

Lab 4 Extending a Simple Microprocessor – Adding I/O

Lab 4 is a project with the goal of accomplishing communication between two DE1-SoC boards. We were able to accomplish this goal to a certain extent.

Ultimately, our code was able to take in a character from another board and display it onto the system console of the NIOS II Software Build Tools for Eclipse IDE. However, each board was only able to do a one-way communication process, meaning that one board could only receive characters and display them while the other board could only transmit characters. This is because we have two different main modules: a receiving module and a transmitting module. These modules use the same microprocessor, but they do not share the same c code nor the same Verilog code. They are two different modules, and, unfortunately for us, creating it this way does not meet the specification requirements. Both boards have to use the same code and be able to transmit characters and receive characters using only one Verilog and C program that, together, do both actions. So in conclusion, we figured out receiving and we figured out transmitting, but we did not figure out how to put those halves together because we missed it in the specification.

We also had another issue that we did not figure out: data bit shifting. Our one-way communication implementation would occasionally display a character different from the one we sent it. This was because either the board or the C code would receive the character shifted to the right by one. For example, if we were to send out the character “h”, which has a binary value of 01101000, to our board that has the receive module running on it, it would sometimes display 4, which has a binary value of 00110100, because it shifts that “h” value to the right by one for some reason.

The issues I addressed are significant ones because not only do they prevent us from fully completing this lab, they also prevent us from successfully completing Lab 5. For lab 5, we will be required to create a game that can be played using two boards. It makes sense that the full completion of lab 4 should be required for lab 5 since lab 5 requires communication between two DE1-SoC boards. Because of this, we will now make it our goal to fix these issues so that we can then successfully complete lab 5 and be done with this class and celebrate.