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Semester: Spring 2024

Course: ECE445L

A) ***Objectives*:**

1. In a few sentences, describe the purpose of the lab:

Purpose is to design an embedded system that can fit in an enclosure. We are building the Tpod, which is an Ipod like music player that stores song in an SD card, plays songs through headphones, and has touch display and can send messages over wifi.

B) ***Hardware Design Deliverables:***

1. Deliverable 1: Using **KiCad**, create a schematic for your design. Include a screenshot in the space below.

A white board with many different colored lines and numbers

Description automatically generated with medium confidence

1. Deliverable 2: Using **KiCad**, create a Layout for your design. Include a screenshot in the space below.

A blueprint with many colored lines

Description automatically generated

C) ***Software Design Deliverables:***

1. I have pushed my project to GitHub for grading (Yes/No):
2. Deliverable 3: System design diagram of the modules created.

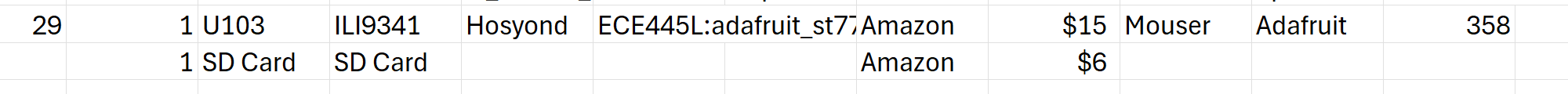
A diagram of a computer hardware system

Description automatically generated

D) ***Deliverables:***

1. Deliverable 4: Total cost estimate

I have updated the bill of materials (Yes/No):



Out of pocket costs: $21

Adjusted competition costs: $21

1. Deliverable 5: Estimated current usage

Launchpad Base – 86 mA

Screen - 25 mA active

Music – 14-144 mA volume range

ESP –78 mA active

Total – 333 mA max

1. Deliverable 6 (5pt EC): TIW Training

A long thin line of a white object

Description automatically generated with medium confidence

1. Deliverable 7 (10pt EC): Discrete IC usage N/A
2. Deliverable 8 (10pt EC): Characterization of the system N/A

E) ***Analysis and Discussion Questions:***

1. How did you debug your system? How intrusive was it?

We mostly focused on isolating the sound and button modules, we wrote a tester main to make sure we could read from a wav file to play music, and testing button presses to make sure the controls worked. It was non-intrusive testing since we tested the functionality of the system in real time without any debugging instruments.

1. What’s the difference between unit testing, integration testing, and functional testing?

Unit testing tests individual units, integration testing tests interaction between units, functional testing is for the overall system as specified by the end user.