

# S E M I C O N D U C T O R S

FMI's family of 3D graphics cards spans the full range of high-performance products from CAD and visual-simulation applications to the new generation of home-entertainment products.



**FMI is emphasizing products for strategic, high-growth industries such as multimedia, graphics and wireless.**



FMI's semiconductor products are used in many high-growth industries, in mainstream applications as well as in specialized markets. In addition to supporting the traditional semiconductor markets, the company is emphasizing new, strategically important areas in the PC, multimedia and wireless applications. Some highlights:

## Graphics Products

In a demonstration of Fujitsu's commitment to the rapidly evolving graphics market, FMI has established a local organization to design, develop and market a comprehensive family of graphics chips, PC Cards and systems. This local organization works closely together with Japan to bring the most sophisticated, state-of-the-art products to the increasingly integrated graphics, audio and video industries.

FMI is presently focusing on the PC-based graphics-accelerator industry, which is growing at an explosive rate. Fujitsu's family of PC graphics cards spans the full range of high-performance products from Computer Aided Design (CAD), design-automation and visual-simulation applications to the new generation of home-entertainment products.

Specifically, Fujitsu was one the first companies to introduce a high-performance graphics accelerator for a PC. FMI's Sapphire 3-D graphics accelerator cards bring high-level graphics capabilities such as lighting, shading and perspective-corrected texturing to the personal computer. The first member of this family began shipping early in 1995. New products that will be available in 1995 and early in 1996 will offer enhanced price/performance ratios, helping expand the market to new industries such as location-based entertainment applications, including virtual reality experiences.

In 1995, Fujitsu also introduced a comprehensive 3-D graphics chip set especially designed for high-performance games and accelerator cards. The 862xx series is one of the few chip sets that performs up-front 3-D calculations, reducing the processor load for faster operation and more realistic images.

## Flat-Panel Displays



The New York Stock Exchange is currently using more than 1,000 of the 21 inch full-color plasma-display panels as overhead displays for the trading floor.

Fujitsu is the only supplier currently delivering multiple full-color flat-panel-display technologies for diverse markets. Fujitsu's product line includes color plasma-display panels (PDPs); color thin-film-transistor, liquid-crystal-display (TFT-LCD) units; and front LCD projection systems. These technologies are used in a wide range of applications, including the personal-computer, medical, industrial and financial markets.

FMI was the first flat-panel-display manufacturer to announce the commercial availability of a 21-inch, full-color PDP. This is the largest color plasma-display panel currently in volume production and is the predecessor to the High Definition Television (HDTV) screens expected before the end of the decade.

The New York Stock Exchange (NYSE) is currently using more than 1,000 of the 21-inch panels as overhead trading-floor displays. The NYSE will install an additional 1,000 panels by the end of 1995. The panels, which are an integral part of the Stock Exchange's introduction of next-generation technology, effectively double the number of overhead displays on the trading floor. Because the panels have a wide viewing angle of more than 140 degrees, information can be viewed off-axis without distortion.

Fujitsu also introduced a 42-inch panel in 1995. FMI's PDPs can be integrated with touch screens for increased configuration flexibility. With more than 100,000 displays shipped annually, Fujitsu is the largest worldwide commercial supplier of AC-memory plasma displays.

Additionally, FMI offers six 10.4-inch color LCD modules that address portable and non-portable applications in the personal-computer, medical-instrumentation and industrial-equipment markets. The company's new high-brightness LCD projector system delivers bright, VGA-class images in a wide range of projected screen sizes. The product, which is designed for multimedia business presentations, allows the user to run either video or still presentations from a PC or Apple Macintosh computer.

In the future, Fujitsu plans to develop panels with larger screen sizes, higher information content, better resolution and lower power consumption to address an even broader range of applications.

## **Wireless Communications**

FMI's telecommunications IC product offering includes a wide range of leading-edge Radio Frequency (RF) devices. These products are used in diverse wireless applications such as cellular and cordless telephones, wireless LAN/WAN systems and wireless PBX systems.

For example, Fujitsu is a leading worldwide supplier of SAW filters, a critical component of cellular telephones. About half the cellular phones currently in use worldwide utilize Fujitsu's technology.

FMI's phase-locked-loop (PLL) frequency synthesizers offer a wide range of operation frequencies to meet diverse design requirements. The company's low-power PLLs, the MB15A01 and MB15A02, feature smaller packages and reduced power consumption, meeting the needs of portable, cellular and related wireless system designs.

Fujitsu is also one of the few companies to offer SuperPLLs, which combine multiple functions into a complete integrated solution. The company's new high-speed Super PLLs, the MB1516A family (?), meet the industry's strictest performance standards, making them appropriate for virtually any digital cellular application.

Other products include prescalers; multi-function, super-analog devices; and power-management devices. The most recent power-management switch, the MB3802, eliminates power consumption when portable computers are in stand-by mode, extending battery life.

FMI is also one of the few semiconductor companies to offer an RF integration road map through the use of Fujitsu's LSI RF Mixed Signal Technology. This technology helps customers go from discrete solutions to an integrated, single-chip solution, thereby reducing the size, cost and weight of products while shortening the development time.

