The Programmable Solutions Company™

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Programmable Logic Solutions

System-on-a-Programmable-Chip Solutions

Time-to-Market

High Performance

Complete System-Level Solutions

Altera Delivers Advanced Programmable Logic Solutions

Companies that can deliver new or improved products faster than their competitors will gain market share and enhance profitability throughout the life cycle of their products. Simply put, the company that gets to market first is the company that wins.

With Altera, you will get there first. Our programmable logic devices (PLDs) shorten development cycles, enabling you to launch a product while your competitors are still finalizing their design. Today's low prices make programmable logic devices ideal for system-level solutions.

Programmable logic devices are integrated circuits that can be customized by system designers at their desktops to perform specific, unique logic functions. Altera® programmable logic devices are the fastest and largest in the industry. They offer densities and speeds that are similar to those of mainstream gate arrays, while avoiding the high up-front costs, large production commitments, and risks that are typical of gate arrays. In contrast to gate arrays, programmable logic devices provide a high degree of flexibility—particularly when it comes to last-minute design changes. The combination of speed, flexibility, and reduced risk makes programmable logic an ideal design solution for today's electronic systems. Additionally, enhanced features and embedded functional blocks make Altera products ideal for system-on-a-programmable-chip applications.

At Altera, our goal is to provide a total solution that gives you the competitive edge. To accomplish this goal, we offer:

- Multiple product families with a total of over 500 chip/package combinations, so you can always find the density, speed, and package type that meets your specific needs
- Advanced development systems that are easy to use and provide seamless integration with industry-standard EDA tools
- Optimized, system-level functional blocks that help you complete your design faster and more efficiently
- A comprehensive customer support system to make sure you get the help you need when you need it

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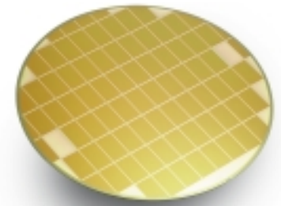
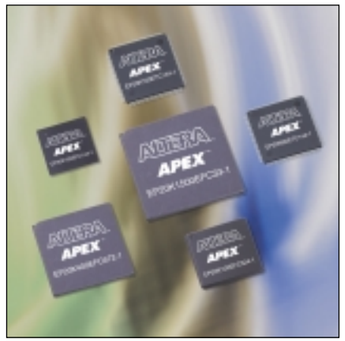


We are proud of our history of innovation. Altera shipped the world's first CMOS reprogrammable logic device in 1984 and has been a pioneer of the dynamic CMOS PLD industry ever since. A series of industry firsts and continual improvements has enabled Altera to become the world's leading supplier of programmable logic. The benefits of Altera's programmable logic solutions reach across a variety of industries, including telecommunications, data communications, as well as computers, and peripherals. In these and other industries, Altera devices are used in a multitude of applications ranging from networking and switching systems to mass storage, navigation systems, desktop servers, video, robotics, medical imaging, graphics and wireless communications. To address the widest range of design requirements and applications possible, Altera offers a broad line of product families that use state-of-the-art CMOS SRAM, EEPROM, and EPROM processes.

We are Dedicated to Making Your Design Process Quick and Successful

APEX 20K. With densities up to 1.5 million gates (over 2.65 million maximum system gates) and clock rates up to 622 MHz, Altera's Advanced Programmable Embedded MatriX (APEX™) family offers complete system-level integration on a single device. Designed to be 64-bit, 66-MHz peripheral component interconnect (PCI) compliant, the innovative MultiCore™ architecture combines look-up table logic, product-term logic, and embedded RAM with high-bandwidth, low-voltage I/O support and flexible phase-locked loops (PLLs) to deliver the ultimate in design integration and efficiency for high-performance, system-on-a-programmable-chip applications.



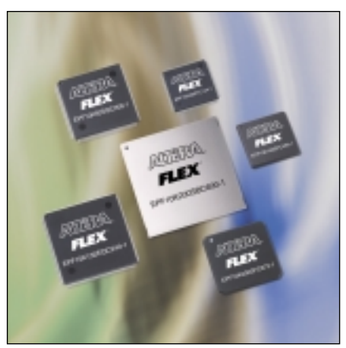
Altera offers a broad line of product families that use state-of-the-art processes.

