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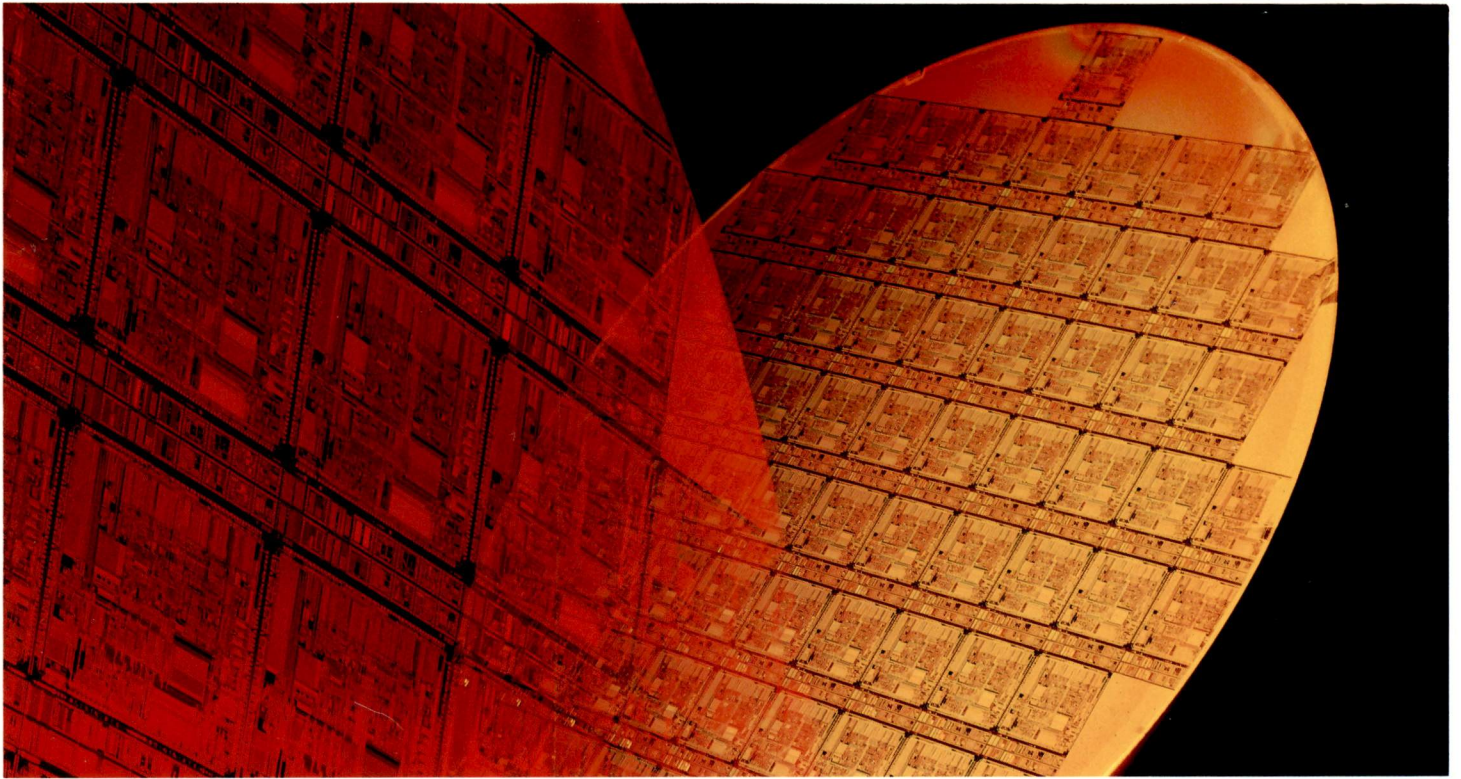
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Semiconductor
Industry
Association
Yearbook and
Directory

SIA 1988

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About the Cover The cover photo is National Semiconductor Corporation's new NS32532 32-bit microprocessor. It incorporates 370,000 transistors to achieve enhanced performance and added architectural features while maintaining full upward and downward software compatibility with the company's Series 32000® microprocessor family. The NS32532 is fabricated in National's 1.25-micron double metal CMOS technology. It includes instruction caches, as well as a four-stage pipeline. The device offers users sustained performance of 8 to 10 million instructions per second (MIPS) with peak performance of 15 VAX-equivalent MIPS.

Editor: Jeanne E. Locke
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When the semiconductor industry was in its infancy in the mid-1950s, the value of worldwide shipments by U.S. manufacturers totalled about \$5 million annually. Today, that value exceeds \$11 *billion*, and is expected to reach some \$20 billion by the end of the decade.

The Semiconductor Industry Association (SIA), which represents U.S.-based semiconductor manufacturers, was created in 1977 as a natural outgrowth of an industry moving to the forefront of national and international prominence. Five manufacturers, all leaders in this young, fast-growing industry, chartered the SIA to accomplish two objectives:

- ☐ to communicate outward, representing the common interests of the U.S. industry in matters of trade and public policy; and
- ☐ to coordinate industry energies inward, solving shared problems and exploring common opportunities, such as safety and education.

The new association's major emphasis was on the international trade situation. In particular, finding solutions to problems involving unfair trade practices and unequal access for American semiconductor products in world markets became the first focus of SIA's efforts.

Today, public policy issues impacting the industry's ability to remain internationally competitive continue to be SIA's main concern. The range of SIA activities has expanded, however, to include a broad spectrum of industry topics, such as occupational health, safety, and environment; industry statistics; public communications; and industry-oriented publications. And the industry's interest in fostering competitiveness through cooperative ventures has led to the creation of the Semiconductor Research Corporation (SRC), a basic research consortium, and the formation of SEMATECH, a manufacturing consortium.

The Semiconductor Industry Association (SIA) proudly marked its ten-year anniversary in 1987.

In celebrating that occasion, we are able to point with pride to many significant accomplishments our association has achieved on behalf of our industry, including facilitating the sale of U.S.-made products overseas, eliminating unfair trade practices on the part of foreign competitors, and assuring that our industry's intellectual property is adequately protected—all within a framework of being responsible and responsive to the needs of our customers and our suppliers, our employees and our communities.

During SIA's ten years of existence, our organization's guiding principles have remained clear and unchanged. The leaders of our industry made a commitment ten years ago to join together in a manner that would allow each new industry issue to be met quickly and flexibly. We have been able to do so with a remarkable degree of effectiveness, even to the extent of creating mechanisms for cooperation that actually enhance rather than reduce competition. We have served as the facilitator for a new level of communication between industry, academia, and government. In so doing, we have become the proving ground for our nation's ability to meet and survive the international competitive challenge. And we have been able to take the information and insights gained from our working together back to our individual firms, making them stronger and more able to compete efficiently and creatively, and assuring that they will remain effective contributors to our association.

As we go forward into the second decade of our association's existence, the qualities we have demonstrated in our work together during the past ten years will no doubt allow us to continue to make contributions that will make a real difference to our industry, and to our nation.

Irwin Federman
Chairman of the Board
Semiconductor Industry Association

Andrew A. Procassini
President
Semiconductor Industry Association

In celebration of our association together.

Certificate of Appreciation

*The Semiconductor Industry Association,
in commemoration of its tenth anniversary,
expresses its sincere appreciation to the members
of its founding Board of Directors:*

**Wilfred Corrigan
Robert Noyce
W.J. Sanders III
Charles Sporck
John Welty**

*Through their vision and efforts, these leaders created an
organization which, over the past ten years, has been able
to achieve significant advancements on behalf of the
industry in the areas of public policy, occupational health,
safety, and environment, government procurement,
industry statistics, and public communications.*

*The industry is grateful to these five pioneers for
the enormous contribution they made in creating
the Semiconductor Industry Association.*

Semiconductor Industry Association
3 March 1987

William E. Simon
President

SIA expresses its profound appreciation for the
efforts of its founding Board members.



A birthday cake celebrating SIA's ten years of existence is ceremonially cut by four of the five founding Board members—Wilfred Corrigan, W. J. Sanders, III, Charles Sporck, and Robert Noyce. Not pictured is John Welty who retired from Motorola Inc. in 1985.

SIA 1988

**SIA MEMBER
COMPANIES**
Regular Member Companies

Advanced Micro Devices, Inc.
 AT&T Technologies, Inc.—
 Electronic Components Division
 Bendix Microelectronics Center
 Cherry Semiconductor Corporation
 Cirrus Logic, Inc.
 Coors Components, Inc.
 Digital Equipment Corporation
 Ford Microelectronics, Inc.
 General Electric Company—
 Solid State Division
 General Semiconductor Industries, Inc.
 GigaBit Logic, Inc.
 Gould Inc.—Semiconductor Division
 Harris Corporation—Semiconductor Sector
 Hewlett-Packard Company—
 Systems Program Planning
 IBM Corporation
 Intel Corporation
 International Rectifier Corporation
 Lansdale Semiconductor, Inc.
 Linear Technology Corporation
 LSI Logic Corporation
 MemTech Technology Corporation
 Motorola, Inc.—
 Semiconductor Products Sector
 National Semiconductor Corporation
 NCR Microelectronics Division
 Northern Telecom Electronics Inc.
 Powerex, Inc.
 Precision Monolithics, Inc.
 Raytheon Company—Semiconductor Division
 Rockwell International Corporation—
 Semiconductor Products Division
 Silicon Systems, Inc.
 Sprague Electric Company
 Texas Instruments, Inc.—
 Semiconductor Group
 TriQuint Semiconductor, Inc.
 United Technologies Corporation—
 Microelectronics Center
 VLSI Technology, Inc.
 Xilinx, Inc.
 Zilog, Inc.

Associate Member Companies

Amdahl Corporation
 ASEA HAFO Inc.
 Cincinnati Milacron
 Semiconductor Materials, Inc.
 Control Data Corporation
 Crysteco, Inc.
 Dewey, Ballantine, Bushby, Palmer & Wood
 Dynamit Nobel Silicon, Inc.
 Environmental Processing, Inc.
 EXAR Corporation
 General Chemical Corporation
 Frank B. Hall & Co.
 Henderson Ventures
 Hogan & Hartson
 International Data Group
 Japan Society of Newer Metals
 Microelectronics Center of North Carolina
 Micro Power Systems
 Monsanto Electronic Materials Company
 NBK Corporation
 NEC Electronics, Inc.
 Pacific Gas & Electric
 PlanTek
 Quick, Finan & Associates, Inc.
 Regis McKenna Inc.
 Samsung Semiconductor Inc.
 Siemens Corporation
 Signetics Corporation
 Siltec Corporation
 The Technology Research Group
 Teksel Co., Ltd.
 Townsend and Townsend
 Wacker Siltronic Corporation
 Ware & Freidenrich
 Yorkshire & Humberside Development Assn.

SIA Membership

The Semiconductor Industry Association has 71 member companies supporting its objectives. Funding for SIA activities is provided mainly through membership dues, although some programs are funded through additional participation fees.

Regular SIA membership is available to U.S.-based firms which manufacture semiconductors in the United States. A sliding dues structure, based on annual semiconductor sales (or on semiconductor manufacturing employment, in the case of captive firms) allows manufacturers of all sizes and types to enjoy the benefits of SIA membership.

SIA also offers associate membership to foreign or U.S. firms which manufacture semiconductors in the United States, but do not qualify for regular membership; and to firms which do not manufacture semiconductors, but perform manufacturing or services related to the semiconductor industry.

SIA Membership Programs The quality and diversity of SIA's membership activities demonstrate how the Association has matured during its ten years of existence. Major SIA activities now include an extensive executive meeting program as well as committees focussed on public policy, government, and law; occupational safety, health, environment, and facilities and building standards; industry statistics; and public communications.

Executive Meeting Forums One of the most important functions of a trade association is to provide a forum for discussion and resolution of issues of common interest. SIA sponsors an Executive Meeting Program which offers opportunities for member company senior executives to gather together to plan and implement solutions to the various challenges confronting the U.S. semiconductor industry.

Early each year, member company executives travel to Washington, D.C. to engage our legislators and administration officials in a dialogue about how to keep the U.S. semiconductor industry internationally competitive. Maintaining technological leadership is the subject of a second conference at mid-year, bringing SIA directors and senior executives together with those of SIA's research affiliate, the Semiconductor Research Corporation. Participants in the long range planning conference near the end of each year review accomplishments and strategize future plans.

Senior executives of SIA member companies periodically may gather at other times during the year to engage in topic-specific dialogues designed to maximize results and minimize redundant efforts. SIA also sponsors an annual forecast dinner at which the industry's leaders meet to discuss market and product growth projections, as well as other topics of interest.

The SIA Board of Directors sets policies and objectives for the Association, and directs the implementation of programs designed to carry out those policies and objectives.

Chairman:

Irwin Federman
Vice Chairman of the Board
Advanced Micro Devices, Inc.

Members:

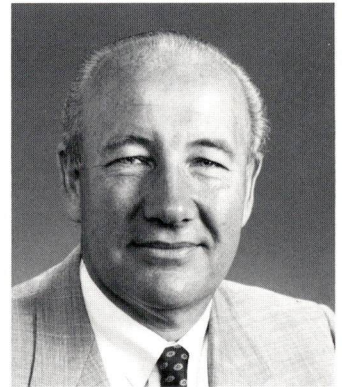
William P. Dugan
Vice President,
Business Development,
AT&T Network Systems



Robert Palmer
Vice President and Group
Manager, Semiconductor
Operations
Digital Equipment Corporation



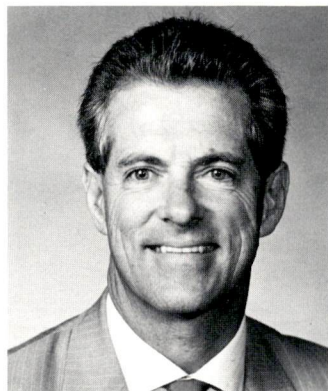
Robert N. Noyce
Vice Chairman of the
Board of Directors
Intel Corporation



Wilfred J. Corrigan
Chairman and
Chief Executive Officer
LSI Logic Corporation



Robert M. Penn
President and
General Manager
Gould Inc.—
Semiconductor Division



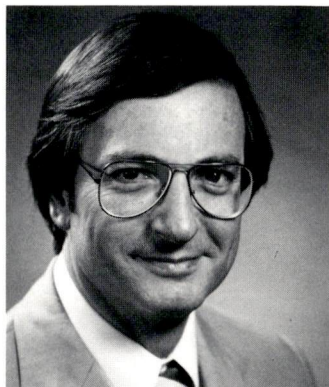
Jonathan E. Cornell
Senior Vice President
and Sector Executive
Harris Corporation—
Semiconductor Sector



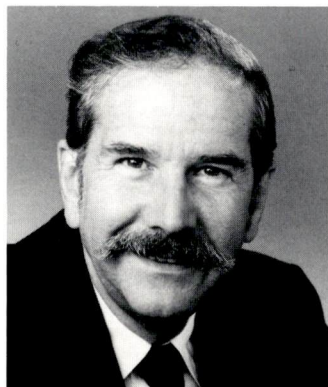
George C. Bodway
Director,
Systems Program Planning
Hewlett-Packard Company



Sanford L. Kane
Vice President,
Industry Operations,
General Technology Division
IBM Corporation



James A. Norling
Executive Vice President and
General Manager
Motorola Inc.—Semiconductor
Products Sector



Charles E. Sporeck
President and
Chief Executive Officer
National Semiconductor
Corporation



Gilbert F. Amelio
President, Semiconductor
Products Businesses
Rockwell International
Corporation



William N. Sick
Executive Vice President
Texas Instruments, Inc.

SIA member companies may request appointment to serve on Association committees focussed on a variety of important industry issues.

SIA Public Policy Committee (PPC)

Acting Chairman:

James Peterman, *Texas Instruments, Inc.*

Former Chairman:

George Scalise, *Advanced Micro Devices, Inc.*

Members:

Clifford Jernigan, *Advanced Micro Devices, Inc.*

Tom D. McKinnon, *AT&T Technologies, Inc.*

Greg Taylor, *AT&T Technologies, Inc.*

Bruce Holbein, *Digital Equipment Corporation*

James Asher, *Harris Semiconductor*

Joseph R. Creighton, *Harris Semiconductor*

Thomas Christiansen, *Hewlett-Packard Company*

Maureen Flanagan, *IBM Corporation*

Michael Maibach, *Intel Corporation*

Robert N. Noyce, *Intel Corporation*

Ted Vian, *Intel Corporation*

Alexander Lidow, *International Rectifier Corporation*

John Steidl, *International Rectifier Corporation*

David E. Sanders, *LSI Logic Corporation*

Veronica A. Haggart, *Motorola, Inc.*

Bruce C. Ladd, Jr., *Motorola, Inc.*

Chuck White, *Motorola Semiconductor*

Gary Arnold, *National Semiconductor Corporation*

David S. Dahmen, *National Semiconductor Corporation*

Ray Garcia, *Rockwell International*

Linda Sadler, *Rockwell International*

Mike Townsend, *Rockwell International*

Robert J. Chadwick, *Signetics Corporation*

John Boidock, *Texas Instruments, Inc.*

Elwin L. Skiles, Jr., *Texas Instruments, Inc.*

The SIA Public Policy Committee (PPC) recommends and pursues the public policy objectives of the Association, as determined by the SIA Board of Directors. This Committee has developed public policy positions designed to

create a climate that will enable the U.S. semiconductor industry to meet worldwide competition in trade, investment, and research. PPC members work with Congress and the executive branch of government to address issues such as foreign unfair trade practices, anti-dumping law reform, intellectual property protection, export control regulations, and tax policy.

SIA Law Committee

Chairman:

Joseph R. Creighton, *Harris Corporation*

Members:

Ron Reiling, *Digital Equipment Corporation*

Edward A. Firestone, *GE Intersil*

Charles Van Orden, *Gould Semiconductor*

Leslie J. Hart, *Harris Semiconductor*

Edward Y. Wong, *Hewlett-Packard Company*

Grant D. Esterling, *IBM Corporation*

F. Thomas Dunlap, Jr., *Intel Corporation*

David E. Sanders, *LSI Logic Corporation*

James D. Coffee, *Motorola, Inc.*

John G. Webb, *National Semiconductor Corporation*

Ann Rojas, *Raytheon Company*

Linda Sadler, *Rockwell International*

William H. Dana, *Signetics Corporation*

Elwin L. Skiles, Jr., *Texas Instruments*

The SIA Law Committee provides guidance to the SIA Board of Directors and the SIA Public Policy Committee on legislative and legal matters requiring a broad industry perspective. The Committee also files *amicus curiae* (friend-of-the-court) briefs on precedent-setting cases impacting the industry. SIA also retains the legal services of private law firms to assure full compliance with U.S. laws governing trade associations.

SIA Japan Chapter

Chairman:

Steve Donovan, *Advanced Micro Devices, K.K.*

Former Chairman:

Ted Jaros, *Nippon Motorola*

Regular Members:

James Shinn, *Advanced Micro Devices, K.K.*

David Hytha, *AT&T International Japan, Ltd.*

Edmund Reilly, *Nihon Digital Equipment Corporation*

Takuo Mimura, *General Electric Semiconductor K.K.*

C. T. Hanchett, *GE Solid State International, LTD*

Yozo Ishida, *General Instrument Japan*

Tsuyoshi Kobayashi, *Harris K.K.*

Neal Carney, *Yokogawa Hewlett-Packard*

Ken Pattin, *IBM World Trade Asia Corporation*

Takahiro Kamo, *Intel Japan K.K.*

Hiroyuki Nagashima, *International Rectifier Far East Co., Ltd.*

Keisuke Yawata, *Nihon LSI Logic Corp.*

William Watson, *National Semiconductor Japan Ltd.*

Noboru Iino, *Rockwell International Overseas Corp.*

Robert Skurko, *Rockwell International Overseas Corp.*

Katsuei Kobayashi, *Sprague Japan Inc.*

L. R. Gibson, *VLSI Technology, Inc.*

Tokio Yoshioka, *VLSI Technology, Inc.*

Seneaki Oshikoji, *Zilog Japan K.K.*

Manufacturing Associate Members:

Norman D. Heller, *Signetics Japan K.K.*

Corporate Associate Members:

Charles W. Cook, Jr., *Monsanto Japan Limited*

Michael L. Jablow, *Teksel Co., Ltd.*

The SIA Japan Chapter facilitates communications between the SIA staff and member company representatives operating in Japan. Created in 1984, the Chapter provides SIA with timely information about Japanese markets, technology, and government policies, while at the same time creating opportunities to brief Chapter members on relevant SIA activities. In this way, SIA is able to assure that its efforts are consistent with the needs of U.S. company personnel in Japan, whose efforts are critical to U.S. industry success in accessing the Japan market.

SIA Industry Statistics Committee

Chairman:

Mark Norwood, *Intel Corporation*

Members:

Nancy Branch, *Advanced Micro Devices, Inc.*

Michael Kimball, *Advanced Micro Devices, Inc.*

Ronald W. Guire, *Exar Corporation*

Angelo Checki, *GE Solid State Division*

David Hutchins, *General Semiconductor Industries, Inc.*

Edwin Torralba, *Gould Semiconductor*

Bob Holl, *Harris Semiconductor*

Gaylor Galihier, *Hewlett-Packard Company*

Gary Oka, *International Rectifier Corporation*

William Ehram, *Linear Technology Corporation*

William O'Meara, *LSI Logic Corporation*

Joe Stern, *Micro Power Systems, Inc.*

Ralph Greenburg, *Motorola, Inc.*

Ali Zargar, *National Semiconductor Corporation*

Jim Blake, *NCR Corporation*

Tom Cate, *Precision Monolithics Inc.*

Val Hux, *Powerex, Inc.*

Martin Geller, *Raytheon Company*

Kathy D'Asaro, *Rockwell Semiconductor*

Ronald Terry, *Siemens Components, Inc.*

Maria Tseng, *Signetics Corporation*

Clysta Seney, *Silicon Systems*

Lennox Lee, *Sprague Electric Company*

Gordon Ratcliff, *Texas Instruments*

Kenneth A. Goldman, *VLSI Technology, Inc.*

Bonnie Littlefield, *Zilog, Inc.*

With its counterparts in Europe and Japan, the SIA Industry Statistics Committee plans and sets policy for the World Semiconductor Trade Statistics (WSTS) program, sponsored jointly by SIA, the European Electronic Components Association (EECA), and the Electronic Industries Association of Japan (EIAJ). WSTS periodically compiles detailed data on worldwide semiconductor orders and shipments. This SIA committee also coordinates SIA's annual industry survey of 100 key financial and economic ratios, which enables participants to compare and contrast their performance with the rest of the industry. The survey is available only to those SIA member companies who elect to submit data.

SIA Government Procurement Committee

Chairman:

Jonathan E. Cornell, *Harris Semiconductor*

Members:

Clyde M. Awad, *Advanced Micro Devices, Inc.*

Jim Lynch, *Advanced Micro Devices, Inc.*

Don Carley, *GE Solid State Division*

James Asher, *Harris Semiconductor*

Steve F. Davis, *Intel Corporation*

Stuart Rosenberg, *Intel Corporation*

Gary Cohrt, *Motorola, Inc.*

Stoney Edwards, *National Semiconductor Corporation*

Stuart H. Bardach, *Rockwell International*

Richard Lambert, *Signetics Corporation*

Gerald D. Reinsma, *United Technologies Microelectronic Center*

The SIA Government Procurement Committee is recognized as the industry's representative in policy discussions relating to U.S. Government procurement of semiconductors, primarily for defense purposes. The Committee's objective is to streamline the procurement process in order to lower costs and improve reliability.

SIA Public Communications Committee (PCC)

Chairman:

Stan Victor, *Texas Instruments, Inc.*

Former Chairman:

Linda Baker, *National Semiconductor Corporation*

Members:

John Greenagel, *Advanced Micro Devices, Inc.*

Diane Ross, *Advanced Micro Devices, Inc.*

Lydia Whitefield, *AT&T Components and Electronics Systems*

Jeffrey Gibson, *Digital Equipment Corporation*

Noelle Greene, *Gould Semiconductor*

Linda Fredericks, *Harris Semiconductor*

Gene Endicott, *Hewlett-Packard Company*

Bruce Odom, *IBM Corporation*

Jim Jarrett, *Intel Corporation*

Bruce Entin, *LSI Logic Corporation*

Ken Phillips, *Motorola Semiconductor*

Jeff Muscatine, *Raytheon Company*

Daniel K. Rime, *Rockwell Semiconductor*

Bob Neudecker, *SEMATECH*

Susan Scott, *Signetics Corporation*

Paula Jones, *VLSI Technology, Inc.*

Dottie Wanat, *Zilog, Inc.*

The SIA Public Communications Committee (PCC) communicates information about the industry, and its activities and issues. Identifying key themes and audiences, and developing messages and programs to address them, the PCC works closely with other SIA committees and with the SIA Board and staff to assist in the achievement of SIA policy objectives, and to maximize the impact of SIA public communications activities.

SIA Occupational Health Committee (OHC)

Chairman:

Craig Modahl, *Intel Corporation*

Former Chairman:

James H. Stewart, *Digital Equipment Corporation*

Members:

Rick Guagliardo, *Advanced Micro Devices, Inc.*

Michael E. Williams, *Advanced Micro Devices, Inc.*

Charles L. Fraust, *AT&T Technology Systems, Inc.*

James R. Weber, *Bendix Aerospace Sector Headquarters*

Gordon E. Greene, *Cherry Semiconductor Corporation*

Robert Wheaton, *Digital Equipment Corporation*

Edward W. C. Leung, *GE Intersil, Inc.*

Tom Tarka, *General Electric Co.*

Jack O. Geissert, *Harris Semiconductor*

Vincent L. Suchoski, *Hewlett-Packard Company*

Khristine L. Hall, *IBM Corporation*

Larry Borgman, *Intel Corporation*

Teresa Pastorius, *International Rectifier Corporation*

Daniel Dimick, *LSI Logic Corporation*

Terry Holleran, *Motorola Semiconductor*

Michael Vaudreuil, *National Semiconductor Corporation*

W. S. Brewer, *NCR Corporation*

Basil Gribbon, *Northern Telecom, Inc.*

Jay Jamali, *Precision Monolithics, Inc.*
 Eugene D. Lanigan, *Siemens Components Inc.*
 Lewis P. Scarpance, *Signetics Corporation*
 Milton Schulman, *Texas Instruments*
 Larry Brown, *Zilog, Inc.*

The SIA Occupational Health Committee (OHC) provides a forum for SIA member companies to communicate with each other about important industry issues in the area of occupational health and safety. In particular, the OHC oversees the operation of the SIA Occupational Health System, which gathers and reports data on industry safety and health to measure performance and improve industry programs, and provides technical assistance to federal, state, and local government agencies concerned with the semiconductor industry's health and safety conditions.

SIA Facilities and Building Standards (FABS) Committee

Southern Region Chairman:

Lawrence Hutker, *Harris Semiconductor*

Western Region Chairman:

Eugene Kiernan, *National Semiconductor Corporation*

Members:

Joseph E. Murphy, *Bendix Microelectronics Center*
 Gordon E. Greene, *Cherry Semiconductor Corporation*
 P. R. Bumgarner, *Harris Semiconductor*
 Vincent L. Suchoski, *Hewlett-Packard Company*
 Ron Long, *IBM Corporation*
 Carey Jones, *International Microelectronic Products*
 Craig Modahl, *Intel Corporation*
 Patrick Robinson, *Motorola Semiconductor*
 Dan Wilkowsky, *National Semiconductor Corporation*
 Eugene D. Lanigan, *Siemens Components Inc.*
 Paul M. Yakubek, *Signetics Corporation*
 Greg Lund, *Silicon Systems, Inc.*
 Rick Austin, *VLSI Technology, Inc.*
 Larry Brown, *Zilog, Inc.*

The SIA Facilities and Building Standards (FABS) Committee works with national and local building and fire officials to develop new semiconductor fabrication facility codes which recognize engineering controls as an essential element for personnel, fire, and building safety.

SIA Environmental Committee

Chairman:

Stephen Greene, *Digital Equipment Corporation*

Former Chairman:

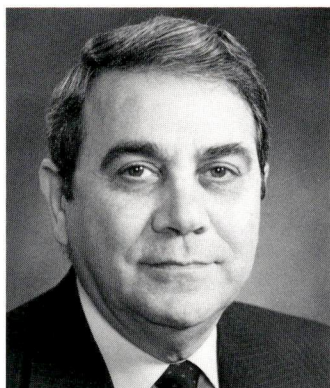
Daniel Wilkowsky, *National Semiconductor Corporation*

Members:

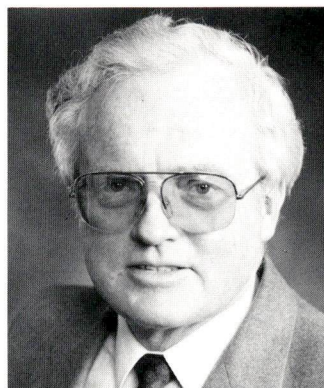
Michael Gingrass, *Advanced Micro Devices, Inc.*
 Guy Van Auken, *Amdahl Corporation*
 David K. Chittick, *AT&T Technologies, Inc.*
 Gordon E. Greene, *Cherry Semiconductor Corporation*
 Robert Wheaton, *Digital Equipment Corporation*
 Clifford Shields, *General Semiconductor Industries, Inc.*
 Larry Hutker, *Harris Semiconductor*
 Cliff Bast, *Hewlett-Packard Company*
 Khristine L. Hall, *IBM Corporation*
 Larry Borgman, *Intel Corporation*
 Clive B. Davies, *Linear Technology Corporation*
 Linda Gee, *LSI Logic Corporation*
 Maurice J. Chait, *Motorola Semiconductor*
 Terry Holleran, *Motorola Semiconductor*
 Ron Schultz, *Precision Monolithics, Inc.*
 Doug Burmen, *Raytheon Company*
 Eurgan D. Lanigan, *Siemens Components, Inc.*
 James W. Davison, *Signetics Corporation*
 Greg Lund, *Silicon Systems*
 Robert Segura, *Sprague Semiconductor Group*
 Carolyn Miletta, *Texas Instruments, Inc.*
 Rick Austin, *VLSI Technology, Inc.*
 Larry Brown, *Zilog, Inc.*

The SIA Environmental Committee monitors and comments on environmental regulations proposed for the industry, and disseminates technical data regarding solutions to environmental control problems to SIA member companies.

The SIA Staff implements the policies and objectives set by the SIA Board of Directors, and provides support for SIA committee activities.



Andrew A. Procassini,
President



Warren E. Davis,
Vice President



Back row: Janet Plansky, *Administrative Assistant*; Judith Burton, *Executive Secretary*; Daryl Hatano, *Director of International Trade and Government Affairs*; Doug Andrey, *Manager of Industry Statistical Programs*. Front row: Carol Orser, *Bookkeeper*; Jeanne Locke, *Director of Communications*; Lori Fraser, *Communications Assistant*; Helen Johnson, *Office Manager*. Not pictured: Robin Ackerson, *Office Assistant*; Lee Neal, *Director of Occupational, Health, Safety and Environmental Programs*.

Semiconductor Worker Health Studies

In late 1986, Digital Equipment Corporation contacted SIA to communicate the preliminary results of an employee health study performed by University of Massachusetts researchers. In that study of employees at a single manufacturing plant, workers in one part of the semiconductor fabrication area experienced a higher incidence of miscarriages and general malaise symptoms than did non-fab workers.

