Corporate Backgrounder

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Xilinx, the leading innovator of complete programmable logic solutions, develops manufactures and markets a broad line of advanced integrated circuits, software design tools and predefined system-level functions delivered as cores. Customers use automated software tools and cores from Xilinx and its partners to program the chips to perform custom logic operations or other system-level processing functions.

Xilinx programmable logic solutions help minimize risks for manufacturers of electronic equipment by shortening the time required to develop products and take them to market. Customers can design and verify their unique circuits in Xilinx programmable devices much faster than they could by choosing traditional methods such as mask-programmed gate arrays. Moreover, because Xilinx devices are standard parts that need only to be programmed, customers are not required to wait for prototypes or pay large non-recurring engineering costs. Customers incorporate Xilinx programmable logic into products for a wide range of markets. Those include data processing, telecommunications, networking, industrial control, instrumentation, consumer electronics, automotive, military and aerospace markets.

Xilinx has more than 5,000 customers worldwide. Among the largest are Alcatel, Bull-France, Cabletron, Cisco Systems, EMC, Ericsson, Fujitsu, Hewlett-Packard, IBM, Lockheed-Martin, Lucent Technologies, Motorola, NEC, Newbridge Networks, Nokia, Northern Telecom, Siemens, StorageTek, Sun Microsystems and Texas Instruments.

Xilinx was founded in 1984 to pioneer a revolutionary new technology, the FPGA, and shipped its first commercial product in 1985. Today Xilinx fulfills more than half the world demand for FPGAs. The Xilinx product line also includes complex programmable logic devices CPLDs, which are generally faster than FPGAs for certain control functions but have fewer logic resources.

Headquartered in San Jose, California, Xilinx is a publicly traded company (NASDAQ: XLNX) that employs approximately 1,500 people worldwide. Revenues for the latest fiscal year ending April 3, 1999, were $662 million, up 8 percent, while net income was $131.8 million, up 4 percent from the prior year. Market researcher Dataquest currently ranks Xilinx as the seventh largest ASIC supplier in the world.

The Market

According to market researcher In-Stat, factory revenue for programmable logic devices totaled more than $2 billion in 1998 and is expected to represent approximately a $4 billion opportunity by 2002. At the low-end of the programmable logic market, more and more designers are switching from older programmable array logic (PAL) devices to CPLDs that provide higher densities ranging from a few hundred to several thousand

gates. At the high-end of the market, FPGAs are increasingly being used as replacements for more costly mask-programmed gate arrays and logic designs requiring up to one million system gates.

About 65 percent of Xilinx revenue comes from the communications and networking markets, which are characterized by last minute design modifications and rapidly changing standards. Customers in these sectors use Xilinx programmable logic in products such as routers, hubs, network adapter cards, telephone handsets, wireless base stations, cable and DSL modems, line testers and central office switches. Manufacturers of data processing equipment – workstations, servers, mass storage devices, printers and scanners, for example – account for another 20 percent of Xilinx revenue. The remaining 15 percent come from sales to manufacturers of industrial control, instrumentation, defense and aerospace equipment.

Operations

As a "fabless" supplier, Xilinx partners with leading semiconductor manufacturers – UMC Group in Taiwan and Seiko Epson in Japan – through close business relationships or equity positions in their factories. This strategy allows Xilinx to focus on designing new product architectures, software tools and cores while having access to the most advanced semiconductor process technologies. Today Xilinx is producing programmable logic devices on state-of-the-art 0.35 and 0.25-micron process technology, and development of 0.18-micron devices is well underway.

Xilinx has manufacturing operations in San Jose and near Dublin, Ireland, where product design, software development, final testing and quality analysis take place. Xilinx also has facilities in Boulder, Colorado, where much of the company's software development takes place, and in Albuquerque, New Mexico, where development of the CoolRunner CPLDs takes place.

Industry Leading ICs

Customer requirements for logic solutions that provide higher speeds and greater logic density continue to drive the demand for Xilinx products. The company currently offers several series of FPGAs and CPLDs that are tailored to meet the requirements of different applications.

FPGAs

Virtex The new Xilinx Virtex series fundamentally redefines programmable logic by expanding the traditional capabilities of field programmable gate arrays (FPGAs) to include a powerful set of features that address system level problems for high performance designs. The Virtex Series is also the industry's first family of FPGAs to offer a device with one million system gates.

