



Company Profile

Company Description

WSI is a market leading producer of high-performance field-programmable peripheral integrated circuits. The company was founded in 1983 to serve the requirements of system designers who need to reduce the size and power consumption of their products, achieve higher system performance, reduce their manufacturing costs, and shorten their product development time in order to achieve faster market entry.

WSI produces six families of PSD field-programmable microcontroller peripherals as well as a broad line of high-performance non-volatile PROM and EPROM memory products. The programmable PSD microcontroller peripherals enable rapid

system design of smaller, lower power products containing embedded controllers. These peripherals are the first to integrate high-performance EPROM, SRAM and user-configurable logic and deliver a performance and integration breakthrough to the embedded controller market.

WSI's technology and product lines have enabled the company to establish itself as a leading supplier of high-performance programmable solutions to a broad customer base that includes some of the world's largest and most technologically advanced electronics companies.

Technology

WSI's patented self-aligned, split-gate non-volatile memory technology enables higher performance and greater memory densities per chip area than the traditional stacked-gate method. By developing significantly higher read current, the WSI EPROM cell has enabled the development of several memory devices that are the fastest of their type on the market. This core NVM technology is further leveraged by WSI's architecture and design innovations such as Alternate Metal Virtual Ground (AMG) and contactless memory

arrays resulting in dramatic die area savings. This high density memory capability enables WSI to provide cost-effective market leading products. WSI's proprietary NVM technology (licensed to American Microsystems, Inc., Sharp Corporation, National Semiconductor Corporation, Advanced Micro Devices, SGS-Thomson, and Tower Semiconductor) has enabled WSI to be first in the industry with numerous product breakthroughs in speed, high density, process innovations and packaging.

Markets and Applications

WSI's Programmable Microcontroller Peripheral and high-performance non-volatile memory products are used by the world's leading suppliers of advanced electronic systems in telecommunications, data processing, military, automotive and industrial markets.

Applications for the programmable PSD microcontroller peripherals include cellular telephones, bar code readers, modems, Internet routers, bus controllers, security systems, telecom switches, motor controllers and others. High performance

memory applications include digital signal processing, engineering workstations, high-speed modems, video graphics controllers, radar and others. By virtue of their high speed and user programming capability, WSI products are ideally suited for these applications where designers are pushing the limits of system performance in highly competitive markets.

Programmable Microcontroller Peripherals

Programmable Microcontroller Peripherals

WSI's families of Programmable Microcontroller Peripherals represent a new class of programmable products. They enable system designers to reduce the size of their products, achieve lower operating power, optimize system performance and shorten product development cycles. They are the first field-programmable devices to integrate high-speed EPROM, SRAM and programmable logic on a single chip. PSD devices are used in over 3000 product designs worldwide.

Alternately sourced by American Microsystems, Inc., mask programmable PSD versions (MPSD) are ideal for code-stable, high-volume low cost applications. Low cost SRAMless PSD versions are available.

Zero Power Technology

New Zero-Power PSD versions (ZPSD211R, ZPSD3XX, ZPSD4XX, ZPSD5XX, ZPSD6XX and ZPSD7XX) feature operation as low as 2.7 volts and standby power as low as 1 microamp. Operating power is significantly reduced (e.g., active power of 400 microamps per bus MHz) due to several innovative features which keep the memory and PLD sections at standby power except for a small portion of the access cycle time.

PSD3XX Family:

Each PSD3XX device integrates all the required peripheral memory and logic elements for an embedded-control design. Programmable logic, page logic, programmable I/O ports, busses, address mapping, port address/data tracking, 256K to 2 Mb EPROM, and 16K SRAM are all on board. Advanced features such as memory paging, microcontroller port reconstruction, track mode, configuration security bit, and cascading further enhance utility and value.

PSD3XXL Family:

Similar to the PSD3XX family, the PSD3XXL series operates in the 3-volt power supply range at low current levels. It is ideal for portable, battery powered equipment.

PSD4XX Family:

PSD4XX devices include 256K to 1 Mb of EPROM, 16Kbits of SRAM, 40 programmable I/O pins, a programmable microcontroller interface, an address decoder PLD and a 4-bit page register. Also included is a general-purpose high-density PLD with 59 inputs and 118 product terms in 24 flexible macrocells. A power management unit controls the zero power PLDs, battery backed-up SRAM and the automatic power-down unit. A programmable security bit protects the customer design from unauthorized access.

