

EE 445L – Lab 7 (PCB Layout Lab)
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October 14th, 2016

1.0 OBJECTIVES

See the requirements document.

Note: we chose to do the PCB layout of lab 5 (piano lab)

2.0 HARDWARE DESIGN

2.1 See the Samsung Galaxy Note i717/T879 Replacement Battery info sheet



Figure 1: Samsung Galaxy Note i717/T879 replacement battery

2.2 See the Hammond 1519E datasheet



Figure 2: Hammond 1519E box (standard box provided by Dr. Valvano)

2.3 New component we created

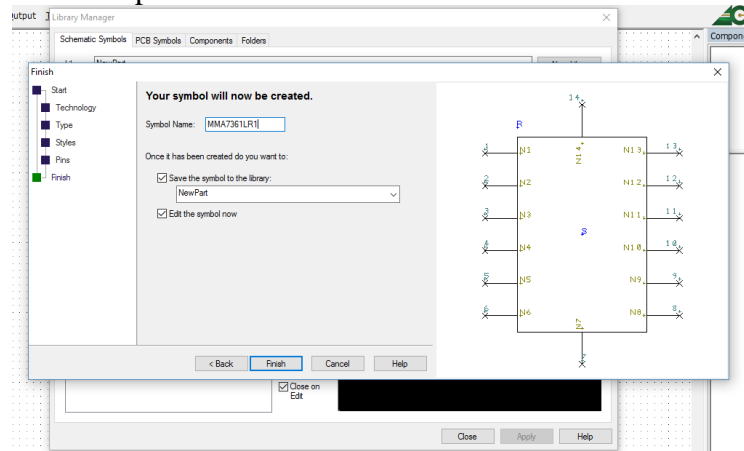


Figure 3: MMA7631LR1 (accelerometer) component in the Schematic Symbols editor

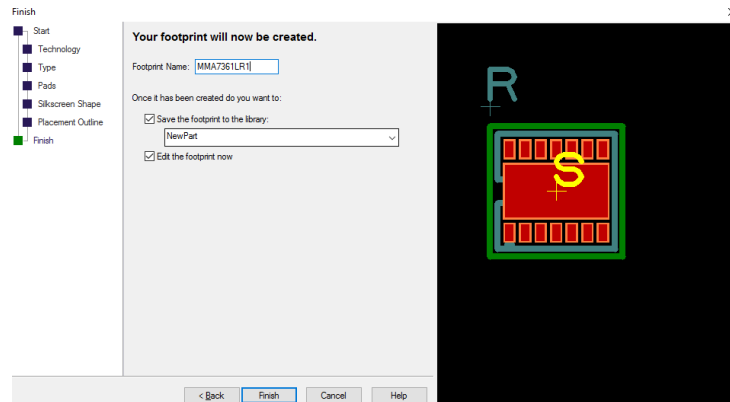


Figure 4: MMA7361LR1 (accelerometer) component in the PCB Symbols editor

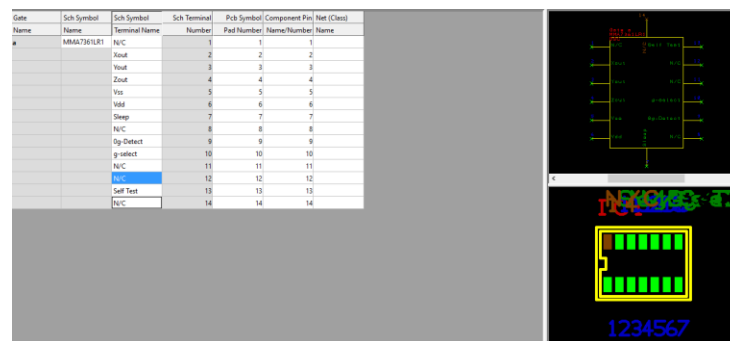


Figure 5: MMA7361LR1 (accelerometer) component in the Components editor

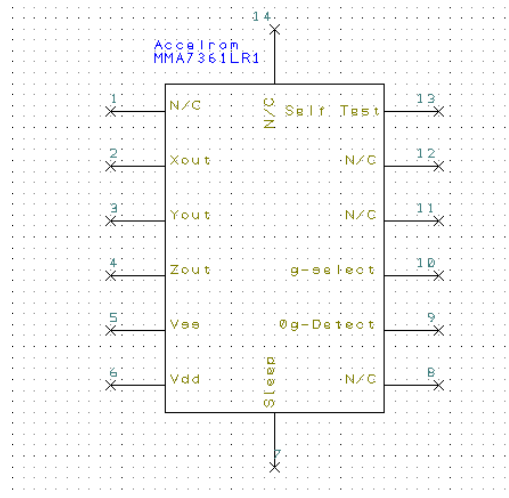


Figure 6: shows that our component can be added from the library to an SCH file

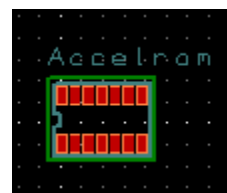


Figure 7: shows that our component can be added from the library to a PCB file

2.4 Mechanical drawings

