Xilinx Online-

A Revolution in Logic Design

With our latest technology, you can create unique new systems that can be remotely reconfigured, upgraded, and maintained at your customers' premises, anywhere in the world.

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Xilinx Online represents a whole new concept in logic design. Now for the first time, it's very practical and cost-effective to design hardware that easily adapts to a changing environment; the advantages of this new technology are enormous and far reaching. This capability is expected to soon replace many conventional fixed-logic designs because the benefits are very compelling.

New Possibilities

Using the reconfigurable logic capability of our Virtex FPGAs, and our new software technologies that enable its use, you can create unique new designs such as:

- **Systems that can accept new features and bug fixes over any network, including the Internet.** For example, imagine shipping new systems, even before their final specifications are complete. This is very useful, because in our industry there is an increasing level of competition between many new standards, for everything from interface specifications to communication protocols. This competition between emerging standards creates open-ended delays for new product introductions and it can significantly decrease the life span of your designs. However, using Xilinx Online technologies, you can enter the market far ahead of your competition and easily adapt to the changing standards, long after your systems are installed.
- **Systems that adapt themselves to a changing environment, on-the-fly.** For example, imagine MPEG decoders or pattern recognition devices that can automatically adapt their algorithms to match the quality of the incoming data. Plus, you can download new algorithms, as they are developed, without interrupting system operation.

In the future it will become even more crucial for you to have the capability of adapting to many different evolving standards and changing environments. If you wait to see which competing standards win, or to see which options your customers are buying, you run the risk of always being behind the technology curve, and your product life span (and profitability) will be significantly reduced.

By creating reconfigurable hardware, you will extend the life and profitability of your systems, and you can also generate new, on-going revenue from existing systems. For example, its not difficult to imagine "universal" Internet-based appliances that can become whatever your customer chooses (and is willing to pay for). With this type of device you can continue to create and sell new designs, long after your initial system was purchased, without shipping any new hardware.

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It's Happening Now

Researchers have been investigating this concept for years, and a few forward-looking companies have already created FPGA-based products that can be reconfigured from afar. IBM, for example, currently markets an ATM switch whose FPGA-based logic can be changed over the network to bring it into accord with the latest changes in the ATM standard. While such reconfigurable hardware is not yet mainstream, a number of Xilinx customers—including large communications companies—are very interested in the idea and are well along the way with major designs efforts.

The types of systems that could benefit from being field upgradable are wide-ranging. Almost any system that has some type of connectivity to the "outside world" can benefit from the Xilinx Online technologies. Typical products include network appliances, set-top boxes, security systems, network diagnostic equipment, cellular base stations, and satellite communications systems. Other likely applications are HDTV, video and image processing, encryption, military communications, surveillance, radar, and sonar.

The Enabling Technologies

Three enabling technologies have recently come together to make it possible for you to easily upgrade your hardware remotely:

- **Pervasive networks such as the Internet** provide the infrastructure that allows you to easily communicate with any type of system, anywhere in the world. Through networks (or any type of communication medium), new FPGA designs can be downloaded and tested, remotely.
- **The Java language** makes it easy to implement universal software applications. Using Java we can create applets that perform the necessary functions of transporting, programming, and verifying FPGA designs, on any type of host system. A Java "virtual machine" can also be implemented in an FPGA if necessary, so a separate microprocessor is not required.
- **The new system-level, Virtex FPGAs from Xilinx** now have enough speed and capacity to implement high performance applications. Our advanced sub-micron fabrication technologies have enabled us to significantly reduce our prices while increasing density and performance.

Our Virtex family was designed from the beginning to allow complete or partial reconfigurability. This means that you can change part of the FPGA while the other parts are still running. These features, along with abundant on-chip RAM (of various types), advanced clocking capability (using Delay Locked Loops), and support for many different I/O types (up to eight different standards simultaneously), makes the Virtex family the perfect choice for remotely upgradable applications.

Most systems today already come with some form of built-in communications or microprocessor interface, making the addition of remote field update capability a simple matter. And, many new tools are being developed that will make it even easier for you to create field upgradable products.

Summary

The capability to remotely upgrade and debug your systems brings many compelling advantages over conventional fixed-logic designs; you can get to the market much sooner, stay in the market much longer, and sell new features as they are developed. Clearly, manufacturers who create remotely upgradable systems today will be the ones who lead their markets in the not-too-distant future.

By incorporating Xilinx Online capability, your equipment is cheaper to maintain, and it will not become prematurely obsolete—benefits that your customers will appreciate and pay for. Σ