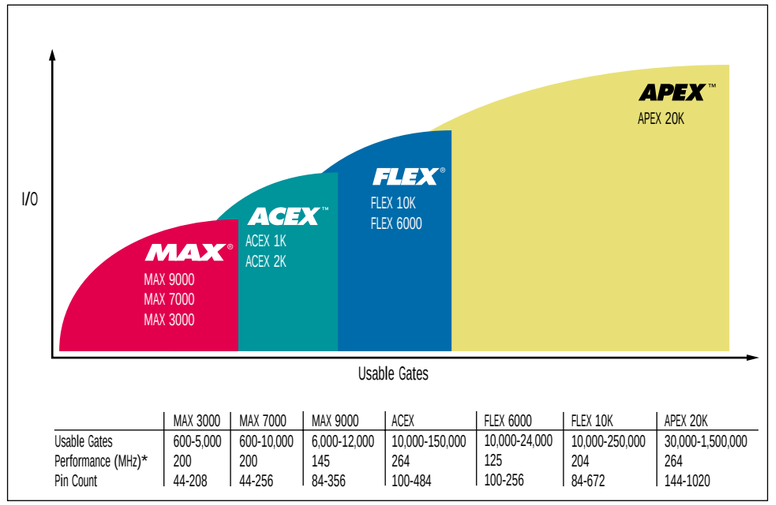
ACEX. Altera's new mid-density range, look-up table-based PLDs provide low cost and high performance for price-sensitive volume applications in the communications marketplace. ACEX™ devices offer the lowest cost-per-function in the industry and a cohesive roadmap across processes. The first ACEX family is based on a hybrid 0.18- to 0.22-micron, 2.5-V process, and features devices ranging in density from 10,000 to 100,000 gates.

FLEX 10K. The Flexible Logic Element MatriX (FLEX®) 10K family is one of the highest-performance, highest-density gate array replacements available in the market today. With devices as large as 250,000 gates, 64-bit, 66-MHz PCI compliance, and a phase-locked loop, the FLEX 10K family addresses the increasing levels of integration and high performance required for today's complex designs.

SRAM-based FLEX 10K devices, offered in 2.5-V, 3.3-V, and 5.0-V supply voltages with MultiVolt™ I/O operation, have a unique embedded architecture made up of both a logic array and an embedded array. The flexible, programmable embedded array consists of embedded array blocks (EABs) that can implement large blocks of RAM or logic. Various memory configurations and complex logic functions such as arithmetic logic units (ALUs), digital signal processing (DSP) algorithms, and microprocessor and microcontroller operations can all be implemented in FLEX 10K devices with the efficiency and speed of embedded gate arrays.

FLEX 6000. Altera's SRAM-based FLEX 6000 family delivers the flexibility and time-to-market of programmable logic at prices that are competitive with gate arrays. Featuring the industry's most efficient architecture — the OptiFLEX™ architecture — FLEX 6000 devices provide a flexible and cost-effective alternative to gate arrays for high-volume production. Every feature in the OptiFLEX architecture is targeted at producing maximum performance and utilization in the smallest possible die area.





	MAX 3000	MAX 7000	MAX 9000	ACEX	FLEX 6000	FLEX 10K	APEX 20K
Usable Gates	600-5,000	600-10,000	6,000-12,000	10,000-150,000	10,000-24,000	10,000-250,000	30,000-1,500,000
Performance (MHz)*	200	200	145	264	125	204	264
Pin Count	44-208	44-256	84-356	100-484	100-256	84-672	144-1020

* Counter frequency (16-bit, up/down loadable counter).

MAX 9000. The Multiple Array MatriX (MAX®) 9000 family offers devices with 320 to 560 macrocells. The EEPROM-based MAX 9000 devices are PCI-compliant and offer non-volatile 5.0-V in-system programmability (ISP) and MultiVolt I/O operation.

MAX 7000. The CMOS EEPROM-based MAX 7000 family is the fastest programmable logic solution available in the industry. This PCI-compliant family offers high-density devices ranging from 32 to 512 macrocells, operating voltages down to 2.5-V, MultiVolt I/O operation, and enhanced ISP support.

MAX 3000. The 3.3-V MAX 3000 device family is ideal for high-volume, low-cost designs. The family has enhanced support for ISP and ranges in density from 32 to 256 macrocells. With propagation delays as fast as 4.5 ns, MAX 3000 devices provide exceptional performance at the lowest price per macrocell among Altera MAX products.