The Virtex series has numerous built-in features to solve designers' challenges throughout the system: broad capability for chip-to-chip communications through support for new I/O standards, clock signal

synchronization on the FPGA and on the board, and a memory hierarchy to manage fast access to RAM on and off chip.

With the Virtex series, digital designers for the first time can use an FPGA to perform not only familiar logic functions, but also tasks that were formerly handled at the board level by separate, dedicated parts. The Virtex series eliminates the need for components such as phase lock loops, voltage translation buffers, and memory when on-chip RAM is sufficient. This high level of integration allows designers to reduce overall system power requirements, cut costs, and save board space.

Board level functions supported by the Virtex series include multiple, fully digital delay locked loops (DLLs) and support for more than a dozen deep submicon signaling standards. With these and other unique features, the Virtex series has created a new industry benchmark for FPGA functionality and performance.

Virtex technology provides the foundation for a scalable platform of FPGAs that are produced using a leading-edge 0.22-micron, five-layer metal process. Virtex FPGAs operate at system frequencies of up to 160 MHz. Densities for the new Virtex FPGAs range from the Xilinx XCV50™ device, with 50,000 system gates at the low end, to the high-end Xilinx XCV1000™ device, the first one-million gate FPGA to come to market.

XC4000XL/XLA The Xilinx XC4000XL/XLA family, the first full line of 0.35 micron FPGAs, is made up of 11 members offering densities range from 5,000 to185,000 system gates. The XC4000XL/XLA family is currently the industry's highest performance line of 3.3-volt FPGAs in full production.

XC4000XV The XC4000XV family, the industry's first 0.25-micron, 2.5-volt devices, provides densities ranging from 250,000 to 500,000 system gates for high-density, high performance applications.

XC4000E/EX and XC5000 For 5-volt solutions, Xilinx offers the XC4000E family for high performance applications, and the XC5000 Series for low-cost, high-volume applications requiring no on-chip RAM.

Spartan The Spartan series is targeted as gate array replacements for low-cost, high volume designs under 40,000 system gates which require on-chip RAM and can benefit from pre-defined software cores. Current Spartan devices operate at 3.3 volts and 5 volts. In large volumes, Spartan FPGAs are available for less than $2.50, making them highly competitive with conventional mask-programmed ASICs.

CPLDs

XC9500 The low-cost XC9500 family of Xilinx CPLDs, ranging in density from 36 to 288 macrocells and available in 3.3-volt and 5-volt versions, supports ISP, or in-system programming, allowing

manufacturers to perform unlimited design iterations during the prototyping phase, extensive system in-board debugging, program and test during manufacturing, and field upgrades. Based on advanced flash memory technology, the XC9500 family provides fast, guaranteed timing, superior pin locking, a full JTAG compliant interface, and 10,000 programming cycles.

Xilinx Internet-enabled Software Solutions

At Xilinx, software tools are a key part of the company's programmable logic solutions. Since its inception, Xilinx has shipped more than 60,000 development systems to customers worldwide. Today Xilinx offers two lines of design and implementation software that is Internet-enabled to allow designers instant and direct access from the tools to the technical support area of the Xilinx Web site.

Alliance Series Through its Alliance Series software, Xilinx has chosen open systems approach that allows its customers to pick the highest quality and widest variety of design and programming tools available on the market today. To accomplish this, Xilinx has established engineering and marketing relationships with the leading third-party suppliers of electronic design automation (EDA) software. Those include Aldec, Cadence, Data I/O, Exemplar, Mentor Graphics, Model Technology, OrCAD, Synopsys, Synplicity, Veribest and Viewlogic. This open systems strategy extends to front-end design creation, synthesis and verification. The result has been the creation of complementary technology and tightly integrated third-party links with the Xilinx Alliance Series backend place and route software for FPGAs and CPLDs.

Foundation Series Foundation Series is a family of a fully integrated, ready-to-use Windows NT and Windows 95 PC tools that support a broad range of FPGA and CPLD design requirements. Available at low price points and targeted at entry-level as well as high end users, the Foundation Series products leverage industry standard hardware description languages (HDLs), including Verilog/VHDL. The Windows-based Foundation Series software provides access to synthesis, schematic entry, gate level simulation and implementation tools. Since Foundation Series tools are integrated into a common design management environment, users have access to all technology from design entry and implementation to verification in a single software package.