SIA immediately shared this information with member companies, who in turn informed their own employees. SIA's Occupational Health Committee then assembled an expert task force to meet with the researchers and to perform an initial scientific and technical evaluation to determine the applicability of the study's results to the industry as a whole. The task force found significant deficiencies in the Digital study that prevented the drawing of cause-and-effect conclusions, or the justification for changes in workplace health and safety practices. Nevertheless, the task force recommended to the SIA Board of Directors that the industry undertake further study designed to verify, clarify, or refute the possibility of an association between work in the semiconductor manufacturing environment and an increased risk of certain untoward health effects.

To accomplish this objective, SIA has created an independent five-member Scientific Advisory Panel, including recognized experts in the fields of epidemiology, occupational medicine, biostatistics, reproductive biology, and industrial hygiene. The panel will develop a Request for Proposal for a broadly-based epidemiological study of semiconductor workers, and undertake ongoing activities, including evaluating study proposals, reviewing study results, and making recommendations for continuing surveillance of the safety and health of the industry's workforce.

Chlorofluorocarbon Alternatives Study

Chlorofluorocarbon-113 (CFC-113), a solvent used extensively in a range of semiconductor manufacturing practices, is one of several chemicals that have been associated with stratospheric ozone depletion. An SIA Environmental Committee task force on chlorofluorocarbon research is examining alternative chemicals, as well as improved emission capture technologies that would permit the safer use of CFC-113.

Waste Reduction Project

The philosophy of industrial waste management has changed rapidly in recent years due to regulatory and economic incentives that have restricted or banned the discharge of hazardous materials into the air, water, and land. The increasing cost and liability associated with waste management activities has resulted in a crisis situation. Regulators and industry alike recognize waste reduction as the most economical and practical solution to the escalating hazardous waste crisis.

One of the major obstacles to achieving waste reduction is the lack of industry-specific waste generation data. The development and compilation of this data would facilitate technology transfer within industry, and provide both the industry and regulators with an adequate information base on which to make a realistic assessment of problems and solutions. To that end, SIA has undertaken a study of waste generation and waste minimization techniques within the semiconductor industry.

Uniform Fire and Building Codes for Semiconductor Facilities

In the absence of uniform fire and building codes, inconsistent and incomplete standards for semiconductor facility construction raised understandable safety concerns. SIA's Facilities and Building Standards Committee effectively addressed this problem by working with fire and building code authorities to develop uniform specifications for pipes and cuts, alarm systems, wall construction, exit criteria, and maximum quantities for stored hazardous substances. The committee's work has been adopted by the official fire and building code organizations for the western and northeastern sections of the United States, and is being considered by code authorities in the southeastern portion of the country.

Occupational Health System (OHS)

Since 1982, SIA has administered an Occupational Health System (OHS) which documents, according to established federal guidelines and procedures, the safety and health experience of employees in the U.S. semiconductor industry. The resulting statistical database provides participating companies as well as SIA's Occupational Health Committee with the most detailed, statistically accurate information available concerning the frequency and severity of employee injuries and illnesses, thus permitting attention to be focussed on problem areas. OHS data is also being used to develop a series of "Chemical Exposure Indices" profiling the various occupations and processes within the industry.

To assure that the OHS is meeting the needs of the industry, SIA contracted with the University of California (Davis) to create a "blue ribbon panel" of experts to review and evaluate the system. Their report, received in October, found the OHS to be "a valuable...system for collecting and analyzing occupational illnesses and injuries within the [semiconductor] industry." It also noted some limitations within the system, particularly in reporting non-serious illnesses and injuries, and made recommendations to improve the reporting process. This report is the basis for expansion and refinement of the OHS in the future.

The Semiconductor Industry's Safety and Health Record

The chart below analyzes the semiconductor industry's safety and health record in relation to that of other durable goods manufacturing industries. This data, published annually by the U.S. Bureau of Labor Statistics (BLS), is recognized by Federal and state authorities as the most reliable indicator of work-related injuries and illnesses.

During 1984 (the most currently available BLS information as of this writing), the incidence of work-related injuries and illnesses involving semiconductor manufacturing employees remained among the lowest of all U.S. industries. For example, the "Semiconductor Manufacturing" incidence rate of 4.1 cases per 100 workers per year was about one-third of the 10.6 case rate established for "All Manufacturing" industries in the United States.

Injury/Illness Incidence Rates
Semiconductor Industry vs. All Durable Goods Manufacturing Industries
(1979-1984)

	1979	1980	1981	1982	1983	1984
Semiconductor Industry Injury/Illness Incidence Rate*	6.1	5.5	4.6	3.8	4.2	4.1
Semiconductor Industry Ranking with Respect to Lowest Incidence Rate	12th	13th	7th	3rd	7th	6th
Number of Durable Goods Manufacturing Industries Surveyed (4-digit SIC)	234	232	232	229	196	196

**Number of injuries and illnesses per 100 fulltime workers per year*
Source: U.S. Bureau of Labor Statistics, *Occupational Injuries and Illnesses in the United States by Industry (1979-1984)*.

The Semiconductor Industry And The National Interest

There is a growing awareness among the nation's policymakers that the U.S. semiconductor industry is facing a competitive challenge of great magnitude, and that the manner in which the industry responds to that challenge will critically impact America's economic future and national security.

As the core ingredient of information age technology, semiconductors are the basic building blocks for many emerging industries, such as supercomputers and telecommunications, and critical to the revitalization of many traditional industries, such as automobiles and appliances. Our national defense also increasingly relies upon semiconductors for technologies ranging from missile guidance systems, to computers for military and strategic applications.

Yet the ability of the U.S. semiconductor industry to remain competitive, and thereby continue to provide a domestic source of semiconductor supply, is being fiercely threatened—at great risk to our nation's future.

"Semiconductor manufacturing trends indicate that we will become highly dependent [on foreign sources of semiconductor supply] in the future if immediate actions are not taken. . . . U.S. technology leadership in this critical area is rapidly eroding, [with] serious implications for the nation's economy, and immediate and predictable consequences for the Defense Department. . . . [This is] a critical national problem that at some time in the future may be looked upon in retrospect as a turning point in the history of our nation."

Charles Fowler

Chairman, Defense Science Board
U.S. Department of Defense

U.S. leadership in semiconductor manufacturing of high volume DRAM's is being surrendered to Japanese competitors. In 1986, U.S. merchant semiconductor companies lost their lead in worldwide market share, a position now held by Japan-based semiconductor manufacturers. The size of the long closed Japan market rose significantly in dollar terms due to the change to more realistic yen/dollar exchange rates, accounting for much of the shift in market share leadership in 1986. European companies' market share has been declining slowly, while companies in the rest of the world—predominantly the Asia-Pacific region—have recently become a significant factor in the marketplace.

Also of concern is the decline in the U.S. semiconductor industry's manufacturing capabilities. What was once a commanding U.S. lead in semiconductor manufacturing technology and processing equipment has dissolved into a trailing position in many areas. If this situation is not reversed, U.S. semiconductor companies will have to rely on Japanese-made equipment, and will not necessarily have access to the best and the latest equipment at the earliest possible time.

"Both Japan and the United States are actively involved in advanced processing research and development, but within the past few years the Japanese have entered a stage of vigorous activity that has accelerated their progress relative to that in the United States. . . .

" . . . The overall competitiveness of the United States in electronics has worsened dramatically relative to Japan in the past 5 years. The Japanese are now developing the science and technology needed for the future. Unless the United States responds to this challenge, this trend is likely to continue."

Advanced Processing of Electronic Materials

Report of the Panel on Materials Science
National Materials Advisory Board
Commission on Engineering and
Technical Systems
National Research Council

Meeting The Competitive Challenge In Microelectronics

The Semiconductor Industry Association is engaged in a number of initiatives to ensure the continued competitiveness of the U.S. semiconductor industry—an industry that is vital to the economic and strategic future of this country. SIA's competitiveness agenda complements, and is driven by, the efforts of individual companies to compete in the marketplace. Just as a company's success in the marketplace requires that it innovate brilliantly, manufacture excellently, and market adeptly, so too does our success as an industry require that we excel in each of these areas.

The Challenge in Innovation In the semiconductor sector, research and development is the lifeblood of the industry. The U.S. semiconductor industry's R&D investment as a percent of sales reached an unprecedented 12.2 percent in 1986—the highest of any industry in the United States.

Although the marketplace generally offers the best allocation of private resources, R&D investments often require additional incentives because market shortcomings inadequately value the benefits from R&D. These shortcomings arise when a business, after years of expensive and risky R&D, is successful in developing a new product but cannot capture all of the benefits of its investment for some reason, such as competitors' copying or even improving upon the new technology, or R&D personnel leaving the firm to start their own ventures. These spillover benefits may be useful to the larger society, but the low "capture ratio" experienced by the original firm reduces the incentives to invest in R&D to levels that are below optimum.

SIA's program has sought to increase the "capture ratio" and thereby create incentives to maintain high R&D investment levels. For example, SIA's efforts to assure that the tax credit for increased R&D survived the tax reform process were successful, and we are now actively engaged in an effort to make the R&D tax credit permanent and to increase it from its current 20 percent level to 25 percent, the level applicable prior to 1985.

A major breakthrough in creating incentives for innovation occurred in 1984, when SIA successfully pursued legislation to protect intellectual property—the fruits of R&D investment. Until the passage of the Semiconductor Chip Protection Act of 1984, semiconductor designs were inadequately covered under existing intellectual property law. The Act provides protection, similar to copyright law, for chip designs in the United States market; reciprocal protection is offered to foreign firms' intellectual property provided that U.S. designs receive similar treatment in the foreign country's home market. SIA's Public Policy and Law Committees have been working to expand chip protection to other countries. Japan, West Germany, and Sweden have already passed chip protection laws, and a number of other countries are creating similar legislation. In addition, an international chip protection treaty is being negotiated.

The obvious benefits that can be derived from joint research convinced the U.S. industry to create the Semiconductor Research Corporation (SRC) in 1981. Headquartered in Research Triangle Park, North Carolina, the SRC grants about \$20 million annually to universities for basic semiconductor research, with the results of such research being made available to member companies for subsequent competitive product development. Not only has the SRC been highly successful in funding research that otherwise would not have been done, it has also enhanced our country's technical education infrastructure by providing funds that support and encourage faculty and graduate students in U.S. universities to pursue the fundamental research goals that are responsive to the needs of U.S. industry.

Business Week Rankings for Percent of Sales on R&D 1986

Semiconductors	12.2%
Information Processing	7.9%
Pharmaceuticals	7.8%
Telecommunications	5.1%
Aerospace	4.5%
Automotive (and parts)	3.6%
All-Industry Average	3.5%
Machinery	3.1%
Steel	0.5%

*The U.S. Semiconductor Industry
is America's R&D Leader.*

Increased attention to strengthening our scientific infrastructure and accelerating technology transfer from this base is also required. Initiatives are underway to increase the number of university centers of excellence and to realize the potential of the U.S. National Laboratories to enhance U.S. competitiveness in microelectronics. Our universities and National Labs are national resources which will complement SIA's SEMATECH consortium, which is discussed further in this section.

"... the National Labs have much to contribute to the semiconductor effort. We must take advantage of their resources."

Senator Pete Domenici
on introduction of "The Department of Energy
Semiconductor Technology Research Initiative"
(S. 1480)

The Challenge in Manufacturing Excellence in manufacturing is essential to the success of the semiconductor industry.

The semiconductor industry is one of the most dynamic and competitive industries in the United States, having improved its productivity, as measured in dollar-value-added per employee, by 250 percent since 1979. Its real productivity gains are even more impressive, however, since falling prices cause monetary measures to understate the functional improvements made over time. For example, the price-per-bit of memory storage has historically dropped fourfold, and the density of transistors-per-chip has increased tenfold, every few years.

Manufacturing excellence requires heavy capital investments in order to remain at state-of-the-art, and SIA's program has focussed on creating a tax environment that promotes such investment. Although the repeal of the Investment Tax Credit in the 1986 tax reform process severely damaged the investment environment, there was a positive change in the depreciation rate for semiconductor manufacturing equipment, in recognition of the fact that such equipment experiences very rapid technological obsolescence, with useful lives of only about four to five years.

The newest and most ambitious initiative to be undertaken by the U.S. semiconductor industry to achieve manufacturing excellence is SEMATECH (SEmiconductor MANufacturing TECHnology), a newly-launched industry-government consortium designed to make America preeminent in semiconductor manufacturing technology.

The SEMATECH consortium of American semiconductor infrastructure, manufacturing companies, and end-use companies has been chartered to achieve a world-class manufacturing capability with exclusively domestic content by 1993. It will accomplish its goal by pooling the collective technology base of its participating member organizations; focussing on research and development of advanced semiconductor processes, equipment, and materials; and returning the advances it achieves to its membership, thereby assuring efficient use of R&D dollars. Conceived and managed by private industry, SEMATECH's annual budget of approximately \$250 million will be funded jointly by industry, and by federal, state, and local government.

"... with the [SEMATECH authorization] amendment. ... we are taking a historic first step toward restoring our competitive base while additionally rebuilding bridges between the Congress, the Pentagon, and the industry."

Senator Lawton Chiles
Chairman, Senate Budget Committee

To achieve its objective of making America's capability to manufacture semiconductors second-to-none, SEMATECH will employ a three-step process. First, SEMATECH will conduct research and development on advanced semiconductor manufacturing techniques contributed by member companies, universities, national laboratories, and SIA's SRC affiliate. Second, SEMATECH will test and demonstrate these techniques on the actual production line with all manufacturing systems integrated into a total factory system. Finally, SEMATECH will develop techniques for adapting the processes proven on the production line so that they can be applied to other products made by member companies.



At the SIA/SRC Joint Conference in September 1987, Professor M. Therese Flaherty of Harvard Business School spoke to senior executives on "U.S. Competitiveness—An Analysis and Remedies."

The program will be conducted in three phases. The first to demonstrate a refinement of existing technology, the second to demonstrate advanced technology, and the third to demonstrate very advanced techniques and tooling 1-2 years ahead of the demand cycle, i.e., a restoration of technological leadership.

The Challenge in Marketing

"The health and vitality of the U.S. semiconductor industry are essential to America's future competitiveness. We cannot allow it to be jeopardized by unfair trading practices."

President Ronald Reagan

April 17, 1987 after imposing \$300 million in trade sanctions for Japan's violation of the U.S.-Japan Semiconductor Accord



Robert Noyce (Intel) provides an answer at SIA's press conference following the Board of Directors first-ever meeting in Japan. Looking on is Ted Jaros (Nippon Motorola), Irwin Federman (Advanced Micro Devices), a Japanese interpreter, and Andy Procassini (SIA).

Brilliant innovations and manufacturing excellence are of little use if products cannot be marketed to customers freely at competitive prices. In that context, the true significance of the signing of the U.S.-Japan Semiconductor Trade Agreement (see pages 19 to 22 of this book) is that it successfully addresses the twin problems of market access and prevention of dumping. In assuring that U.S. manufacturers will have access to the Japan market, and that semiconductor products will not be sold at prices below the cost of manufacture, the industry can now focus on maintaining its innovative capabilities and restoring its manufacturing excellence, secure in the knowledge that quality, price, and service are the requirements for success in the marketplace.

The semiconductor industry's recent experience with the U.S. antidumping law has led SIA to propose several reforms. In particular, SIA believes that the existing law should be amended so that "multiple offenders"—i.e., foreign firms which have repeatedly been found guilty of dumping products in the U.S. market—will be subject to additional monitoring, and dumping suits against these companies will be facilitated.

To help communicate American industry's commitment to the world's largest market, Japan, the SIA Board of Directors met in Tokyo in June 1987, its first meeting outside the United States. During its meeting, the SIA Board passed resolutions underscoring the industry's intention to "aggressively pursue every sales opportunity in the Japanese market" and to "continue to commit resources in response to improving long-term relations with Japanese semiconductor customers." In addition, the Board held meetings with, and hosted a reception for, the Japanese industry and Government leaders. They also held a press conference.

Conclusion

Because of its highly leveraged position, the United States semiconductor industry has the potential to play a major role in assuring a healthy United States economy for decades to come. The industry's leadership role has been strongly challenged from overseas competitors.

To maintain a viable and competitive U.S. semiconductor industry, numerous initiatives are needed to maintain innovation leadership, manufacturing excellence, and marketing prowess. SIA is actively addressing all of these areas. With the help of individuals in the semiconductor manufacturing industry, the semiconductor equipment and materials industry, semiconductor user companies, trade associations like AEA and SEMI, the nation's universities, and the U.S. Government, the U.S. semiconductor industry can maintain its competitive edge and thereby keep America first in Information Age technology.

Introduction

On September 2, 1986, United States Trade Representative Clayton Yeutter and Nobuo Matsunaga, the Japanese Ambassador to the United States, signed an historic document outlining an Agreement reached between their two nations on the subject of semiconductor trade. The U.S.-Japan Semiconductor Accord has two major objectives:

- to provide increased access to the Japanese semiconductor market for foreign-based semiconductor manufacturers; and
- to prevent Japanese semiconductor manufacturers from dumping (i.e., selling their products at prices below Foreign Market Value [FMV]) in the U.S. and other world markets.

Why the Agreement was Necessary

The need to improve access to the Japan market and prevent Japanese dumping of semiconductors has its roots in the 1960s and early 1970s. Recognizing the potential of the new American technology called microelectronics, the Government of Japan, through its Ministry of International Trade and Industry (MITI), encouraged its fledgling semiconductor industry to develop through government-sponsored research and development programs; long-term, free and low-cost loans; and a protected home market. American firms were not permitted to locate facilities in Japan, and were often prohibited from importing their products. As a result, the share of the Japan market enjoyed by U.S. firms was limited to about 10 percent.

Japan "Opens" Its Market By 1975, in response to objections from the international trading community, MITI had removed most of the formal barriers. At the same time, however, a market restructuring had been encouraged to avoid duplication of research, specialize producers along specific product lines, concentrate semiconductor suppliers among those firms which were also the major semiconductor purchasers, aid reciprocal buying among Japanese electronics firms, and exclude American imports—actions described in Japan at the time as "liberalization countermeasures."

As a result of such measures, American efforts to penetrate the Japanese market throughout the balance of 1970s and into the 1980s were thwarted. So effective were these measures that the share of market earned by U.S. firms since the official "opening" of the Japan market has remained at about 10 percent—the same level achieved when the market was officially closed. U.S. firms found that they were welcome in Japan only during those periods when Japanese domestic producers were not able to fully meet the demands of their own market, or when the U.S. supplier manufactured a product not yet available from a Japanese domestic source. In the latter case, the market for the U.S. supplier immediately disappeared as soon as a Japanese-produced substitute became available.

The argument that a Japan market share of 10 percent or less is unfairly low is supported by the demonstrated competitiveness of U.S. firms in all other world markets. When U.S. and Japanese firms have competed head-to-head in neutral markets, for example, U.S. firms have earned a share of market that is four to five times greater than their Japanese counterparts.

The High Technology Working Group SIA's efforts to gain access to the Japan market led in 1982 to the formation of the U.S.-Japan High Technology Working Group (HTWG), a negotiating task force co-chaired for the U.S. by the Department of Commerce and the U.S. Trade Representative's Office, and for Japan by MITI. In late 1983, the HTWG reached an understanding on semiconductors in which MITI agreed to encourage the purchase of U.S.-made product.

Early 1984 was a period of extremely high worldwide semiconductor demand and shortage. U.S. sales in Japan during that period increased at a rate greater than the increase in the size of the Japan market. Although U.S. firms were being pressed to meet the demands of their existing customers, they nevertheless devoted a greater percentage of their worldwide output to the Japan market to show their good faith in the agreement, and their intention to provide reliable service to their newfound Japanese customers.

The bright signs of progress faded, however, when the market slowed in late 1984. By early 1985, U.S. firms were again residual suppliers in Japan, their sales having decreased faster than the market, and their market share, which had risen to about 14 percent, having declined once again to about 10 percent.

Dumping Meanwhile, a problem that had been apparent in every previous cyclical downturn had grown to disastrous proportions. Japanese semiconductor producers—protected in their home market and able to tap the resources of giant parent corporations—have been relatively shielded from market forces. Unlike their U.S. counterparts who “tighten their belts” in response to periodic industry recessions, Japanese manufacturers may even add capacity in disregard of whether market conditions justify such actions, then drop prices on excess product to below the cost of manufacture in order to gain market share.

The practice of foreign firms selling their products at prices below Foreign Market Value (FMV)—the company-specific cost of production, plus a profit of 8 percent—is illegal under United States law because it is anticompetitive, harming not only a U.S. industry but also consumers, who always suffer when competition is destroyed. Nations signatory to the General Agreement on Tariffs and Trade (GATT), including both the United States and Japan, have also agreed that the practice of dumping is intolerable because it allows a country that is overproducing to export unemployment.

In the U.S. market, the dumping practices of Japanese semiconductor manufacturers have had disastrous consequences. For example, as the price of one type of computer memory device called Dynamic Random Access Memories (DRAMs) continued to fall at a rate far in excess of what would be expected based on the traditional learning curve, most U.S. firms were forced to abandon the marketplace to their Japanese competitors. Today, only a few U.S. firms still manufacture DRAMs. In EPROMs, U.S. Department of Commerce investigations concluded that Japanese companies were selling devices at roughly one half the cost of production.

Cases are Filed On June 14, 1985, SIA filed a petition with the Office of the U.S. Trade Representative under Section 301 of the Trade Act of 1974 (as amended by the Trade and Tariff Act of 1984). In that complaint, SIA maintained that U.S. firms have been denied access to the Japan market, and that Japan’s closed market condition inevitably leads to overcapacity and dumping. SIA asked President Reagan to negotiate the removal of Japan market barriers and the prevention of Japanese dumping of semiconductors.

Just ten days later, Micron Technology filed a petition with the Department of Commerce under the antidumping statute of the Tariff Act of 1930. Micron alleged that Japanese firms were selling 64K DRAMs in the United States at prices below the cost of production, and that such actions were injuring a United States industry.

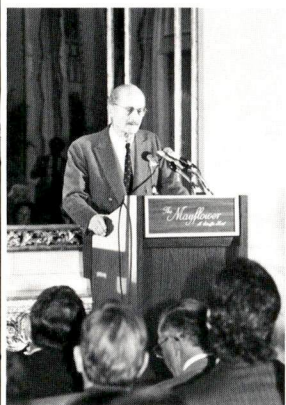
A second antidumping case was filed in September 1985 by Advanced Micro Devices, Intel Corporation, and National Semiconductor Corporation, charging that Japanese semiconductor companies were dumping EPROMs (Erasable Programmable Read-Only Memories), another type of computer memory device. The petitioners pointed out the similarities between Japanese pricing behavior in EPROMs and the reasons why most U.S. firms have had to remove themselves from the DRAM business.

In December 1985, a third antidumping case was filed against Japanese semiconductor manufacturers. This time the petitioner was the U.S. Government itself, self-initiating an antidumping investigation on 256K (and up) DRAMs. This unprecedented action was the first by a newly-created Trade Strike Force, charged by the President to uncover unfair trading practices used against the United States and to develop strategies for countering and eliminating them.

During the course of the investigation into SIA’s Section 301 unfair trade complaint, the 64K DRAM antidumping case was completed, and final dumping margins were issued against the Japanese companies selling those products in the U.S. market.

A Comprehensive Resolution Is Achieved

On July 30, 1986, negotiators for the U.S. and Japanese governments reached a comprehensive resolution on semiconductor trade issues. Since the U.S.-Japan Semiconductor Trade Agreement successfully addresses both the market access and prevention of dumping issues raised by SIA’s Section 301 complaint, the U.S. Government agreed to suspend both the SIA case and the two remaining antidumping cases as part of the overall resolution.



The late Secretary of Commerce Malcolm Baldrige, shown here presenting the keynote address at the SIA Washington Conference in March 1987, was instrumental in establishing the semiconductor trade agreement with Japan.

Increasing Japan Market Access In order to achieve a gradual and steady increase in market access over the next five years, the Japanese government agreed to:

- encourage Japanese producers and users of semiconductors to take advantage of the increased availability of foreign-manufactured products in their market;
- establish an organization to help foreign semiconductor producers increase sales in the Japan market;
- promote long-term relationships between Japanese semiconductor purchasers and foreign manufacturers through joint product development with Japanese customers; and
- assure equitable access for foreign companies to patents resulting from government-sponsored research and development.

The U.S. industry made clear that it expected a gradual and steady increase in foreign producers' market share in Japan to at least 20 percent during the five-year period of the Agreement. The Japanese Government understood these expectations when it entered into the agreement.

Preventing Dumping To prevent Japanese dumping of semiconductors, the Japanese Government has agreed to:

- monitor costs and prices on semiconductor products being exported to the United States and to third countries;
- take appropriate actions available under Japanese law and regulation to prevent exports at less than company-specific Foreign Market Value (i.e., company specific cost of production);
- assure that Japanese exporters cooperate with U.S. Government agencies if an antidumping action is initiated on any monitored product; and
- assure that the Agreement is not undermined in any manner, including below-cost pricing of products in Japan.

It is the intent of the Agreement that Japanese firms will not dump semiconductor products in any world markets, and that company-specific Foreign Market Value pricing will prevail in all world markets. Such a policy promotes competition in the free marketplace; companies will be encouraged to increase their efficiency, since the most efficient producer will be able to offer the best price.

Impact Of The Agreement

Just as limited access to the Japan market has posed a severe threat to the U.S. semiconductor industry, increased Japan market access will vastly improve the U.S. industry's chances of remaining competitive. The Japanese semiconductor market is now the largest semiconductor market in the world. In an industry that reinvests 10-12 percent of its sales for the research and development necessary to produce tomorrow's products, limitation of U.S. firms' sales opportunities in Japan creates a huge competitive disadvantage. Furthermore, since semiconductor manufacturing efficiency is a direct function of volume, lack of Japan market access disadvantages U.S. firms by limiting economies of scale.

Putting an end to Japanese semiconductor dumping will also improve the U.S. semiconductor industry's ability to remain competitive, since no one can survive in a business where products must be sold below the cost of manufacture. Furthermore, the products which Japanese firms have dumped have been large volume "technology drivers," yielding not only high returns and economies of scale, but allowing firms to develop the techniques necessary to make all other semiconductor products. Forced to leave technology drivers behind, it might have been impossible for any U.S. firm to remain in the semiconductor manufacturing business.

A return to fair pricing will allow U.S. semiconductor manufacturing firms to earn a reasonable return on investment so that they can stay in business; fund the R&D necessary to produce future generations of products and stay competitive; remain in businesses that were previously threatened by unfair pricing, such as EPROM manufacturing; and, possibly, return to businesses that they were forced to leave because of unfair pricing practices, such as DRAM manufacture.

Implementation Of The Agreement

During the seven month period following the signing of the Agreement and prior to the imposition of sanctions, Japanese dumping of EPROMs and DRAMs in the United States was reduced; Japanese dumping of EPROMs and DRAMs continued unabated in third country markets; and the U.S. share of the Japanese semiconductor market was flat.

In April 1987, after additional consultations between the U.S. and Japanese Governments were unsuccessful, President Reagan announced 100 percent *ad valorem* tariffs on \$300 million worth of Japanese exports to the United States, stating that he would lift the sanctions when there was sufficient evidence that dumping had stopped and Japan market access had improved. In June, the President removed 17 percent of the sanctions, in acknowledgment of progress made toward achieving compliance with the Agreement.

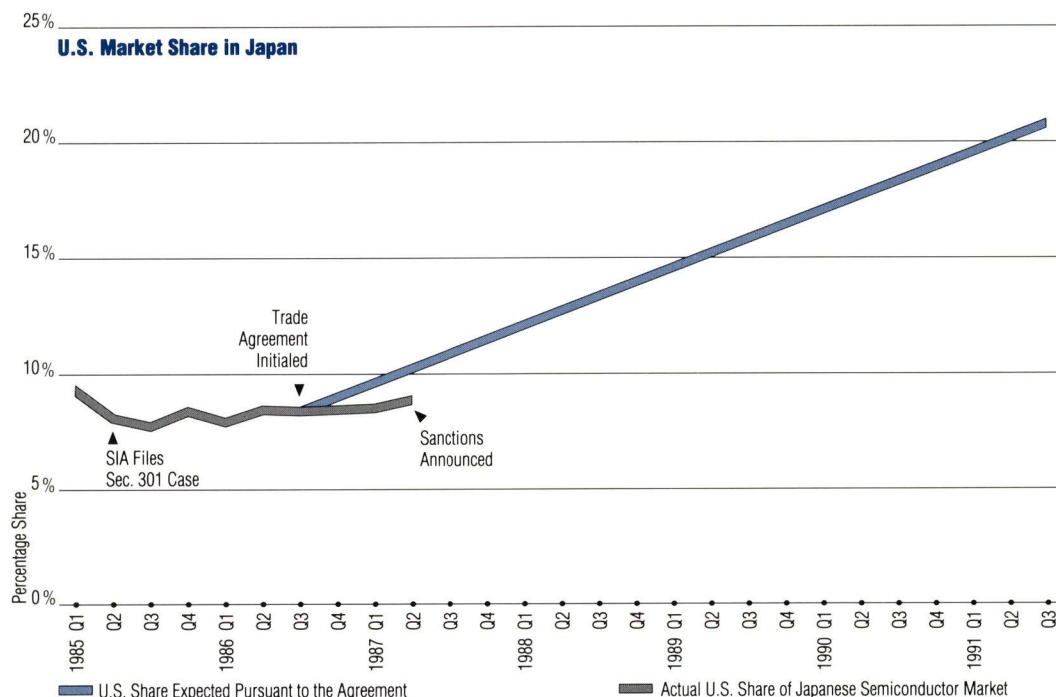
Since the imposition of sanctions, there has been a gradual reduction in third-country dumping of EPROMs and DRAMS, and some tentative signs of improvement in U.S. access to the Japanese market.

Nevertheless, even with the imposition of the sanctions, Japanese government and industry actions have fallen short of full compliance with the Agreement in two key respects:

- As of September 1987, U.S. company access to the Japanese market is 9 percent, two percentage points lower than the level expected by the first anniversary of the Agreement.

If U.S. market access were at the level expected to have resulted from the Agreement, U.S. companies would have made \$162 million of additional sales and would have provided approximately 1,500 additional jobs over the last year.

- Through the use of production controls and floor price measures, the Government of Japan has disrupted the pricing and supply of key semiconductor products. These policies have meant artificially high prices and short supply for U.S. semiconductor users and are contrary to the Agreement which seeks the restoration of normal market forces which encourage competition based on "cost-based pricing."



To eliminate these problems and to promote the continuation of the progress made to date, the U.S. government should keep the remaining sanctions in place until there is firm and continuing evidence that full Japanese compliance with the Agreement has been achieved (i.e., sales to Japan must increase to levels commensurate with the Agreement and MITI must eliminate the use of production controls and minimum floor prices). In addition, the U.S. government should be prepared to reapply the sanctions which have already been removed, if there is no movement toward full compliance.