Meeting Market Needs

PCI LOCAL BUS MEMBER

Altera strives to meet the emerging demands of the marketplace. To help our customers remain at the forefront of technical developments, Altera offers the most extensive selection of 64-bit, 66-MHz PCI local-bus-compliant devices, ideal for high-speed and high-bandwidth computing and networking applications.

FLEX DSP™

Altera's DSP solutions provides the performance and flexibility required for DSP applications. Because DSP algorithms optimally map to Altera device architectures, there is no tradeoff between flexibility and performance, making Altera PLDs a logical alternative to DSP processors and ASICs. PCI, DSP, and a wide range of end-market applications are supported by a comprehensive offering of intellectual property.

Programmable Logic Is Cost-Effective

System-Level Solutions

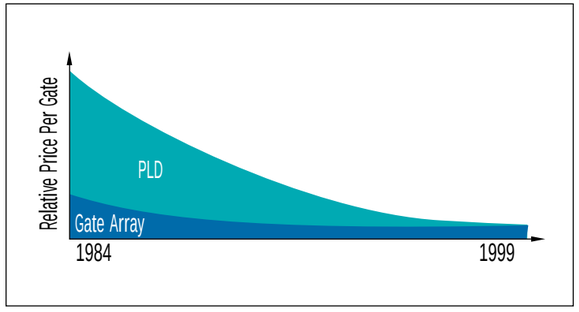
Designers today are challenged with producing quality products at lower costs than ever before. Altera helps meet this challenge by providing complete system-level solutions that reduce the amount of time and resources you will spend streamlining your development process. Altera's system-on-a-programmable-chip solutions combine our PLD product families, advanced development tools, and extensive intellectual property offerings to create a truly integrated and efficient design flow.

Gate Array Alternative

Due to PLD cost decreases through high-volume manufacturing and the use of aggressive process technologies, Altera offers devices that are similar in integration, density, performance, and cost to that of a gate-array solution. These factors, combined with the time-to-market and flexibility of a programmable-logic solution, continue to drive the increasing use of high-density PLDs in the development and production of electronic systems.

Simple Logic Integration

Integrating the functionality of several smaller PLDs into a larger one can reduce cost, board space, and overall power consumption, while increasing reliability. For example, the EPM7128A can integrate the logic of over ten simple PLDs and achieve a reduction in price, power consumption, and board space requirements. Also, because the board will contain fewer devices, there will be fewer interconnections between chips, thus resulting in greater system board performance and reliability.



Dramatic cost reductions and process migrations allow Altera to offer devices at prices comparable to gate arrays.

Advanced Development Tools

To enable you to quickly design with Altera devices for specific applications, we deliver the most advanced engineering software available. Altera's state-of-the-art Quartus™ and MAX+PLUS® II development systems are fully integrated software products that easily adapt to meet the designer's needs. Altera development systems consist of a variety of modular applications centered around a logic compiler.

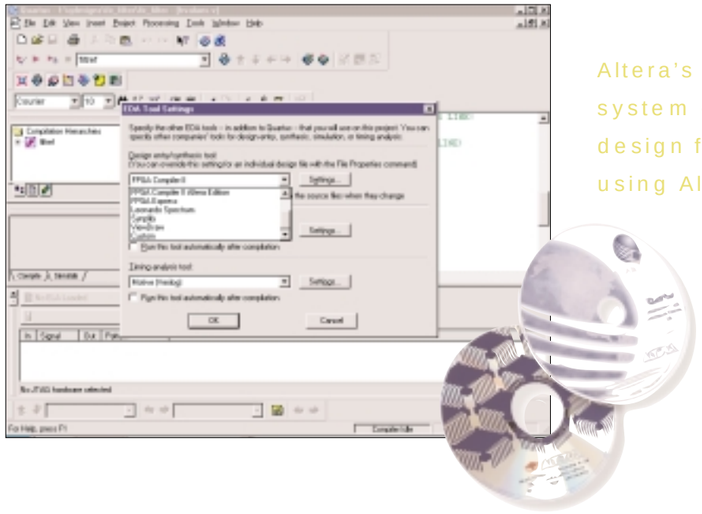
The MAX+PLUS II Compiler supports Altera's FLEX, MAX, and Classic™ families, offering the industry's only truly architecture-independent programmable logic design environment. This innovative design methodology allows you to create logic designs independent of the device architecture with hardware description languages (HDLs) such as VHDL and Verilog HDL. After you have entered a design, you can target it to any Altera device to determine the best fit. This architecture-independent design flow also allows the same design to be easily targeted towards a gate array.

