finger lakes engineering

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Freescale Design Alliance Partner

Finger Lakes Engineering is happy to announce that the firm has been accepted into the Freescale Semiconductor Design Alliance Partner Program.

FLE has been developing applications for over four years using a variety of Freescale Semiconductor products such as the 8-bit HCS08, 16-bit HCS12, and high performance network/imaging processors such as the MPC500/PowerPC products and the new i.MX ARM based image engines. FLE was approached by Freescale Semiconductor for nomination into the Design Alliance Program in February of 2006.

The DAP program will allow FLE to further assist our Freescale clients because the firm will now have advanced access to Freescale engineering documents, design references, evaluation boards, and information on upcoming product launches. The advanced access will help FLE develop higher performance and lower-cost solutions for our clients through a direct contact with Freescale's engineering and product teams.

RoHS Compliant = YES!

Finger Lakes Engineering is announcing that all of the firm's engineering design libraries have now been converted to provide our clients with fully RoHS compliant circuit board designs.

The European Union (EU) has enacted Directive 2002/95/EC, commonly referred to as the RoHS requirement (Restriction of Hazardous Substances) initiative. This law will become effective on July 1, 2006. This legislation has been enacted as a method to help reduce both environmental contamination (from recycled/disposed electronics) and human health hazards associated with toxic chemicals that are within nearly all electronic devices.

The RoHS/WEEE requirements have not *yet* been adopted as a law in the United States. However, component vendors are moving their devices to fully RoHS compliant and this is affecting all manufactured products (i.e. lead-times and availability of components).

FLE recommends that all manufacturers should check their component lead-times and availability throughout the next 12 months to ensure that all designed-in components will still be available.

Additional information on RoHS can be found at www.FL-ENG.com

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Processors, FPGAs, and Saving $$$ Part #3

By Steve Spano, President and Principal Consultant

In Part 2, we talked about microprocessors and how they operate. It was shown that $1 processors through higher-end "pipelined" processors can really only perform one or two (maybe three on a good day) operations at any time. In this installment, we are going to discuss the FPGA architecture and how it is the optimal solution to provide a lower-power, simple to implement, and extremely high performance processing system.

What is an FPGA (Field-Programmable-Gate-Array)?

Think of an FPGA as a device constructed from the "DNA" of a computer system. An FPGA device, such as the Xilinx Spartan3 or Vertex, is comprised of three main logic elements; common elements found in every modern microprocessor.

These elements are Ram Blocks, Flip-Flops, and Look-Up-Tables. These three elements, properly combined, allow an engineer to custom design a computing system to solve a specific problem, such as moving 10Gb/s of network data, compressing a video image, or filtering/processing an audio signal.

The Block-Ram, Flip-Flops, and Look-Up-Tables are located within an interconnect matrix on the FPGA silicon. The interconnect matrix allows virtually any input/output signals to be connected to any of the ram/flip-flops/look-up-tables in the device. The Look-Up-Table is used to emulate the Boolean logic associated with individual logic gates such as AND/OR/XOR/NOR/etc. These structures can be combined to create an almost limitless range of customized processing systems tailored specifically to each application. It is through this customization, that the optimal balance between power, performance, and scalability can be achieved.

How Do I Develop with an FPGA?

An FPGA device is typically developed using a Hardware Description Language (HDL) such as Verilog or VHDL. By using this language, an engineer can programmatically describe the hardware structure of a computing system right down to an individual flip-flop.

An FPGA, such as the Xilinx Spartan3 or Vertex4, is commonly paired with existing or third party Intellectual Property cores. The "cores" can be thought of as discrete components that reside within the FPGA fabric, rather than consuming real estate on a printed circuit board. IP cores are commonly used to add advanced functions such as Ethernet, Memory Interfaces, and DSP elements into a design.

It is also possible to develop FPGAs using schematic entry tools to manually draw logic gates. However, with the advent of multi-million gate FPGAs and hundreds of IP cores, a hardware description language can save tremendous amounts of time during the development cycle.

What can an FPGA do for me?

An FPGA device can pretty much do anything you want! You can combine the "DNA" elements to form image processing engines, Ethernet packet processors, signal acquisition systems, Fourier decompositions processors, video display adapters, hard-drive interfaces, PCI bridges, and many more such systems.

The defining element of a FPGA is the ability to perform parallel operations on a data-set. In the last installment of inPhase, we showed that a traditional microprocessor can only perform one-or-two instructions at a time. In an FPGA device, there are no "instructions". Each operation is a dedicated hardware event (such as an add, multiply, get, store, etc). These operations can be overlapped or pipelined together and created in a way that allows the operations to execute on each system clock cycle.

FLE has realized over 100x performance gains in time-critical applications using FPGA based solutions as opposed to a traditional processor method.

Taking advantage of true parallel operations is the path way to achieve the optimal balance between power, performance, and scalability for your applications.

Finger Lakes Engineering: Vision, Mission, Values

Vision: To be the first choice engineering service provider for the most innovative companies in the world, to provide an ethical and flexible work environment for our staff, and to continually invest in our community.

Mission: To develop relationships with companies who use electronics technology and help them achieve a superior marketplace advantage by providing complete hardware design services from concept through production on a fixed cost quote.

Values:

- Treating each client as if they are our most important customer
- Open and timely communications with our clients and employees
- Maintaining the confidentiality and security of client information
- Treating our employees with fairness, respect, and accountability
- Continued business growth through reinvestment of profits

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Stay tuned for Part#4 of the series "Processors, FPGAs, and Saving $$$" and more FLE news.

Do you have an Idea for a topic that you would like to see FLE discuss?

Email your suggestions to steve@flconsult.com