A) Objectives
The goals of this lab were to create a PCB Layout, introduce a systems-level approach to embedded system design, and to design for test purposes. The systems-level approach included mechanical considerations, availability of parts, cost considerations, and power considerations.

B) Hardware Design
One page description of the battery is on page 3.
One page description of the box is on page 4.
Three pages showing the new component you created and an example PCB using it are pages 5-7.
Two mechanical drawings were shown to TA during prelab.
Final circuit diagram of the embedded system, SCH file are pages 8 and 9.
Top copper printout of the PCB layout is page 10.
Bottom copper printout of the PCB layout is page 11.
Cardboard mockup of the PCB layout can be printed out from page 12.

C) Software Design
None

D) Measurement Data
Bill of Materials (quantity, package type, cost, and supply current) starts on page 13.
Explain how you chose the battery (Preparation 2) The maximum current was 250 mA but the average was around 200 mA for our song which included periods of time when the speak was off. To compensate for this we chose to design for a battery at 225 mA. 225 mA * 24 hrs = 5400 mAhrs. The battery we chose was the *Tenergy Polymer Li-Ion 1-2C 3.7V 5400mA.* Since the voltage is only 3.7 V, we would need two of them to get above 5V for our 5V regulator to work properly.

E) Analysis and Discussion
Explain the testing procedure you would suggest for the system (Procedure 1)
First, provide 5-9V power to the board using the power headers. Verify that the LED (D1) is on. Use the test access points, GND and Vcc, to verify that the voltage is 5V at Vcc. Use the test point REF2V5 to verify it is 2.5V. Load software to output a 1 kHz sine wave to the speaker headers (J5). Test TLV5616 pin 7 output if there is no signal on J5. The software will also toggle the sine wave on and off upon switch press. This can be used to verify that the switches work. Press and hold the reset switch and verify that the sine wave turns off during switch press and returns on depress.
Explain any differences between estimated current (Procedure 2) and actual measured current measured when doing the lab.
Since the average current was measured while we played our song, this is not solely indicative of all the current requirements that a user may come up with. Therefore we chose a midpoint between the maximum and average current to design for the battery.