Core Solutions

Today, more than 60 different predefined cores are available to implement system-level functions directly in Xilinx programmable logic devices. These cores, available from Xilinx and third-party partners, allow designers to cut design time and significantly reduce risk while having access to the best performing and lowest cost components available. Full information about Xilinx cores is available on-line from the IP Center area of the Xilinx Web site

LogiCORE products are sold and supported directly by Xilinx and include a PCI interface, digital signal processing (DSP) functions and a number of other modules such as adders, multipliers and look-up tables.

AllianceCORE modules are sold and supported by a network of third-party developers and are optimized for Xilinx devices. Current AllianceCORE products range from RISC processors and standard peripheral controllers to ATM functions.

The CORE Generator tool from Xilinx delivers highly optimized cores that are compatible with standard design methodologies for Xilinx FPGAs. This easy-to-use tool generates flexible, high performance cores with a high degree of predictability and allows customers to download future core offerings from the Xilinx web site. Both Xilinx and independent IP developers can design cores for the CORE Generator tool, which also serves as a cataloging and delivery system for related collateral for all designers using Xilinx.

Xilinx Online Upgradable Systems

In 1998 Xilinx announced its broad ranging "Silicon Xpresso" initiative to step up use of the Internet and Java tools and applications to increase the productivity of designers who use Xilinx programmable logic solutions. Silicon Xpresso includes:

Internet Reconfigurable Logic (IRL). The IRL methodology combines three fundamental technologies that will allow the design of a new class of products: pervasive networking, Java technology and reconfigurable Virtex FPGAs. These technologies will allow system-on-a-chip designers to create Xilinx Online upgradable systems that can be enhanced with new features, after installation at the customer site. These solutions will be targeted at emerging network appliances such as multi-use set top boxes, games, security systems and process controllers. In addition, IRL will be deployed in network equipment such as ATM, cellular base stations and satellite communications systems. The hardware for these Virtex-based products can be upgraded over the Internet to add new features or capabilities. IRL includes the JBits API and ChipScope tools.

JBits API is a Java-based tool set, or application programming interface, that allows designers to write information directly to a Xilinx FPGA to carry out whatever customer logic operations were designed for it. The JBits API permits the FPGA bitstream to be modified quickly, allowing for fast reconfiguration of the FPGA. With Virtex FPGAs, the JBits API can partially or fully reconfigure the internal logic of the hardware device. The Virtex architecture allows this reconfiguration to be as extensive as necessary and still maintain timing information. The JBits API also makes it possible to integrate the operations of the FPGA with other system components such as an embedded processor, a graphics coprocessor, or any digital peripheral device.

ChipScope is a portable, interactive debug tool, written in Java, that allows designers to examine the operation of Xilinx FPGA circuits. The ChipScope tool, like the JBits API, is Internet enabled, allowing for remote debugging of IRL based products. Designed to show data flow, the ChipScope tool displays the internal states of all FPGAs in the system. The ChipScope tool simplifies design verification required for system-on-a-chip designs. A waveform display permits both bit-level signal and multi-bit busses to be viewed in fashion similar to that used by circuit simulators. Moreover, a remote access feature allows multiple users to communicate with the hardware over a network for Internet team-based design. The ChipScope tool also allows the designer to functionally view tagged, but secure, intellectual property. This enables discrete core manipulation for system-on-a-chip design.

Java API for Boundary Scan is a Java API for the boundary scan market for programming, testing and debugging PLDs from any supplier. This Java API simplifies the current work flow, which now requires that device-dependant routines be translated, compiled and chained for each vendor's PLDs to ensure they are mounted properly and connected to other components according to design. The Java API for boundary scan will extend the Java platform's "Write Once, Run Anywhere" capability to the field of programmable logic. Any PLD supplier as well as manufacturers of automatic test equipment, device programmers and JTAG software developers can deploy it. In addition, it can be used to communicate with embedded processors, or Java Virtual Machines, to control board-level functions.

JBits applications, or "applets," can use the Java API for Boundary Scan for platform independent device configurations deployed locally or remotely over the Internet. These applets can be control programs, consumer interface programs, or updates. Previously, Java applets were only used to send software updates via the Internet. The JBits API makes its possible to create Java *logic* applets that can used to send new *hardware* updates via the Internet.