PSD5XX Family:

The PSD5XX devices extend the PSD4XX architecture by adding four 16-bit counter/timers including a watchdog timer, an eight-level priority interrupt controller, and a peripheral PLD to control the counter/timers and interrupt controller.

PSD6XX Family:

PSD6XX peripherals add 2,500 gates of PLD and Micro↔Cell™, logic that is directly connected to the MCU address/data bus. This programmable logic can be used for general requirements or for multiprocessor interfacing. Additional resources include up to 128KB of EPROM, 512 bytes of SRAM, extra I/O ports, Zero-power technology, and easy interfacing to any 8- or 16-bit MCU including the new '251 and XA controllers.

PSD7XX Family:

PSD7XX devices feature system supervisory resources to protect the system from power failure consequences. Programmable features include a WatchDog timer, reset generation, reset pulse width, and system power supply monitoring with selectable trip-points. Additional features include up to 128KB of EPROM, 512 bytes of SRAM, 27-I/O ports, three PLDs, Micro↔Cell logic, security bit, and more.

Programmable Peripherals

PAC1000 Programmable Peripheral Controller

The high speed PAC1000 sets a new standard for Programmable Peripheral performance, integration and functionality. The 16 MHz PAC1000 replaces up to 50 complex devices in high-end embedded controllers and microprocessor-based systems. Combining a CPU, 1K x 64 EPROM and extensive user-configurable logic, the PAC1000 assists its host processor with high rates of data manipulation and control, freeing the processor for other system functions.

Programmable Peripherals Development Tools

WSI's Programmable Peripheral products are supported with complete easy-to-use system development tools. Operating under Microsoft® Windows® 3.X, the PSDsoft™ design environment seamlessly integrates Data I/O's ABEL® and Simucad's Verilog-based SILOSIII® behavioral simulator along with WSI's fitting and configuration software.

Additional development tools include the WSI MagicPro® engineering programmer, an Internet web-based FTP software site, and easy access to WSI's highly skilled field and factory applications engineering team.

Production programmers that support PSD products are available from Data I/O, Logical Devices, Stag Microsystems, BP Microsystems, Advin Systems, Hi-Lo Research, Needham Electronics, Tribal Microsystems, System General, SMS, and others.

High- Performance Non-volatile Memory Products

WSI offers a broad product line of high-performance CMOS PROMs and EPROMs featuring architectures ranging from 2K x 8 to 128K x 8, with speeds ranging from 25 to 200 ns. Commercial, industrial and military products including MIL-STD-883C/SMD are available. A wide variety of package selections include plastic and hermetic, through-hole and surface mount types.

CMOS PROMs

As WSI's fastest family of products, Re-Programmable Read Only Memories (RPMs) provide high-speed bipolar PROM pinout with matching speed and low power operation. The product family includes architectures ranging from 2K x 8 to 32K x 8 with speeds ranging from 25 to 70 ns. Commercial, industrial and military MIL-STD-883C/SMD configurations are available in a variety of hermetic and plastic package types. New 3-volt versions are ideal for low voltage DSP applications.

Fast EPROMs

The high-speed "F" series EPROM family offers speeds ranging from 35 to 70 ns and architectures from 8K x 8 to 128K x 8 with JEDEC CMOS Pinouts. Fast EPROMs are ideal for use in high-end engineering and scientific workstations, data communications and similar high-performance applications.

"L" Family Military EPROMs

WSI's "L" family military EPROM memory products feature high-density and high speed in popular JEDEC pinouts. With speeds ranging from 120 to 200 ns and architectures to 32K x 8, the "L" family offers significant speed and high density benefits for developers of military avionics, communications, and control systems.

Manufacturing

WSI's manufacturing strategy includes utilizing multiple world-class manufacturing partners for each facet of the production process.

