Project 1b: Hello World Four

Create 16 (32 bit) read/write registers on the AMBA APB Bus using 4 of the available AMBA APB signal sets. Modify APBBusMaster.v to generate the bus cycles needed to test your design. Then create a C program that writes/read the 16 characters of “Hello World Four” to the 16 registers. That is, write ‘H’ to Reg0, ‘e’ to Reg1, …, ‘r’ to Reg15 and so on. Echo the read back value to the console. Verify that you really wrote to the correct addresses using the Memory window after your code has run. Capture all 16 write/read cycles on the scope using the Test vector routed out to J24 and using ChipScope to verify that it is working. You do not need to show PRData[i] on the scope.

Demo – Demonstrate that your code is working.
Report – No formal report required. Just turn in your Verilog code, C code, Block Diagram and the annotated 16 write/read cycles from Modelsim. Also annotate 1 Write cycle from the Scope and 1 Read/Write cycle from ChipScope.

The top.v signals needed to interface you peripheral to the leon are shown below:

AMBA APB Signals for peripherals 11 -14

1. Clk – 30 MHz system clock – use this and not clk (50MHz external clock)
2. Reset_ - AMBA APB low active reset.
3. Bus Signals (see class notes)
   a. PSel<11-14>
   b. PEnable
   c. PWrite
   d. PAddr
   e. PWData
   f. PRData<11-14>

Miscellaneous Signals

1. Test – General Purpose Inputs/Outputs – see build/leon.ucf and the Nu-Horizons docs for pinouts.