FMI develops, manufactures and markets one of the industry's most comprehensive lines of advanced memory and logic products.

Some highlights:

## **Networking Products**

FMI's networking product line includes ATM chips, networking chips, SCSI integrated circuits and plug-and-play controllers.

An early entrant into the ATM market, Fujitsu has a long-term commitment to this technology. The company has in-depth knowledge of ATM design and has worked with a broad cross-section of equipment builders worldwide. FMI leveraged its early experience with this technology to develop a broad range of ATM products, providing the most comprehensive ATM solutions available today. For example, the company's new ITC-25 and ITC-155 terminal controllers are optimized for network adapter card (NIC) applications. This will

help give ATM a price/performance advantage as this technology expands from the wide area network to the desktop. Leading networking vendors such as UB Networks and Cabletron (need to check re permission) are already incorporating Fujitsu's ATM ICs into their respective broadband products.



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FMI designs and produces a number of devices for Ethernet local area networks, including single-chip controllers and coaxial and twisted pair transceivers. The latest addition to the product line, the MB86966, is a single-chip low-voltage (3.3 volt) device targeted at the fast-growing market for PC Cards.

Leading equipment vendors use FMI's Ethernet products in a wide variety of products. For example, GageTalker Corporation uses FMI's MB86965B EtherCoupler in their ruggedized, industrial computers. Xircom Inc. uses FMI's MB86964, a small-footprint single-chip controller, in their second-generation CreditCard Ethernet+Modem II Adapter for portable PCs. And Allied Telesyn Corporation uses FMI's single-chip controllers in a number of their Ethernet network interface cards.

FMI has also maintained a leading-edge position in general-purpose, high-performance SCSI integrated circuits since entering that market in 1986. The company's SCSI ICs are used in a variety of applications including large disk-array controllers, workstations, servers and high-end PCs. FMI is presently developing PCI-based SCSI-3 products that are expected to be introduced early in 1996.

FMI's single-chip plug-and-play controller, the MB86701A, provides



comprehensive autoconfiguration capabilities for PC Cards, simplifying upgrades and reducing costs. Because the product meets Microsoft Corporation's "PC95" requirements, OEMs using the device can certify their cards to carry the Windows 95 logo, an important step in assuring Windows compatibility.

## **Memory Products**

Over the past year, Fujitsu has taken a leadership role in driving the memory industry's conversion from traditional asynchronous DRAMs and Synchronous RAMs (SRAMs) architectures to the new high-performance synchronous architectures.

FMI was the first company to announce the 64-Megabit SDRAM, the industry's most powerful memory device. The company is developing a production version of that 64-Megabit SDRAM and is currently shipping production volumes of the 4-, 8- and 16-Megabit devices. FMI is also prototyping 256-Megabit memory devices. These next-generation architectures, which provide higher performance at lower cost, will support the stringent memory requirements of today's intensive computing and multimedia applications.

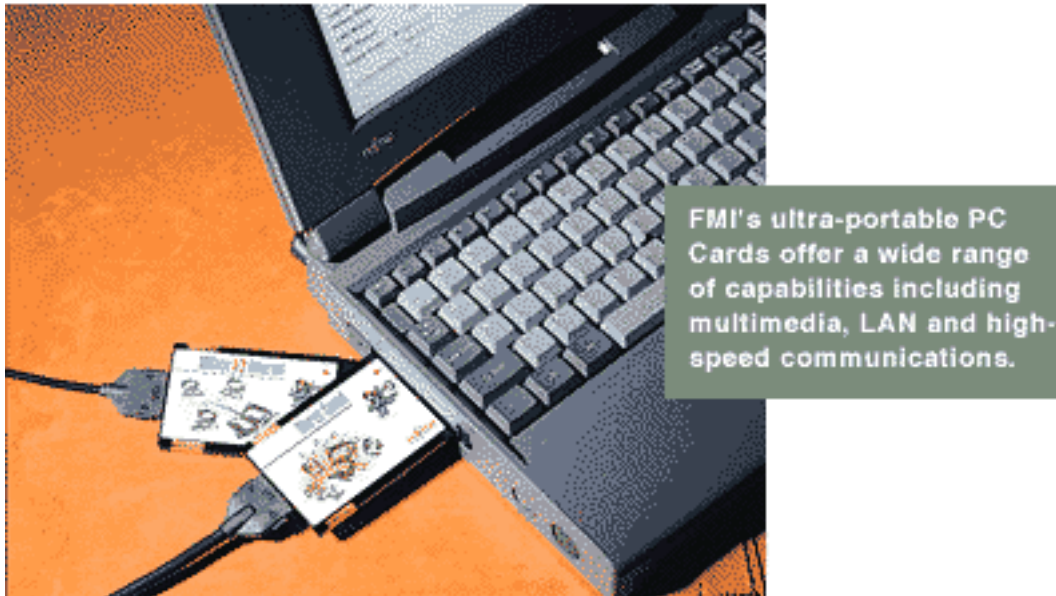
FMI's revenues from its memory products increased more than 75 percent in fiscal year 1994, due to a strong market, improved relationships with major customers and enhanced production output. FMI anticipates another year of strong growth as it makes significant progress in setting new industry standards and supporting the conversion to leading-edge high-performance memory products. To further increase its support for its customers in the Americas, FMI announced a \$1 billion expansion to its wafer fabrication facility in Gresham, Oregon, to produce 16 and 64 Megabit DRAMs and SDRAMs.

