EE120A

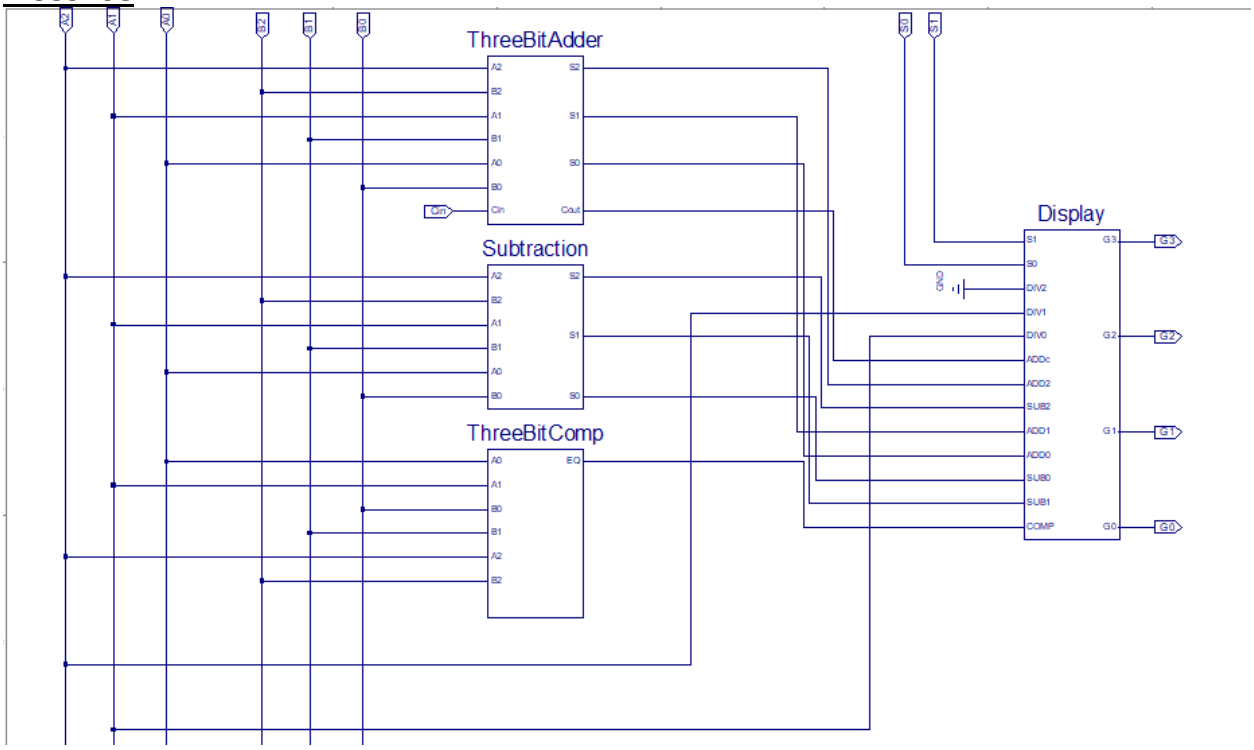
Lab 7 – Mini Project

Quillan Hong
861 210 810
Isaac Tate

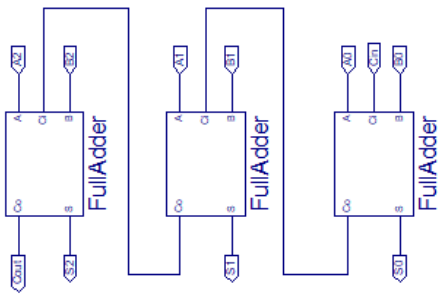
Overview
In this lab/mini project, we had the choice between three projects to design and implement. We chose to make an Arithmetic Logic Unit (ALU). The ALU is essentially the calculator inside of a computer. Overall, the process was straightforward and was fairly easy.

New Concepts
There were no new concepts in this lab, as the purpose was to utilize everything we learned to complete the project.

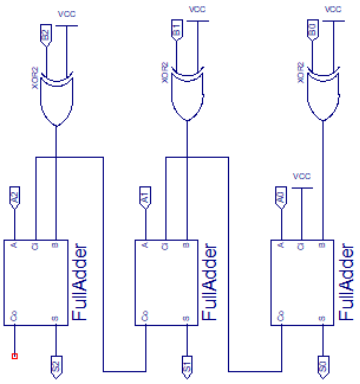
Analysis
I began by first designing a separate component for each operation of the ALU. I made an adder, subtractor, and comparator (the divider did not need a component). Afterwards, I made a mux that would select the operation to be used as well as a special mux to output the results. Then, it was merely a matter of assembling the parts. For the divider, I simply shifted the inputs over while throwing out the least significant bit.

Records


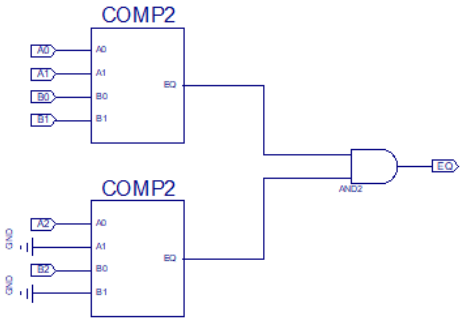
Schematic of the ALU



Adder



Subtractor



Comparator

```
net "A2" loc = "K3";
net "A1" loc = "L3";
net "A0" loc = "P11";

net "B2" loc = "M4";
net "B1" loc = "C11";
net "B0" loc = "G12";

net "Cin" loc = "B4";

net "S1" loc = "N3";
net "S0" loc = "E2";

net "G3" loc = "P6";
net "G2" loc = "P7";
net "G1" loc = "M11";
net "G0" loc = "M5";

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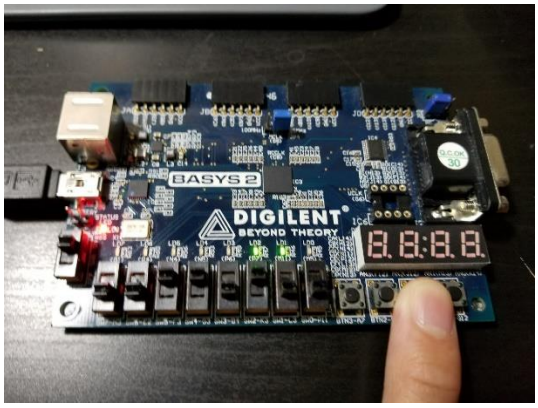
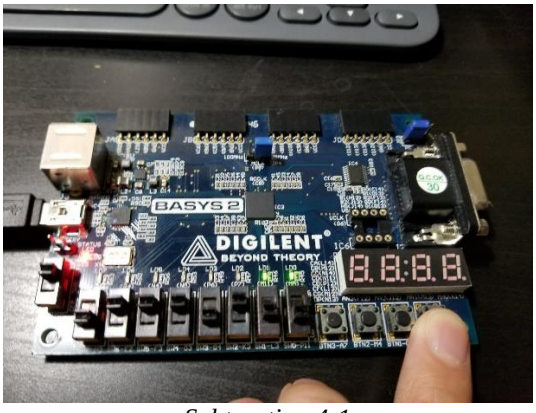
UCF



Adding 4+2



Subtracting 4-1

Discussion

Since Lab 1, we've noticed that some switches on the board would only work occasionally. To work around this, we used two switched for the operation select, three switches for input one, and three *buttons* for the second input. Otherwise, the ALU worked as expected.

Conclusion

This lab was a lot of fun to do. I did mess up a bit when designing the mux, and would make it more efficient if I had to do it again.

Questions

There were no questions in the manual.