Pandora's Box - Project Requirements

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1. Overview

1.1. Objectives: Why are we doing this project? What is the purpose?

The purpose of this project is to learn how to design and program an embedded system, study issues of power, clock, reset, and layout a PCB board. This project is done as the final lab for the class.

1.2. Roles and Responsibilities: Who will do what? Who are the clients?

The team consists of Mohit Gupta, Amy Lee, Zander Tedjo, and Hans Matthew Robles. We will all design and implement the software. We will all contribute to the PCB design. Hans and Mohit will solder components to the PCB. Zander and Amy will help design and debug the software components of the lab. The TA and Dr. Valvano are the clients.

1.3. Interactions with Existing Systems: Include this if you are connecting to another board

The system will use the TM4C123 board as well as hardware components and software modules developed in previous labs for the various subsystems of the overall project.

2. Function Description

2.1. Functionality: What will the system do precisely?

The system will function as a lock box that can be unlocked with a passcode. The box will have a physical lock that is controlled by a motor. When the lid of the box is opened, it will play songs that can be selected by the user. The user will be able to set the passcode and lock and unlock the box from their phone.

2.4. Performance: Define the measures and describe how they will be determined.

The system will be judged by several measures. First, the software modules must be easy to understand and well-organized. The DAC and the speaker will play beautiful music when activated. The lock box should provide security for the items inside.

2.5. Usability: Describe the interfaces. Be quantitative if possible.

The Blynk app will be used for interfacing with the microcontroller as passcode buttons for the lock box. The speaker and DAC will be used to play two "ringtones" (one for inputting an incorrect passcode; one for inputting the correct passcode). The motor will activate when the correct passcode is entered.

3. Deliverables

Lab reports for labs 7 and 11 are described below and are due by the due dates listed in the syllabus. The reports will include the final requirements document.

Hardware Design
- SCH PCB Files
- Detailed circuit diagram of the system
- Printout of PCB Layout Top and Bottom taped to cardboard

Software Design
- Any software you wrote to test hardware should be uploaded to GitHub Repository
- Briefly explain how your software works (1/2 page maximum)

Measurement Data
- Current Estimation
- Cost Estimation
- Include data as appropriate for your system. Explain how the data was collected

Analysis and Discussion
- How will you debug the system

Recording
- The YouTube video is required, put link in PCB google doc