## **PC Cards**

A founding member of the PCMCIA (Personal Computer Memory Card International Association) standards organization, Fujitsu was one of the leaders in defining the original PCMCIA specifications and is now a leading worldwide manufacturer of PC Memory Cards.

The company has one of the industry's broadest lines of PC Cards. In addition to its memory cards, FMI presently markets PC Ethernet, fax-modem, sound, Integrated Services Digital Network (ISDN), SCSI and multi-function cards.

In its work on PC Cards, Fujitsu is leveraging its core competency in mobile computing. FMI will continue to expand its product line and plans to broaden its distribution to include retail channels in addition to its traditional OEM market.



## ASICs

Fujitsu is one of the largest producers of ASICs in the world. The company's ASIC product line ranges from commodity gate arrays to some of the industry's most complex, advanced embedded arrays. FMI is focusing on leading-edge chips with high gate counts to handle today's most complex applications. For example, the .5 micron CMOS ASIC, the 3.3V CG51/CE51, features up to 750,000 useable gates in a channelless, "sea-of-gates" architecture. The new .65 micron product, the 5V CG46/CE46, was developed specifically for workstations, data-communications systems and other mainstream designs that require high levels of performance and speed, together with reduced power consumption. FMI is presently shipping samples of its .35 micron ASIC family as well.

Few companies can match Fujitsu's submicron manufacturing capability, which enables customer to fit more functions onto a single ASIC chip. The addition of BGA (Ball Grid Array) packages, together with the .5 and .65 micron CMOS ASIC products, provide optimal, cost-effective, high-performance solutions to customers' design requirements.

FMI's semiconductors are installed in state-of-the products.



## Processors

The SPARC microprocessor is targeted at applications that require highly efficient computing power. FMI has continued to improve the performance of the SPARC product line. The company is presently shipping production volumes of the next-generation microprocessor, the microSPARC II. This product, which operates at 110 Megahertz, is used in Sun Microsystems' SPARCstation 5 family of workstations, the most popular workstation in the industry. FMI is now independently developing the next-generation SPARC microprocessor for use in computer workstations.

## Embedded Controls

FMI's other major ASSP product line, the embedded-control family covers the full range of performance and costs. These embedded controls are used in a wide variety of applications, from traditional areas such as office-automation products to newer applications such as communications devices. FMI is presently shipping production volumes of its lower-end 933H 32-bit embedded control, which provides high performance, consumes little power and is priced very competitively. FMI's new 934 high-performance embedded control is the first such product to have a direct interface to SDRAMs, allowing high bandwidth transactions between the processors and the system. The 936 highly integrated processor is presently shipping to early customers.



Fujitsu's embedded-control technology has gained wide market acceptance and is incorporated into many leading products in their respective categories. For example, EPSON's new ActionLaser 1600 personal laser printer uses the SPARClite Reduced Instruction Set Computer (RISC) microprocessor and the OmniSwitch from Xylan Corporation uses FMI's RISC embedded processors.

## **Interconnect Technologies**

FMI is one of the few semiconductor companies to offer value-added packaging solutions. FMI's interconnect expertise enables customers to combine their products or Fujitsu's products in unique ways to produce new levels of integration and performance. The company is making a substantial investment in this technology that helps designers achieve the maximum performance through reducing size and space.

The product offering includes custom modules such as hybrid ICs and multichip modules (MCM). Fujitsu, which offers a wide range of MCM technology available today, recently announced a new MCM technology for high-performance CMOS parallel computers. The new technology features the highest pattern density in the world on an MCM substrate.

FMI also markets board-level products, such as printed-wiring assemblies and printed-circuit boards. In 1995, Convex Computer Corporation gave FMI a special award for its printed-wiring boards and printed-wiring assembly products. Convex uses the products in its Exemplar SPP1000 and SPP1200 systems.

## **Marketing and Future Plans**

FMI markets its semiconductor products primarily through selected independent manufacturer's representatives and authorized distributors to OEM computer and telecommunications manufacturers worldwide. VARs and distributors will market the company's graphics products and PC Cards to retail channels.

To maintain and expand its leadership position, FMI is focusing increased amounts of its resources on high-end semiconductors such as ASICs and ASSPs. The company is also increasing its presence in high-growth areas such as PC Cards, telecommunications, networking and imaging through additional products based on ATM and other advanced technologies.

By far the major segment of the company's business, FMI's semiconductor products represent the pivotal factor in the company's success today and in the future.

FMI's semiconductor  
products expand computing  
power and performance.



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