

# Developing New PLD Solutions

by **CHUCK FOX** ♦ Vice President, Product Marketing

By the end of 1995, Xilinx will have introduced more new programmable logic device family solutions in the last 18 months than in our prior ten-year history. Why so many? Why now? As with most semiconductor products, the answer to both questions stems from the convergence of technology and market needs.

## Technology and Markets

First, there is the "push factor" of rapid advancements in IC fabrication technology. It took the industry nearly a decade to migrate from 2.0 micron to 1.0 micron technology. Yet, the move from 1.0 to 0.5 micron has taken less than five years (and 0.35 micron technology is only a year or so away). These shrinking IC geometries, along with larger wafer sizes, additional layers of metal interconnect, new software technologies and new packaging technologies have allowed dramatic increases in device density and performance. Equally dramatic price reductions have followed.

Advances in IC processing technology have accelerated the development of new programming structures. Xilinx is the only PLD company that is providing cost-effective and reliable SRAM, antifuse, EPROM and FLASH processes now available in volume production.

These technology shifts, of course, influence PLD architectural development. What conventional wisdom assumed was impossible yesterday may be feasible today. For example, the shift from two-layer to three-layer metal processes alters the "logic vs. routing" trade-offs in FPGA design (as evident in the new XC8100, XC5200, and XC6200 FPGA family architectures). Thus, advances in process technology lead to new programmable logic architectures.

Just as influential is the "pull factor" of increasingly competitive end-use markets. Today's electronic system market is characterized by global competition and changing industry standards, resulting in higher-performance products with shorter life cycles.

Design methodologies are changing; higher levels of design abstraction and automated tools are required to meet the twin challenges of increased complexity and decreased time-to-market.

## Inspiration + Ability = New Architectures

Thus, our new product offerings reflect the goal of every electronics design: leverage advancing technology to best match users' needs. In some cases, this takes the form of evolutionary improvements to current products, such as enhancing the popular XC4000 FPGA architecture to create the XC4000E family. In other cases, it involves new product development to take full advantage of new technologies or to address new markets; for example, the XC5200 architecture leverages 3-layer metal technology to lower FPGA costs, thereby expanding FPGA



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The high-performance XC7336Q is just one of the new products introduced by Xilinx in the first half of 1995.

## GUEST EDITORIAL

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usage in high-volume applications.

Why so many PLD architectures? CPLDs and FPGAs are being used in an amazingly wide variety of logic applications, ranging from simple interface logic to reconfigurable computing arrays. While PLD use in communications, industrial and peripheral control applications continues to expand, increasing PLD capabilities and decreasing prices are opening up new markets in PC and consumer applications. Different applications have different needs. Different users have different preferences. No single technology or architecture can meet all those needs and desires.

The SRAM-based XC2000, XC3000A/XC3100A, XC4000E and XC5200 architectures remain the best FPGA architectures for "glue logic" applications. Each has a slightly different mix of attributes. The XC3100A family offers the best raw speed,

tions requiring "instant-on" operation, the increased security of a one-time-programmable solution, or a more "ASIC-like," synthesis-friendly design flow.

Some applications fit better with a CPLD-type architecture. The XC7300 family, featuring industry-leading performance, continues to expand with the recent additions of the XC73144 and XC7336Q. A revolutionary, new, in-system programmable architecture, based on flash memory technology, will be introduced later this year.

### Industry Leadership

Why now? It has always been our corporate goal to be the leading supplier of programmable logic. Simply put, we want to fulfill all of our users' high-density programmable logic needs. As Xilinx and the programmable logic market grew in the late 1980s and early 1990s, we became the leading PLD supplier and could afford to make substantial investments in research and development. The new products appearing now are the result of years of development. As the largest and most successful supplier of programmable logic, we have the engineering resources to explore different approaches and support multiple development efforts. With the recent acquisition of FPGA-software-supplier NeoCAD, we are setting the standard for leading-edge development software to support multiple component families.

High-density PLDs are rapidly becoming a critical, strategic technology for leading electronic systems companies. A broad product line supported by a powerful, unified suite of development tools gives the user the best of both worlds — the choice of the most-appropriate PLD architecture, and no need to purchase and learn a new set of design tools. We think this is crucial to being not only your programmable logic *supplier*, but also your programmable logic *partner*. ♦

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the XC4000E provides the largest densities and feature set (including on-chip memory), and the XC5200 delivers the lowest cost per gate. We will continue to enhance these architectures and improve these product families. The new XC6200 FPGA architecture, with its built-in processor interface, targets a different type of application — reconfigurable coprocessing (although it will undoubtedly find its way into other applications as well). The XC8100 FPGAs are ideal for those applica-