WSI has licensed its CMOS EPROM and logic process technology to Sharp Corporation in Japan, SGS-Thomson Microelectronics in Italy, National Semiconductor Corporation, Advanced Micro Devices (AMD), Tower Semiconductor (Israel), and American Microsystems (AMI) in the USA. The Sharp facility in Fukuyama, Japan employs the most advanced sub-micron VLSI integrated circuit manufacturing equipment available including ion implantation, reactive ion etch, and wafer stepper lithographic systems. SGS-Thomson Microelectronics provides WSI with Flash memory technology for use in PSDs and 0.6 micron process technology. The world-class high volume National Semiconductor operation delivers low cost production of 0.8 micron CMOS technology product on 6" wafers. Tower and WSI, in conjunction with WSI's Design Center in Israel, are developing a manufacturing process using WSI's proprietary NVM technology and Tower's 0.6 micron wafer fabrication process. AMI, as the USA's largest masked-ROM supplier, leverages mask-programmable PSD products with sub-micron manufacturing technology.

High-volume, low cost integrated circuit packaging and testing is performed by ANAM Electronics in Seoul, Korea, AAPI in the Phillipines, and at WSI in Fremont, CA. ANAM is the largest independent manufacturer of I.C. packaging and produces excellent product quality. Test capability ranges from simple logic devices to complex VLSI product. ANAM routinely processes a wide variety of high volume packages and enables WSI to leverage its materiel needs through ANAM's combined high-volume, low cost procurement activity. Commercial, industrial, and military grade product processing is available from ANAM.

Additional quality assurance and reliability testing are performed at WSI in Fremont, CA.

WSI's manufacturing strategy ensures the supply of multi-sourced high quality, high-volume product with fast delivery and competitive costs. All manufacturing partners are certified to ISO9002.



Sales Network

WSI's international sales network includes several regional sales managers who direct the resources of the company to major market opportunities. Experienced technical field application engineers located in each field office assist WSI's customers during their new product development and match customer needs with WSI's product solutions. Over sixty manufacturer's representatives and leading national and regional component distributors in the United States, Europe and Asia round out the WSI sales network.

United States

Direct sales and field application engineering offices in Chicago, Philadelphia, Dallas, Irvine and Fremont, CA; More than 25 manufacturer's representatives for major national accounts; national distributors include Arrow/Schweber, Avnet Electronics, Time Electronics and Wyle Laboratories; and regional distributors.

International

Direct WSI Sales management offices in Paris and Hong Kong; sales representatives and distributors in Austria, Belgium, Denmark, England, Finland, France, Germany, Israel, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden and Switzerland. Sales representatives and distributors for the Asia/Pacific Rim region in Australia, Hong Kong, India, Japan, New Zealand, Korea, Singapore and Taiwan. Also offices in Brazil and South Africa.

Management and Previous Affiliations:

Michael Callahan

President, CEO and Chairman of the Board (Advanced Micro Devices, Monolithic Memories, Motorola)

Carl Mills

V.P. Finance (Signetics)

Robert Hoard

V. P. Sales (Oki, Signetics)

Boaz Eitan

Sr. V. P. and Chief Technical Officer (Intel)

Howard Gopen

V. P. Operations (Weitek, Intel)

Reza Kazerounian

V. P. Research & Development (U. C. Berkeley)

Yoram Cedar

V. P. Business Development (Rafael)

Gregory Lebkowski

V. P. Sales (Europe)

David Raun

V. P. PSD and Memory Products

Mike Speckman

V. P. (Worldwide Distributor Operations)

Financing

WSI is a privately held California corporation founded in August, 1983. The company has been financed by corporate investors, institutional investors, venture capital groups and private investors. Corporate investors are Advanced Micro Devices, Sharp Corporation, National Semiconductor Corporation, Intergraph Corporation, and Kyocera Corporation. Venture capital investors include Accel Partners, Adler and Company, Bessemer Venture Partners, Genevest Consulting

Group S. A., Hambrecht & Quist, J. H. Whitney, Needham & Co., Norwest Venture Capital, Oak Investment Partners, Robertson Stephens and Co., Smith Barney Venture Corporation, U.S. Venture Partners, and Warburg Pincus. The company has been audited annually since its inception by Ernst & Young (Arthur Young prior to 1989) and regularly reports financial information to Dunn & Bradstreet (Dunns number is 10-209-8167).

