVG TOTAL ASSETS	*****	1.715	1.852	1.586	1.068	1.273	1.340	1.396	1.461	1.379
35 SALES/AVG OPER ASSETS	*****	1.724	1.871	1.607	1.076	1.287	1.355	1.401	1.475	1.392
36 SALES/AVG GROSS P P E	*****	9.139	7.408	4.139	2.149	2.190	2.075	2.179	4.183	2.986
BALANCE SHEET										
37 CASH/SALES	0.323	0.328	0.097	0.046	0.064	0.094	0.029	0.032	0.127	0.078
38 RECEIVABLES/SALES	0.284	0.277	0.196	0.211	0.269	0.220	0.205	0.235	0.237	0.229
41 INVENTORY/SALES	0.300	0.190	0.213	0.228	0.181	0.163	0.214	0.211	0.213	0.203
42 OTH CURR ASSETS/SALES	0.003	0.001	0.002	0.002	0.002	0.003	0.003	0.003	0.002	0.002
44 GROSS P P E/SALES	0.261	0.165	0.200	0.344	0.493	0.510	0.620	0.522	0.369	0.461
46 MISC ASSETS/SALES	0.010	0.004	0.009	0.009	0.003	0.016	0.006	0.002	0.007	0.007
47 ACCOUNTS PAYABLE/SALES	0.132	0.169	0.105	0.094	0.064	0.061	0.091	0.090	0.101	0.089
48 ACCRUED TAXES/SALES	0.000	0.064	0.101	0.013	0.003	0.025	0.016	0.022	0.031	0.026
51 ACCRUED LIABILITY/SALES	0.046	0.037	0.028	0.029	0.030	0.036	0.044	0.049	0.037	0.038
53 DEFERRED TAXES/SALES	0.000	0.028	0.024	0.025	0.028	0.039	0.029	0.035	0.026	0.030
54 MISC LIABILITIES/SALES	0.000	0.032	0.011	0.002	0.001	0.008	0.006	0.004	0.008	0.007
MISCELLANEOUS										
57 EQUITY PER COMMON SHARE	0.356	3.197	4.682	4.175	8.064	8.515	11.244	12.327	7.070	8.951
58 RETIRE/PREV GROSS P P E	*****	(0.019)	(0.006)	(0.013)	0.012	(0.058)	(0.016)	(0.016)	(0.017)	(0.019)
61 DEPREC/PREV GROSS P P E	*****	0.372	0.311	0.247	0.137	0.150	0.193	0.152	0.223	0.188
62 CON DIVS/ERN-PRD DIVS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
63 TAX RATE	0.453	0.473	0.476	0.443	0.451	0.452	0.400	0.404	0.444	0.433
64 COST OF GOODS/SALES	0.483	0.544	0.469	0.609	0.681	0.560	0.552	0.534	0.557	0.566
65 S G e A/SALES	0.263	0.126	0.129	0.160	0.182	0.175	0.189	0.188	0.177	0.176

Source: Mostek Annual Reports and Form 10-K
DATAQUEST, Inc.

DATAQUEST RESEARCH NEWSLETTER

A Subsidiary of A.C. Nielsen Co. INCORPORATED

SIS Code: Newsletters

March 9, 1979

MOSTEK ANALYSTS' MEETING February 26, 1979

DATAQUEST attended an Analysts' Meeting given by Mostek on February 26. Our observation of the meeting was that it was a forthright, upbeat meeting. Among those present were Vin Pothro, President; Berry Cash, Vice President of Marketing; Robert Palmer, Vice President of Wafer Fabrication/R&D; Jim Peoples, Vice President, Manufacturing; and Chuck Barker, Vice President of Finance.

The beginning of the meeting was devoted to a discussion of 1978 results and the impact of the Fab IV start-up problems on 1978 results.

Looking into 1979, some interesting data were presented.

1. Financial

Mostek's long-term goal is to achieve a 14 percent net profit before taxes. In light of the Company's 11.8 percent NPBT in 1978, DATAQUEST is assuming that Mostek's NPBT will improve slightly this year.

DATAQUEST expects that the first quarter will continue to show to some extent the financial effect of the Fab IV yield problem which was resolved in late 1978-early 1979.

Sales per employee increased to \$29,000 in 1978 from \$26,000 in 1977.

2. Capital and Capacity

Mostek expects capital expenditures to reach \$32 million in 1979 of which \$7 million will be for new facilities. DATAQUEST anticipates that a significant portion of this capital will be expended on its new facilities in Colorado Springs. We understand that the initial facility will be about 150,000 square feet. It will contain one wafer fabrication module which will be roughly equivalent in capacity and technology to Fab IV, which began processing silicon in mid-1978.