WebFitter is an Internet-based software productivity tool that permits customers anywhere in the world to do on-line fitting of CPLD designs from their PC or workstation. Designers access WebFitter from the Xilinx Web site and work from a graphical user interface integrated with the Netscape browser. WebFitter produces complete on-line reports for design evaluation, and it eliminates the need for designers to load software or manage updates and licenses because the latest Xilinx tools always reside on the Xilinx Web site. WebFitter accepts design files for Xilinx XC9500 complex programmable logic devices (CPLDs) and supports VHDL, Verilog, ABEL, XNF or EDIF input formats. After completing a front-end design, users simply enter their email address, attach their design file and send it to the Xilinx server for compilation. Shortly after, a return email provides a complete fitter report and bitstream to implement the design in the PLD.

Distribution

To reach its broad customer base, Xilinx has established a worldwide network of independent sales organizations – manufacturer representatives and distributors – supported by more than a dozen Xilinx sales offices throughout North America, Europe and Asia. Approximately 65 percent of Xilinx revenue come from sales in North America. Europe accounts for 20 percent of sales, Japan 10 percent, with South East Asia and the rest of the world generating another 5 percent.

Customer Service

The Xilinx commitment to customer success includes a complete and uniquely accessible array of services, training and support. Xilinx experts provide responsive resolutions to problems and creative, timely solutions to design challenges. A team of factory-based applications engineers forms the core of the Xilinx support organization. Another 300 field application engineers (FAEs) throughout North America, Europe and Asia provide on-site answers and consulting services for customers. FAEs, both from Xilinx and the company's independent sales organizations, are experts in electronic design. They also offer design evaluation of new projects and close consultation through the design process. Full training in design completion and methodology review is also available, along with special application consultation.

Xilinx augments this front-line knowledge with 24-hour access to sophisticated customer support information systems. Xilinx provides a worldwide cooperative hotline network and offers instant access to the latest information on the company's products and services through its XTALK network of electronic services. XTALK includes a bulletin board; E-mail access to technical support, applications and documents; phone-driven fax-back and order information systems; and the company's web page, www.xilinx.com.

Management

Willem P. "Wim" Roelandts, chief executive officer and president, joined Xilinx in January 1996. He is responsible for formulating the company's overall strategy and providing the leadership, vision and focus necessary for Xilinx to continue its pace of rapid growth and expansion. He joined Xilinx after a 30-year career with Hewlett-Packard. Immediately before coming to Xilinx, he served as senior vice president and was responsible for all aspects of HP's worldwide computer systems business, including research and development, marketing, manufacturing, sales and professional services. He holds a bachelor's degree in electrical engineering from Rijks Hogere Technische School in Belgium.

Bernard V. "Bernie" Vonderschmitt, chairman of the board, is a respected industry veteran with an extensive semiconductor background who served as chief executive officer at Xilinx until January 1996. Before co-founding Xilinx in 1984, he spent three years as vice president and general manager of Zilog's component division. Earlier, he held similar responsibilities with the solid-state division of RCA, where he worked for 20 years helping the company establish several major agreements with Japanese firms. He earned his MBA from

Rider University, Lawrenceville, New Jersey, and MS in electrical engineering from the University of Pennsylvania.

Bill Carter, vice president and chief technology officer, is responsible for identifying the technologies and technical talent necessary for Xilinx to continue its lead in the programmable logic industry into the next century. He joined Xilinx in 1984 and earlier served as vice president of research and development at Xilinx. He has been involved in integrated circuit design since 1974 and holds nine U.S. patents. He earned his bachelor's and master's degrees in electrical engineering from Santa Clara University.

Kris Chellam, senior vice president, finance, and chief financial officer joined Xilinx in July 1998. He is responsible for all aspects of finance, investor relations, and facilities. Chellam came to Xilinx from Atmel Corp., where he had served as vice president, finance and administration, and chief financial officer since September 1991, and from March to July 1998 as senior vice president and general manager of a product group. From 1979 until 1991, Chellam worked in a variety of financial management positions at Intel Corp. in both Europe and the United States.