***Editor's note: In November, the Department of Commerce reported an end to dumping in the U.S. and third country markets. As an acknowledgement toward this progress, President Reagan suspended the remaining \$84 million worth of sanctions tied to dumping. The President left in place those sanctions relating to lack of progress in market access.*

Keeping Track Of Worldwide Trends

As the driving force behind the microelectronics revolution, semiconductors are transforming our industrial structure by creating new industries, such as robotics, and helping older industries to meet competition through microelectronic technology. The resulting economic importance of the semiconductor industry has generated widespread interest on the part of the business, government, financial, and academic communities for reliable and timely industry statistics that can be used for a variety of purposes.

In this section, the semiconductor industry is examined through analysis of key market data. Performance statistics from 1954 to the present illustrate the unique dynamics of this industry, and provide an insight into growth, prices, and productivity.

The earliest statistical information available about the semiconductor industry was collected by the Electronic Industries Association (EIA) and the U.S. Department of Commerce (DOC). The industry itself created the Semiconductor Trade Statistics Program (STSP) in the 1970s to organize and centralize the efficient, accurate collection of data. When Japanese manufacturers began to submit data in 1984, the program's name was changed to World Semiconductor Trade Statistics (WSTS) to more accurately reflect a truly worldwide focus.

Between 1954 and the present, the statistical base has changed. As the industry has matured, new product lines have become significant, and the international segment has grown in importance. In order to provide a statistical track of comparable data, SIA has combined EIA's U.S. factory shipments data and SIA data for U.S.-based companies, including overseas shipments. For the period beginning in the mid-1960s through 1972, SIA and member company market researchers have made estimates of overseas shipments by U.S. companies, to adjust the EIA and DOC data.

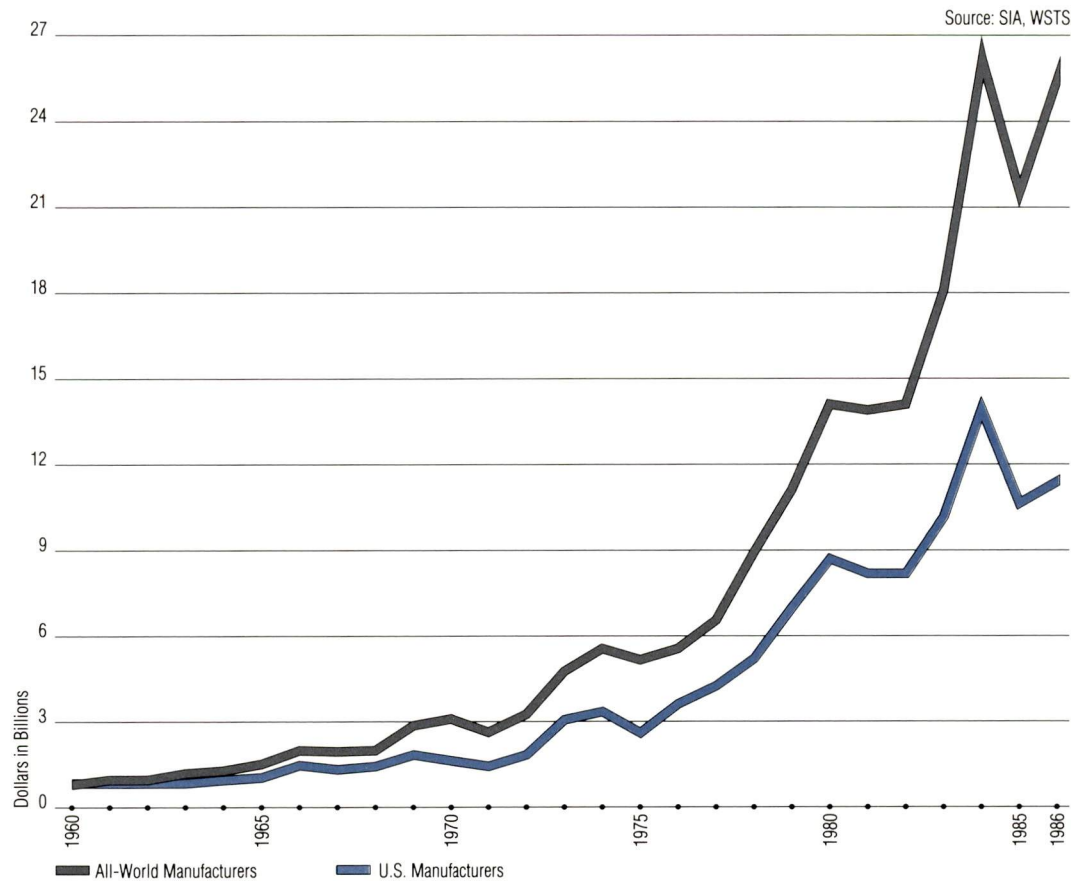
All of the data from 1973 to the present is based on the product and geographic classifications WSTS uses for statistical reporting. The system provides for year-to-year comparability, yet is flexible enough to allow for the addition of new product information and classifications as change and growth require. STSP data included only U.S.-based firms until 1980, when Europe-based companies joined the program; since January 1984, WSTS data has included reports from U.S., Europe-, and Japan-based firms.

The data in this section is expressed in U.S. dollars since this is the most common currency unit used for transactions in the semiconductor industry. However, the use of the dollar will mask changes in the marketplace caused by large currency savings. In 1980-84, the dollar appreciated substantially against foreign currencies, and in 1985-86 there was a substantial drop in the value of the dollar versus foreign currencies.

Any merchant semiconductor manufacturer willing to contribute data may participate in the WSTS program. Complete security of company-specific information is maintained through the use of a public accounting firm, which compiles program statistics according to guidelines developed by the WSTS Committee. More than 60 semiconductor manufacturers report data each month in 154 product and geographic categories, and estimates are made for non-participating companies. From this data, monthly reports are produced that detail shipments, bookings, and backlog.

Subscriptions to WSTS monthly data reports are available to the business and financial communities as well as government and academia. Additional information may be obtained from the SIA office.

CHART 1
Worldwide
Semiconductor
Shipments
U.S. and
All-World
Manufacturers
 (\$ billions)



Perspective

Chart 1 documents the historic eras of the semiconductor industry.

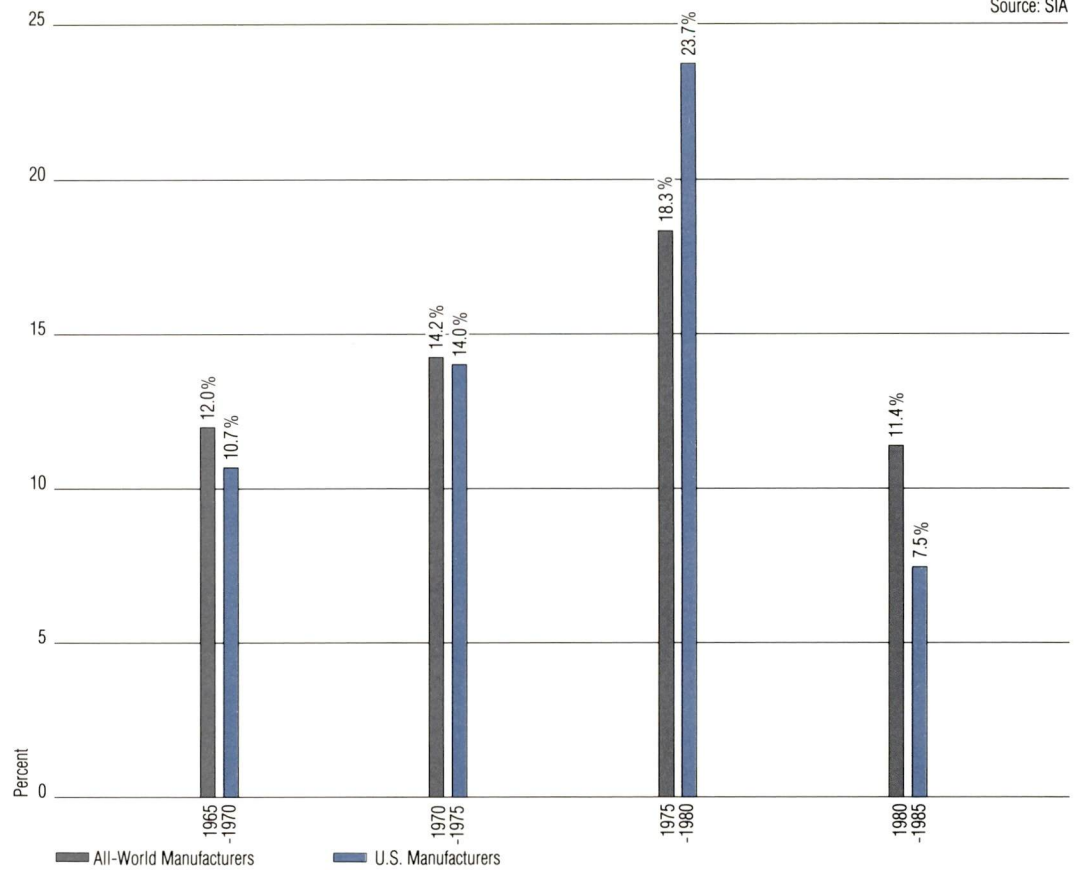
Before 1960, the industry was dominated by the realization of the possibilities of solid state electronics. In 1961, the industry experienced its first recession, as sales dropped some 16.7 percent from the year before. Then a new era began, dominated by the 1959 invention of the bipolar integrated circuit and new discrete devices that propelled the industry's growth through 1974 at a compound annual rate of 11 percent.

In 1974-75, the industry experienced its greatest recession to that time, with sales dropping 18.5 percent year-to-year. Nevertheless, the explosive growth of new types of integrated circuits such as microprocessors, EPROMs, and DRAMs, fabricated using a new process technology called MOS, lifted the industry out of that recession to experience compound annual growth rates of 20 percent through 1983. During this period, the U.S. industry had to confront significant foreign competition for the first time, as Japan built its electronics industry into a world power. By 1984, the Japanese had come to dominate the discrete and DRAM memory marketplace.

The 1983-84 timeframe witnessed the biggest growth in the industry's history when a combination of low inventories, a strong U.S. economy, a booming personal electronics market, and the rising prices associated with more complex devices caused sales to increase 34.2 percent in one year.

In 1985, the industry suffered a dramatic recession as boom times disappeared almost overnight and another semiconductor industry era came to an end. The market's mild recovery during 1986 led some observers to say that the industry was on the verge of another boom, while others believed exactly the opposite. One thing is certain: the next few years in the semiconductor industry will be unlike any others that have been seen before.

CHART 2
Compound Annual
Growth Rates
U.S. vs.
All-World
Manufacturers



Perspective

Chart 2 compares the growth of the U.S. semiconductor industry to that of the world. In the period 1965-75, all-world suppliers grew faster percentage-wise than the U.S. industry because foreign-based manufacturers were growing from smaller bases and in many cases had the advantage of protected home markets. The period was also dominated by discrete devices, with competition being cost-based rather than driven by innovation.

With the advent of MOS-technology integrated circuits in the mid-1970s, American innovation paved the way for U.S. companies' sales to increase quickly, especially with a favorable exchange rate. Since 1980, however, the U.S. industry has grown far more slowly, having to contend with the disadvantages of unfavorable exchange rates, foreign targeting of the industry, and unfair trade practices in many parts of the world.

Perhaps even more importantly, both U.S. and All-World manufacturers are now experiencing growth rates half those of the preceeding five years, a sign of an increasingly mature industry.

CHART 3
Worldwide Merchant
Shipments by
WSTS Product Line
(\$ millions)

	1984	1985	1986
Total Semiconductors	25,956	21,480	26,355
Integrated Circuits	20,568	16,485	20,156
Discrete Devices	5,388	4,995	6,199
INTEGRATED CIRCUITS			
Digital Bipolar	4,770	3,725	4,221
TTL Schottky Logic	3,085	2,310	2,469
ECL Logic	475	483	634
Other Logic	532	412	539
Bipolar Memory	678	520	579
Digital N+PMOS	8,642	5,141	5,789
N+PMOS Logic	3,469	2,499	2,820
N+PMOS Memory	5,173	2,642	2,969
Digital CMOS	3,095	3,721	5,088
CMOS Logic	2,261	2,979	4,113
CMOS Memory	834	742	975
Analog	4,061	3,898	5,058
Amplifier	743	601	707
Voltage Regulator and Reference	304	244	329
Data Conversion	338	366	470
Interface	502	438	512
Special Consumer	1,552	1,653	2,225
Other Linear including Comparator	662	596	815
DISCRETE DEVICES			
Diodes	661	570	710
Small Signal Transistors	1,106	1,063	1,255
Power Transistors	1,232	1,128	1,411
Rectifiers	892	783	973
Thyristors	367	344	391
Optoelectronics	931	877	1,180
Other Discrete	199	230	279

Source: WSTS, SIA

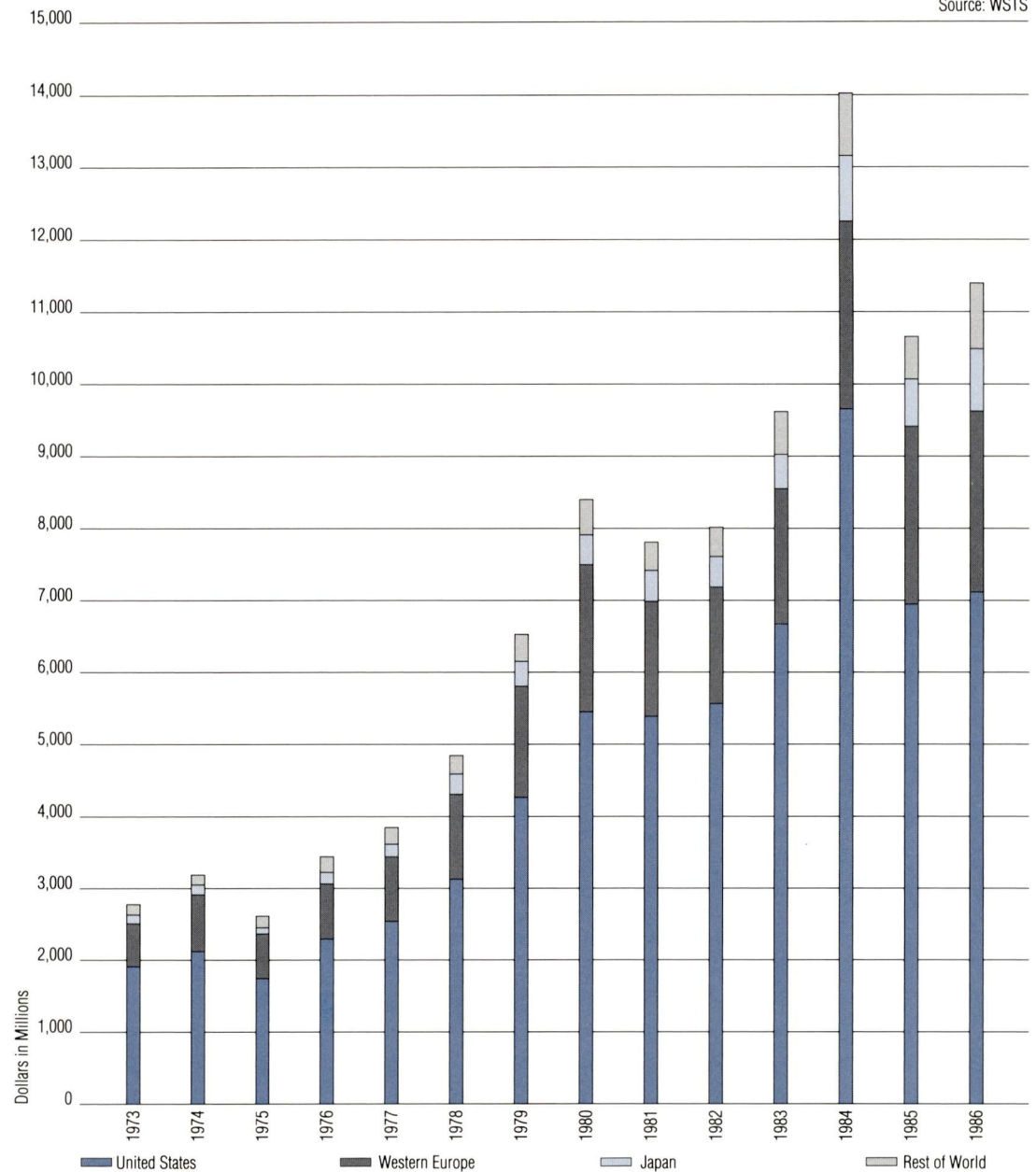
Perspective

Chart 3 represents worldwide merchant shipments for U.S., Europe, and Japan-based semiconductor manufacturers, analyzed according to the product line divisions of the World Semiconductor Trade Statistics (WSTS) program. The data incorporates actual inputs from manufacturers representing about 95 percent of world semiconductor sales; sales of the remaining companies are estimated.

The reporting of sales data in U.S. dollars provides a common yardstick with which to measure the size of the world semiconductor market. Year-to-year comparisons are to be avoided, however, since currency effects can often mask real change in the marketplace. A classic example of this problem is represented by 1986, a year in which world semiconductor sales, as measured in dollars, appear to have increased 22.7 percent. The large decline in the value of the dollar worldwide during 1986, however, means that real growth was far less. Measured in local currencies, such as the Japanese yen and the West German mark, real growth in 1986 was 5.2 percent in the United States, -6.0 percent in Western Europe, -3.0 percent in Japan, and 4.3 percent worldwide.

The dynamism of semiconductor technology advances is well illustrated by the rapid change of the product mix in the marketplace. Sales of CMOS-based products grew 64.4 percent between 1984 and 1986, while Digital Bipolar and Digital N+PMOS declined 33.6 percent during the same period. The shift can be explained by the growth in the semicustom marketplace and the increased use of CMOS in a large number of applications.

CHART 4
Geographic Markets
U.S.-Based
Semiconductor
Manufacturers
 (\$ millions)



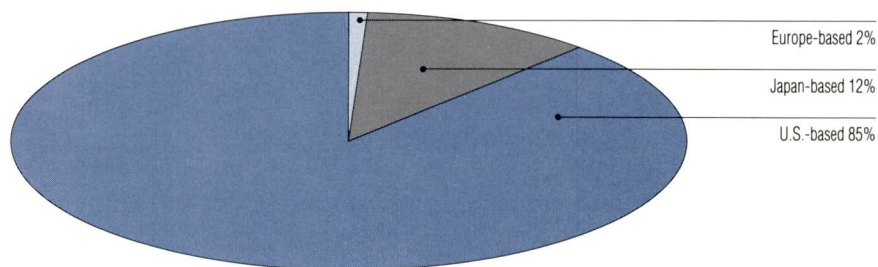
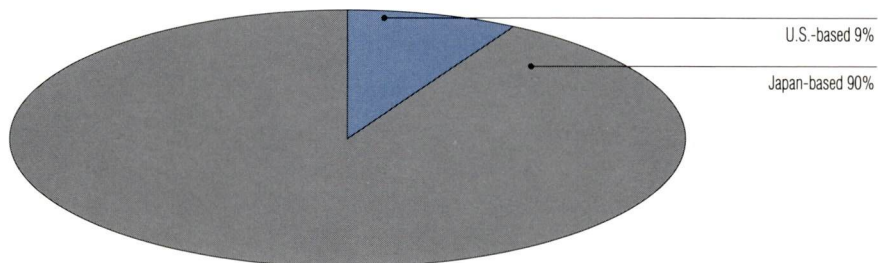
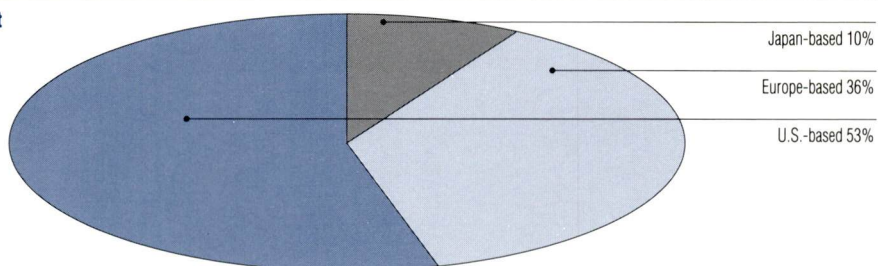
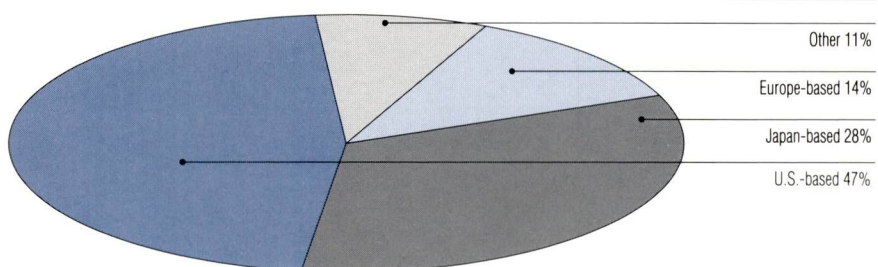
Perspective

As the worldwide electronics revolution continues to spread throughout the world, international markets are becoming increasingly important to U.S. semiconductor manufacturers. In fact, international markets now account for 67 percent of the total world market for semiconductors, with Japan being the largest single market in the world as of 1986.

U.S. firms have become more global in their perspective as the percentage of their sales to international markets has risen from 31 percent in 1984 to 37 percent in 1986. The geographic shift in the consumption of semiconductors represents both challenge and opportunity for U.S. companies. Considering this perspective, it is imperative that all markets be free of both tariff and non-tariff barriers if U.S. companies are going to achieve the market share their products deserve.

CHART 5
Average
Semiconductor
Market Share
1982 through 1986

Source: SIA

U.S. Market**Japan Market****Western Europe Market****Other Markets**

Some charts do not total 100% as a function of the rounding process.

Perspective

Chart 5 shows the average semiconductor market share earned by U.S., Europe, and Japan-based manufacturers in the major world markets during the period 1982 through 1986. World market share is not shown because the volatile exchange rates that took place during this period would make such information misleading. Clearly, U.S. manufacturers have outsold their foreign competitors in all major world markets except the Japan market. One must conclude, therefore, that the factors affecting sales in Japan are not simply those of price, quality, and service which normally govern purchasing decisions. Eliminating the barriers that prevent penetration of the Japan market is a major objective of the U.S.-Japan Semiconductor Trade Agreement.

CHART 6
U.S. Semiconductor
Market Shipments
(\$ millions)

	TRANSISTORS	RECTIFIERS & DIODES	THYRISTORS & OTHER DISCRETE	OPTOELECTRONICS	TOTAL DISCRETE	BIPOLAR	MOS*	ANALOG	TOTAL IC	TOTAL SEMICONDUCTORS
1954	5.1				5.1					5.1
1955	12.3				12.3					12.3
1956	37.4				37.4					37.4
1957	67.7	73.2	31.6		172.5					172.5
1958	109.7	95.4	20.4		225.5					225.5
1959	217.2	143.9	28.5		389.6					389.6
1960	293.6	203.1	24.9		521.6					521.6
1961	287.6	109.4	37.6		434.6					434.6
1962	278.1	180.7	49.7		508.5					508.5
1963	287.3	178.5	49.0		514.8					514.8
1964	311.7	216.6	61.4		589.7	34.7		6.0	40.7	630.4
1965	377.2	256.2	67.7		701.1	60.9		13.5	74.4	775.5
1966	443.1	315.8	94.9		853.8	107.7		28.3	136.0	989.8
1967	370.5	271.9	95.2		737.6	161.6		40.7	202.3	939.9
1968	345.2	267.9	94.5		707.6	224.1		53.6	277.7	985.3
1969	368.3	313.0	100.7		782.0	294.6		64.2	358.8	1140.8
1970	296.4	261.5	88.7		646.6	295.8		68.9	364.7	1011.3
1971	267.3	171.3	79.8	36.0	554.4	298.1		78.8	376.9	931.3
1972	319.7	192.0	94.3	70.0	676.0	417.8		113.7	531.5	1207.5
1973	408.3	276.2	124.6	90.3	899.4	495.2	303.8	204.8	1003.8	1903.2
1974	408.5	292.9	129.3	91.4	922.1	528.9	432.8	237.8	1199.5	2121.6
1975	332.1	222.5	105.9	99.9	760.4	348.5	427.6	197.8	973.9	1734.3
1976	392.1	257.2	129.9	140.0	919.2	465.8	635.9	270.1	1371.8	2291.0
1977	389.6	257.4	147.0	94.2	888.2	558.1	777.3	349.0	1684.4	2572.6
1978	407.3	275.4	159.4	129.1	971.2	681.9	1045.3	424.3	2151.5	3122.7
1979	475.7	334.5	172.3	204.5	1187.0	921.6	1628.6	546.4	3096.6	4283.6
1980	483.3	366.8	163.0	225.4	1238.5	1341.2	2289.6	632.8	4263.6	5502.1
1981	520.6	370.9	170.1	223.0	1284.6	1247.5	2190.4	700.3	4138.2	5422.8
1982	518.6	361.9	139.7	235.8	1256.0	1335.4	2912.2	755.2	5002.8	6358.8
1983	585.8	414.7	155.0	290.5	1446.0	1715.3	3641.2	961.0	6317.5	7763.5
1984	800.1	529.1	209.9	403.0	1942.1	2787.9	5380.5	1488.1	9656.5	11598.6
1985	626.7	410.0	186.3	254.3	1477.3	1943.9	3492.2	1177.2	6613.3	8090.6
1986	675.3	449.5	179.3	272.8	1576.9	1930.5	3612.4	1388.7	6491.6	8508.6

Source: EIA, SIA, WSTS

1954-1979—U.S.-based manufacturers only

1980-1981—U.S.- and Europe-based manufacturers

1982-1986—U.S., Europe-, and Japan-based manufacturers

*including CMOS

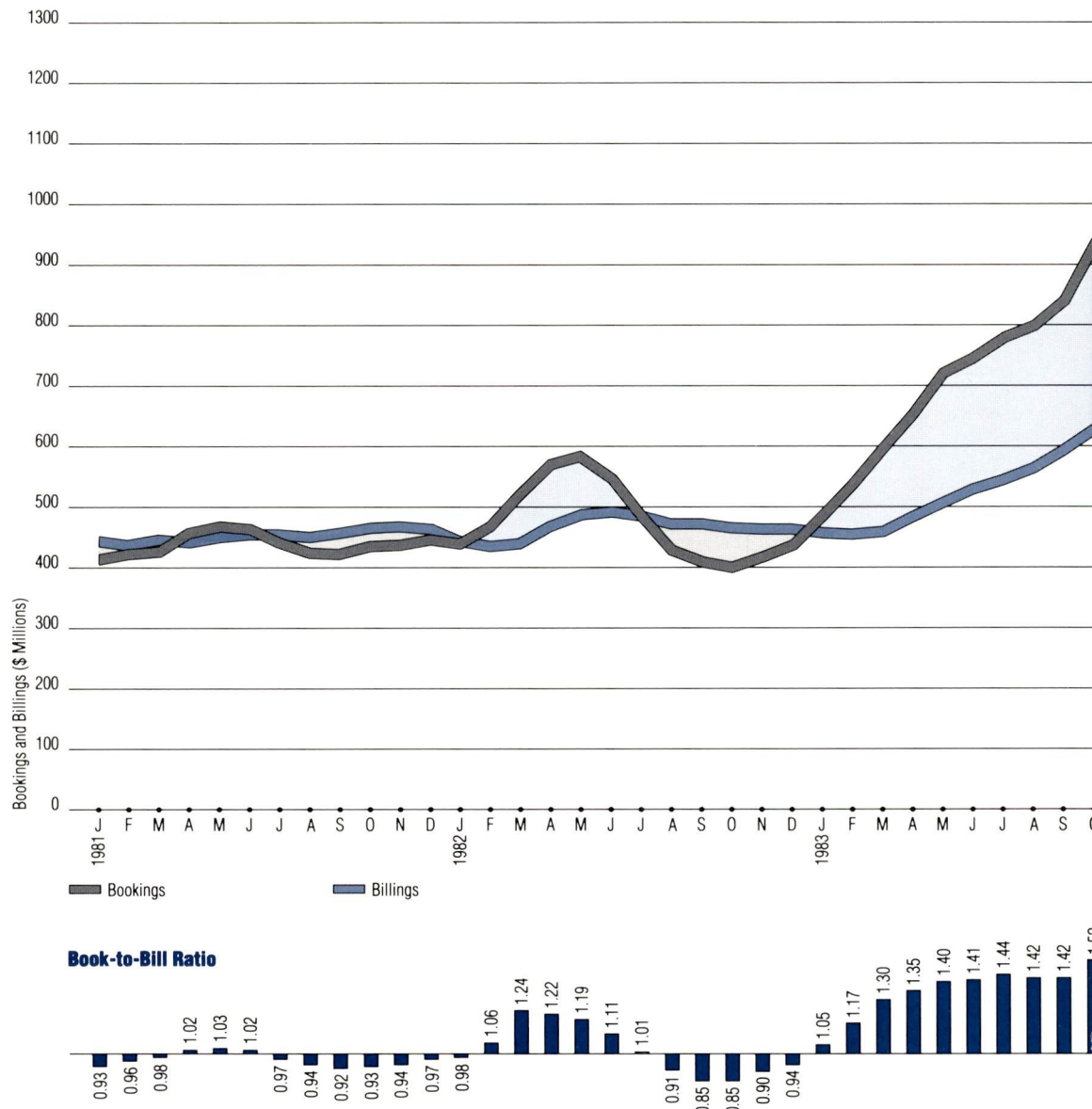
Perspective

Chart 6 provides an historical evaluation of the U.S. semiconductor market in terms of both size and products. It chronicles the growth of the U.S. market from \$5.1 million worth of transistors in 1954, to \$8.5 billion of many types of products, including chips that hold one million transistors in a space the size of just one 1954-type transistor!

The addition of European and Japanese manufacturers' data in 1980 and 1982, respectively, provides evidence of the rise of foreign competition in the U.S. market. Foreign-based companies accounted for about 15 percent of U.S. market sales in 1986, as compared to almost nothing ten years ago, giving further testimony to the increasingly global focus of the semiconductor industry.

The data in this chart is based on statistics collected by the Electronic Industries Association from 1954-72, and by the Semiconductor Trade Statistics Program (STSP) and World Semiconductor Trade Statistics (WSTS) since 1973.