Copyright © 9 March 1979 by DATAQUEST - Reproduction Prohibited

The content of this report represents our interpretation and analysis of information generally available to the public or released by responsible individuals in the subject companies, but is not guaranteed as to accuracy or completeness. It does not contain material provided to us in confidence by our clients. This information is not furnished in connection with a sale or offer to sell securities or in connection with the solicitation of an offer to buy securities. This firm and its parent and/or their officers, stockholders, or members of their families may, from time to time, have a long or short position in the securities mentioned and may sell or buy such securities.

3. 1977-1978 Comparisons

Mostek displayed several charts showing the shift of business mix between 1977 and 1978 and also data relative to unit shipments on various key products. Table 1 represents DATAQUEST's estimates of dollar shipments by major business segment. This table was constructed by using the slide presented by Mostek showing major segments and DATAQUEST's estimates within the Miscellaneous category.

Table 2 was presented at the meeting.

Table 1

MOSTEK CORPORATION
ESTIMATED REVENUES BY MAJOR CATEGORY
(\$ in Millions)

	<u>1978</u>	<u>1979</u>
Memory	\$105	\$119
Memory Systems	5	12
Microprocessors & Systems	5	20
Telecommunications	8	12
Miscellaneous	<u>11</u>	<u>12</u>
Total Revenues	\$134	\$175

Source: Mostek Corporation
DATAQUEST, Inc., Estimates
March 1979

Table 2

MOSTEK CORPORATION
KEY PRODUCT SALES COMPARISONS
(Units in Millions)

<u>Product Type</u>	<u>1978</u>	<u>1979</u>
16K Dynamic RAM	5.0	13.0
4K Dynamic RAM	16.0	10.0
4K Static RAM	0.8	3.5
Microprocessors	1.2	3.5
Telecommunications	3.0	4.4

Source: Mostek Corporation
March 1979

4. Corporate Focus/New Products

Mostek then commented on its areas of concentration:

Memory

In 1978, the Company introduced four new products. In 1979, the plan is for eleven new memory products—four dynamic, five static, one EPROM, and one ROM. The 64K dynamic MOS RAM is scheduled for sampling in the second quarter.

Telecommunications

In 1978, the Company introduced four new products. In 1979, Mostek expects to introduce seven new products including a filter utilizing CCD technology. The part number is MK5200. It will be a rather small chip, 88x201 mils.

Microcomputers

In 1979, Mostek expects to introduce eight new products.

Miscellaneous

- Mostek's backlog of orders for dynamic and static RAMs is scheduled into the third quarter.
- Distributor shipments in 1978 were about 15 percent of total sales.

The outlook for Mostek in 1979 appears quite good. If DATAQUEST's sales estimate of \$175 million is achieved, along with a retention of the 40 percent tax rate, Mostek should earn between \$2.55 and \$2.65 per share in 1979 (based on 12 percent NPBT).

James F. Riley

DATAQUEST RESEARCH INCORPORATED NEWSLETTER

SIS Code: 8.40 Mostek

November 29, 1976

SECURITY ANALYSTS' MEETING AT MOSTEK

Summary

On November 18, Mostek hosted a tour of its new facilities for wafer processing and unit testing, followed by a meeting and a question-and-answer period. The highlights of the presentations are:

- The book-to-bill ratio in August and September was disappointing.
- Fourth quarter bookings are now substantially higher, with a book-to-bill ratio of close to 1.2:1; if the 16K RAM orders are taken out, the book-to-bill is about 1.1:1.
- Mostek's fourth quarter earnings will be \$0.05 to \$0.10 per share less than the third quarter earnings.
- Mostek indicated that its 1976 shipments of 4K RAMs would be on the order of five million units; the company is estimating the total 1976 4K RAM shipments at 20 to 24 million units.
- Mostek expects to ship approximately 30,000 16K MOS RAM units in calendar year 1976; next year it hopes to ship between 0.5 and 1.0 million units, depending upon demand.
- Mostek's largest customer accounts for 14 percent of its sales; its top 20 customers represent 75 percent of its sales.
- Mostek is continuing its emphasis on increased sales through distributors; the company has grown from 4 percent distributor sales in 1972 to 7.2 percent distributor sales in 1976, and eventually expects to reach a goal of 10 percent.

Corporate Overview

Bruce Carlson gave an abbreviated version of his WEMA presentation for those who had not attended that meeting. Major points from his presentation are given below:

The content of this report represents our interpretation and analysis of information generally available to the public or released by responsible individuals in the subject companies, but is not guaranteed as to accuracy or completeness. It does not contain material provided to us in confidence by our clients. This information is not furnished in connection with a sale or offer to sell securities or in connection with the solicitation of an offer to buy securities. This firm and/or its officers, stockholders, or members of their families may, from time to time, have a long or short position in the securities mentioned and may sell or buy such securities.