Stacy Fender was appointed president of Xilinx K.K., the company's subsidiary in Japan, in April 1999. In that capacity, he is responsible for all aspects of sales and marketing in Japan and the Asia-Pacific region. He joined Xilinx in 1994 as regional sales manager, Asia-Pacific, and promoted to area sales director in 1997. He was instrumental in establishing Hong Kong as the regional headquarters and opening sales office in Korea and Taiwan. From 1989 to1994, he was district sales manager for Phoenix Technologies in Korea, Hong Kong and Singapore. Earlier, he worked as a sales manager at Harris Semiconductor and as a field sales engineer for Texas Instruments. He earned his bachelor's of science degree in computer engineering from Auburn University.

Steve Haynes serves as vice president, worldwide sales, at Xilinx. He joined Xilinx in 1987 as a regional sales manager in the Northeast, was promoted to area sales director in 1988, and served as vice president, North American sales, from 1995 to 1998. Haynes has over 25 years of sales and marketing experience in the semiconductor industry, including tenure at National Semiconductor and Silicon Systems. He earned his bachelor's degree in marketing from the University of Denver in Denver, Colo.

Clay Johnson, vice president and general manager of the HardWire Business Unit, is responsible for all aspects of the HardWire program at Xilinx. He joined Xilinx in 1990 and previously served as vice president of worldwide service and support. Earlier, he worked as European marketing manager and director of support. Before joining Xilinx, Johnson was director of customer support at Daisy Systems Corp. and a product engineer at Advanced Micro Devices. He earned his bachelor's degree in electrical engineering from the University of California, Berkeley.

Randy Ong, vice president of worldwide operations, has overall responsibility for manufacturing, quality assurance, testing, reliability and package development for Xilinx programmable logic devices. He also oversees strategic management of the company's semiconductor foundry partners. Ong joined Xilinx in 1990 and earlier held product development positions with ASPEN Semiconductor, Advanced Micro Devices and Fairchild Semiconductor. He earned his bachelor's and master's degrees in electrical engineering at the University of California, Berkeley.

Dennis Segers, vice president of FPGA product development and general manager of the High End FPGA Business Unit, is responsible for ensuring the delivery of the most cohesive hardware and software products in the industry. Before joining Xilinx in 1994, he served as vice president and general manager of the non-volatile products group at Benchmarq Microelectronics. He holds a bachelor's degree in electrical engineering from Texas A&M University.

Richard Sevcik, senior vice president of software, cores and support, is responsible for all aspects of software tools and cores at Xilinx, including product development, marketing and the company's relationships with third-party software developers. In addition, he oversees the company's support organization, which provides application and design services as well as training for customers worldwide. He joined Xilinx in 1997 from Hewlett-Packard, where he had served as group general manager of HP's Systems Technology Group. Sevcik received his bachelor's degree in engineering physics from the University of Illinois and his master's in solid state physics from Northwestern University.

Sandy Sully, vice president and Chief Information Officer, has been with Xilinx since 1995. She is responsible for worldwide information systems at Xilinx. Before joining Xilinx, she served as vice president of MIS at 3Com Corp. for three years. Prior to that, she was with National Semiconductor Corp. for eleven years, most recently as director of Worldwide Systems Development. Sully holds a bachelor's degree in business administration from the University of Michigan and an MBA degree from Pepperdine University.

Chris Taylor, vice president of human resources, came to Xilinx as director of employee relations and training in July of 1993. She has been in the human resources field since 1973 and previously worked for Computervision, Intel Corp. and Tolerant Systems. She ran her own consulting firm for seven years. She became vice president of human resources at Xilinx in January 1996. She holds a bachelor's degree in behavioral science from the University of Santa Clara.

Sandeep Vij, vice president of marketing and general manager of the High Volume FPGA Business Unit, has overall responsibility for all marketing activities involving the company's programmable logic solutions. Earlier he served as director of FPGA marketing at Xilinx. He joined Xilinx in 1996 from Altera Corp., where he worked for more than five years in a number of product marketing roles. Before that he held various

engineering and marketing positions at General Electric Co. He has master's degree in electrical engineering from Stanford University and a bachelor's degree in electrical engineering from San Jose State University.

Evert Wolsheimer, vice president and general manager of the CPLD Business Unit, oversees all aspects of CPLD product design, operations, product planning and software processes. Before joining Xilinx in 1991, he served as manager of technology development at LSI Logic and earlier held several R&D and marketing management positions at Philips. He earned his doctorate in electrical engineering from Delft University in the Netherlands and has three U.S. patents.

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