Altera's fourth-generation Quartus software supports the APEX device family, offering revolutionary process advances that use state-of-the-art features—such as multi-processor support and incremental recompilation—to significantly reduce design cycles. The Quartus software supports system-on-a-programmable-chip methodology with block-level editing, workgroup computing, and expanded support for intellectual property, giving you the features and performance you need to design with today's million-gate PLDs.

Optimized Building Blocks Help Speed Your Design Cycle

Altera provides its customers with a wide variety of complex system-level functions that are optimized for the Altera device architectures. Altera's MegaCore™ functions are developed, pre-tested, and licensed by Altera, providing customers with a wide variety of functions ranging from PCI master/target interfaces to finite impulse response (FIR) filter functions and more.

Intellectual property is also offered through the Altera Megafunction Partners Program (AMPP℠), an alliance between Altera and developers of optimized synthesizable megafunctions. The AMPP alliance encourages megafunction development and adds significant breadth to Altera's intellectual property offering.



Altera's Quartus development system enables engineers to quickly design for specific applications using Altera devices.

Your Choice of Design Environment and Platform

Through the Quartus and MAX+PLUS II development systems, Altera pioneered an open design system that fits into your design environment. Altera opened the Quartus interface to various EDA partners to enable them to provide unmatched levels of integration. NativeLink™ integration provides a truly seamless interface between the Quartus software and major EDA software tools. The MAX+PLUS II software can exchange netlists in EDIF, VHDL, or Verilog HDL formats, providing a convenient interface to industry-standard EDA tools. The Altera Commitment to Cooperative Engineering Solutions (ACCESS^{SM}) program consists of EDA vendors that have developed design entry, synthesis, and analysis software products that support all of Altera's programmable logic families. Through this program, Altera offers a seamless path to industry-standard EDA tools common in many of today's design environments.

The Quartus and MAX+PLUS II software can be used alone or together with industry-standard EDA tools. They run under Microsoft Windows on PCs and on UNIX platforms from Sun, HP, and IBM. Regardless of your preferred platform, Altera development systems provide a rich graphical user interface, complemented by instantly accessible on-line documentation. The variety of dialog boxes and menus, combined with comprehensive on-line help, and Internet-based product support, notably simplifies the design process.

Advanced Packaging Technology

Altera programmable logic devices are available in a wide variety of packages and pin counts for surface-mount or through-hole applications. To provide maximum logic integration in the smallest board area, Altera has pioneered the use of 1.0-mm thin quad flat pack (TQFP) and space-saving ball-grid array (BGA) packages for programmable logic. With the advanced FineLine BGA™ and Ultra FineLine BGA packaging, Altera offers the most space-efficient and cost-effective packaging for high-pin-count devices in the PLD industry.

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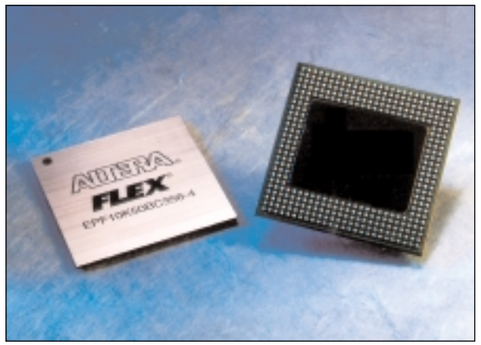


Technical Support

Altera provides the industry's most complete multi-tiered support system to meet customer needs. This system includes the comprehensive on-line help built into both the Quartus and MAX+PLUS II development software, as well as Internet support for Quartus; a technical support hotline where customers can receive direct technical support for devices and tools; an on-line database of technical solutions accessed through the Altera web site; a 24-hour file transfer protocol (FTP) site for instant Internet access to product information; and an electronic mail (e-mail) response for sending technical questions to Altera's technical support team. Altera's web site also provides the latest information on Altera devices and software development tools, as well as technical literature and information on special programs.

