

Class Report 4

Ian Nolan, Aidan Highsmith

November 13, 2025

1 Objective

The purpose of this report is to inform the reader about the methodology, strategy, and results relating to the implementation of lab 4. This lab aimed to complete problem 16.8.1 from the textbook. This problem asked for four output LEDs to be used to indicate the orientation of the board. One for 90 degrees, another for 180, and so on.

2 Design

2.1 Design Method

The hardware of the system is simply an SPI driver that Pong Chu made. My modifications were minimal, including making the SPI use only 1 select line and tying that line to the accelerometer's SPI ports.

The software design is a modified version of Pong Chu's example found in `"/fpga_mcs_sv_src/fpga_mcs_s_src/cpp/app/main_sampler_test.cpp"`

2.2 Implementation

The hardware implementation is copied directly from Pong Chu's sample code with the minimal modifications specified earlier. The same is true of the software implementation.

Although implementation was relatively straightforward, the main issue I ran into is that running Vitis off of BOX causes crashes. After moving my directory to the local desktop, Vitis ran much quicker and more reliably.

3 Results

3.1 Testing

Testing included using UART to print out values. LEDs are also lit up for confirmation. No hardware testing was done since the code was pre-tested and simple to implement.

Now that the system is fully functioning, the video demonstrating the final implementation can be found linked below!

<https://youtu.be/CXkYl2d41Ng>

3.2 GitHub Repository

All SystemVerilog and C++ code used in this project can be found in the GitHub repository linked below.

https://github.com/Ian-Nolan/SoC_Lab4_Accelerometer.git

4 Conclusion

Overall, I learned that for every lab three, there is also a lab four. Not every lab or assignment or project in the field has to be a nightmare with extended deadlines, especially if there is reliable tested code that you can directly implement.

I enjoyed this lab quite a bit and I look forward to working on similar projects in the future!