finger lakes engineering

inPHASE

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Free From FLE

In June 2006, FLE has begun to release key "building block" Intellectual Property Cores to the engineering community.

The Free-From-FLE program provides FREE access to design proven IP Cores that can be openly and freely reused.

The initial releases of the Free-From-FLE cores will be targeted for the Xilinx Microblaze processor and developed using VHDL code. These cores will be directly synthesizable within the Xilinx Platform Studio design tool available at www.xilinx.com

The Free-From-FLE IP modules are available directly at www.FL-ENG.com.
The June 2006 Free-From-FLE cores are listed below.

VersionControl → *Easily track the FPGA hardware version of a Microblaze design.*

FT245BM→ *Direct interface to the FTDi FT245BM USB 1.1 Controller. Allows for an extremely simple and high performance USB+Microblaze Implementation*

I2CDriver→ *Firmware routines for a "bit-bang" implementation of the I2C Protocol*

LCDDriver→ *Microblaze core to allow direct interface to a graphic/text LCD display*

QuadDecoder→ *Quadrature signal decoder with integrated digital debounce*

SPICore → *4 channel 16-bit SPI output core for interfacing with D/A's etc*

ToneGen → *Simple and easy to use Frequency Generator for use with a Piezo buzzer*

UartLiteX → *Extension of the Xilinx UART LITE core, provides register adjustable baud rates and embedded auto RTS/CTS hardware handshaking.*

Learn More at WWW.FL-ENG.COM

FLE has also launched a developers forum located at www.FLEDEVFORUM.com

Over time, the developers forum will provide a common knowledge base where engineers can trade ideas, techniques, and successes on topics such as VHDL cores, FPGAs, Windows Drivers, and other R&D activities.

FLE will provide support guidelines and Q&A to registered users who sign on to the developers forum.

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Processors, FPGAs, and Saving $$$ Part #4

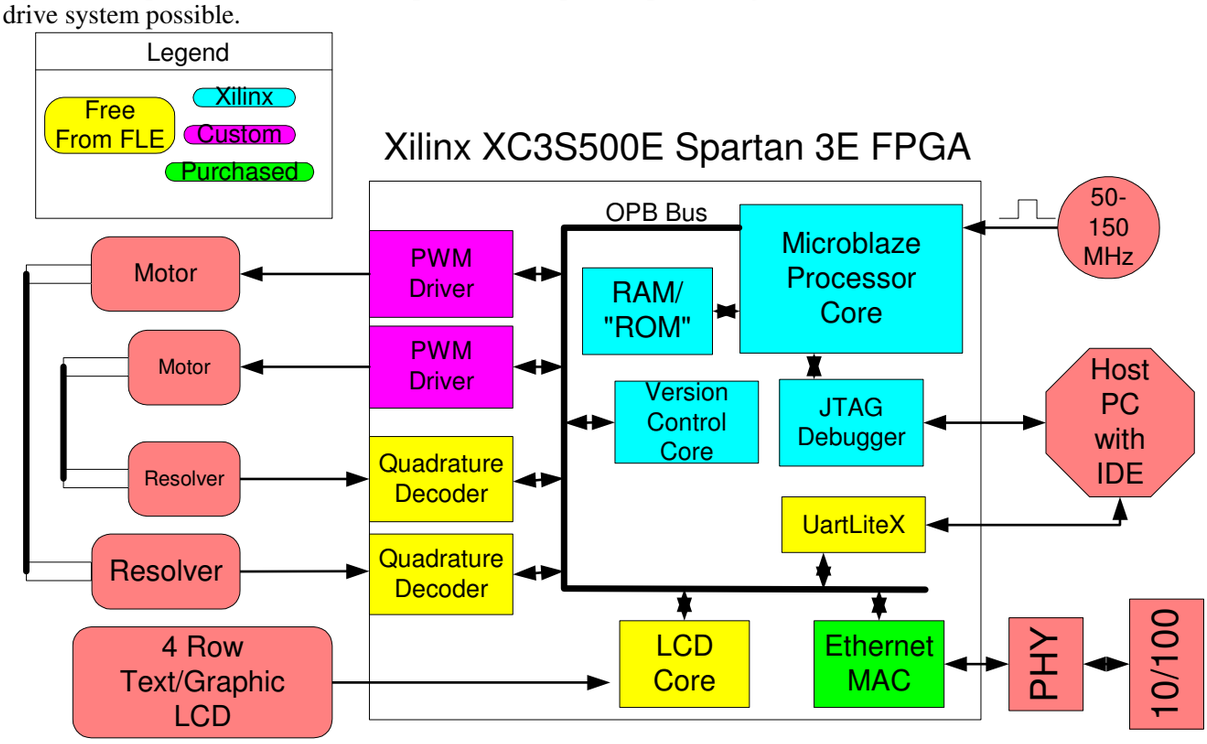
By Steve Spano, President and Principal Consultant

In Part 3, we spoke more about the structure of an FPGA device, how you can begin developing with an FPGA, and what an FPGA can actually do to help a design. In this issue of InPhase, we will discuss a specific example of a Xilinx Microblaze based FPGA design that also implements some of the Free-From-FLE IP Cores.

Xilinx Microblaze Motor Controller w/ Ethernet, Motor Drivers, LCD, and Quadrature Feedback

Goal: Develop a network based motor control system capable of moving a gantry at a high rate of speed with best-in-class position accuracy and settling time. The system receives commands from a 10/100 Ethernet Interface, displays error/status conditions on an LCD, and utilizes PWM motor drives with Quadrature position/velocity feedback.

Solution: Use the Xilinx Microblaze FPGA, combined with custom logic cores, to implement a system that provides perfect (<10nS jitter) closed loop response between the PWM drivers and the Quadrature position velocity/sensors. All cores are operating on interrupts and the FPGA fabric provides true parallel processing functions. This results in the most accurate motor drive system possible.



Product Results: The product goal was to create a high precision high-speed motor drive system. In motor drive systems, the operation of the product comes down to high quickly can the processor compute the speed of the motor (thus relating it to position/overshoot/undershoot) and the precision of the motor control waveforms generated by the controller.

By using the Xilinx Microblaze, combined with custom IP cores, the design is able to use parallel processing techniques to generate precision motor drive waveforms and determine resolver states WITHOUT any interaction from the processor core.

The key benefit of this architecture is that the motor signal generation, resolver detection, LCD interface, and Ethernet interface are all processing in parallel. The Microblaze core can is dedicated to computing motor drive states as its highest priority before any LCD/Ethernet servicing is even required.

Your Results: Company launches a higher performance motor drive system weeks ahead of a competitor, gains market share, and builds a 100% reusable IP library for the next generation of motor drive system.

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#5 of the series “Processors, FPGAs, and Saving $$$” with more examples and design ideas!

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

Email your suggestions to steve@flconsult.com