1. Mostek's sales are as follows:

(Millions of Dollars)					
	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976 (9 mo.) (Prelim.)</u>
Memory	6.9	15.3	29.4	22.4	26.4
Microprocessors	-	-	-	1.2	1.0
Calculator Logic	6.6	10.2	7.9	5.0	2.9
Timing & Counting Logic	.5	1.6	1.8	4.0	4.0
Custom Circuits	<u>2.5</u>	<u>10.8</u>	<u>10.0</u>	<u>5.0</u>	<u>5.7</u>
Subtotal	16.5	37.9	49.1	37.6	40.0
Additional Consumer Products	<u>1.2</u>	<u>4.1</u>	<u>10.9</u>	<u>9.5</u>	<u>1.0</u>
Total	17.7	42.0	60.0	47.1	41.0

2. Estimates of the total memory market and total RAM market, as well as Mostek's estimated penetration are shown here:

(Millions of Dollars)					
	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	
Total Memory Market	281.0	368.0	472.0	569.0	
Mostek Share	22.4	34.5	65.8	79.7	
% Share	7.9	9.4	13.9	14.0	
Total RAM Market	151.0	236.0	300.0	372.0	
Mostek Share	16.3	29.9	58.0	75.0	
% Share	10.8	12.7	19.3	20.1	

3. Mostek is making a conscious effort to add to its marketing breadth; it has recently added eight field sales engineers and are bringing on more manufacturers' representatives.
4. New products (and their expected availability) include the following:

- 16K RAM (4116)—This unit is 20 percent smaller than the Intel chip and 50 percent smaller than the TI chip; it is becoming the industry standard.
- 4K by One-Bit Static RAM (MK 4104 P-20)—This is an 18-pin DIP requiring no refresh with 200 nanoseconds of access time; it is pin-compatible with the National unit.
- 1K by Four-Bit Static RAM—This is scheduled for first quarter 1977 sampling.
- 16K RAM—A faster (150 nanosecond) device will be sampled in the first quarter of 1977.
- 2708 8K PROM—A second source device will be sampled in March 1977.
- MK 30,000—An 8K N-channel ROM will be sampled in the first quarter as an eventual 2708 replacement.
- MK 34,000—This 16K N-channel ROM is expected for sampling in the first quarter of 1977.
- MK 32,000—The 32K N-channel ROM is expected to be sampled in March of 1977.
- One-Chip F8 Microprocessor—This is scheduled for early next year.

Answers to Questions from Floor

1. Mostek's new processing technique yields chips with little more than half the original area; for example, it expects the new 16K RAM to occupy some 15,000 to 17,000 square mils with 100 nanosecond access time and 2-mil geometries.
2. Mostek is developing a memory systems capability to insure that it can respond to all competitive business.
3. With the memory systems business, Mostek could use defective 16K RAMs as 8K devices rather than discarding them; however, it does not make good business sense to sell these as 8K units because it is difficult to guarantee that the defective part will be a reliable unit.
4. Bookings in Europe were worse in the last quarter; shipments to Europe have been flat.
5. Mostek is trying not to overcommit its 16K MOS RAM devices to any single customer; the company is currently dealing with 150 domestic customers and over 300 customers worldwide with this device.

6. Since the fourth quarter of 1975, Mostek has doubled its unit volume on 4K RAMs every quarter.
7. Mostek estimates that the three leaders—Mostek, TI, and Intel—are each shipping between 500,000 and 600,000 4K RAMs per month.
8. Mostek apparently is receiving back fewer defective components than its major competitors; the company is receiving 3 percent returns, and the competition is receiving 5 to 7 percent returns.
9. Mostek believes that the Z-80 Zilog microprocessor, which it is building, has effective software performance and yield.
10. Mostek is developing a cross assembler to enable programming of the Z-80 on its Microprocessor Development System.
11. Mostek does not expect the crossover between 4K and 16K MOS RAM prices to occur until 1978; i.e., during 1977, four 4K RAMs will be cheaper than one 16K RAM.
12. Mostek expects the 8K PROM market to become quite competitive next year with TI, EA, and AMD—as well as Mostek—currently sampling parts.
13. The 2708 8K PROM will fill an application need for Mostek; the company always ships one or more 2708s with its microprocessors and can now ship its own 2708.

James F. Riley
Daniel L. Klesken
Frederick L. Zieber