CHART 7
U.S. Market Bookings,
Billings, and
Book-to-Bill Ratio
January 1981 to
September 1987

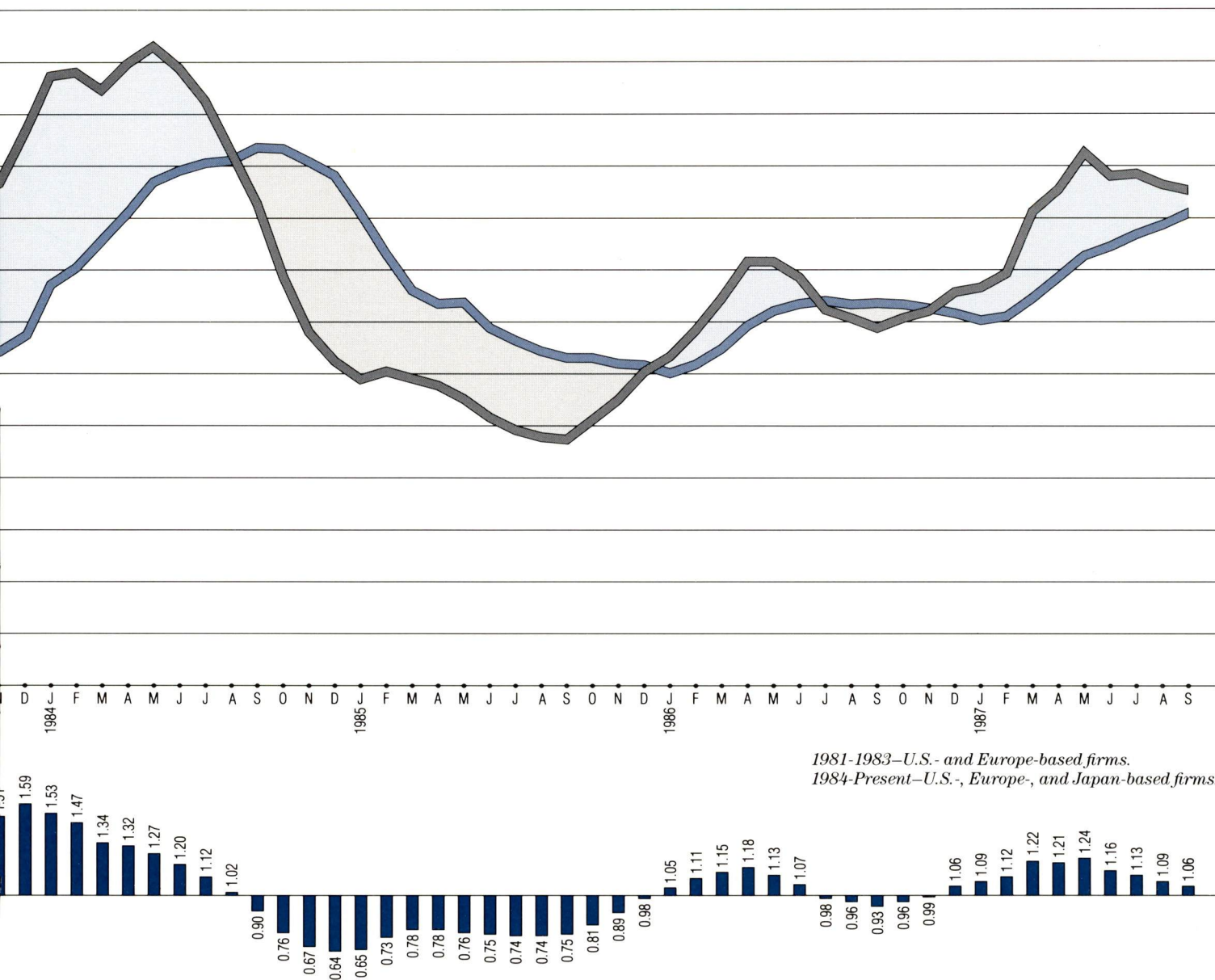


Perspective

Chart 7 provides a six-year history of U.S. market bookings, billings, and book-to-bill ratios. All of the data has been expressed as three-month moving averages to eliminate the "volatility" created by month-to-month changes. The book-to-bill ratio, calculated by dividing three-month average orders (bookings) by three-month average shipments (billings), is considered by most industry analysts to be the best available indicator of current semiconductor industry conditions.

During the period covered by the graph, the book-to-bill ratio has gone through many changes. During most of 1981, billings exceeded bookings as the industry experienced a recession created by the over-booking and double-booking that had taken place during the previous year's short supply conditions. (Over-booking occurs when a customer orders more than what is actually required, in hopes of receiving close to real requirements; double-booking occurs when a customer places the same order with several suppliers, then cancels the remaining orders when one supplier delivers.) In 1982, there was a short term increase in orders as distributors restocked inventory for a recovery that was not yet ready to take place.

The period between 1983 and 1985 provides a classic example of how the book-to-bill ratio indicates trends in the marketplace. During the early phase of the recovery, as leadtimes lengthened and product became scarce, purchasing departments scrambled to find reliable

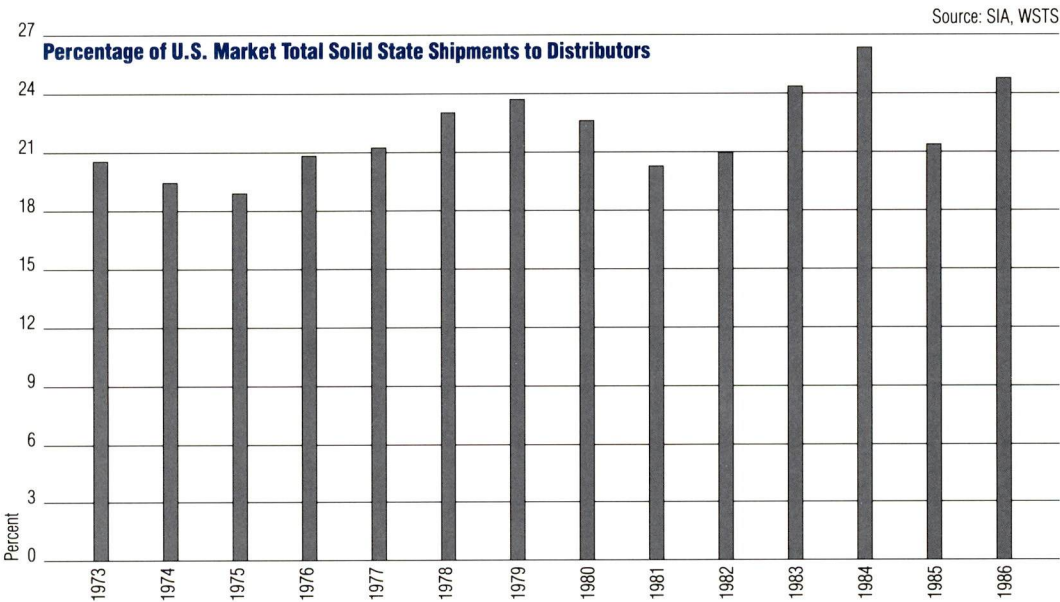
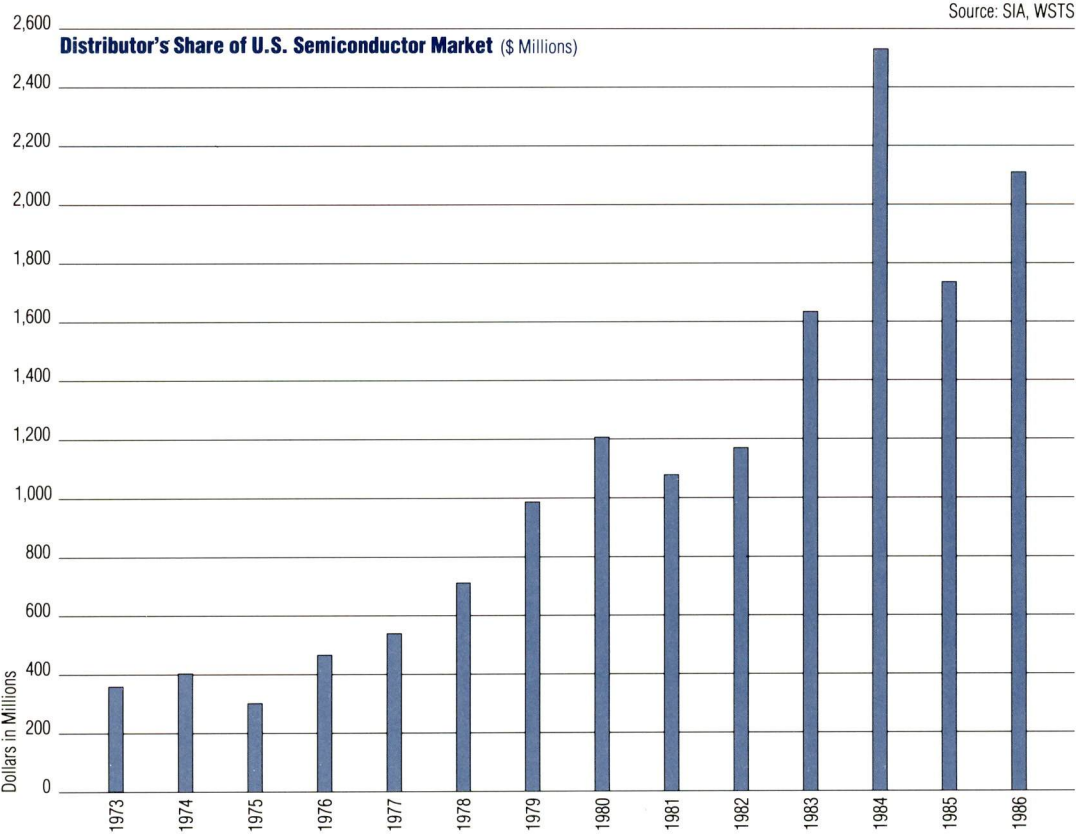


sources of semiconductors. Orders far outstripped shipments, and the book-to-bill ratio soared close to the 1.60 level. Semiconductor manufacturers raced to bring new capacity on line to meet the perceived explosion in demand, and the book-to-bill ratio dropped to more manageable levels of between 1.10 and 1.20. During the last part of the cycle, capacity exceeded demand; prices dropped, leadtimes shortened, and customers cancelled orders when they realized they had far more inventory than needed. Book-to-bill ratios in this phase bottomed out at 0.64.

Orders reported are net of cancellations and other financial adjustments, but it is not possible to determine orders with absolute accuracy. Price adjustments and currency savings may be posted only on quarter-end financial statements, rather than on order entry systems. Like a weather barometer, the book-to-bill ratio is not a precise predictor of change, but rather an indicator of the direction of such change. Generally, a book-to-bill ratio of 1.05 is required to maintain current business levels.

The addition of Japanese manufacturers' data in 1984 has dampened the magnitude of the changes in the book-to-bill ratio. Although U.S. and European firms will report orders placed up to twelve months in advance of shipment, Japanese firms generally report only those orders placed up to three months in advance.

CHART 8
U.S. Distributor
Market Share
1973 through 1986



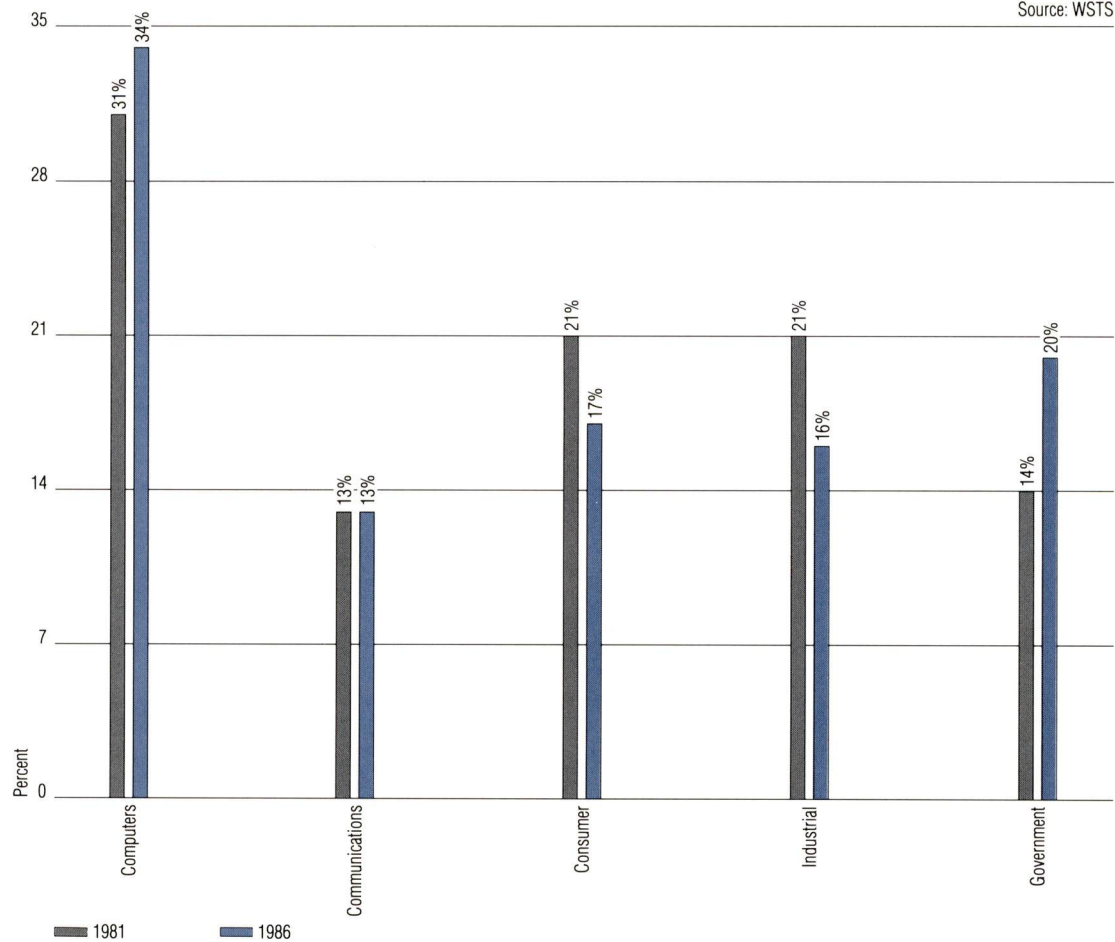
Perspective

As Chart 8 indicates, the share of the U.S. market shipments to distributors between 1973 and 1986 varied between 19 and 26 percent, depending upon market conditions.

Distribution market share will rise during boom times when even large OEMs, who usually buy direct from semiconductor manufacturers, place a large percentage of their orders through distributors because of long manufacturer leadtimes and spot shortages. In declining markets, distribution market share will decline, as small- and medium-size companies find that semiconductor manufacturer leadtimes are close to that of distribution.

Over time, distribution has increased in its share of the U.S. semiconductor market in every market cycle because of the enormous rate of growth in the amount number of semiconductor-using firms that only distribution can serve profitably and effectively.

CHART 9
U.S. Semiconductor
Market End Use
1981 vs. 1986



Perspective

Chart 9 compares U.S. semiconductor market end use during 1981 to that during 1986.

During this five-year period, the mix of uses for semiconductors in U.S. end markets changed substantially. Driving this change were the explosive growth of the office automation marketplace, the movement offshore of electronic equipment production and assembly for industrial and consumer applications, and large increases in the defense budget. The computer and government sectors gained three percent and six percent, respectively, in market share, while the consumer and industrial sectors lost share. Communications sector growth has been relatively flat due to the uncertainty created by the breakup of the Bell System, and the inroads that foreign suppliers have made in the U.S. communications marketplace.

CHART 10
U.S.-Based
Semiconductor
Manufacturers
Economic and
Market Indicators

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
SALES WORLDWIDE (\$billions)	2.6	3.4	3.9	4.8	6.6	8.4	7.8	8.0	9.6	14.0	10.6	11.4
INTERNATIONAL SALES (% of U.S.)	35	32	33	35	35	34	31	31	31	31	35	37
OPERATING INDICES*												
Value Added Per Employee (\$000)	5.9	7.5	9.5	9.9	11.1	15.8	15.0	14.8	18.1	27.5	21.9	23.6
Sales per Square Foot (\$ per sq. ft.)	126	141	172	204	259	264	236	217	245	316	226	229
Wafer Fab Capacity (% utilization)	70	76	79	82	82	69	59	67	72	84	49	58
Research & Development (% of sales)	8.3	6.7	7.7	8.0	7.1	7.4	9.7	10.9	9.9	9.9	15.1	15.0
Gross Fixed Assets Per Employee (\$000)	12.5	11.1	11.9	11.7	12.9	17.0	22.3	26.6	27.3	38.0	52.8	55.4
Capital Spending (% of sales)	5.6	9.0	10.6	13.6	13.4	15.4	17.7	14.8	13.6	21.0	16.6	8.8

Source: SIA

**This data has been extracted from a survey of major firms in the industry, and is believed to be representative of the industry as a whole.*

Perspective

In 1983, the U.S. semiconductor industry began the most dramatic cycle of its short history. Quite unexpectedly, the industry recovered from the 1981-82 doldrums, during which sales were relatively flat for two years, and headed into a boom market fueled by the growth of the personal computer and office automation marketplace. U.S. semiconductor manufacturers experienced growth rates of 20 and 46 percent in 1983 and 1984, respectively. Realizing the necessity of planning for the future, U.S. companies spent record amounts during this period for capital and R&D in both absolute terms and as a percentage of total revenues.

The period of intense growth was destined to be short-lived, however. During late 1984 and early 1985, the industry tumbled into the worst recession in its history. A combination of high end-user semiconductor inventories and the collapse of demand from the critical computer sector caused U.S. manufacturers' 1985 sales to plummet 24 percent. Nevertheless, U.S. semiconductor executives kept their levels of capital and R&D spending high, having learned difficult lessons during past recessions. The depth of the 1985 recession can be seen in the large drop in capacity utilization from 1984 to 1985.

Many analysts would call the modest 7.5 percent growth experienced during 1986 a modest recovery from the misfortunes of 1985. Predatory foreign competition in some commodity segments, both overseas and in the U.S. market, certainly hampered the U.S. industry's recovery. Faced with difficult financial choices, U.S. semiconductor manufacturers were forced to cut capital and R&D spending, although even the reduced levels were high by historical standards. Capacity utilization recovered slightly but was still at recessionary levels in comparison with past years.

The following portions of this book provide directories of U.S. semiconductor manufacturers, both those that are members of the Semiconductor Industry Association and those that are not. Every effort has been made to assure that all of the information contained in these directories is accurate, and to have the Industry Directory section include a listing for every semiconductor manufacturer in the United States. Users of these directories should realize, however, that the rapidly changing nature of the semiconductor industry has an impact on the accuracy and completeness of such information, and that that impact increases through time. All information contained in these directories was collected and verified in the summer of 1987.

36 Directory 1: SIA Member Company Directory

contains extensive information about the companies and company divisions which hold regular membership in the Semiconductor Industry Association. Annual sales information for SIA member companies has been expressed as a range, rather than a fixed amount.

43 Directory 2: SIA Associate Member Company Directory

contains information about the companies which hold corporate associate or manufacturing associate membership in the Semiconductor Industry Association. These companies either perform manufacturing or services related to the semiconductor industry; or manufacture semiconductors in the U.S., but do not qualify for regular membership.

45 Directory 3: Industry Directory/Merchant Producers

contains information about U.S. merchant producers, i.e., semiconductor manufacturers who sell their products on the open market.

59 Directory 4: Industry Directory/In-House Producers

contains information about U.S. "in-house" producers, i.e., semiconductor manufacturers whose products are consumed internally.

About Product Indications The SIA Member Company Directory and the merchant producer section of the Industry Directory contain an indication of the semiconductor products manufactured by each company or division. For purposes of standardization, these products are indicated only by the *general product classifications* used in the World Semiconductor Trade Statistics (WSTS) program. The listing of a general product classification for a company means that the company manufactures *at least one* of the sub-products in that class, but not necessarily all.

No product information has been provided in the SIA Associate Member Company Directory. For non-SIA member merchant firms listed in the Industry Directory, specific product information may be obtained by contacting the individual firms. No product information has been provided for the "in-house" producers, since their semiconductors are manufactured for internal consumption only.

ADVANCED MICRO DEVICES, INC.

901 Thompson Place
P.O. Box 3453
Sunnyvale, CA 94088
Telephone: (408) 732-2400
FAX: (408) 749-3945

W. J. Sanders, III, *Chief Executive Officer & Chairman of the Board*

Irwin Federman, *Vice Chairman of the Board*

Tony Holbrook, *President & Chief Operating Officer*

Rich Previte, *Senior Vice President, Treasurer & Chief Financial & Administrative Officer*

Steve Zelencik, *Senior Vice President & Chief Marketing Executive*

Gene Conner, *Senior Vice President, Memory, Manufacturing & Technology*

John East, *Senior Vice President, Logic*

Mike Callahan, *Senior Vice President, Programmable Products*

Thomas Armstrong, *Vice President, General Counsel*

Marv Burkett, *Vice President, Controller*

Stan Winick, *Vice President, Human Resources*

George Anderl, *Vice President, Sector II, North American Sales*

Ben Anixter, *Vice President, Corporate Marketing*

Gary Ashcraft, *Vice President, Communication Products*

Glen Balzer, *Vice President, Strategic Sales & Southeast Asia Sales*

Frank Barone, *Vice President, Bipolar Memory Division*

Donald Brettner, *Vice President, Manufacturing Services Division*

J. Philip Downing, *Vice President, Integrated Technology Division*

Curt Francis, *Vice President, Strategic Planning*

Clive Ghest, *Vice President, Business Development & Corporate Strategic Marketing*

Gary Heerssen, *Vice President & Group Executive, Austin Wafer Fabrication Operations*

George Kern, *Vice President, Santa Clara & San Antonio Wafer Operations*

Mark Koretz, *Vice President, Sector I, North American Sales*

Al Lapierre, *Vice President & Group Executive, MOS*

James Lynch, *Vice President, Quality Assurance & Reliability*

Rick Marz, *Vice President, North American Sales*

K. C. Murphy, *Vice President, Field Applications Engineering*

Timothy Propeck, *Vice President, Headquarters Marketing*

George Rigg, *Vice President, Processor Products Division*

Fred Roeder, *Vice President & Marketing Director, Interface & Logic Products Division*

Dave Simpson, *Vice President, Logic Products Division*

Terry Smith, *Vice President, European Sales*

Elliott Sopkin, *Vice President, Communications*

Ed Ward, *Vice President, Non-Volatile Memory Division*

Annual Sales: \$900-1500 Million

Products: Digital Bipolar, Analog, N+PMOS Logic, N+PMOS Memory, CMOS Logic, CMOS Memory, Bipolar ASICs, CMOS ASICs

AT&T TECHNOLOGIES, INC**Electronic Components Division**

One Oak Way
Berkeley Heights, NJ 07922
Telephone: (201) 771-2000

W. P. Dugan, *Vice President, Business Development, AT&T Network Systems*

J. F. Martin, *Product Management & Marketing Vice President,*

Electronic Components Division

K. D. Bowers, *Vice President, Electronics Technology AT&T-BL*

Products: Digital Bipolar, Analog, N+PMOS Logic, N+PMOS Memory, CMOS Logic, CMOS Memory, Gallium Arsenide ICs, Bipolar ASICs, Analog ASICs, NMOS ASICs, CMOS ASICs, Diodes, Small Signal & Switching Transistors, Power Transistors, Optoelectronics, Other Discrete

A Division of:

AMERICAN TELEPHONE & TELEGRAPH COMPANY

550 Madison Avenue
New York, NY 10022
Telephone: (212) 605-5500

BENDIX MICROELECTRONICS CENTER

9140 Old Annapolis Road
Columbia, MD 21045
Telephone: (301) 964-4000
FAX: (301) 992-5813

Aldo Mecchi, *General Manager*

Products: Bendix Microelectronics Center does not sell semiconductors as a merchant supplier.

A Division of:

ALLIED-SIGNAL INC.

Columbia Road and Park Avenue
Morristown, NJ 07960
Telephone: (201) 455-2000

CHERRY SEMICONDUCTOR CORPORATION

2000 South County Trail
East Greenwich, RI 02818
Telephone: (401) 885-3600
FAX: (401) 885-5786

Alfred S. Budnick, *President*

Walter E. McMann, *Vice President, Finance & Administration*

Barry H. Wiley, *Vice President, Marketing & Sales*

Andrew F. Durette, *Executive Vice President, Manufacturing & Engineering*

Annual Sales: \$25-30 Million

Products: Bipolar ASICs, Analog ASICs

A Subsidiary of:

THE CHERRY CORPORATION

(formerly Cherry Electrical Products Corporation)
3600 Sunset Avenue
Waukegan, IL 60087
Telephone: (312) 662-9200

CIRRUS LOGIC, INC.

1463 Centre Pointe Drive
Milpitas, CA 95035
Telephone: (408) 945-8300
FAX: (408) 263-5682

Michael Hackworth, *President & Chief Executive Officer*

Kamran Elahian, *Executive Vice President, International Operations*

Dr. Suhas Patil, *Chairman, Vice President, Research & Development*

Dr. Kenyon Mei, *Vice President, Engineering*

Dr. Michael Canning, *Vice President, Manufacturing*

Marilyn Guerrieri, *Vice President, Finance*

Eugene Parrott, *Vice President, Sales*

Annual Sales: \$5-10 Million

Products: CMOS Logic, NMOS ASICs, CMOS ASICs

COORS COMPONENTS, INC.

(formerly Siemens Components, Inc.—Colorado Components Division)

800 Hoyt Street
Broomfield, CO 80020
Telephone: (303) 469-2161
FAX: (303) 466-3775

Mike Fenerty, *President*

Annual Sales: \$5-10 Million

Products: Rectifiers, Thyristors

A Subsidiary of:

COORS PORCELAIN

600 Ninth Street
Golden, CO 80401
Telephone: (303) 278-4000

DIGITAL EQUIPMENT CORPORATION

77 Reed Road
Hudson, MA 01749-2895
Telephone: (617) 568-6677

Robert B. Palmer, *Vice President & Group Manager, Semiconductor Operations*

William C. Robinette, *Group Manager, Semiconductor Manufacturing & Technology*

Duane Dickhut, *Group Manager, Semiconductor Engineering*

Daniel Hamel, *Group Manager, Semiconductor Business & Operations*

Products: Digital Equipment Corporation does not sell semiconductors as a merchant supplier.

FORD MICROELECTRONICS, INC.

10340 State Highway 83, N.
Colorado Springs, CO 80908-3698
Telephone: (303) 528-7600
FAX: (303) 528-7635

John R. Wallace, *President*

Michael S. Ledford, *Vice President, Operations*

Robert E. Smith, *Controller*

Michael F. Doyle, *Director, Marketing*

HeBong Kim, *Executive Vice President, Gallium Arsenide*

Richard W. Griffith, *Director, Fabrication*

Charlotte S. Diener, *Marketing Manager*

Annual Sales: \$0-5 Million

Products: Gallium Arsenide ICs

A Subsidiary of:

FORD MOTOR COMPANY

The American Road
Dearborn, MI 48121
Telephone: (313) 322-3000

GENERAL ELECTRIC COMPANY**Solid State Division**

(formerly General Electric Company-Semiconductor Business Division and RCA Solid State Division)

Route 202
Somerville, NJ 08876
Telephone: (201) 685-6000
FAX: (201) 685-7246

C. R. Turner, *Vice President & General Manager*

H. Khajezadeh, *Vice President, Integrated Circuits*

R. P. Jones, *Vice President, Power Devices*

H. V. Criscito, *Vice President, Marketing*

W. J. Glowczynski, *Vice President, Finance*

L. Cantor, *Director, Communications*

Annual Sales: \$500-600 Million

Products: Analog, CMOS Logic, CMOS Memory, CMOS ASICs, Small Signal & Switching Transistors, Power Transistors, Rectifiers, Thyristors, Optoelectronics, Other Discrete

A Division of:

GENERAL ELECTRIC COMPANY

3135 Easton Turnpike
Fairfield, CT 06431
Telephone: (203) 373-2211

See also:

POWEREX, INC.

A Joint-Venture of General Electric Company

GENERAL SEMICONDUCTOR INDUSTRIES, INC.

2001 West 10th Place
Tempe, AZ 85281
Telephone: (602) 968-3101
FAX: (602) 966-6396

Brian Bachman, *President & Chairman of the Board*

Theodore R. Myers, *Executive Vice President*

James Keenan, *Vice President,*

Administration & Human Resources

Richard Von Barandy, *Vice President, Marketing*

William Skanadore, *Director, Device Development*

Rakesh Kansal, *Operations Manager, Diodes*

John Rogers, *Operations Manager, Transistors*

Sam Johnson, *Operations Manager,*

Modular Assemblies

David Hutchins, *Vice President, Diode Marketing*

James Williams, *Vice President, National Sales*

Annual Sales: \$25-30 Million

Products: Diodes, Power Transistors

A Subsidiary of:

SQUARE D COMPANY

Executive Plaza
Palatine, IL 60067
Telephone: (312) 397-2600

GIGABIT LOGIC, INC.

1908 Oak Terrace Lane
Newbury Park, CA 91320
Telephone: (805) 499-0610
FAX: (805) 499-2751

John D. Heightley, *President & Chief Executive Officer*

Spencer J. Brown, *Vice President, Finance &*

Chief Financial Officer

Richard C. Eden, *Senior Vice President, Research & Development*

Bryant M. Welch, *Vice President, Manufacturing*

Michael M. Pawlik, *Director, ASIC Products*

John H. Kemps, *Director,*

Standard Products Marketing

Annual Sales: \$10-15 Million

Products: Gallium Arsenide ICs

GOULD INC.**Semiconductor Division**

(formerly Gould AMI Semiconductors)

3800 Homestead Road
Santa Clara, CA 95051
Telephone: (408) 246-0330
FAX: (408) 554-2112

Conrad Wredberg, *President & Chief Executive Officer*

James Ellick, *Senior Vice President,*

Marketing, Sales & ASIC Engineering

Harvey Wagner, *Vice President, Finance*

Bruce Bourbon, *Vice President, Marketing*

Wesley Grant, *Vice President, Research & Development*

Martin Landin, *Vice President, Sales*

James Painter, *Vice President, ASIC Engineering*

Ben Ting, *Vice President,*

Technical Information Services

Edwin Chow, *Vice President,*

Standard Products Engineering

Nancy Hartsoch, *Director,*

Communications & Planning

Annual Sales: \$100-150 Million

Products: Analog, N+PMOS Memory, CMOS Logic, CMOS Memory, Analog ASICs, CMOS ASICs

A Division of:

GOULD INC.

10 Gould Center
Rolling Meadows, IL 60008
Telephone: (312) 640-4000

HARRIS SEMICONDUCTOR

P.O. Box 883
Melbourne, FL 32901
Telephone: (305) 724-7000
TWX: 510-959-6259

J. E. Cornell, *Senior Vice President & Sector Executive*
J. A. Davis, *Vice President & General Manager,*
Custom Integrated Circuits Division &
Microwave Semiconductor, Inc.

W. R. Morcom, *Vice President & General Manager,*
Semiconductor Products Division

J. T. Asher, *Vice President,*
Sector Commercial Relations &
Administration

M. H. Graff, *Vice President, Sector Marketing*
T. J. Sanders, *Vice President, Advanced Technology*
W. E. Wagner, *Vice President, Sector Sales*
L. H. Fredericks, *Director,*
Marketing Communications

Annual Sales: \$300-400 Million

Products: Analog, CMOS Logic, CMOS Memory, Gallium
Arsenide ICs, Analog ASICs, CMOS ASICs

A Division of:

HARRIS CORPORATION

1025 West Nasa Boulevard
Melbourne, FL 32901
Telephone: (305) 727-9100

HEWLETT-PACKARD COMPANY**Systems Program Planning**

19111 Pruneridge Avenue
Cupertino, CA 95014
Telephone: (408) 725-8900
FAX: (408) 446-0817

John Young, *President & Chief Executive Officer*
Dean Morton, *Executive Vice President &*
Chief Operating Officer

John Doyle, *Executive Vice President,*
Systems Technology Sector

Dick Alberding, *Executive Vice President,*
Marketing & International

Joel Birnbaum, *Vice President & General Manager,*
Information Technology Group

Hal Edmondson, *Vice President & Director,*
Corporate Manufacturing

Jack Brigham, *Vice President & General Counsel*
Bill Craven, *Vice President & General Manager,*
Discrete Components Group

Dave Kirby, *Director, Public Relations*

Fred Schwettman, *General Manager, Circuits &*
Technology Group

George Bodway, *Director, Systems Program Planning*
Bob Kirkwood, *Director, Government Affairs*

Products: Hewlett-Packard Company does not sell
semiconductors as a merchant supplier.