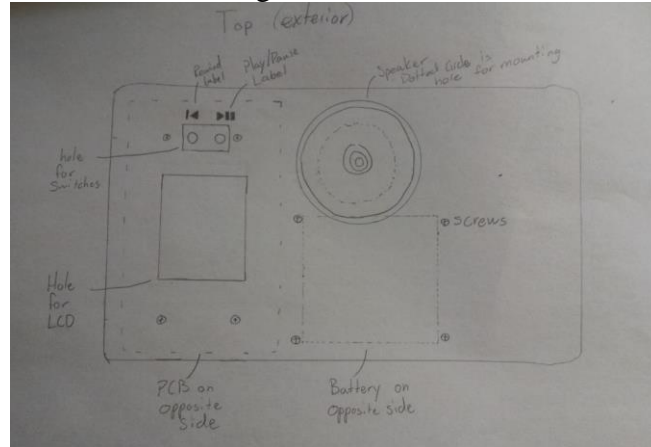


Figure 8: Top (External) View

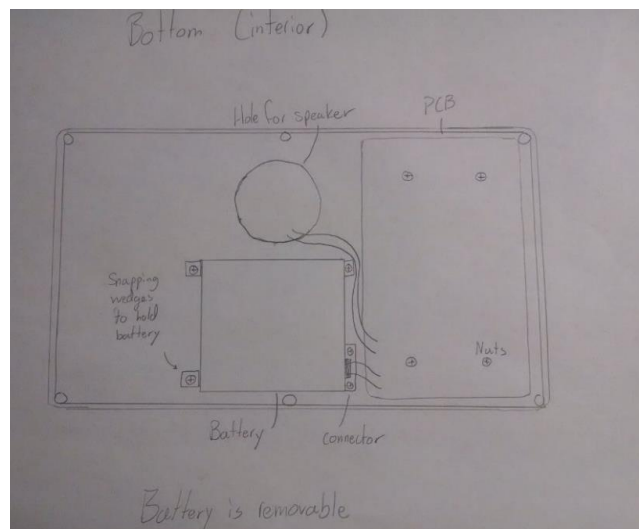


Figure 9: Bottom (Interior) View

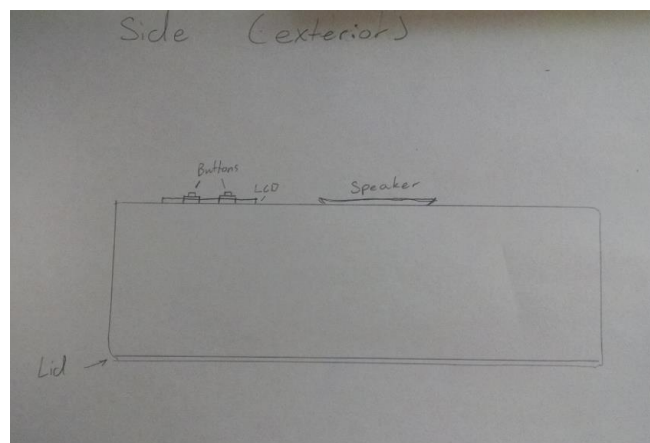


Figure 10: Side (Exterior) View

2.5 See the schematic file of our final circuit

2.6 Cardboard mockup of the PCB layout

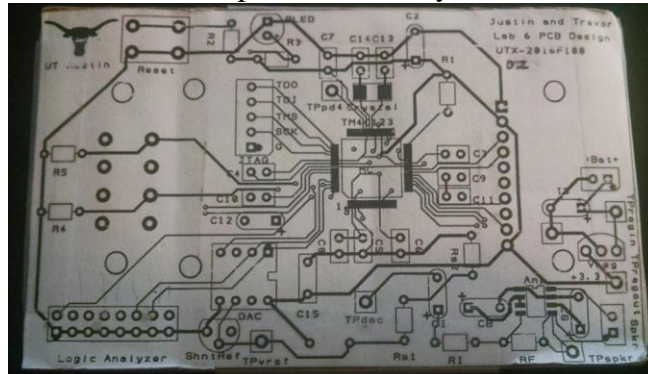


Figure 11: top copper/silk on top

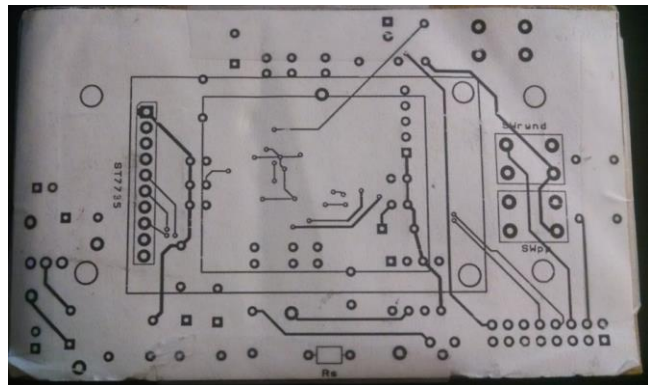


Figure 12: bottom copper/silk on bottom

3.0 SOFTWARE DESIGN

None

4.0 MEASUREMENT DATA

4.1 See the Lab6_BOM excel file.

Total estimated cost: \$17.10

Max estimated current: 90 mA

- 4.2** Our project requires a maximum current input of 90 mA. With a battery capacity of 2500 mAH, our system will be able run for at least 27.7 hours (longer if the system doesn't draw the full current at every point in time). Furthermore, the voltage output will sufficiently power our regulator.

We chose a phone battery because it is much slimmer and less bulky than other batteries, allowing us to mount the battery in just about any kind of orientation. Also, this particular battery is relatively inexpensive compared to other Li-Ion batteries of the same size and capacity.

5.0 ANALYSIS AND DISCUSSION

5.1 Explain the testing procedure you would suggest for the system

Testing of the system will begin by ensuring the battery has a full charge and that the regulator is functioning correctly. We will use test points near the power train wired to an oscilloscope to accomplish this. Second, we will flash the microcontroller with test code that includes a heartbeat for the foreground process and background processes. The oscilloscope will be used to verify the lengths of interrupts. The test code will also include the saw-tooth wave generator we wrote to test the DAC previously in Lab 5. Again, the oscilloscope will be connected to test points around the DAC for this purpose. We will also test the DAC's reference voltage to see if it is 1.5 volts. The amp will be sampled to determine if it is within the acceptable range of output. Finally, the test code will play a series of sine waves at varying frequencies and an electronic tuner will be used to verify the correct notes are played (we will also check the waves' frequencies with an oscilloscope).