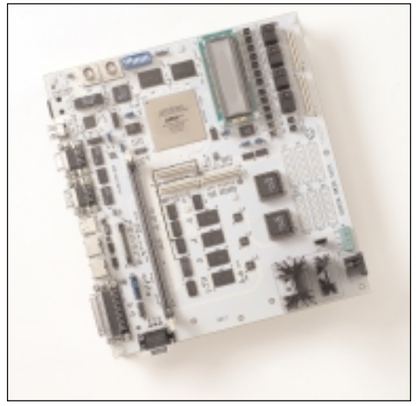
Altera offers a Failure Analysis Service, which is designed to perform detailed analysis on suspected failing devices. In addition, Field Applications Engineers are available worldwide to help enter and evaluate designs at customer locations. For customers who desire hands-on training, we provide a variety of on- or off-site programs that teach innovative and efficient design techniques.

Altera offers the industry's most complete multi-tiered support system to meet customer needs.

Quality & Reliability

Every Altera product undergoes a series of extensive qualification and characterization tests. Each programming element is tested numerous times during manufacturing, helping to ensure 100% programming yield and eliminating the uncertainty of testing one-time programmable processes such as antifuse. Additionally, Altera maintains modern quality assurance systems that have been widely audited and conform to ISO 9001 requirements.

I.S. EN ISO 9001



Developing Future Generations

Altera continues to define the future of programmable logic design by focusing on research and development, key industry partnerships, and educational programs.

We commit a significant portion of our revenue to R&D. For example, Altera has pioneered research in reconfigurable hardware products using our SRAM-based FLEX device families. Reconfigurable hardware is a new application area that holds exciting possibilities for new product development by enabling hardware to be changed as easily as software for maximum system flexibility and speed.

Altera's University Partnership Program provides major universities around the world with a design package that includes a board with Altera devices, a student version of the MAX+PLUS II development software, and technical literature. These commitments ensure that tomorrow's designers will be well equipped to use leading-edge programmable logic devices to meet their design challenges.

The Programmable Solutions Company

When you choose Altera for your programmable logic needs, you get much more than speed and density. You get design cycles that measure in hours instead of days or weeks. You get comprehensive technical support, easy-to-use design software, and technology leadership. You get the time-to-market edge you need to be successful. You get system-on-a-programmable-chip solutions. These reasons are why you get there first when you choose Altera, The Programmable Solutions Company. For more information, contact your local Altera sales representative or visit us on the web at http://www.altera.com.

Altera maintains modern quality assurance systems that have been widely audited and conform to ISO 9001 requirements.

Timeline	Date	Significant Events
	1983	Altera is founded
	1984	EP300–world's first EPLD A+PLUS–Altera's first PC-based development system
	1985	EP1200–world's first high-density PLD
	1988	Altera stock goes public MAX 5000 architecture introduced
	1989	AHDL (Altera Hardware Description Language) introduced
	1990	Altera purchases 17% of Cypress Texas wafer fabrication facility Altera's first UNIX-based PLD development system
	1991	MAX+PLUS II–industry's first Microsoft Windows-based development system MAX 7000 architecture introduced
	1992	EPM7032–Altera's first EEPROM PLD ACCESS program–industry alliance with EDA and programmer manufacturers FLEX 8000 architecture introduced
	1993	EPM7032V–world's first 3.3-V complex PLD Altera ships 15,000th PLD development system MAX 7000E architecture introduced
	1994	Altera purchases Intel's programmable logic business Altera wins prestigious President's Export Achievement Award MAX 9000 architecture introduced
	1995	MAX 7000S architecture introduced FLEX 10K architecture introduced Altera completes first stock split Altera ships 20,000th PLD development system AMPP–industry's first alliance of intellectual property providers
	1996	Altera ships EPF10K100–world's first 100,000-gate embedded PLD Altera partners with TSMC to build domestic manufacturing plant (WaferTech) MegaCore functions introduced as part of MAX+PLUS II FLEX 10KA architecture introduced
	1997	Altera completes second stock split FLEX 6000 architecture introduced Altera moves into new corporate headquarters MAX 7000A architecture introduced Altera announces APEX–2 million gate device family Altera Consultants Alliance Program (ACAP) introduced
	1998	FLEX 10KE architecture introduced Altera ships EPF10K250–world's largest PLD (250,000 gates) Altera ships EPM7128A–world's fastest 3.3-V complex PLD
	1999	Altera completes third stock split Altera completes rollout of APEX 20K 2.5-V family with the EP20K2000 Altera completes rollout of FLEX 10KE 2.5-V family with the EPF10K30E Altera ships Quartus software for system-on-a-programmable-chip solutions MAX 3000A architecture introduced Altera acquires Boulder Creek Engineering Altera opens Programmable eStore, selling software tools and IP on the internet