A Division of:

HEWLETT-PACKARD COMPANY

3000 Hanover Street
Palo Alto, CA 94304
Telephone: (415) 857-1501

IBM CORPORATION

Old Orchard Road
Armonk, NY 10504
Telephone: (914) 765-1900

J. F. Akers, *Chairman of the Board*
P. R. Low, *IBM Vice President, and President,*
General Technology Division

S. L. Kane, *Vice President, Industry Operations*
General Technology Division

Products: IBM Corporation does not sell
semiconductors as a merchant supplier.

INTEL CORPORATION

3065 Bowers Avenue
Santa Clara, CA 95051
Telephone: (408) 987-8080

Gordon E. Moore, *Chairman*
Andrew S. Grove, *President & Chief Executive Officer*
Robert N. Noyce, *Vice Chairman of the*
Board of Directors

Richard D. Boucher, *Vice President,*
Administration Group

Laurence R. Hootnick, *Senior Vice President,*
Sales & Marketing Group

Gerhard H. Parker, *Vice President,*
Technology Development

Jack C. Carsten, *Senior Vice President*

Leslie L. Vadasz, *Senior Vice President &*
General Manager, Systems Group

Edward L. Gelbach, *Senior Vice President,*
Corporate Sales

Craig R. Barrett, *Vice President,*
Component Technology &
Manufacturing Group

F. Thomas Dunlap, Jr., *General Counsel & Secretary*

Eugene J. Flath, *Vice President*

David L. House, *Vice President, Microcomputer Group*

Harold E. Hughes, Jr., *Treasurer*

Robert W. Reed, *Vice President &*
Chief Financial Officer

George H. Schnee, *Vice President,*
Component Quality & Reliability

Keith L. Thomson, *Vice President &*
Assistant General Manager, Systems Group

Ronald J. Whittier, *Vice President,*
Corporate Marketing

James W. Jarrett, *Vice President,*
Sales & Marketing Group,
Director, Corporate Communications

Annual Sales: \$600-900 Million

Products: N+PMOS Logic, N+PMOS Memory,
CMOS Logic, CMOS Memory, CMOS ASICs

INTERNATIONAL RECTIFIER CORPORATION

247 Kansas Street
El Segundo, CA 90245
Telephone: (213) 322-3331
FAX: (213) 772-9028

Eric Lidow, *President & Chairman of the Board*

Alex Lidow, *Executive Vice President,*
Manufacturing & Technology

Derek Lidow, *Executive Vice President,*
Marketing & Administration

Annual Sales: \$100-150 Million

Products: Analog, Power Transistors, Rectifiers,
Thyristors, Optoelectronics

LANSDALE SEMICONDUCTOR, INC.

3600 West Osborn Road
Phoenix, AZ 85019
Telephone: (602) 269-6262
FAX: (602) 269-6266

R. Dale Lillard, *President*

Robert L. Grandestaff, *Director of Sales &*
Marketing

R. Scott Reynolds, *Controller*

Annual Sales: \$5-10 Million

Products: Digital Bipolar, Analog

LINEAR TECHNOLOGY CORPORATION

1630 McCarthy Boulevard
Milpitas, CA 95035-7487
Telephone: (408) 432-1900
FAX: (408) 434-0507

Robert L. Swanson, *President & Chief Executive Officer*
Brian Hollins, *Vice President, Operations*
William A. Ehrt, *Vice President, Marketing*
Robert C. Dobkin, *Vice President, Engineering*
Clive B. Davies, Ph.D., *Vice President, Quality & Service*
Paul Coghlan, *Vice President, Finance & Chief Financial Officer*

Annual Sales: \$25-30 Million
Products: Analog

LSI LOGIC CORPORATION

1551 McCarthy Boulevard
Milpitas, CA 95035
Telephone: (408) 433-8000
FAX: (408) 434-6422

Wilfred J. Corrigan, *Chairman & Chief Executive Officer*
George Wells, *President & Chief Operating Officer*
D. Scott Mercer, *Vice President, Chief Financial Officer*
William J. O'Meara, *Vice President, Chief Marketing Officer*
Robert M. Walker, *Vice President, Chief Engineering Officer*
Cyril F. Hannon, *Vice President, Components & Technology*
Bruce Entin, *Vice President, Investor Relations & Corporate Communications*
Robert N. Blair, *President, LSI Logic Europe, Ltd.*
Mitchell D. Bohn, *President, LSI Logic Canada, Inc.*
Keiske K. Yawata, *President, LSI Logic KK*
Norman W. Chanoski, *Vice President, Reliability/QA/Military/Aerospace Operations*
Conrad J. Dell'Oca, *Vice President, Research & Development*
Raymond M. Fritz, *Vice President & Corporate Controller*
James S. Koford, *Vice President, Software & Computer Services*
Ven L. Lee, *Vice President, Engineering Services*
Keith R. Lobo, *Vice President, Advanced Products & Software*
Murray L. McLachlan, *Vice President, Chief Development Officer*
Lewis C. Wallbridge, *Vice President, Industrial Relations & Corporate Services*
A. Travis White, *Vice President, Assembly, Test & Packaging*
Joseph M. Zelayeta, *Vice President, Wafer Manufacturing Operations*

Annual Sales: \$200-300 Million
Products: CMOS ASICs

MEMTECH TECHNOLOGY CORPORATION

3000 Oakmead Village Drive
Santa Clara, CA 95051
Telephone: (408) 980-5300
FAX: (408) 980-5383

Richard H. Loeffler, *Chairman & Chief Executive Officer*
William H. Almond, *President & Chief Operating Officer*
Michael Shores, *Vice President, Finance*
Joseph Rutherford, *Vice President, Marketing*
Peter J. Silverman, *Vice President, Engineering & Technology*

Annual Sales: \$5-10 Million
Products: Magnetic Bubble Memory

MONOLITHIC MEMORIES, INC.

See: ADVANCED MICRO DEVICES, INC.

MOTOROLA INC.

Semiconductor Products Sector

5005 East McDowell Road
P.O. Box 2953
Phoenix, AZ 85008
Telephone: (602) 244-4367
FAX: (602) 244-4385

James A. Norling, *Executive Vice President & General Manager, Semiconductor Products Sector*
Tommy George, *Senior Vice President & Assistant General Manager, Semiconductor Products Sector*
Andre Borrel, *Senior Vice President & General Manager, International Semiconductor Group*
Gordon Chilton, *Corporate Vice President & General Manager, Assembly Manufacturing & Equipment Engineering Division*
Larry Gartin, *Corporate Vice President & Director of Sector Finance*
Jim George, *Vice President & General Manager, MOS Memory Division*
Murray Goldman, *Senior Vice President & General Manager, Microprocessor Products Group*
Bob Jenkins, *Corporate Vice President & Director of Semiconductor Technology Management*
Gary Johnson, *Senior Vice President & General Manager, Standard Logic & Analog Integrated Circuits Group*
Geno Ori, *Senior Vice President & General Manager, Discrete & Special Technologies Group*
Ken Phillips, *Director of Communications*
Hector Ruiz, *Corporate Vice President & General Manager, Integrated Circuit Wafer Manufacturing Group*
Paul Shimp, *Corporate Vice President & Director of Sector Support Operations*
Chuck Thompson, *Senior Vice President & Director of World Marketing*
Ken Wolf, *Corporate Vice President & General Manager, Applications Specific Integrated Circuits Division*

Annual Sales: >\$1 Billion
Products: Digital Bipolar, Analog, N+PMOS Logic, N+PMOS Memory, CMOS Logic, CMOS Memory, Bipolar ASICs, NMOS ASICs, CMOS ASICs, Diodes, Small Signal & Switching Transistors, Power Transistors, Rectifiers, Thyristors, Optoelectronics, Other Discrete

A Sector of:

Motorola Inc.
1303 East Algonquin Road
Schaumburg, IL 60196
Telephone: (312) 397-5000

NATIONAL SEMICONDUCTOR CORPORATION

2900 Semiconductor Drive
P.O. Box 58090
Santa Clara, CA 95052-8090
Telephone: (408) 721-5000
FAX: (408) 245-9655

Charles E. Sporck, *President & Chief Executive Officer*

James E. Smaha, *Executive Vice President,
Semiconductor Group*

F. Joseph Van Poppelen, *Vice President,
Semiconductor Marketing*

E. Edward Pausa, *Vice President,
International Manufacturing*

Linda Baker, *Vice President, Corporate
Communications*

Gary P. Arnold, *Vice President, Finance; Treasurer &
Chief Financial Officer*

David N. Martin, *Executive Vice President,
Information Systems Group*

Annual Sales: \$600-900 Million

Products: Digital Bipolar, Analog, N+PMOS Logic,
N+PMOS Memory, CMOS Logic, CMOS
Memory, Bipolar ASICs, Analog ASICs,
NMOS ASICs, CMOS ASICs, Diodes,
Small Signal & Switching Transistors,
Power Transistors, Rectifiers

NCR MICROELECTRONICS DIVISION

1700 South Patterson Boulevard
Dayton, OH 45479
Telephone: (513) 445-2480
FAX: (513) 445-1035

Dr. J. H. Van Tassel, *Vice President*

Jerry A. Slovick, *Controller*

A. Kenneth Davis, *Assistant Vice President, Marketing*

Lowell D. Deckard, *Assistant Vice President,
Product Management*

John Stratford, *Manager, Merchandising*

Annual Sales: \$80-100 Million

Products: N+PMOS Logic, N+PMOS Memory, CMOS
Logic, CMOS Memory, Analog ASICs, NMOS
ASICs, CMOS ASICs

A Division of:

NCR CORPORATION

1700 South Patterson Boulevard
Dayton, OH 45479
Telephone: (513) 445-5000

NORTHERN TELECOM ELECTRONICS INC.

16350 West Bernardo Drive
San Diego, CA 92127
Telephone: (619) 485-8900
FAX: (619) 485-9110

M. Frank Garbis, *Assistant Vice President*

Kenneth J. Bradley, *Division General Manager*

Products: Northern Telecom does not sell
semiconductors as a merchant supplier.

A Division of:

NORTHERN TELECOM INC.

200 Athens Way
Nashville, TN 37228
Telephone: (615) 734-4000

POWEREX, INC.

(formerly Westinghouse Electric Corporation-
Semiconductor Division)

Hillis Street
Youngwood, PA 15697
Telephone: (412) 925-7272
FAX: (412) 925-4393

Ronald C. Whigham, *President &
Chief Executive Officer*

James R. Myler, *Vice President &
Chief Financial Officer*

Joseph R. Forys, *Quality Director*

Stanley R. Hunt, *Commercial Operations
Vice President*

David M. Gillott, *Manufacturing Operations Director*

Dominique Poughon, *President, Powerex Europe SA*

Annual Sales: \$65-80 Million

Products: Power Transistors, Rectifiers, Thyristors

A Joint-Venture of:

GENERAL ELECTRIC COMPANY**MITSUBISHI ELECTRONICS AMERICA, INC.****WESTINGHOUSE ELECTRIC CORPORATION**

See also:

GENERAL ELECTRIC COMPANY-SOLID STATE DIVISION

A Division of General Electric Company

PRECISION MONOLITHICS, INC.

1500 Space Park Drive
P.O. Box 58020
Santa Clara, CA 95052-8020
Telephone: (408) 727-9222
FAX: (408) 496-6725

Alan King, *President & Chief Executive Officer*

Alan King, *Executive Vice President, Operations*

Robert Bluell, *Vice President, Administration &
Finance*

Donn Soderquist, *Vice President, Marketing & Sales*

Richard Corbin, *Vice President, Technology
Development*

Lou Chetaud, *Vice President,
Manufacturing Operations*

Ron Miller, *Vice President, Human Resources*

Jock Ochiltree, *Vice President,
Industrial & Commercial Products*

Barry Shiller, *Vice President,
Military Aerospace Products*

Annual Sales: \$65-80 Million

Products: Analog

A Subsidiary of:

BOURNS, INC.

1200 Columbia Avenue
Riverside, CA 92507
Telephone: (714) 781-5618

RCA SOLID STATE DIVISION

See: GENERAL ELECTRIC COMPANY

Solid State Division

RAYTHEON COMPANY **Semiconductor Division**

350 Ellis Street
P.O. Box 7016
Mountain View, CA 94039-7016
Telephone: (415) 968-9211
FAX: (415) 969-6930

David A. Deardorf, *Vice President & General Manager*

Peter B. Bejarano, *Director-Operations, VLSI*

Stanley L. Karp, *Manager, Industrial Relations & Administration*

Martin Geller, *Director, Marketing*

Eugene A. Blanchette, *Director, Analog & Mature Operations*

Michael G. Rosa, *Director, Manufacturing Services*

Jeffrey Muscatine, *Manager, Marketing Communications*

Annual Sales: \$80-100 Million

Products: Digital Bipolar, Analog, CMOS Logic, CMOS Memory, Bipolar ASICs, Analog ASICs, CMOS ASICs, Small Signal & Switching Transistors

A Division of:

RAYTHEON COMPANY

141 Spring Street
Lexington, MA 02173
Telephone: (617) 862-6600

ROCKWELL INTERNATIONAL **Semiconductor Products Businesses**

Dr. Gilbert F. Amelio, *President*

Annual Sales: \$150-200 Million

Semiconductor Products Division

4311 Jamboree Road
P.O. Box C
Newport Beach, CA 92658-8902
Telephone: (714) 833-4600
FAX: (714) 833-4078

William D. Baker, *Executive Vice President*

Dina S. Traylor, *Assistant to the President*

Dan K. Rime, *Manager Industry Relations*

John E. Algeo, *Division Director Production Operations*

H. Daniel Ball, *Controller*

Samuel B. Goldstein, *Division Director Vendor Relations*

Charles V. Kovac, *Vice President Major Programs*

Joseph W. Mader, *Vice President Marketing & Domestic Sales*

David J. Marriott, *General Manager European Operations*

Dr. Frank B. Micheletti, *Division Director Engineering*

William P. Romano, *Division Director Personnel*

Michael J. Townsend, *Division Director Strategic & Product Planning*

Dale W. Williams, *General Manager Far Eastern Operations*

Lee T. Troxler, *Director*

Division Quality

Products: N+PMOS Logic, CMOS Logic, CMOS ASICs

Microelectronics Research and Development Center

3370 Miraloma Avenue
Building 241
P.O. Box 3105
Anaheim, CA 92803-3105
Telephone: (714) 762-8111
FAX: (714) 762-4127

R. Ronald Duncan, *General Manager*

Products: CMOS Logic, CMOS Memory, Gallium Arsenide ICs, NMOS ASICs, CMOS ASICs

Divisions of:

ROCKWELL INTERNATIONAL CORPORATION

600 Grant Street
Pittsburgh, PA 15219
Telephone: (412) 565-2000

SILICON SYSTEMS

14351 Myford Road
Tustin, CA 92680
Telephone: (714) 731-7110
FAX: (714) 731-5457

Carmelo J. Santoro, *Chairman & Chief Executive Officer*

Stephen E. Cooper, *President & Chief Operating Officer*

John V. Crosby, *Senior Vice President, Operations*

Martin H. Jurick, *Senior Vice President*

Rick Goerner, *Senior Vice President, Marketing & Sales*

Gary Kelson, *Senior Vice President, Chief Technology Officer*

William L. Healey, *Senior Vice President, Manufacturing*

Larry J. Pepper, *Director, Corporate Communications*

Annual Sales: \$65-80 Million

Products: Bipolar ASICs, Analog ASICs, CMOS ASICs

SPRAGUE ELECTRIC COMPANY

92 Hayden Avenue
Lexington, MA 02173
Telephone: (617) 862-5500
FAX: (617) 862-5508

John L. Sprague, *President & Chief Executive Officer*

Richard J. Morrison, *Group Vice President, Semiconductors*

Charles D. Park, *Senior Vice President, Finance & Administration*

Peter R. Loconto, *Senior Vice President, Marketing & Sales*

Kenneth E. Manchester, *Corporate Director, Research & Development*

Len N. Lee, *Director, Market Research*

Annual Sales: \$100-150 Million

Products: Analog, CMOS Logic, Analog ASICs, Small Signal & Switching Transistors

TEXAS INSTRUMENTS INCORPORATED **Semiconductor Group**

13532 North Central Expressway
Semiconductor Building
P.O. Box 655012
Dallas, TX 75265
Telephone: (214) 995-2011

William P. Weber, *Executive Vice President & President, Semiconductor Group*

William N. Sick, *Executive Vice President*

James H. Peterman, *Vice President, Semiconductor Group*

Kevin J. McGarity, *Vice President, Marketing, Semiconductor Group*

Mohan Rao Gollapudi, *Senior Vice President, Advanced Development & Process Automation*

Delbert Whitaker, *Senior Vice President, U.S. Semiconductor Operations*

Norm Neureiter, *Vice President, Texas Instruments Corporate Staff*

Annual Sales: >\$1 Billion

Products: Digital Bipolar, Analog, N+PMOS Logic, N+PMOS Memory, CMOS Memory, Bipolar ASICs, Analog ASICs, NMOS ASICs, CMOS ASICs, Small Signal & Switching Transistors, Power Transistors, Rectifiers, Thyristors, Optoelectronics, Other Discrete

A Division of:

TEXAS INSTRUMENTS INCORPORATED

13532 North Central Expressway
P.O. Box 655474
Dallas, TX 75265
Telephone: (214) 995-2011

TRIQUINT SEMICONDUCTOR, INC.

18700 N.W. Walker Road
P.O. Box 4935
Beaverton, OR 97076
Telephone: (503) 629-3535
FAX: (503) 645-8067

Alan D. Patz, *President*
Richard V. Sasaki, *Treasurer & Controller*
Thomas M. Reeder, *Vice President, Marketing*
Richard Y. Koyama, *Vice President, Research & Development*
J. Gordon Roper, *Vice President, Manufacturing*
Richard J. Allen, *Quality Assurance Manager*
Ajit G. Rode, *Vice President, Foundry Operations*
Binoy A. Rosario, *Vice President, Design Engineering*
Philip B. Snow, *Vice President, Microwave Product Line*

Annual Sales: \$0-5 Million

Products: Gallium Arsenide ICs

A Subsidiary of:

TEKTRONIX, INC.

14150 S. W. Karl Braun Drive
Beaverton, OR 97077
Telephone: (503) 627-7111

UNITED TECHNOLOGIES MICROELECTRONICS CENTER

1575 Garden of the Gods Road
Colorado Springs, CO 80907
Telephone: (303) 594-8000
FAX: (303) 594-8187

Cal Ransom, *President*
Douglas W. Small, *Director, Operations*
James Rasmus, *Manager, Human Resources*
Robert C. Cook, *Director, Business Development*
Charles W. Gwyn, *Vice President, Engineering & Technology*
Douglas W. Small, *Director, Operations*
Laura McGuire, *Manager, Communications*

Products: United Technologies Microelectronics Center does not sell semiconductors as a merchant supplier.

A Division of:

UNITED TECHNOLOGIES CORPORATION

One Financial Plaza
Hartford, CT 06101
Telephone: (203) 728-7000

VLSI TECHNOLOGY, INC.

1109 McKay Drive
San Jose, CA 95131
Telephone: (408) 434-3000
FAX: (408) 263-2511

Alfred Stein, *Chairman & Chief Executive Officer*
Henri Jarrat, *President & Chief Operations Officer*
Kenneth Goldman, *Vice President, Finance*
Jim Miller, *Vice President, Sales & Marketing*
Douglas Fairbairn, *Vice President & General Manager, ASIC*

David Ledvina, *Vice President, Wafer Fabrication*
Paula Jones, *Manager, Corporate Communications*

Annual Sales: \$100-150 Million

Products: N+PMOS Memory, CMOS Logic, CMOS Memory, CMOS ASICs

WESTINGHOUSE ELECTRIC CORPORATION**Semiconductor Division**

See: POWEREX, INC.

XILINX, INC.

2069 Hamilton Avenue
San Jose, CA 95125
Telephone: (408) 559-7778
FAX: (408) 559-7114

Bernard V. Vonderschmitt, *President*
Wes Patterson, *Executive Vice President*
Ross H. Freeman, *Vice President, Engineering*
Scott Brown, *Vice President, Sales*
James V. Barnett, *Vice President, Administration*
Frank Myers, *Vice President, Manufacturing*
David E. Galli, *Director, Corporate Communications*

Annual Sales: \$10-15 Million

Products: CMOS ASICs

ZILOG, INC.

210 Hacienda Avenue
Campbell, CA 95008
Telephone: (408) 370-8000
FAX: (408) 370-8027

Edgar A. Sack, *President & Chief Executive Officer*
William R. Walker, *Senior Vice President, Finance & Administration*

Michael J. Bradshaw, *Vice President, Operations*
Wayne A. Ricciardi, *Vice President, Marketing & Sales*
Richard L. Moore, *Vice President, Engineering*
Dottie M. Wanat, *Director, Corporate Communications*

Annual Sales: \$65-80 Million

Products: N+PMOS Logic, N+PMOS Memory, CMOS Logic, CMOS Memory, CMOS ASICs

A Subsidiary of:

EXXON CORPORATION

1251 Avenue of the Americas
New York, NY 10020-1198
Telephone: (212) 333-1128

AMDAHL CORPORATION

1250 East Arques Avenue
Sunnyvale, CA 94088-3470
Telephone: (408) 746-6000
FAX: (408) 773-0833

John C. Lewis, *President &
Chief Executive Officer*

ASEA HAFO INC.

11501 Rancho Bernardo Road
P.O. Box 27255
San Diego, CA 92127
Telephone: (619) 485-8200
FAX: (619) 484-2973

Lars G. Bodin, *President*

A Subsidiary of:

ASEA INC.

4 New King Street
White Plains, NY 10604
Telephone: (914) 428-6000

**CINCINNATI MILACRON
SEMICONDUCTOR MATERIALS, INC.**

537 Grandin Road
Maineville, OH 45039
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The American Road
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Telephone: (313) 322-3000

Frequency Sources, Inc.**Semiconductor Division**

16 Maple Road
Chelmsford, MA 01824
Telephone: (617) 256-8101

D. Weinhold, *Product Line Manager*

Products: Diodes, Other Discrete

A Division of:

Loral Corporation

600 Third Avenue
New York, NY 10016
Telephone: (212) 697-1105

Fujitsu Microelectronics, Inc.

3320 Scott Boulevard
Santa Clara, CA 95054-3197
Telephone: (408) 562-1000
FAX: (408) 748-7655

Yutaka Sugiyama,
*Executive Vice President,
Chief Operating Officer*

Products: Digital Bipolar, N+PMOS Logic, N+PMOS Memory, CMOS Logic, CMOS Memory, Bipolar ASICs, CMOS ASICs

A Subsidiary of:

Fujitsu Limited

Marunouchi Center Building
Marunouchi 1-6-1, Chiyoda-ku
Tokyo 100, Japan
Telephone: (03) 216-3211

Gain Electronics Corp.

22 Chubb Way
Somerville, NJ 08876
Telephone: (201) 526-7111
FAX: (201) 526-7321

Raymond Dingle, *President & Chief Executive Officer*

Products: Gallium Arsenide ICs

Gazelle Microcircuits, Inc.

2300 Owen Street
Santa Clara, CA 95054
Telephone: (408) 982-0900
FAX: (408) 982-0222

Jerry R. Crowley, *Chairman,
President & CEO*

Products: Gallium Arsenide ICs

General Electric Company**Solid State Division**

(formerly General Electric Company—Semiconductor Business Division and RCA Solid State Division)

Route 202
Somerville, NJ 08876
Telephone: (201) 685-6000
FAX: (201) 685-7246

C. R. Turner, *Vice President & General Manager*

Products: Analog, CMOS Logic, CMOS Memory, CMOS ASICs, Small Signal & Switching Transistors, Power Transistors, Rectifiers, Thyristors, Optoelectronics, Other Discrete

A Division of:

General Electric Company

3135 Easton Turnpike
Fairfield, CT 06431
Telephone: (203) 373-2211

See also:

General Electric Company

(in In-House Producers Directory)

also:

Powerex, Inc.

A Joint-Venture of General Electric Company

General Diode Corporation

90 Eames Street
Framingham, MA 01701
Telephone: (617) 879-0880

Philip Tang, *President*

Products: Diodes, Small Signal & Switching Transistors, Power Transistors, Rectifiers, Thyristors, Optoelectronics, Other Discrete

A Subsidiary of:

Tang Industries, Inc.

90 Eames Street
Framingham, MA 01701

General Instrument Corporation Microelectronics

2355 West Chandler Blvd.
Chandler, AZ 85226-6199
Telephone: (602) 963-7373
FAX: (602) 899-9210

Donald R. Sorchych, *President & Chief Executive Officer*

Products: N+PMOS Logic, N+PMOS Memory, CMOS Logic, CMOS Memory

Optoelectronics Division

3400 Hillview Avenue
Palo Alto, CA 94034
Telephone: (415) 493-0400
FAX: (415) 493-7055

Walter P. Stewart, *Vice President & General Manager*

Products: Optoelectronics

Power Semiconductor Division
(formerly Discrete Semiconductor Division)

600 West John Street
Hicksville, NY 11802
Telephone: (516) 933-3000
FAX: (516) 933-3236

Chris Stuphin,
*Senior Vice President,
Components Group*

Products: Diodes, Rectifiers

Divisions of:

General Instrument Corporation
767 5th Avenue
45th Floor
New York, NY 10153
Telephone: (212) 207-6200

General Optronics Corp

2 Olsen Avenue
Edison, NJ 08820
Telephone: (201) 549-9000

I. B. Kahn, *Chairman*

Products: Optoelectronics,
Other Discrete

General Semiconductor Industries, Inc.

2001 West 10th Place
Tempe, AZ 85281
Telephone: (602) 968-3101
FAX: (602) 966-6396

Brian Bachman, *President &
Chairman of the Board*

Products: Diodes, Power
Transistors

A Subsidiary of:

Square D Company
Executive Plaza
Palatine, IL 60067
Telephone: (312) 397-2600

General Transistor Corp.

216 West Florence Avenue
Inglewood, CA 90301
Telephone: (213) 673-8422
FAX: (213) 672-2905

Albert Barrios, *President*

Products: Diodes, Small Signal
& Switching Transistors,
Power Transistors, Rectifiers,
Thyristors, Other Discrete

Germanium Power Devices Corporation

P.O. Box 3065 SVS
Andover, MA 01810
Telephone: (617) 475-5982

Oliver O. Ward, *President*

Products: Diodes, Small Signal
& Switching Transistors,
Power Transistors, Rectifiers,
Thyristors, Optoelectronics

Gigabit Logic, Inc.

1908 Oak Terrace Lane
Newbury Park, CA 91320
Telephone: (805) 499-0610
FAX: (805) 499-2751

John D. Heightley, *President &
Chief Executive Officer*

Products: Gallium Arsenide ICs

Gould Inc.

Semiconductor Division

(formerly Gould AMI Semiconductors)
3800 Homestead Road
Santa Clara, CA 95051
Telephone: (408) 246-0330
FAX: (408) 554-2112

Conrad Wredberg, *President &
Chief Executive Officer*

Products: Analog, N+PMOS
Memory, CMOS Logic, CMOS
Memory, Analog ASICs,
CMOS ASICs

Microwave Products Division

(formerly Dexcel Division)
2580 Junction Avenue
San Jose, CA 95134
Telephone: (408) 943-9055

Products: Small Signal & Switching
Transistors

Divisions of:

Gould Inc.
Ten Gould Center
Rolling Meadows, IL 60008
Telephone: (312) 640-4000

Harris Semiconductor

P.O. Box 883
Melbourne, FL 32901
Telephone: (305) 724-7000
TWX: 510-959-6259

J. E. Cornell, *Senior Vice President
& Sector Executive*

Products: Analog, CMOS Logic,
CMOS Memory, Gallium
Arsenide ICs, Analog ASICs,
CMOS ASICs

A Division of:

Harris Corporation
1025 West Nasa Boulevard
Melbourne, FL 32901
Telephone: (305) 727-9100

HEI Inc.

1495 Steiger Lake Lane
P.O. Box 5000
Victoria, MN 55386
Telephone: (612) 443-2500
FAX: (612) 443-2668

Robert J. Pitel, *President &
Chief Executive Officer*

Products: Optoelectronics

**Hewlett-Packard Company
Optoelectronics Division**

370 West Trimble Road
San Jose, CA 95131
Telephone: (408) 435-7400

Michael Cowley, *General Manager*

Products: Optoelectronics

A Division of:

Hewlett-Packard Company
3000 Hanover Street
Palo Alto, CA 94304
Telephone: (415) 857-1501

See also:

Hewlett-Packard Company
(in In-House Producers Directory)

Hittite Microwave Corporation

21 Cabot Road
Woburn, MA 01801
Telephone: (617) 933-7267

Y. Ayasli, *President*

Products: Gallium Arsenide ICs,
Power Transistors

Honeywell, Inc.

Optoelectronics Division

830 East Arapaho Road
Richardson, TX 75081
Telephone: (214) 470-4200
FAX: (214) 470-4417

Duane Adams, *Vice President &
General Manager*

Products: Optoelectronics

A Division of:

Honeywell, Inc.
Honeywell Plaza
Minneapolis, MN 55408
Telephone: (612) 870-5200

See also:

Honeywell, Inc.
(in In-House Producers Directory)

Hughes Aircraft Company

Hughes Microelectronics Center
(formerly Solid State Products Division)

500 Superior Avenue
P.O. Box H
Newport Beach, CA 92663
Telephone: (714) 759-2411

Karl Reissmuller, *Center Manager*

Products: CMOS Logic, CMOS
Memory, CMOS ASICs

Parent Company:

Hughes Aircraft Company
7200 Hughes Terrace
Los Angeles, CA 90045-0066
Telephone: (213) 568-7200

Hutson Industries Inc.

1000 Hutson Circle
Frisco, TX 75034
Telephone: (214) 377-2402

J. L. Hutson, *President*

Products: Analog, Diodes,
Small Signal & Switching
Transistors, Power
Transistors, Rectifiers,
Thyristors, Optoelectronics

Hybrid Systems Corporation

22 Linnell Circle
Billerica, MA 01821
Telephone: (617) 667-8700
James Donegan, *Chief Executive Officer & President*

Products: Analog

Hypres, Inc.

