Getting Started: Microblaze on the NEXYS2 Spartan 3E Starter Kit

With the confluence of high gate density, low cost, and plentiful RAM, the Xilinx Spartan 3E is a perfect platform for hobbyists and students alike. As starter kits and evaluation modules for this FPGA family are available for under $100, the platform is gaining widespread acceptance in many fields. Using such a low-cost FPGA and development kit however does not severely restrict the applications that one can experiment with. For instance, the NEXYS2 Spartan 3E kit from Digilent Inc. contains a Spartan 3E 500k gate FPGA, which sells for on the order of $10. Even on this incredibly low-cost platform, one can implement a combined hardware/software system for countless devices.

To demonstrate this principle, and to assist in getting a quick start using the Microblaze processor, a sample project has been created for download. This project, contains all that is necessary to be up and running C code on the Microblaze processor within minutes. The project occupies less than 25% of the 3S500E device, so plenty of room for expansion and experimentation is available.

Project Requirements:

Of course, to download the project and run as-is, one only needs the Digilent ADEPT suite, or a suitable JTAG cable and Xilinx IMPACT. This however will be wholly unsatisfying for an aspiring Microblaze developer. To make full use of this project, one needs :

Xilinx ISE 9.2i
Xilinx EDK 9.2i
JTAG Debugging Cable (strongly recommended. If you wish to develop software without debugging, and just download executables to try, this is not necessary)

Project Contents:

The project is managed using Xilinx ISE 9.2i as the top level. Three sources are included in the final build :

Toplevel.vhd

This is the top level which just instantiates the below components

Seg7_driver.vhd

This is a driver for the 4 digit, seven segment display unit on the board. It takes 4 hexadecimal digits as inputs, and displays those 4 digits on the displays in readable fashion.

Ublaze_subsystem.xmp

This is the main piece of the design. It is a platform studio processor project, which contains:

1) Microblaze Processor
2) UART running at 115200 baud (stdin and stdout for easy access)
3) GPIO peripherals for handling all switches and LEDs on the board

Instructions

More info will appear here when we have time to write it!