500 Executive Boulevard
Elmsford, NY 10523
Telephone: (914) 592-1190
Sadeg Faris, *President*
Products: Josephson ICs

Hyundai Electronics America

4401 Great America Parkway
Santa Clara, CA 95054
Telephone: (408) 986-9800
FAX: (408) 988-0665
Chong Sup Park, *Chief Operating Officer*
Products: N+PMOS Memory, CMOS Memory
A Subsidiary of:
Hyundai Electronics Industries Co., Ltd.
San 136-1, Ami-Ri,
Bubal-Myun
Ichon-Kun, Kyungki-Do
South Korea
Telephone: (822) 741-0661

ICI Array Technology

(formerly Array Technology)
1297 Parkmoor Avenue
San Jose, CA 95126
Telephone: (408) 297-3333
FAX: (408) 297-3763
William Robson, *President & Chief Executive officer*

Products: CMOS Logic, Analog ASICs, CMOS ASICs

A Subsidiary of:

ICI Americas
Wilmington, DE 19897
Telephone: (302) 575-3057

IC Sensors, Inc.

1701 McCarthy Boulevard
Milpitas, CA 95035
Telephone: (408) 432-1800
FAX: (408) 434-6687

Donald G. Lynam, *Chief Executive Officer*

Products: Other Discrete

Inmos Corporation

1110 Bayfield Drive
P.O. Box 16000
Colorado Springs, CO 80935
Telephone: (303) 630-4000
FAX: (303) 630-4325

Douglas Stevenson, *Chief Executive Officer*

Products: N+PMOS Memory, CMOS Logic, CMOS Memory, CMOS ASICs

A Subsidiary of:

Thorn EMI
Upper St. Martins Lane
London WC2H 9ED
United Kingdom
Telephone: (01) 836-2444

Inova

(formerly Inova Microelectronics Corporation)
2220 Martin Avenue
Santa Clara, CA 95050
Telephone: (408) 980-0730
FAX: (408) 980-1805
Pete Thomas, *Chief Executive Officer*

Products: CMOS Memory

Integrated Device Technology, Inc.

3236 Scott Boulevard
P.O. Box 58015
Santa Clara, CA 95054
Telephone: (408) 727-6116
FAX: (408) 988-3029
D. John Carey, *Chief Executive Officer & Chairman of the Board*

Products: Analog, CMOS Logic, CMOS Memory, CMOS ASICs

Integrated Logic Systems, Inc.

4445 Northpark Drive
Suite 102
Colorado Springs, CO 80907
Telephone: (303) 590-1588
David Taylor, *Chairman of the Board & President*

Products: CMOS ASICs

Integrated Power Semiconductors, Ltd.

2727 Walsh Avenue
Suite 201
Santa Clara, CA 95051
Telephone: (408) 727-2772
Dave Wood, *Managing Director*
Products: Analog, Analog ASICs

Intel Corporation

3065 Bowers Avenue
Santa Clara, CA 95051
Telephone: (408) 987-8080
Gordon E. Moore, *Chairman*

Products: N+PMOS Logic, N+PMOS Memory, CMOS Logic, CMOS Memory, CMOS ASICs

Intercept Microelectronics

1250 Oakmead Parkway
Suite 210
Sunnyvale, CA 94088
Telephone: (408) 434-7070
Val Rodriguez, *President*

Products: CMOS ASICs

Interdesign, Inc.

See: Ferranti Interdesign, Inc.

International CMOS Technology, Inc. (ICT)

2031 Concourse Drive
San Jose, CA 95131
Telephone: (408) 434-0678
FAX: (408) 434-0688

Drew Allen Osterman,
Chairman & President

Products: CMOS Memory, CMOS ASICs

International Devices

Division of Pacesetter Electronics
See: Pacesetter Electronics, Inc.

International Microcircuits, Inc.

3350 Scott Boulevard
Building 36
Santa Clara, CA 95054
Telephone: (408) 727-2280
FAX: (408) 727-6160

Frank Deverse, *President*

Products: CMOS ASICs

International Microelectronic Products (IMP)

2830 North First Street
San Jose, CA 95134
Telephone: (408) 432-9100
FAX: (408) 434-0335

George Gray, *Chairman*

Products: Analog ASICs, NMOS ASICs, CMOS ASICs

International Rectifier Corporation

247 Kansas Street
El Segundo, CA 90245
Telephone: (213) 322-3331
FAX: (213) 772-9028

Eric Lidow, *President & Chairman of the Board*

Products: Analog, Power Transistors, Rectifiers, Thyristors, Optoelectronics

ITT Semiconductors

470 Broadway
P.O. Box 749
Lawrence, MA 01841
Telephone: (617) 688-1881
FAX: (617) 682-2092

Ljubomir Micic, *Managing Director*

Products: Analog, N+PMOS Logic, CMOS Logic, Diodes, Small Signal & Switching Transistors, Rectifiers

A Division of:

ITT Corporation
320 Park Avenue
New York, NY 10022
Telephone: (212) 752-6000

IXYS Corporation

2355 Zanker Road
San Jose, CA 95131
Telephone: (408) 435-1900
FAX: (408) 435-1033

Alan L. Hofstein, *President*

Products: Analog, CMOS Logic, Power Transistors, Rectifiers

Krysalis Corporation

4200 Osuna, N.E.
Suite 102, P.O. Box 106
Albuquerque, NM 87109
Telephone: (505) 345-1953

Franc R. J. deWeeger, *President*

Products: CMOS Memory

**Lambda Semiconductors/
Power Monolithics**

(formerly Lambda Semiconductors
and Power Monolithics, Inc.)

121 International Drive
Corpus Christi, TX 78410
Telephone: (512) 289-0403

Allen E. Busching, *President &
Chief Executive Officer*

Products: Analog, Power
Transistors, Rectifiers

A Division of:

Veeco Instruments Inc.

515 Broad Hollow Road
Melville, NY 11747
Telephone: (516) 694-4200

Lansdale Semiconductor, Inc.

3600 West Osborn Road
Phoenix, AZ 85253
Telephone: (602) 269-6262
FAX: (602) 269-6266

R. Dale Lillard, *President*

Products: Digital Bipolar, Analog

Laser Diode, Inc.

(formerly M/A-COM
Laser Diode, Inc.)

1130 Somerset Street
New Brunswick, NJ 08901
Telephone: (201) 249-7000
FAX: (201) 249-9165

Robert Gill, *President*

Products: Optoelectronics

Laserpath Corporation

160 Sobrante Way
Sunnyvale, CA 94086
Telephone: (408) 773-8484
FAX: (408) 736-2697

Jim Hively, *President*

Products: CMOS ASICs

Lattice Semiconductor Corporation

15400 N.W. Greenbrier Pkwy.
Beaverton, OR 97006
Telephone: (503) 629-2131
FAX: (503) 645-7921

C. Norman Winningstad,
*Chairman &
Chief Executive Officer*

Products: N+PMOS Memory,
CMOS ASICs

Linear Technology Corporation

1630 McCarthy Boulevard
Milpitas, CA 95035-7487
Telephone: (408) 432-1900
FAX: (408) 434-0507

Robert H. Swanson, *President &
Chief Executive Officer*

Products: Analog

Logic Devices Inc.

628-E Evelyn Avenue
Sunnyvale, CA 94086
Telephone: (408) 720-8630
FAX: (408) 733-7690

James M. McAllister, *President*

Products: CMOS Logic,
CMOS ASICs

LSI Computer Systems Inc.

1235 Walt Whitman Road
Melville, NY 11747
Telephone: (516) 271-0400
FAX: (516) 271-0405

Attila Tetik, *President*

Products: N+PMOS Logic,
CMOS Logic, NMOS ASICs,
CMOS ASICs

LSI Logic Corporation

1551 McCarthy Boulevard
Milpitas, CA 95035
Telephone: (408) 433-8000
FAX: (408) 434-6422

Wilfred J. Corrigan, *Chairman &
Chief Executive Officer*

Products: CMOS ASICs

Lytel Incorporated

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

Eugene I. Gordon, *President &
Chairman*

Products: Optoelectronics

M/A-COM, Inc.
**M/A-COM Advanced Semiconductor
Operations**

(formerly M/A-COM Gallium
Arsenide Products, Inc.)

100 Chelmsford Street
Lowell, MA 01851
Telephone: (617) 937-2800
FAX: (617) 441-0003

T. B. Ramachandran, *President*

Products: Analog, Gallium
Arsenide ICs, Analog ASICs,
Small Signal & Switching
Transistors, Power Transistors

M/A-COM PHI, Inc.

1742 Crenshaw Boulevard
Torrance, CA 90501
Telephone: (213) 320-6160

Vahan Garboushian, *President*

Products: Analog, Small Signal
& Switching Transistors,
Power Transistors

**M/A-COM Semiconductor
Products, Inc.**

South Avenue
Building 12
Burlington, MA 01803
Telephone: (617) 272-3000
FAX: (617) 272-0925

Dennis Revelotis, *President*

Products: Other Discrete

Divisions of:

M/A-COM, Inc.

7 New England
Executive Park
Burlington, MA 01803
Telephone: (617) 272-9600

Maxim Integrated Products, Inc.

510 North Pastoria Avenue
Sunnyvale, CA 94086
Telephone: (408) 737-7600
FAX: (408) 737-7194

John F. Gifford, *President &
Chief Executive Officer*

Products: Analog, Analog ASICs

MCE Semiconductor, Inc.

111 Fairfield Drive
West Palm Beach, FL 33407
Telephone: (305) 845-2837
FAX: (305) 863-8275

Richard Stanmeyer, *President*

Products: Bipolar ASICs, Analog
ASICs, CMOS ASICs

Metelics Corp.

1031-F East Duane Avenue
Sunnyvale, CA 94086
Telephone: (408) 737-8181
FAX: (408) 733-7645

Rudy C. Dorilag, *President &
Chief Executive Officer*

Products: Other Discrete

Micrel Inc.

1235 Midas Way
Sunnyvale, CA 94086
Telephone: (408) 245-2500
FAX: (408) 245-4175

Ray Zinn, *President &
Chief Executive Officer*

Products: Digital Bipolar, Analog,
N+PMOS Logic, CMOS
Logic, NMOS ASICs, CMOS
ASICs, Power Transistors

Micro Linear Corporation

2092 Concourse Drive
San Jose, CA 95131
Telephone: (408) 433-5200
FAX: (408) 432-0295

Arthur B. Stabenow, *President &
Chief Executive Officer*

Products: Analog, Analog ASICs

Micron Technology, Inc.

2805 East Columbia Road
Boise, ID 83706
Telephone: (208) 383-4000
FAX: (208) 343-2536

Joseph L. Parkinson, *Chairman &
Chief Executive Officer*

Products: N+PMOS Memory,
CMOS Memory

Micropac Industries, Inc.

905 East Walnut Street
Garland, TX 75040
Telephone: (214) 272-3571
FAX: (214) 494-2281

Nicholas Nadolsky, *President*

Products: Optoelectronics

Micro Power Systems, Inc.

3151 Jay Street
P.O. Box 54965
Santa Clara, CA 95054-0965
Telephone: (408) 727-5350
FAX: (408) 748-9045

Michele Giammarino, *President & Chief Executive Officer*

Products: Analog, Analog ASICs

Micro-Rel

2343 West 10th Place
Tempe, AZ 85281
Telephone: (602) 968-6411
FAX: (602) 968-9691

Mike Selzer, *General Manager*

Products: Analog ASICs, CMOS ASICs

A Division of:

Medtronic, Inc.

7000 Central Avenue, N.E.
Minneapolis, MN 55432
Telephone: (612) 574-3016

See also:

Micro-Rel

(in In-House Producers Directory)

Microsemi Corp.

2830 South Fairview Street
P.O. Box 26890
Santa Ana, CA 92799-6890
Telephone: (714) 979-8220
FAX: (714) 557-5989

Philip Frey, Jr., *President & Chief Executive Officer*

Products: Diodes, Small Signal & Switching Transistors, Power Transistors, Rectifiers, Other Discrete

See also:

Power Technology Components

A Subsidiary of Microsemi Corp.

Microwave Diode Corp.

10 Washington Street
U.S. Route 3
P.O. Box 250
West Stewartstown, NH 03597
Telephone: (603) 346-3363

Daniel E. Shea, *President & Treasurer*

Products: Diodes, Other Discrete

Microwave Modules and Devices, Inc.

554 Ellis Street
Mountain View, CA 94043
Telephone: (415) 961-1473

Joseph Johnson, *President*

Products: Analog

Microwave Monolithic Incorporated

465 East Easy Street
Simi Valley, CA 93065
Telephone: (805) 584-6642

Daniel R. Chen, *President*

Products: Gallium Arsenide ICs, Analog ASICs

Microwave Semiconductor Corporation

100 School House Road
Somerset, NJ 08873-1276
Telephone: (201) 563-6300
FAX: (201) 469-3318

Saul R. Lederhandler, *President & Chief Executive Officer*

Products: Gallium Arsenide ICs, Power Transistors

A Subsidiary of:

Siemens Components, Inc.

186 Wood Avenue South
Iselin, NJ 08830
Telephone: (201) 321-3400

See also:

Siemens Components, Inc.**Microwave Technology, Inc.**

4268 Solar Way
Fremont, CA 94538
Telephone: (415) 651-6700
FAX: (415) 651-2208

Thomas R. Baruch, *President & Chief Executive Officer*

Products: Analog, Gallium Arsenide ICs, Small Signal & Switching Transistors, Power Transistors

Mitsubishi Semiconductor America, Inc.

Three Diamond Lane
Durham, NC 27704
Telephone: (919) 479-3333
FAX: (919) 479-1082

Kazuo Watanabe, *President & Chief Executive Officer*

Products: N+PMOS Memory, CMOS ASICs

Parent Company:

Mitsubishi Electric Corporation

Mitsubishi Denki Building
2-3 Marunouchi, 2-Chome,
Chiyoda-ku
Tokyo 100, Japan
Telephone: (03) 218-2111

See also:

Powerex, Inc.

A Joint-Venture of Mitsubishi Electronics America, Inc.

Modular Semiconductor Inc.

2334-G Walsh Avenue
Santa Clara, CA 95051
Telephone: (408) 748-1501

Singh Yalamanchili, *President*

Products: CMOS Logic, CMOS Memory

Molecular Electronics Corp.

4030 Spencer Street, #108
Torrance, CA 90503
Telephone: (213) 214-1485
FAX: (213) 542-1270

George N. Reynolds, *Chairman & Chief Executive Officer*

Products: MFT ICs

Monolithic Memories, Inc.

See: Advanced Micro Devices, Inc.

MOSel

914 West Maude
Sunnyvale, CA 94086
Telephone: (408) 733-4556

Peter Chen, *President*

Products: CMOS Memory

Mostek Corporation

See: Thomson Components-Mostek Corporation

Motorola Inc.**Semiconductor Products Sector**

5005 East McDowell Road
P.O. Box 2953
Phoenix, AZ 85008
Telephone: (602) 244-4367
FAX: (602) 244-4385

James A. Norling,

*Executive Vice President & General Manager,
Semiconductor Products
Sector*

Products: Digital Bipolar, Analog, N+PMOS Logic, N+PMOS Memory, CMOS Logic, CMOS Memory, Bipolar ASICs, NMOS ASICs, CMOS ASICs, Diodes, Small Signal & Switching Transistors, Power Transistors, Rectifiers, Thyristors, Optoelectronics, Other Discrete

A Sector of:

Motorola Inc.

1303 East Algonquin Road
Schaumburg, IL 60196
Telephone: (312) 397-5000

See also:

Motorola Computer Systems

A Subsidiary of Motorola, Inc.
(in In-House Producers Directory)

MSI Electronics

34-32 57th Street
Woodside, NY 11377
Telephone: (718) 672-6500
Telex: 426407

A. Lederman, *President*

Products: Diodes, Other Discrete

National Electronics

See: Richardson Electronics, Ltd

National Semiconductor Corporation

2900 Semiconductor Drive
P.O. Box 58090
Santa Clara, CA 95052-8090
Telephone: (408) 721-5000
FAX: (408) 245-9655

Charles E. Sporck, *President & Chief Executive Officer*

Products: Digital Bipolar, Analog, N+PMOS Logic, N+PMOS Memory, CMOS Logic, CMOS Memory, Bipolar ASICs, Analog ASICs, NMOS ASICs, CMOS ASICs, Diodes, Small Signal & Switching Transistors, Power Transistors, Rectifiers

NCR Microelectronics Division

1700 South Patterson Blvd.
Dayton, OH 45479
Telephone: (513) 445-2480
FAX: (513) 445-1035

Dr. J. H. Van Tassel, *Vice President*

Products: N+PMOS Logic,
N+PMOS Memory, CMOS
Logic, CMOS Memory,
Analog ASICs, NMOS ASICs,
CMOS ASICs

A Division of:

NCR Corporation

1700 South Patterson Blvd.
Dayton, OH 45479
Telephone: (513) 445-5000

NEC Electronics, Inc.

401 Ellis Street
P.O. Box 7241
Mountain View, CA 94039
Telephone: (415) 960-6000

Hideo Nakao, *President &
Chief Executive Officer*

Products: N+PMOS Memory,
CMOS Logic, CMOS Memory

A Subsidiary of:

NEC Corporation

33-1, Shiba 5-Chome,
Minato-ku
Tokyo 108, Japan

NMB Semiconductor

11621 Monarch
Garden Grove, CA 92641
Telephone: (714) 898-9511
FAX: (714) 891-0895

H. Robert Ishikawa, *President*

Products: CMOS Memory

A Subsidiary of:

Minebea/NMB USA

9730 Independence Avenue
Chatsworth, CA 91311
Telephone: (818) 341-0820

Novix

19925 Stevens Creek Blvd.
Suite 280
Cupertino, CA 95014
Telephone: (408) 255-2750

John Peers, *President &
Chief Executive Officer*

Products: CMOS Logic

Optek Technology Inc.

345 Industrial Boulevard
McKinney, TX 75069
Telephone: (214) 542-9461
FAX: (214) 542-1739

Jim Crownover, *President*

Products: Small Signal & Switching
Transistors, Optoelectronics

Optoelectronics Inc.

1309 Dynamic Street
Petaluma, CA 94952
Telephone: (707) 763-4181

Paul R. Bradshaw, *President*

Products: Optoelectronics

Orbit Semiconductor, Inc.

(formerly Comdial Semiconductor
Services)

1230 Bordeaux Drive
Sunnyvale, CA 94089
Telephone: (408) 744-1800
FAX: (408) 747-1263

Gary P. Kennedy, *President*

Products: CMOS Memory, NMOS
ASICs, CMOS ASICs

A Subsidiary of:

Orbit Instrument Corporation

80 Cabot Court
Hauppauge, NY 11788
Telephone: (516) 435-8300

Pacesetter Electronics, Inc.

(formerly International Devices—
Division of Pacesetter
Electronics)

5417 East La Palma Avenue
Anaheim, CA 92807
Telephone: (714) 777-4711
FAX: (714) 777-0410

Michael A. Povey, *President*

Products: Small Signal & Switching
Transistors, Power Transistors,
Rectifiers, Optoelectronics

A Subsidiary of:

Electron House PLC

Cray Avenue, St. Mary Cray
Orpington, Kent BR5 3PN
England
Telephone: (689) 27099

Pacific Monolithics

245 Santa Ana Court
Sunnyvale, CA 94086
Telephone: (408) 732-8000
FAX: (408) 732-3413

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Products: Analog, Gallium
Arsenide ICs, Analog ASICs

Panatech Semiconductor

3375 Scott Boulevard
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Santa Clara, CA 95054
Telephone: (408) 727-7700
FAX: (408) 727-8144

William Bradford, Jr., *President*

Products: N+PMOS Memory,
CMOS Logic, CMOS Memory,
CMOS ASICs

A Division of:

Panatech Research & Development

655 Deep Valley Road
Rolling Hills Estates,
CA 90274
Telephone: (213) 541-0221

**Performance Semiconductor
Corporation**

610 East Weddell Drive
Sunnyvale, CA 94089
Telephone: (408) 734-8200

Dr. Thomas A. Longo, *President &
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Products: CMOS Logic, CMOS
Memory

Plessey Solid State

9 Parker
Irvine, CA 92718
Telephone: (714) 472-0303

Robert Anslow, *President*

Products: Digital Bipolar, Analog,
N+PMOS Logic, N+PMOS
Memory, CMOS Logic,
CMOS Memory, Small Signal
& Switching Transistors,
Optoelectronics

A Division of:

Plessey Trading Company

277 Park Avenue
New York, NY 10172
Telephone: (212) 752-4441

Polycore Electronics, Inc.

11077 Tourmaline Drive
Newbury Park, CA 91320
Telephone: (805) 499-6777
FAX: (805) 499-6017

S. K. Leong, *Vice President*

Products: Digital Bipolar, Analog,
N+PMOS Logic, CMOS
Logic, Bipolar ASICs,
Analog ASICs, Small Signal
& Switching Transistors,
Power Transistors

Powerex, Inc.

(formerly Westinghouse Electric
Corporation-Semiconductor
Division)

Hillis Street
Youngwood, PA 15697
Telephone: (412) 925-7272
FAX: (412) 925-4393

Ronald C. Whigham, *President &
Chief Executive Officer*

Products: Power Transistors,
Rectifiers, Thyristors

A Joint-Venture of:

General Electric Company

Mitsubishi Electronics America, Inc.
Westinghouse Electric Corporation

See also:

**General Electric Company—Solid
State Division**

*A Division of General Electric
Company*

also:

General Electric Company

(in In-House Producers Directory)

also:

**Mitsubishi Semiconductor
America, Inc.**

*A Subsidiary of Mitsubishi Electric
Corporation*

also:

Westinghouse Electric Corporation
(in In-House Producers Directory)

Power Monolithics, Inc.
See: Lambda Semiconductors/
Power Monolithics

Power Semiconductors, Inc.
 6352 Corte del Abeto
 Suite F
 Carlsbad, CA 92008
 Telephone: (800) 654-8721

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Products: Rectifiers, Thyristors

PowerTech, Inc.
 0-02 Fair Lawn Avenue
 Fair Lawn, NJ 07410
 Telephone: (201) 791-5050

Alex M. Polner, *President*

Products: Power Transistors,
 Other Discrete

A Subsidiary of:
Hawker Siddeley
 18 St. James's Square
 London, England

Power Technology Components
 (formerly Allen-Bradley Company—
 Electronics Division)
 23201 South Normandie Ave.
 Torrance, CA 90501
 Telephone: (213) 534-3737

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Products: Power Transistors,
 Rectifiers, Other Discrete

A Subsidiary of:
Microsemi Corp.
 2830 South Fairview Street
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 Santa Ana, CA 92799-6890
 Telephone: (714) 979-8220

See also:
Microsemi Corp.

PPC Products Corporation
 7516 Central Industrial Drive
 Riviera Beach, FL 33404
 Telephone: (305) 848-9606

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Products: Power Transistors,
 Rectifiers

Precision Monolithics, Inc.
 1500 Space Park Drive
 P.O. Box 58020
 Santa Clara, CA 95052-8020
 Telephone: (408) 727-9222
 FAX: (408) 496-6725

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Products: Analog

A Subsidiary of:
Bourns, Inc.
 1200 Columbia Avenue
 Riverside, CA 92507
 Telephone: (714) 781-5618

Raytheon Company
Semiconductor Division
 350 Ellis Street
 P.O. Box 7016
 Mountain View,
 CA 94039-7016
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 FAX: (415) 969-6930

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& General Manager

Products: Digital Bipolar, Analog,
 CMOS Logic, CMOS Memory,
 Bipolar ASICs, Analog ASICs,
 CMOS ASICs, Small Signal &
 Switching Transistors

Special Microwave Devices
Operation
 55 Bearfoot Road
 Northboro, MA 01532
 Telephone: (617) 393-7300

Dr. James G. Oakes,
Product Line Manager

Products: Gallium Arsenide ICs,
 Small Signal & Switching
 Transistors, Other Discrete

Parent Company:
Raytheon Company
 141 Spring Street
 Lexington, MA 02173
 Telephone: (617) 862-6600

RCA Solid State Division
See: General Electric Company-Solid
State Division

REFAC Electronics Corporation
 West Hill Road
 Winsted, CT 06098
 Telephone: (203) 379-2731
 FAX: (203) 379-8861

Louis R. Muller, *President*

Products: Optoelectronics

A Subsidiary of:
Electronic Research Associates, Inc.
 West Hill Road
 Winsted, CT 06098
 Telephone: (203) 379-2731

Richardson Electronics, Ltd.
 (formerly National Electronics)
 40W267 Keslinger Road
 La Fox, IL 60147
 Telephone: (312) 232-4300

Edward J. Richardson, *Chief*
Executive Officer &
Chairman of the Board

Products: Thyristors

Rockwell International
Semiconductor Products Businesses
 Dr. Gilbert F. Amelio, *President*
Semiconductor Products Division
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 P.O. Box C
 Newport Beach,
 CA 92658-8902
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 FAX: (714) 833-4078

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Products: N+PMOS Logic,
 CMOS Logic, CMOS ASICs

Microelectronics Research and
Development Center
 3370 Miraloma Avenue
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 P.O. Box 3105
 Anaheim, CA 92803-3105
 Telephone: (714) 762-8111
 FAX: (714) 762-4127

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General Manager

Products: CMOS Logic, CMOS
 Memory, Gallium Arsenide
 ICs, NMOS ASICs,
 CMOS ASICs

Divisions of:
Rockwell International Corporation
 600 Grant Street
 Pittsburgh, PA 15219
 Telephone: (412) 565-2000

Samsung Semiconductor, Inc.
 (formerly Tristar Semiconductor,
 Inc.)

5150 Great America Parkway
 Santa Clara, CA 95014
 Telephone: (408) 980-1630
 FAX: (408) 988-2376

S. Joon Lee, *President*

Products: Analog, N+PMOS
 Memory, CMOS Logic, CMOS
 Memory, Analog ASICs,
 CMOS ASICs, Small Signal &
 Switching Transistors, Power
 Transistors, Other Discrete

A Subsidiary of:
Samsung Semiconductor &
Telecommunications Co., Ltd.
 150, 2-Ka, Taepyung-ro
 Chung-Ku, Seoul
 Korea

Saratoga Semiconductor Corp.
 10500 Ridgeview Court
 Cupertino, CA 95014
 Telephone: (408) 864-0500
 FAX: (408) 446-4416

Edward H. Browder, *President &*
Chief Executive Officer

Products: Digital Bipolar, CMOS
 Logic, CMOS Memory

Schauer Manufacturing Corp.
 4500 Alpine Avenue
 Cincinnati, OH 45242
 Telephone: (513) 791-3030

Dan Shaw, *Manager,*
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Products: Diodes

SEEQ Technology, Inc.
 1849 Fortune Drive
 San Jose, CA 95131
 Telephone: (408) 432-7400

Daniel McCranie, *President*

Products: N+PMOS Logic,
 N+PMOS Memory, CMOS
 Logic, CMOS Memory

Semi Processes Inc. (SPI)
See: Topaz Semiconductor Inc.

Semicoa

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FAX: (714) 557-4541

Mark Kalatsky, *President*

Products: Small Signal & Switching Transistors, Power Transistors, Optoelectronics

Semicon Components Inc.

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Telephone: (617) 272-9015

Robert House, *President*

Products: Diodes, Rectifiers

A Subsidiary of:

Semicon Inc.

10 North Avenue
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Telephone: (617) 229-6290

See also:

ST-Semicon, Inc.

A Subsidiary of Semicon Inc.

Semiconductor Technology, Inc.

3131 S.E. Jay Street
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Stuart, FL 33497
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FAX: (305) 286-8914

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Semikron Inc.

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FAX: (603) 883-8021

John R. Welsh, *President*

Products: Power Transistors, Rectifiers, Thyristors

A Subsidiary of:

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Telephone: (0911) 65591

Semitronics Corporation

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Products: Diodes, Small Signal & Switching Transistors, Power Transistors, Rectifiers, Thyristors, Other Discrete

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Sensitron Semiconductor

221 West Industry Court
Deer Park, NY 11729
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John Rogers, *President*

Products: Diodes, Rectifiers

Sensym, Inc.

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Sunnyvale, CA 94089
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FAX: (408) 734-0407

Dennis Dauenhauer, *President*

Products: Analog, Other Discrete

SGS Semiconductor Corporation

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FAX: (602) 867-6102

Daniel Queyssac, *President*

Products: Digital Bipolar, Analog, N+PMOS Logic, N+PMOS Memory, CMOS Logic, CMOS Memory, Bipolar ASICs, Analog ASICs, NMOS ASICs, CMOS ASICs, Small Signal & Switching Transistors, Power Transistors, Rectifiers

A Subsidiary of:

SGS Microelettronica, SpA

Via C. Olivetti, 20041
Agrate Brianza, Italy
Telephone: (039) 65551

Siemens Components, Inc. Semiconductor Group

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Telex: 98-9791

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Products: Digital Bipolar, Analog, N+PMOS Logic, N+PMOS Memory, CMOS Logic, CMOS Memory, Gallium Arsenide ICs, Bipolar ASICs, Analog ASICs, NMOS ASICs, CMOS ASICs, Optoelectronics, Power Transistors, Other Discrete

Special Products Division

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Telex: 84-4491

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Divisions of:

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Telex: WU 84-4491

Helmut Schwab, *President & Chief Executive Officer*

See also:

Microwave Semiconductor Corp.

(A Subsidiary of Siemens Components, Inc.)

Sierra Semiconductor Corporation

2075 North Capitol Avenue
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FAX: (408) 263-3337

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Products: Analog, CMOS Logic, CMOS Memory, Analog ASICs, CMOS ASICs

Si-Fab Corporation

27 Janis Way
Scotts Valley, CA 95066
Telephone: (408) 438-6800

Leon B. Pearce, *President*

Products: CMOS Logic

Signetics Corporation

811 East Arques Avenue
P.O. Box 3409
Sunnyvale, CA 94088
Telephone: (408) 991-2000
FAX: (408) 991-2300

Norman Neumann, *President & Chief Executive Officer*

Products: Digital Bipolar, Analog, N+PMOS Logic, CMOS Logic, CMOS Memory, Bipolar ASICs

A Subsidiary of:

U.S. Philips

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Tarrytown, NY 10591

Silicon General Inc. Semiconductor Division

11861 Western Avenue
Garden Grove, CA 92641
Telephone: (714) 898-8121

Q. T. Wiles, *Chairman*

Products: Analog

A Division of:

Silicon General Inc.

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San Jose, CA 95134
Telephone: (408) 943-9403

Silicon Systems

14351 Myford Road
Tustin, CA 92680
Telephone: (714) 731-7110
FAX: (714) 731-5457

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Products: Bipolar ASICs, Analog ASICs, CMOS ASICs

Silicon Transistor Corporation

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Telephone: (617) 256-3321

Richard Carrara, *President*

Products: Power Transistors

Siliconix, Inc.

2201 Laurelwood Road
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Telephone: (408) 988-8000
FAX: (408) 727-5414

Dr. Richard E. Lee,
*Chief Executive Officer
& President*

Products: Analog, Analog ASICs,
CMOS ASICs, Diodes,
Small Signal & Switching
Transistors, Power
Transistors

SIMTEK Corporation

Regency Executive Centre,
Suite 301
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Colorado Springs, CO 80902
Telephone: (303) 531-9444

Gary Derbenwick, *President*

Products: N+PMOS Memory

S-MOS Systems, Inc.

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Telephone: (408) 922-0200
FAX: (408) 922-0238

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Products: CMOS Logic, CMOS
Memory, CMOS ASICs

Solarex Corporation

1335 Piccard Drive
Rockville, MD 20850
Telephone: (301) 948-0202

John Corsi, *President*

Products: Other Discrete

A Subsidiary of:

Amoco

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Chicago, IL 60680-0703
Telephone: (312) 856-6111

Solid Power Corporation

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Farmingdale, NY 11735
Telephone: (516) 694-2883

James Marcos, *President*

Products: Power Transistors

Solid State Devices, Inc.

14830 Valley View Avenue
P.O. Box 577
La Mirada, CA 90638
Telephone: (213) 921-9660
FAX: (213) 921-2396

Arnold N. Applebaum, *President*

Products: Diodes, Small Signal
& Switching Transistors,
Power Transistors, Rectifiers,
Thyristors, Other Discrete

Solitron Devices, Inc.

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Riviera Beach, FL 33404
Telephone: (305) 848-4311
FAX: (305) 863-5946

Norbert Fuhrmann, *President &
Chief Operating Officer*

Products: Analog, Analog ASICs,
Diodes, Small Signal &
Switching Transistors,
Power Transistors, Rectifiers

Space Power Electronics Inc.

Jeffrey Lane, RD 1
Glen Gardner, NJ 08826
Telephone: (201) 537-2184

R. J. Alestra, *Chief Engineer &
President*

Products: Diodes, Small Signal
& Switching Transistors,
Power Transistors, Rectifiers,
Thyristors

Sprague Electric Company

92 Hayden Avenue
Lexington, MA 02173
Telephone: (617) 862-5500
FAX: (617) 862-5508

John L. Sprague, *President &
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Products: Analog, CMOS Logic,
Analog ASICs, Small Signal &
Switching Transistors

Standard Microsystems Corporation

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Hauppauge, NY 11788
Telephone: (516) 273-3100

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Chairman of the Board &
Chief Executive Officer*

Products: Analog, N+PMOS Logic,
N+PMOS Memory, CMOS
Logic, Bipolar ASICs,
Analog ASICs, NMOS ASICs,
CMOS ASICs

ST-Semicon, Inc.

415 North College Avenue
P.O. Box 609
Bloomington, IN 47401
Telephone: (812) 332-1435
FAX: (812) 331-8706

Lane L. Jorgensen, *President*

Products: Diodes, Rectifiers,
Thyristors

A Subsidiary of:

Semicon, Inc.

10 North Avenue
Burlington, MA 01803
Telephone: (617) 229-6290

See also:

Semicon Components Inc.

A Subsidiary of Semicon, Inc.

Supertex Inc.

1225 Bordeaux Drive
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Sunnyvale, CA 94088-3607
Telephone: (408) 744-0100
FAX: (408) 734-5247

Dr. Henry C. Pao, *President*

Products: Analog, CMOS Logic,
CMOS ASICs, Small Signal
& Switching Transistors,
Power Transistors

Tachonics Corporation

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FAX: (609) 275-2591

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Products: Gallium Arsenide ICs

A Subsidiary of:

Grumman Corporation

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Teccor Electronics, Inc.

1801 Hurd Drive
Irving, TX 75038
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FAX: (214) 550-1309

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General Manager*

Products: Rectifiers, Thyristors,
Other Discrete

A Subsidiary of:

Ranco Incorporated

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Telephone: (614) 764-3733

Teledyne, Inc.**Teledyne Crystallonics**

147 Sherman Street
Cambridge, MA 02140
Telephone: (617) 491-1670

Edward Powers, *President*

Products: Diodes, Small Signal
& Switching Transistors,
Power Transistors

Teledyne Monolithic Microwave

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FAX: (415) 968-6533

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Products: Digital Bipolar, Analog,
Analog ASICs

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Semiconductor Building
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Products: Digital Bipolar, Analog, N+PMOS Logic, N+PMOS Memory, CMOS Memory, Bipolar ASICs, Analog ASICs, NMOS ASICs, CMOS ASICs, Small Signal & Switching Transistors, Power Transistors, Rectifiers, Thyristors, Optoelectronics, Other Discrete

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Thomson Components—Mostek Corporation

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Telephone: (214) 466-6000

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Telephone: 33-147439640

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FAX: (602) 431-0790

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FAX: (408) 942-1174

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Products: Analog, CMOS Logic, Small Signal & Switching Transistors, Power Transistors

A Subsidiary of:

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Toshiba Semiconductor (USA), Inc.

1220 Midas Way
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Telephone: (408) 739-0560
FAX: (408) 746-0577

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Products: N+PMOS Memory, CMOS Logic, CMOS Memory, CMOS ASICs

A Subsidiary of:

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1-1, Shibaura, 1-Chome
Minato-Ku, Tokyo
Japan

Transistor Specialties, Inc.

3 Electronics Avenue
Danvers, MA 01923
Telephone: (617) 774-8722
FAX: (617) 774-8729

Charles Yiakas, *President*

Products: Digital Bipolar, Analog, Bipolar ASICs, Analog ASICs, Small Signal & Switching Transistors

Triad Semiconductors, Inc.

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Colorado Springs, CO 80936
Telephone: (303) 528-8574
FAX: (303) 528-8875

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Products: CMOS Memory

A Division of:

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Holland
Telephone: (31) 45-35-3675

Triquint Semiconductor, Inc.

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P.O. Box 4935
Beaverton, OR 97076
Telephone: (503) 629-3535
FAX: (503) 645-8067

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Products: Gallium Arsenide ICs

A Subsidiary of:

Tektronix, Inc.
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Beaverton, OR 97077
Telephone: (503) 627-7111

See also:

Tektronix, Inc.
(in In-House Producers Directory)

Tristar Semiconductor, Inc.

See: Samsung Semiconductor, Inc.

TRW, Inc.

TRW LSI Products

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P.O. Box 2472
San Diego, CA 92021
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FAX: (619) 455-6314

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Products: Digital Bipolar, Analog, CMOS Logic

TRW Microwave

825 Stewart Drive
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Telephone: (408) 732-0880

Dr. Peter Clark, *Vice President & General Manager*

Products: Other Discrete

TRW Optoelectronics Division

1215 West Crosby Road
P.O. Box 428
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Telephone: (214) 323-2200
FAX: (214) 323-2396

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Products: Diodes, Power Transistors, Rectifiers, Optoelectronics

TRW RF Devices

14520 Aviation Boulevard
Lawndale, CA 90260
Telephone: (213) 536-0888

Fred Sturm, *General Manager*

Products: Power Transistors

Divisions of:

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Cleveland, OH 44124
Telephone: (216) 291-7000

Unicorn Microelectronics Corporation

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San Jose, CA 95134
Telephone: (408) 433-3388

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Products: CMOS ASICs

United Microelectronics Corp.

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Products: CMOS Logic, CMOS Memory, CMOS ASICs

Parent Company:

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#3 Industrial East 3rd Road
Hsin-Chu, Taiwan

Unitrode Corporation

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Telephone: (617) 861-6540

George M. Berman,
Chairman of the Board

Products: Analog, Analog ASICs,
Diodes, Power Transistors,
Rectifiers, Thyristors,
Other Discrete

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1925 Zanker Road
San Jose, CA 95112
Telephone: (408) 436-1906

Vic Hejmadi, *President*

Products: Analog, CMOS Logic,
NMOS ASICs, CMOS ASICs

Varian Solid State Operations—Cal

(formerly Varian Solid State
Microwave Division)

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Telephone: (408) 988-1331
FAX: (408) 970-9950

Frank Olson, *Vice President,
Solid State Operations*

Products: Gallium Arsenide ICs,
Small Signal & Switching
Transistors, Other Discrete

A Division of:

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Telephone: (415) 493-4000

Varo Quality Semiconductor, Inc.

(formerly Varo Semiconductor,
Inc.)

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Discrete

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FAX: (408) 433-0331

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FAX: (408) 263-2511

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CMOS Logic, CMOS Memory,
CMOS ASICs

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CMOS Logic, Bipolar ASICs,
Analog ASICs, CMOS ASICs

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Fremont, CA 94538
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Sheldon Taylor, *President &
Chief Executive Officer*

Products: CMOS Logic, CMOS
Memory, CMOS ASICs

Weitek Corporation

1060 East Arques
Sunnyvale, CA 94086
Telephone: (408) 738-8400
FAX: (408) 738-1185

Arthur J. Colmeyer, *President*

Products: N+PMOS Logic,
CMOS Logic

Western Digital Corporation

2445 McCabe Way
Irvine, CA 92714
Telephone: (714) 863-0102

Roger W. Johnson, *Chairman of
the Board, President &
Chief Executive Officer*

Products: N+PMOS Logic, CMOS
Logic, CMOS ASICs

**Westinghouse Electric Corporation—
Semiconductor Division**

See: Powerex, Inc.

Xicor

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Raphael Klein, *Chairman &
President*

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Memory, CMOS Memory

Xilinx, Inc.

2069 Hamilton Avenue
San Jose, CA 95125
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FAX: (408) 559-7114

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President

Products: CMOS ASICs

XTAR Corporation

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Emmett J. Powers,
*Chief Executive Officer,
Chairman*

Products: CMOS ASICs

Zilog, Inc.

210 Hacienda Avenue
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Edgar A. Sack, *President &
Chief Executive Officer*

Products: N+PMOS Logic,
N+PMOS Memory, CMOS
Logic, CMOS Memory,
CMOS ASICs

A Subsidiary of:

Exxon Corporation

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New York, NY 10020-1198
Telephone: (212) 333-1128

Zoran Corporation

3450 Central Expressway
Santa Clara, CA 95051
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FAX: (408) 720-9875

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& Director*

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Amdahl, Inc.

1250 East Arques Avenue
Sunnyvale, CA 94088-3470
Telephone: (408) 746-6000

AT&T Technologies, Inc.

Electronic Components Division

One Oak Way
Berkeley Heights, NJ 07922
Telephone: (201) 771-2000

A Division of:

American Telephone & Telegraph Company

550 Madison Avenue
New York, NY 10022
Telephone: (212) 605-5500

Bendix Microelectronics Center

9140 Old Annapolis Road
Columbia, MD 21045
Telephone: (301) 964-4000

A Division of:

Allied-Signal Inc.

Columbia Road and
Park Avenue
Morristown, NJ 07960
Telephone: (201) 455-2000

The Boeing Company

Corporate Headquarters
P.O. Box 3707
Seattle, WA 98124
Telephone: (206) 655-2121

Burroughs Corporation

See: Unisys Corporation

Commodore Semiconductor Group

(formerly Commodore
Semiconductor Systems Division)

950 Rittenhouse Road
Norristown, PA 19403
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FAX: (215) 647-0791

Daniel J. Koloski, *Vice President &
General Manager*

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Westchester, PA 19830
Telephone: (215) 431-9100

**Data General Corporation
Semiconductor Division**

433 North Mathilda
Sunnyvale, CA 94086
Telephone: (408) 739-9200

A Division of:

Data General Corporation

4400 Computer Drive
Westboro, MA 01580
Telephone: (617) 366-8911

Delco Electronics

700 East Firmin Street
Kokomo, IN 46902
Telephone: (317) 457-8461

Parent Company:

General Motors

3044 General Motors Blvd.
Detroit, MI 48202
Telephone: (313) 556-5000

Digital Equipment Corporation

77 Reed Road
Hudson, MA 01749-2895
Telephone: (617) 568-6677

Eastman Kodak Company

343 State Street
Rochester, NY 14650
Telephone: (716) 724-4000

John Fluke Manufacturing Co., Inc.

6920 Seaway Boulevard
Everett, WA 98204
Telephone: (206) 347-6100

General Dynamics Corporation

7713 Forsyth Boulevard
St. Louis, MO 63105
Telephone: (314) 889-8200

General Electric Company

**GE Aerospace Electronics Systems
Department**

French Road
Utica, NY 13503
Telephone: (315) 793-7000

GE Microelectronics Center

One Micro Drive
P.O. Box 13049
Research Triangle Park,
NC 27709

Parent Company:

General Electric Company

3135 Easton Turnpike
Fairfield, CT 06431
Telephone: (203) 373-2211

See also:

**General Electric Company-
Solid State Division**

A Division of General Electric
Company
(in Merchant Producers Directory)

also:

Powerex, Inc.

A Joint-Venture of
General Electric Company
(in Merchant Producers Directory)

**Hewlett-Packard Company
Fort Collins IC Division**

3404 East Harmony Road
Fort Collins, CO 80525
Telephone: (303) 226-3800

Northwest IC Division

1000 Northeast Circle Blvd.
Corvallis, OR 97330
Telephone: (503) 757-2000

Systems Program Planning

19111 Pruneridge Avenue
Cupertino, CA 95014
Telephone: (408) 725-8900
FAX: (408) 446-0817

Parent Company:

Hewlett-Packard Company

3000 Hanover Street
Palo Alto, CA 95304
Telephone: (415) 857-1501

Honeywell Inc.

Solid State Electronics Division

1150 Cheyenne Mountain Blvd.
Colorado Springs, CO 80906
Telephone: (303) 576-3300
FAX: (303) 577-3626

A Division of:

Honeywell, Inc.

Honeywell Plaza
Minneapolis, MN 55408
Telephone: (612) 870-5200

See also:

Honeywell, Inc.

(in Merchant Producers Directory)

IBM Corporation

Burlington Facility

1000 River Road
Essex Junction, VT 05452
Telephone: (802) 769-0111

East Fishkill Facility

Route 52
Hopewell Junction, NY 12533
Telephone: (914) 894-2121

Manassas Facility

9500 Godwin Drive
Manassas, VA 22110
Telephone: (703) 367-2121

Thomas J. Watson Research Center

P.O. Box 218
Yorktown Heights, NY 10598
Telephone: (914) 945-1614
FAX: (914) 945-1263

Parent Company:

IBM Corporation

Old Orchard Road
Armonk, NY 10504
Telephone: (914) 765-1900

**Lockheed Missiles & Space Company
Microelectronics Center**

Department 6E-30
Building 150
P.O. Box 3504
Sunnyvale, CA 94088
Telephone: (408) 742-7148

**McDonnell Douglas Astronautics
Company**

5301 Bolsa Avenue
Huntington Beach
CA 92647-2048
Telephone: (714) 896-3311

Micro-Rel

2343 West 10th Place
Tempe, AZ 85281
Telephone: (602) 968-6411
FAX: (602) 968-9691

A Division of:

Medtronic, Inc.

7000 Central Avenue, N.E.
Minneapolis, MN 55432
Telephone: (612) 574-3016

See also:

Micro-Rel

(in Merchant Producers Directory)

Motorola Computer Systems
(formerly Motorola Four Phase Systems)

10700 North DeAnza Blvd.
Cupertino, CA 95014
Telephone: (408) 255-0900

A Subsidiary of:

Motorola, Inc.

1303 East Algonquin Road
Schaumburg, IL 60196
Telephone: (312) 397-5000

See also:

Motorola, Inc.

(in Merchant Producers Directory)

**Naval Ocean System Center (NOSC)
Solid State Electronics Division**

Code 55
San Diego, CA 92152-5000
Telephone: (619) 225-7272

Northern Telecom Electronics Inc.

16350 West Bernardo Drive
San Diego, CA 92127
Telephone: (619) 485-8900
FAX: (619) 485-9110

A Division of:

Northern Telecom Inc.

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**Sandia National Laboratories
Microelectronics Directorate 2100**

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Albuquerque, NM 87185
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FAX: (505) 844-1068

Sperry Semiconductor Operations

See: Unisys Corporation

Tektronix, Inc.

14150 S. W. Karl Braun Drive
Beaverton, OR 97077
Telephone: (503) 627-7111

See also:

Triquint Semiconductor, Inc.

A Subsidiary of Tektronix, Inc.
(in Merchant Producers Directory)

Teletype Corporation

See: AT&T Technologies, Inc.

**United Technologies
Microelectronics Center**

1575 Garden of the Gods Rd.
Colorado Springs, CO 80907
Telephone: (303) 594-8000
FAX: (303) 594-8187

A Division of:

United Technologies Corporation

One Financial Plaza
Hartford, CT 06101
Telephone: (203) 728-7000

Unisys Corporation

(formerly Burroughs Corporation
and Sperry Corporation)

Eagan Semiconductor Operations

P.O. Box 64724
St. Paul, MN 55164-0724
Telephone: (612) 456-2920

A Division of:

Unisys Corporation

One Burroughs Place
Detroit, MI 48232
Telephone: (313) 972-7000

**Watkins-Johnson Company
Solid State Devices Division**

3333 Hillview Avenue
Palo Alto, CA 94304
Telephone: (415) 493-4141

**Westinghouse Electric Corporation
Advanced Technology Division**

P.O. Box 1693
Baltimore, MD 21203
Telephone: (301) 765-1000

Parent Company:

Westinghouse Electric Corporation

Westinghouse Building
Pittsburgh, PA 15222
Telephone: (412) 255-3800

See also:

Powerex, Inc.

A Joint-Venture of Westinghouse
Electric Corporation
(in Merchant Producers Directory)

Xerox Corporation

701 South Aviation Boulevard
El Segundo, CA 90245
Telephone: (213) 536-7000

**Zenith Electronics Corporation
Microcircuit Facility**

1851 Arthur Avenue
Elk Grove Village, IL 60007
Telephone: (312) 956-1550

Parent Company:

Zenith Electronic Corporation

1000 Milwaukee Avenue
Glenview, IL 60025
Telephone: (312) 391-7000



10201 Torre Avenue, Suite 275
Cupertino, CA 95014
Telephone: (408) 973-9973

7

THE WHITE HOUSE
WASHINGTON

April 13, 1989

THE CHIEF of STAFF
has seen

MEMORANDUM FOR GOVERNOR SUNUNU
CHIEF OF STAFF TO THE PRESIDENT
THROUGH DAVID DEMAREST ~~XX~~
ASSISTANT TO THE PRESIDENT FOR COMMUNICATIONS
FROM SICHAN SIV ²
DEPUTY ASSISTANT TO THE PRESIDENT
FOR PUBLIC LIAISON
SUBJECT Retrospect on the President's Ethics Initiative.

A. THE PRESIDENT'S SPEECH

The President introduced his Ethics initiatives in a speech to the American Society of Newspaper Editors yesterday morning. 1,021 persons were present at the Society's convention.

B. BRIEFING

The office of Public Liaison held a briefing yesterday for all government designated agency ethics officials. Approximately 120 officials attended. The briefing, led by Amy Schwartz, Associate Counsel to the President and Executive Director of the President's Council on Ethics, was basically technical in nature. She summarized the legislation by highlighting some of the major changes, including:

- amending the tax code for individuals required to divest assets to avoid conflicts of interest,
- requiring uniform financial reporting and review across the three branches of government,
- imposing a 15% cap on outside earned income for senior officials in all three branches of government.

Each official was presented with copies of the President's Executive Order, the section-by-section analysis, talking points,

and fact sheet, and was given a chance to ask questions at the conclusion of the briefing.

B. DISSEMINATION OF MATERIALS

- Talking points and fact sheets have been sent to all Cabinet members via the Office of Cabinet Affairs.
- The Press Office has made a copy of the legislation available to members of the White House Press Corps, as well as the fact sheet and a section-by-section analysis of the proposal.
- The Office of Public Affairs has distributed a set of talking points to the agencies, RNC, Senatorial Committee for use by the Leadership.
- The Office of Media Relations has mailed the Government-wide Ethics Act of 1989 fact sheet and the President's speech to over 2,000 media outlets coast-to-coast, including judicial papers.

C. MEDIA

Although the briefing was closed to the media, the President's initiatives were very well covered. Major papers, including the Washington Post and the Los Angeles Times, had the President's proposal on their front page.

ABC and NBC also covered the President's initiatives on their evening news programs.

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01. Memo	From Cooper Evans to John Sununu Re: Des Moines Register Article on GATT (1 pp.)	4/3/89	P5	

Collection:

Record Group: Bush Presidential Records
Office: Chief of Staff, White House Office of
Series: Sununu, John, Files
Subseries: Group A Subject Files
WHORM Cat.:
File Location: Chief of Staff Has Seen (Sununu) [1989] [5]

Open on Expiration of PRA
(Document Follows)
By JP (NLGB) on 5/12/05

Date Closed: 12/7/2004	OA/ID Number: 29200-005
FOIA/SYS Case #: 1998-0004-F[2]	Appeal Case #:
Re-review Case #: 2005-0426-S	Appeal Disposition:
P-2/P-5 Review Case #:	Disposition Date:
AR Case #:	MR Case #:
AR Disposition:	MR Disposition:
AR Disposition Date:	MR Disposition Date:

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

P-1 National Security Classified Information [(a)(1) of the PRA]
P-2 Relating to the appointment to Federal office [(a)(2) of the PRA]
P-3 Release would violate a Federal statute [(a)(3) of the PRA]
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P-5 Release would disclose confidential advice between the President and his advisors, or between such advisors [(a)(5) of the PRA]
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(b)(1) National security classified information [(b)(1) of the FOIA]
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(b)(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
(b)(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
(b)(9) Release would disclose geological or geophysical information

File

THE WHITE HOUSE

WASHINGTON

April 3, 1989

THE CHIEF of STAFF
has seen

MEMORANDUM FOR GOVERNOR SUNUNU
ROGER PORTER
DAVID BATES
LEHMANN LI

FROM : Cooper Evans *CE*
SUBJECT : Des Moines Register Article on GATT

Some days ago I suggested that the Administration would be subject to increasing criticism of our agricultural position in GATT.

The attached piece by George Anthan is from the April 2 Des Moines Register. The article is very critical of the Administration. As the article points out, the criticism is not merely from "Iowa" but is broadly based both geographically and by commodity.

Of particular concern to me is the harsh tone used to depict the "Bush Administration attitude" toward producers. This is in marked contrast to the positive message which the President personally delivered throughout the campaign.

In the days ahead there is likely to be more criticism in the press and from members of Congress.

Farm bloc may lose grip on ag policy

Free-trade pact could
supersede new farm bill

By GEORGE ANTHAN

The Register's Washington Bureau Chief

WASHINGTON, D.C. — U.S. agricultural interests and their congressional allies could lose control of farm policy in the 1990s if the world's major trading countries reach accord on a new free-trade agreement.

Farm lobbyists in Washington say such an agreement could, in effect, supersede the multi-year farm bill Congress is expected to develop next year. The result, some fear, could be sharply lower farm subsidies and cuts in other programs beneficial to American farmers.

Agriculture Secretary Clayton Yeutter predicted recently that the farm-bill revision will come in 1991 and will be based on agreements reached under the General Agreement on Tariffs and Trade (GATT). The 96 nations belonging to GATT are meeting under the so-called Uruguay Round of talks in an effort to reduce barriers to free trade.

"Whether the [farm] bill that is legislated in this year or next year . . . applies for one, two or five years is irrelevant because for all practical purposes it will be in effect only for 1991," said Yeutter.

No Amendments Allowed

Some farm interests say they fear such an outcome because the trade bill implementing a GATT agreement would be controlled tightly by the Bush administration — and not by the traditional farm bloc friendly to agriculture. Congress already has approved a so-called "fast-track" procedure for the trade bill that will allow no amendments.

"With the limited number of members who are agriculturally oriented, that poses a real danger," said Senator Tom Harkin (Dem., Ia.), a member of the Agriculture Committee. "I am alarmed."

"I think we have to be careful that farm policy is not taken out of the hands of Congress."

Power of veto

The impact could be felt even before the trade talks conclude. The Bush administration insists that new legislation to replace the farm bill, which expires in 1990, must conform to the American stance in the GATT talks. The U.S. position says, in effect, that all farm subsidies should be eliminated.

"One can see the farm bill being vetoed if it says the wrong things," Yeutter said.

Democrats on the House and Senate agriculture committees are backing passage next year of a multi-year farm bill in the belief it would give farm interests more say in shaping any final GATT pact.

But Yeutter insists that "no matter how one denominates that bill, it is likely to be a one-year bill."

"What Yeutter is saying is that if there is a GATT agreement that makes major changes in agriculture policy, we would have to make those changes," said Randy Green, an official here of the National Association of Wheat Growers.

Wheat and corn interests in the United States are concerned that the Bush administration will agree to bigger cuts in U.S. cash subsidies than Congress and farm interests envision for the first half of the 1990s.

They also are concerned the administration will agree to idle a mini-

FARM POLICY

Please turn to Page 4A

Farm allies could lose grip on ag policy

FARM POLICY

Continued from Page One

amount of land annually, and they emphasize the United States is the only major grain exporter that already has a significant program of taking land out of production.

Other experts, though, contend the world's leading farm nations are unlikely to make major cuts in farm subsidies and, in any case, the administration won't propose a bill unacceptable to rural members of Congress.

Dale Hathaway, former assistant

secretary of agriculture for international affairs and a leading expert on farm trade issues, said Yeutter "is implying that the fast-track legislative authority overrules the domestic farm legislation."

"I'm glad people are finally paying attention to what [Yeutter] is saying," he said. "It's markedly different from what has been said before."

"He's saying that GATT should do in agriculture as it does in other areas, that it should limit the kinds of protection individual countries use. This has never applied to agriculture before."

Hathaway continued: "What really is at issue is whether GATT will have rules that prohibit or limit certain kinds of domestic agriculture policies. Clayton is saying, 'yes.'"

Paul Drazek, trade specialist with the American Farm Bureau Federation, said the issue of how farm policy will be made is "the question of the hour."

"What surprises me is that it's sur-

prising others that this should be coming up. It seems strange that this was not foreseen ... when the 1988 trade bill with its fast-track authority was passed."

But Drazek said Congress will oversee the GATT negotiations, and he added, "if history repeats itself, the administration is not going to present a package which Congress will have trouble swallowing, especially in agriculture."

Some congressional farm-state leaders, however, are becoming concerned.

House Agriculture Committee Chairman E. Kika de la Garza (Dem., Texas) recently drafted a letter to Yeutter as the secretary prepared to leave for Geneva and GATT talks aimed at a compromise on farm trade issues between the U.S. and the European Community.

De la Garza didn't send the letter, but it has been circulated on Capitol Hill. It states:

"We will write the next farm bill. It will not be written in Geneva."

Tim Galvin, farm policy specialist for Senator Bob Kerrey (Dem., Neb.) and former aide to de la Garza and to former Iowa Congressman Berkley Bedell, said passage of a one-year farm bill in 1990 "would put the administration in the driver's seat on farm policy. We would just be sitting back and waiting for the administration to hand down the word on what farm policy would be."

But even with a multi-year farm bill, Galvin acknowledged, Congress might be in "the same position we were with the U.S.-Canadian trade agreement. We could only comment on it."

Farm Bureau president Dean Kleckner, an Iowa farmer, said Congress should play the lead role in setting farm policy but that the House and Senate agriculture committees "have to recognize there may be some GATT agreements that will require us to make some changes if we want to be a player in the world market."

Kleckner is upset with Western Europe's intransigence over farm subsidy reforms and notes the EC currently is criticizing the United States for reducing its land set-aside requirements from 20 percent to 10 percent because of drought.

At the same time, he notes, the EC countries idle less than 1 percent of their productive land.

"So far," Kleckner said, "the GATT has been a waste of time."

Another former USDA official, economist John Schnittker, also believes the Bush administration's GATT negotiating team "will have to stay in bounds of what Congress will approve."

Schnittker represents the view of many private trade experts that the United States will fail in its demand that the 96-member GATT group set a deadline for abandoning trade-distorting farm subsidies and barriers to market access.

"Europe and Japan won't give a hell of a lot, so we won't have to do a hell of a lot," Schnittker said.

But Dixon Terry, a Greenfield, Ia., dairy farmer and president of the National Save the Family Farm Coalition, is concerned that the Bush administration, anxious for a pact, "now seems ready to sell us out."

Terry called the administration's GATT negotiating stance "an outrageous attempt to bypass Congress," and he added, "We're hoping Congress will act to keep farm policy within the domestic political process, where the public might have some input and where elected officials might have some accountability."

GEORGE H. DENISON
ATTORNEY AT LAW

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March 31, 1989

Memorandum To Governor John Sununu

From: George H. Denison *GHD*

Re: Frank Ruddy

THE CHIEF of STAFF
has seen

Frank was the General Counsel of the Energy Department until a couple of weeks ago. He was interested in retaining that position or becoming Assistant Secretary of Energy for International Affairs (see my February 14 memo); but, apparently, that may not happen.

Accordingly, I am now trying to help Frank find an appropriate position at the State Department where he has previous experience as the U.S. Ambassador to Equatorial Guinea (1984 - April 1988). In this endeavor, Ruddy has the support of the Foreign Service in the person of Ambassador Herman Cohen, the incoming Assistant Secretary of State for African Affairs, who is also a friend of mine.

The three ambassadorships in Africa that Ruddy, with the help of Assistant Secretary Cohen, has targetted as posts normally going to "political" appointees that would be right for Frank are:

- 1) Cameroon
- 2) Sierra Leone
- 3) Madagascar

Frank Ruddy is fluent in French and Spanish, is highly regarded by Ambassador Cohen and has excellent political credentials including the support of Senator Phil Gramm, Senator Jesse Helms as well as Bill Archer and Republican Leader Bob Michel in the House.

cc: Chase Untermeyer

GEORGE H. DENISON

ATTORNEY AT LAW

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TELEPHONE
(202) 244-3125

February 14, 1989

Memorandum To Governor John Sununu

From: George H. Denison *GHD*

Re: Frank Ruddy

Frank Ruddy, the General Counsel of the Energy Department since April of last year, would like to retain that position. His previous Reagan Administration service has included being an Assistant Administrator of the Agency for International Development and a successful ambassadorship to an African country. He has strong support from Senator Phil Gramm, Senator Jesse Helms as well as from the House Republican Leader, Bob Michel and Congressman Bill Archer of Texas.

Ruddy seeks to remain as:

. General Counsel, Department of Energy

As an alternative, he wishes to be considered for:

. Assistant Secretary of Energy for International Affairs and Energy
Emergencies

cc: Chase Untermeyer

Frank Ruddy
5600 Western Avenue
Chevy Chase, Maryland 20815
(301) 654-0828(H)
(202) 586-5281(W)

Currently:

General Counsel, Department of Energy, Washington, D.C.

As General Counsel Ruddy is chief legal officer of a \$15 billion Cabinet Department. Ruddy was brought in by Secretary Herrington to deal with the unprecedented legal problems the Department was facing in 1988, particularly in regard to nuclear clean up and litigation involving DOE nuclear Facilities, (Principally the Fernald feeder in Ohio) and the production reactors at Savannah River and Hanford. As General Counsel Ruddy directs DOE litigation strategy in these as well as other less controversial suits and is responsible for advising the Secretary and forming DOE legal strategy on environmental and conservation matters, nuclear affairs, natural gas, mineral leasing, procurement and finance (DOE's procurement volume is second only to DOD). Ruddy is also responsible for directing DOE's international legal affairs (involving him with such matters as the Non Proliferation and Test Ban treaties) and patents. In carrying out these duties Ruddy supervised a staff of 118 lawyers, 37 secretaries and 12 other office workers and managed an office budget of \$11 million.

Energy's Secretary Herrington, on his departure from office January 19th, 1989 presented Ruddy an award for distinguished performance.

September 1984-April 1988

United States Ambassador to Equatorial Guinea (E.G.)

Appointed Ambassador when in 1984, the State Department needed an Ambassador with fluent Spanish to go to this remote and desperately poor country to protect U.S. interests in the face of a considerable Russian, Chinese, North Korean and Cuban presence there. Through Ruddy's efforts, U.S. prestige in E.G. rose to an all time high, and US-EG relations improved markedly. Equatorial Guinea became one of the staunchest African supporters of the United States at the U.N., and Soviet and Bloc influence within E.G. was dramatically diminished during the years 1985-1988 directly as a result of Ruddy's efforts. The Ambassador's own political reporting was formally rated among the best in the State Department. On departure, he became the only foreigner ever awarded Equatorial Guinea's highest decoration.

May 1981-September 1984

Assistant Administrator, United States Agency for International Development

After appointment by the President and Confirmation by the Senate Ruddy ran USAID's \$800 Million Africa Bureau, with Missions in 37 SubSaharan African countries and a Washington staff of several hundred employees. Ruddy began a top-to-bottom housecleaning of white elephant aid projects and other wastes of taxpayer dollars and instituted tough foreign language standards for our people in the field. Most importantly, he made assistance to the indigenous private sector a priority of our foreign aid program, thereby making available to statist African economies the key element of the economic success stories of other African nations such as Ivory Coast, Cameroon, Malawi and Togo. Privatization in Africa is just beginning, but Ruddy laid the foundation for the direction our foreign aid is taking there, a direction, which, notwithstanding bureaucratic and political pressures to maintain the status quo, has animated private enterprise, lessened continued dependence on foreign aid, and in a word, transformed our foreign aid program. These kinds of success were possible because Ruddy met face to face with heads of state and key ministers and discussed economic policy in their own language. This was especially effective in producing candor and cooperation among Francophone African leaders, many of whom were much less guarded when discussing issues in French.

May 1983-September 1984

Member of the Board, African Development Foundation

While Assistant Administrator, Ruddy was appointed by the President and Confirmed by the Senate to the first board of the newly created foundation created solely to promote private enterprise in Africa. His duties here ran concurrently with those at USAID.

September 1974-May 1981

Counsel for Exxon

Ruddy was recruited directly by Exxon towards the end of President Nixon's Administration and joined the law department in Houston. By way of introduction to Exxon Ruddy participated on the legal side of virtually all areas of Exxon's activities, including trademark, copyright, federal and state lobbying laws (Ruddy designed Exxon's federal and state Political Action Programs(PACs)), pipeline matters, federal pricing regulations and general corporate law matters. After two years of generalized responsibilities Ruddy was given responsibility for marketing law matters, which, given Exxon's market share, involved a considerable amount of antitrust law.

In this capacity Ruddy by necessity worked very closely with the company's top management in creating Exxon's domestic marketing strategy. Ruddy's creativity was reflected not only in overall marketing strategy but also in Public Relations and Ad campaigns where he rolled up his sleeves when necessary (especially in the years 1976-80) and wrote copy, right along with the copywriters. Ruddy also wrote, produced and directed an antitrust compliance film for Exxon Executives.

On the basis of his performance Ruddy's salary almost tripled in his seven years there. By way of acknowledging his professional standing, Exxon not only permitted Ruddy to assume, along with his Exxon duties, the position of Editor in Chief of The International Lawyer, a very important professional editorship, but it also provided a special secretary to assist him in this additional work and assumed all costs of mailing, travel, etc.

September 1873-September 1974

Deputy General Counsel and Congressional Liaison, US Information Agency

Ruddy's work included the supervision of contract litigation arising out of Voice of America transmitters in Rhodes and the Philippines (hundreds of millions of dollars at stake), the responsibility for USIA contracts for trade and cultural activities throughout Eastern Europe, and various legal/technical issues such as allocation of VOA frequencies. There were also legal/technical issues with a large political component such as direct broadcast satellites opposed by the Russians at the UN and elsewhere, and Ruddy represented USIA, and on occasion, the USG on these matters, such as at the Brussels Treaty on the Protection of Satellite Signals where he was legal adviser to the US Delegation.

Ruddy also worked closely with the Director of USIA, OMB and the Hill on legislative issues affecting USIA, reviewed testimony, accompanied witnesses, etc.

September 1972-September 1973

Senior Attorney-White House Office of Telecommunications Policy(OTP)

In 1972 there were two very big telecommunications issues in Washington. One was license renewal by domestic broadcasters; the other was the status in international law of direct broadcast satellites which were then in development and fiercely opposed by the Russians. The White House was planning to take the lead on both issues, and on the basis of several law review articles Ruddy had written, he was asked by the then OTP General Counsel, Antonin Scalia, with USIA's blessing, to join OTP and work on these issues. Ruddy worked almost exclusively on these issues until events were overtaken by Watergate. License renewal became a dead issue, and Ruddy divided time between direct broadcast satellite issues and more technical matters such as those affecting the then upcoming World Administrative Radio Conference(which allocates frequencies Worldwide).

September 1969-September 1972

Staff Attorney US Information Agency

Ruddy was learning the ropes as a lawyer for USIA and had responsibility for advising USIA's African operations of the law. He did little that was not routine except that he was chosen to lecture on the Angela Davis case, which was a very hot item in Africa at the time, at universities in Ghana, Nigeria, South Africa, Kenya, Malawi and Ethiopia, and his trip, which was reported in Newsweek, was a serious blow to Bloc misinformation campaigns in those countries.

1962-1969

Teaching

Ruddy paid his way through law school and graduate school by teaching and investing what he made teaching. While in school Ruddy taught at these places:

Loyola Academy, Wilmette, Ill.	1962-63(Junior & Senior English)
Illinois Benedictine College	1963-64(Chaucer, the English Romantic Poets & American Lit)
Dillard University(N.O. LA.)	1964-65(Classics, English Lit)
Fordham University	1966-67(English & American Poetry)
Cambridge University	1967-69(International Law)

Miscellaneous:

Born September 15, 1937; Married August 29, 1964 to Kateri O'Neill; 3 children, Neil, David and Stephen.

Honorable Discharge 1961, Marine Reserve.

Member of NY, DC and Texas Bars

Written and Spoken Spanish and French

Education:

AB, Holy Cross 1959

MA, LL.M. New York University, 1962, 67

LL.B. Loyola University(N.O.LA.) 1965

Ph.D.(International Law) Cambridge University 1969

Publications:

Royalty Earning Publications

Author: International Law in the Enlightenment, published by OCEANA, Dobbs Ferry, New York, in 1975.(Still in-print) Editor: American International Law Cases, Volumes 1-31(also still in print). Ruddy worked with Professor Richard Baxter of Harvard Law School on these volumes, and when Professor Baxter became Judge of the International Court at the Hague, Ruddy succeeded him as Editor. In addition to royalty earning publications, Ruddy edited the American Bar Associations's quarterly, The International Lawyer from 1978-83. With 11,000 plus subscriptions, it is one of the most widely read professional journals in the world.

file

THE WHITE HOUSE

WASHINGTON

April 6, 1989

THE CHIEF of STAFF
has seen

MEMORANDUM FOR GOVERNOR SUNUNU
CHIEF-OF-STAFF TO THE PRESIDENT

THROUGH DAVID DEMAREST
ASSISTANT TO THE PRESIDENT FOR COMMUNICATIONS

FROM SICHAN SIV²
DEPUTY ASSISTANT TO THE PRESIDENT
FOR PUBLIC LIAISON

SUBJECT Retrospect on the President's Education Event.

A. ROSE GARDEN CEREMONY

The Rose Garden ceremony consisted of two parts. First, the President made some remarks on the National Teacher of the Year and presented a crystal apple to this year's winner, Mrs. Mary Bicouvaris of Bethel High School in Hampton, Virginia.

The President then introduced the framework of his legislative proposal. After his remarks, the President invited Sec. Cavazos, Sen. Kassebaum, Cong. Goodling, and Governors Kean of New Jersey; Perpich of Minnesota; Castle of Delaware; and Schaeffer of Maryland; and Mrs. Bicouvaris to join him when he signed the transmittal letter. About 250 people attended the Rose Garden event, including 23 Members of Congress.

B. BRIEFING

A briefing on the President's Educational Excellence Act of 1989 took place yesterday morning before the Rose Garden event in room 450 for over 100 members of the Education community and Education media. Briefers included Roger Porter, Under Secretary of Education for Planning, Budget and Evaluation Charles Kolb, and Secretary Lauro Cavazos.

The fact sheet on the Educational Excellence Act of 1989 was distributed at the briefing.

C. DISSEMINATION OF MATERIALS

- Talking points and fact sheets have been sent to RNC and to all Cabinet members.
- Fact sheets have been sent to all Members of Congress.
- The Press Office has distributed fact sheets to the White House press corps.
- The Office of Public Affairs has sent its package to all Agencies public affairs directors, including the "White House Wire."
- The Office of Media Relations has mailed out an editorial package to over 1,500 newspapers and other media.

D. MEDIA

- Secretary Cavazos who was on the Today Show the day before also briefed the White House press corps after the Rose Garden event.
- Surrogates, including Gov. Kean, were interviewed in the stake-out area following the Rose Garden event.
- CNN covered the Rose Garden event live. Two networks (ABC and NBC) highlighted the event on the evening news.

E. SUMMARY

Generally the event and supporting activities went well. The staff worked well together in the planning process. The Office of Economic and Domestic Policy moved the policy process forward effectively. There was also good coordination between Roger Porter's office and ours on the marketing of the legislation.

According to Legislative Affairs, at the time of this writing, there are 34 Senators and 76 Representatives who are co-sponsoring the President's initiatives on Education.

However, there were minor problems that occurred in staging the Rose Garden event, as well as some logistical problems clearing attendees into the complex. We are meeting today to go over the entire process to ensure similar problems can be addressed for future events.

File

THE WHITE HOUSE
WASHINGTON

April 3, 1989

TO: GOVERNOR SUNUNU
RICHARD DARMAN
C. BOYDEN GRAY

FROM: DAVID Q. BATES

A handwritten signature in blue ink, appearing to be 'DQ Bates', written over the 'FROM' line.

For your information.

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
02. Memo	From Constance Horner to David Bates Re: Drug Testing Program (2 pp.)	3/31/89	P-5	

Collection:

Record Group: Bush Presidential Records
Office: Chief of Staff, White House Office of
Series: Sununu, John, Files
Subseries: Group A Subject Files
WHORM Cat.:
File Location: Chief of Staff Has Seen (Sununu) [1989] [5]

Open on Expiration of PRA
 (Document Follows)
 By JP (NLGB) on 5/12/05

Date Closed:	12/7/2004	OA/ID Number:	29200-005
FOIA/SYS Case #:	1998-0004-F[2]	Appeal Case #:	
Re-review Case #:	2005-0426-S	Appeal Disposition:	
P-2/P-5 Review Case #:		Disposition Date:	
AR Case #:		MR Case #:	
AR Disposition:		MR Disposition:	
AR Disposition Date:		MR Disposition Date:	

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

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 P-2 Relating to the appointment to Federal office [(a)(2) of the PRA]
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C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Removed as a personal record misfile.

Freedom of Information Act - [5 U.S.C. 552(b)]

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UNITED STATES
OFFICE OF PERSONNEL MANAGEMENT
WASHINGTON, D.C. 20415

OFFICE OF THE DIRECTOR

MAR 31 1989

THE CHIEF of STAFF
has seen

MEMORANDUM FOR: DAVID Q. BATES
ASSISTANT TO THE PRESIDENT AND
SECRETARY OF THE CABINET

FROM: CONSTANCE HORNER
DIRECTOR
OFFICE OF PERSONNEL MANAGEMENT

SUBJECT: Drug-Testing Program

A handwritten signature in cursive script, reading "Constance Horner", is written over the typed name and title of the Director.

As you may know, the National Treasury Employees Union has challenged the President's Drug-Free Workplace Program in a suit in Louisiana. A U.S. District Court in New Orleans ordered the Office of Personnel Management to publish the program implementation guidelines in the Federal Register. Today, I approved such publication, after receiving the considered judgment of OPM and Justice attorneys, who believe this course will best protect the drug-testing program.

I would like for you to be aware of this case. The key issue at present is whether the drug-testing program can be implemented through non-reviewable agency "guidance" documents (which is what we did), or whether the implementation document should be considered a "rule" (necessitating notice-and-comment and other Administrative Procedure Act requirements). The District Court, not reaching constitutional issues, held that our policy should have been issued as a rule, and the government will appeal this holding before the 5th Circuit.

Today's Federal Register notice is carefully crafted to meet the District Court's order that the drug implementation strategy be subject to notice-and-comment while simultaneously not setting a precedent which would limit executive discretion to choose guidance rather than regulation in other appropriate circumstances. The 5th Circuit is a generally conservative court, and we believe we are in a relatively favorable venue, though the outcome cannot be predicted with certainty.

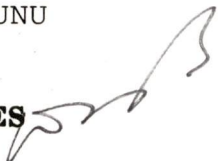
I will keep you informed of new information as it develops, and will be prepared to work with the White House to ameliorate any potential delay to the drug-testing effort which might result from adverse judicial rulings.



THE WHITE HOUSE
WASHINGTON

TO: GOVERNOR SUNUNU
ANDY CARD
ROGER PORTER

FROM: **DAVID Q. BATES**



- ☒ FYI
- ☐ Action
- ☐ Comment

THE WHITE HOUSE

WASHINGTON

April 13, 1989

THE CHIEF of STAFF
has seen

MEMORANDUM FOR DAVID BATES

FROM:

Juanita
JUANITA DUGGAN

SUBJECT:

Minimum Wage Bill Veto

Bob Davis called to pass on Secretary Dole's thoughts on the timing of the Minimum Wage Bill veto. She believes the enrolled bill will be at the White House on Monday and understands it is our intention to veto the bill quickly. Sec. Dole wants to make sure that if the plan is to veto the bill on Tuesday, we wait until after the President and the Secretary address the AFL-CIO National Conference of Building and Construction Trades. She does not think it wise to veto before their joint appearance.

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
03a. Memo	From Larry Lindsey to Roger Porter Re: Housing Meeting (2 pp.)	6/22/89	P-3	

Collection:

Record Group: Bush Presidential Records
Office: Chief of Staff, White House Office of
Series: Sununu, John, Files
Subseries: Group A Subject Files
WHORM Cat.:
File Location: Chief of Staff Has Seen (Sununu) [1989] [5]

Open on Expiration of PRA
 (Document Follows)
 By JP (NLGB) on 5/12/05

Date Closed:	12/7/2004	OA/ID Number:	29200-005
FOIA/SYS Case #:	1998-0004-F[2]	Appeal Case #:	
Re-review Case #:	2005-0426-S	Appeal Disposition:	
P-2/P-5 Review Case #:		Disposition Date:	
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AR Disposition:		MR Disposition:	
AR Disposition Date:		MR Disposition Date:	

RESTRICTION CODES

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PRM. Removed as a personal record misfile.

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THE WHITE HOUSE
WASHINGTON

THE CHIEF of STAFF
has seen

JUN 24 1989

June 22, 1989

MEMORANDUM FOR ROGER PORTER

FROM: LARRY LINDSEY

SUBJECT: Housing Meeting

Administration Policy Objectives

- o Establish a positive and aggressive stance toward meeting the housing needs of the poor and working class Americans.
- o Adhere to the President's budget.
- o Eliminate wasteful and fraudulent programs.

Suggested Positions

HOPE GRANTS: WSJ story says HUD buys \$250 million. Avoid an argument on money. (P2)

FHA Buyouts should be avoided. Fight hard. It gives money to lucky landlords. Let the local media beat up on those who do the evicting. (P2 & P3)

No money to buy single family homes. It's unseemly. No real resistance expected. (P3)

Fight hard to include rhetoric on need for local changes to lower cost of housing for poor: end rent control, modify building codes, repeal Davis Bacon. Let's take this issue from the liberals. (P1)

FRAIL ELDERLY: Basically good program.

Let OMB do the fight on adding vouchers vs. replacing them. (P1)

Support OMB on not putting social service support money in HUD budget. Leave it with HHS. (P3)

REPLACEMENT: Fight hard to include rhetoric on need to end replacement at 1 for 1 ratio. (P2 & P3)

Let OMB take lead on fighting the number of vouchers for displaced. Support them if needed.

MOD REHAB: Fight hard for strong rhetoric condemning this scandal ridden program. We should use this money to really help the poor get housing. (P3)

LOW INC TAX CREDITS: Not in President's budget. Treasury testified against. OMB wants to give in. Suggest letting the Dems do the dirty work in raising the money. Continue Administration token opposition. Strongly support Treasury, but let them take the lead. (P2)

FHA MORTGAGES: Currently \$101,250, OMB willing to go to \$118,000, HUD wants \$168,000. Note internal dissension within HUD. Don't bother fighting on this.

Insurance Premium should be actuarially fair. Fight hard for full prepayment of current 3.8 percent and increase to actuarially fair level of rest. Increased portion of premium can be annualized, need not be prepaid to ease this increase. (P3)

Fight hard to limit future FHA mortgages to first time homebuyers. Currently one third of such mortgages go to others. (P1 and P3)

USE IRA & 401(k) Treasury firmly opposed. Could be a good initiative. Suggest leaving it for the State of the Union address.

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
03b. Memo	From Larry Lindsey to Roger Porter Re: Housing Opportunity and Progress Everywhere (HOPE) (4 pp.)	6/7/89	P/5	

Collection:

Record Group: Bush Presidential Records
Office: Chief of Staff, White House Office of
Series: Sununu, John, Files
Subseries: Group A Subject Files
WHORM Cat.:
File Location: Chief of Staff Has Seen (Sununu) [1989] [5]

Open on Expiration of PRA
 (Document Follows)
 By JP (NLGB) on 5/12/05

Date Closed:	12/7/2004	OA/ID Number:	29200-005
FOIA/SYS Case #:	1998-0004-F[2]	Appeal Case #:	
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P-2/P-5 Review Case #:		Disposition Date:	
AR Case #:		MR Case #:	
AR Disposition:		MR Disposition:	
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THE WHITE HOUSE

WASHINGTON

June 7, 1989

MEMORANDUM FOR ROGER B. PORTER

FROM: LARRY LINDSEY

SUBJECT: Housing Opportunity and Progress Everywhere (HOPE)

(First, we have to come up with a new acronym. Progress Everywhere just doesn't pass the laugh test for hyperbole, even in Washington.)

The HOPE program is comprised of several major pieces. The unifying theme is an increase in home ownership. It is important to note that we are putting forward home ownership largely as a substitute for new construction of public housing units. That is the broad policy decision which lies behind HOPE.

Principles Behind Home Ownership for the Poor

I propose the following three principles for evaluating our program of home ownership for the poor:

- o Concentrate resources on those currently in federally assisted units.
- o Promote the involvement of tenants in managing projects and becoming involved in decision making.
- o Stress home ownership where it is a feasible option, sustainable for the long term.

Part I: HOPE Grant Program

The centerpiece of the HOPE program are HOPE Grants, a new \$1 billion program of competitive matching grants to states, localities, and nonprofits to promote low-income homeownership. The program would be linked to matching grants at the rate of \$1 for every \$2 of Federal money. Four types of housing would be eligible:

- o Public Housing. HOPE Grants could be used to promote tenant ownership and residential management through by funding rehabilitation, providing technical assistance, and providing seed money for tenant management organizations. Funds could also be used for replacement vouchers. (See discussion of the Preservation Issue below on the replacement issue.)

- o Secretary Held Projects. These housing projects are owned by the Secretary of Housing and Urban Development because they have been so badly managed in the past that HUD had to take them over directly. They are generally in deplorable condition. Funds could be used as above except that replacement vouchers are not needed.
- o FHA Buyout Projects. These projects involve 40 year low interest FHA mortgages taken out 20 years ago. The mortgages had 20 year prohibitions on prepayment and subsidized interest rates in return for rent caps. In "hot" markets it is now in the owners' interest to buy out the mortgage and convert to market-level rents. This would displace many poor tenants. HOPE Grant funds could be used to keep the owners in their current mortgages.
- o Homeownership for Families at Under Half the Median Income. Funds could be provided for interest buydowns and downpayments. Single family as well as multifamily units are involved.

Issues and Analysis

MONEY. The first point of contention between HUD and OMB is money. HUD wants \$1 billion. OMB will give a billion over 4 years.

Rehabilitation costs about \$50,000 per unit in order to bring the unit up to code and make it saleable. Thus, \$1 billion means 20,000 units. There are roughly 1.5 million public housing units in the country.

The key issue is the number of families who can sustain themselves in housing they own even if it is given to them. The average income of families in public housing is \$6000. It is hard to do even routine maintenance on that income. Experience has shown that operating subsidies are needed after the tenants have been given the housing.

CONCLUSION: The more cautious approach taken by HUD seems more appropriate. If we have success in getting families to sustain themselves in self-owned housing, then more money would be appropriate to expand the program in a few years.

FOCUS. OMB opposes using funds on FHA projects and for homes for families not now in public housing. In short, they prefer focussing the program on tenants currently in public housing.

Subsidizing private landlords to stop them from prepaying their mortgages seems a bad precedent to set. It is a potentially bottomless pit as different areas

in the country begin to experience housing booms. Instead, funds should be used for vouchers for the low income families who may be displaced in any conversion.

While assisting families with downpayments may seem a good idea, it really defeats the purpose of homeownership which is to give the family an equity stake in the house. People in distressed areas might easily choose to walk away from mortgages they can't meet if none of their own money is lost in the process. The evidence is overwhelming that defaults are linked to downpayments.

CONCLUSION: Limit HOPE Grant funds to the first two types of housing listed above and to provide vouchers for those who are displaced under FHA buyouts.

Part II: Vouchers for Individuals Who Can't Care for Themselves

HUD is proposing a series of programs to assist the mentally ill, substance abusing homeless persons, and the frail elderly. This is basically a very good program. Difference between OMB and HUD are minor and not worth getting involved in.

Part III: Preservation

Under current law, every time a unit of public housing disappears from the market another unit must be built to replace it. In addition there is the issue of displacement caused by FHA prepayment discussed above.

PREPAYMENT HUD is asking for \$810 million of budget authority over 5 years to take care of 31,000 households likely to be displaced by FHA conversions. The budget estimates 6,000 conversions. The truth is somewhere in between.

CONCLUSION: Ask for more than 6,000, but much less than 31,000. Something like 10,000 seems right to me.

REPLACEMENT We must take the initiative on housing. The one for one replacement issue is well meaning craziness. If we are really talking about HOMEOWNERSHIP for poor people, why should the government have to build another unit of low income housing because an existing tenant bought the unit in which he/she is now living? Replacement may be necessary if a building is demolished or sold to a middle class family but should not be required in cases of low income purchases.

This is not politically easy. But it makes perfect sense. At the very least we should propose exempting sales to low income families from the replacement requirement.

Part IV: Middle Class Housing

HUD is proposing two initiatives. First, an increase in the FHA ceiling to 95 percent of area median price or \$168,000, whichever is lower. Second, letting people use up to \$10,000 of their IRAs to make housing downpayments.

FHA LIMIT Currently, FHA insures low downpayment (5 percent) loans up to \$101,250. Some increase is needed. OMB is proposing \$118,000. HUD is asking for \$168,000. I propose \$130,000.

But, we should attach some restrictions. First, the evidence indicates that the current FHA insurance premium is insufficient. We should raise the premium to its actuarially fair level. In order to make it more palatable, we should require full prepayment of the current 3.8 percent insurance premium and annualize any increase in the premium.

Most important, we should limit FHA loans to FIRST TIME HOMEBUYERS ONLY. Presently, one third of FHA loans go to investors, vacation homes, and second time homebuyers. That is ridiculous.

IRAs HUD is proposing that people be allowed to remove up to \$10,000 from their IRAs and 401(k)s for use as a downpayment. Treasury is opposed.

Compromise 1: Allow people to use their IRA money for a downpayment by exempting it from the 10 percent penalty tax, but require them to pay ordinary tax on the withdrawal, as they would at age 59 1/2. This is a revenue raiser in the short run as people withdraw the money currently in their IRAs.

Compromise 2: Go along with HUD, but require that the taxes be recaptured when the house is sold. This is likely to provoke Treasury opposition.

The idea is basically a sound one and a popular one. It is both pro-saving and pro-housing.

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
03c. Memo	From Larry Lindsey to Roger Porter Re: Other Housing Issues (1 pp.)	6/8/89	P-5	

Collection:

Record Group: Bush Presidential Records
Office: Chief of Staff, White House Office of
Series: Sununu, John, Files
Subseries: Group A Subject Files
WHORM Cat.:
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AR Disposition:		MR Disposition:	
AR Disposition Date:		MR Disposition Date:	

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(b)(9) Release would disclose geological or geophysical information

THE WHITE HOUSE

WASHINGTON

June 8, 1989

MEMORANDUM FOR ROGER PORTER

FROM: LARRY LINDSEY

SUBJECT: Other Housing Issues

In addition to Enterprise Zones and the HOPE Program, there are other issues in the housing program. Chief among them is the reauthorization of the Low Income Housing Tax Credit. There are two salient facts:

- o Reauthorization of the credit was not in the President's budget.
- o Congress is likely to approve it anyway.

In my view, the answer is easy. Let Congress approve it and let Congress come up with the money. Treasury has already testified against extending the credit and has taken the heat. We have nothing to gain by proposing more money.

Reducing the Cost of Housing for Low Income Americans

One of the best options we have is requiring that any housing legislation that is enacted include provisions to lower the cost of housing. HUD has already developed a detailed set of guidelines on this subject. Secretary Kemp has given numerous speeches which includes a chart showing that needless regulations raise the cost of a typical house in Southern California by between \$30,000 and \$40,000. Possible changes include:

- o Zoning requirements that go beyond reasonable needs.
- o Code requirements that have no current basis in building soundness but were put in years ago before technology caught up.
- o Davis Bacon laws which dramatically raise the cost of constructing and maintaining low income housing projects.

This is a real Republican initiative which helps the poor, helps housing, and keeps us out of a bidding war we are bound to lose.

Withdrawal/Redaction Sheet

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03d. Memo	From Larry Lindsey to Roger Porter Re: Enterprise Zones (4 pp.)	6/8/89	P 5	

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Office: Chief of Staff, White House Office of
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THE WHITE HOUSE

WASHINGTON

June 8, 1989

MEMORANDUM FOR ROGER PORTER

FROM: LARRY LINDSEY

SUBJECT: Enterprise Zones

The Enterprise Zone issue has reached the point where the Senior policy makers in the Administration must make a decision. As a consequence, you, Secretary Brady, Director Darman, and Secretary Kemp will be meeting today at 5.

You have four options:

- o Drastically increase the budget allocation to the enterprise zone concept above that in the President's budget.
- o Sharply cut the number of zones.
- o Significantly scale back the incentives which Secretary Kemp has proposed and described in his speeches.
- o Adopt a certificate program which maintains the incentives and budget limits by imposing a rationing system on access to the incentives.

The words "drastically", "sharply" and "significantly" are not hyperbole as the following discussion makes clear.

Revenue Effects of Enterprise Zone Proposal

The table at Tab A shows the preliminary Treasury estimates of the cost of HR 6 which closely resembles the incentives which the Secretary has called for in Enterprise Zones. A combination of employment credits, real estate incentives, and financing incentives are presented.

As the table indicates, the cost of the program is \$2.268 billion through 1993 while the President's budget calls for \$1 billion. But that's the good news. The bad news is that the table presents the three year cost of 20 zones. We have proposed up to 70. While the three year cost of 70 zones is not quite 3.5 times the cost of 20 zones as some of the zones will be started later in the cycle, 70 zones would cost roughly twice as much 20 zones through 1993. Call it \$4.5 billion.

That's not all. The major incentive which Secretary Kemp has called for is an exclusion from capital gains tax of new

investments in the zone. Treasury did not estimate that, as the revenue effect is potentially unlimited. On the other hand, most of the loss will be in the out-years. So, backloading the proposed incentives is not a viable option. A huge backloaded cost is implicit in the numbers due to omission.

So, either the number of zones must be reduced to about 10 in total, or the list of incentives must be cut in half, or we must at least double our budget proposal for this program.

Certificates

One other alternative remains. HUD could issue certificates entitling the bearer to a tax break of up to \$X. This would cap the revenue loss. It would also allow HUD to permit the full panoply of incentives.

Certificates could be bureaucratically administered with some agency in charge of determining the merits of projects. But, that goes against the very spirit of enterprise zones.

Alternatively, certificates could be auctioned off to the highest bidder. This is an economist's dream. But selling tax breaks is not likely to produce favorable press for the program.

Still, certificates potentially represent the least bad way out of a bad situation and should be seriously considered.

A Decision is Necessary

A menu like this would make most people want to skip dinner. Given that this is government, that approach would be to refer the issue back to the Working Group to come up with a solution. That is simply not possible.

At yesterday's meeting, Tom Humbert of HUD said that he could not possibly give anything up without checking with Secretary Kemp. Obviously, Treasury and OMB representatives can't break the budget without authority. Sending the issue back to the Working Group is not an option if you want to advance the enterprise zone initiative.

Wiggle Room Questions and Answers

There will be an obvious institutional interest among some at today's meeting to minimize or avoid the need for a decision. Here are a list of possible claims and suggested replies:

WIGGLE: This is just a technical matter of revenue estimating. If the revenue estimators did it "right", allowing for a tightening of rules or for behavioral responses, it wouldn't cost so much.

ANSWER: The revenue estimators have incorporated a tight set of rules in their assumptions. Little additional revenue could be had in this area.

In addition, Larry Lindsey of my staff (who is a supply sider) assures me that Treasury has done a fair job including behavioral responses and feedback effects. (Actually they've been more than fair.)

WIGGLE: The revenue estimators can only guess at the extent to which these incentives will be used.

ANSWER: That's right. They could be too high or they could be too low. So, the project could cost even more. They've made their best guess.

WIGGLE: Enterprise zones simply can't work unless there is a broad base of incentives.

ANSWER: Fine. Let's either cut the number of zones or increase the budget.

WIGGLE: This is an issue best left to the technical people to decide how to best design a zone.

ANSWER: The technical people have failed. This is a political decision.

PRELIMINARY
Revenue Impact of Provisions of HR 6 1/
20 Enterprise Zones
Implemented on January 1, 1990

Fiscal Year

	1990	1991	1992	1993	1990-93
	(\$'s in millions)				
Credit for Qualified Increased Employment Expend.	-5	-23	-51	-83	-162
Credit for Wages Paid Economically Disadvantaged	-5	-18	-33	-48	-104
Credit for EZ Employees	-56	-85	-99	-115	-355
Total Employment Credits	-66	-126	-183	-246	-621
ITC for Structures	-16	-47	-55	-58	-176
Total Employment Credits and ITC	-82	-173	-238	-304	-797
Capital Gains Rollover	-19	-134	-234	-246	-633
EZ Stock Expensing	-82	-223	-261	-271	-838
Total Rollover and Expensing	-101	-358	-495	-517	-1471
Total HR 6	-183	-531	-733	-821	-2268

Department of the Treasury
Office of Tax Analysis

June 6, 1989

1/ Not including provisions relating to R&D incentives, private activity tax-exempt bonds, and ordinary loss deduction for worthless EZ securities.

Note: Cost of HR 6 if 20 zones implemented in 1990, 20 zones in 1991, 20 zones in 1992, and 10 zones in 1993: \$2.2 billion in FY 1990, \$7.7 billion in FY 1991, \$1.5 billion in FY 1992 and \$2.2 billion in FY 1993; totaling \$4.5 billion in FY's 1990-1993.