490A Final Report

Team and Individual Report

Submitted on Beachboard in the respective dropbox

2 Submissions:

- **Team Report** – One per team.
- **Individual Report** – 1 Page, Not Double Spaced, Detailing your contributions. Please mention if you worked with other team members on a specific aspect. Also include your perception of the contributions by other team members if you feel that the workload is not being distributed evenly or if members have been absent.

Format Guidelines: Not double-spaced, 12pt Calibri Font or similar. Should be mostly written (approx.. 60% or more), diagrams and images are necessary but should not comprise the majority of the report. Should be long enough to demonstrate a mastery of the topic and technologies used to implement your design. Length of the report is ultimately up to the team

Midterm Report 1 will be graded on completeness, thoroughness, and the overall attention given to the details.

Team Name

The name must describe the project. This team name must be included on the title page of all future reports, labs, etc. submitted by your team.

Team Members and Biography

On one page, include a picture of each team member and a short one paragraph biography for each. Biography should be professional and something that a prospective employer would be interested in (i.e. Engineering Interests and/or hobbies and other interests that make you unique).

Project Overview

Provide a one to two paragraph, non-technical, description of your project. This must be a clear, uncomplicated description that any lay person could understand. Include any diagrams or drawings to help the reader understand the project. Who is the intended end-user of this product?

Project Implementation

The same as the project overview, but now go into much more detail about your implantation of the solution using the technical "jargon" that accurately conveys how the entire project is to be implemented.

Subcomponent Descriptions

Each sub-component or sub-module of your project should be broken down into a section that describes the functionality, description, and implementation. This would also be the place where snapshots of the schematic would serve to explain the functionality. Any tests, hardware or software verifications should be placed in these sections where applicable. The goal here is to prove that you have a complete understanding and mastery of the fundamentals of these components. (Think of the class example of the switch/buttons submodule)

Overall System Functional Block Diagram or Diagrams

Many of our projects are being made up of other commercial (off-the-shelf) products or modules. These may be represented as boxes/blocks with all inputs/outputs/power connections clearly labeled. Every aspect of your project should exist in one of these modules and should have all inputs/outputs clearly labeled including power connections (in other words, if there is a wire involved it should be included).

A table must be written for each block/module after the Diagram and must include the functionality of every input or output, Signal Name, Signal Description, Signal Type (Analog/Digital/Power), Voltage Level, Current Requirements (if it is a power connection) and Operation.

Complete Schematic

- Designed in a proper schematic entry/capture program, i.e. Circuit Maker/ Altium, or Orcad.
- A Detailed schematic of the above mentioned modules. If the module is an "off-shelf component" or a development board then a schematic does not need to be created, instead use a connector and label the wires correctly for the necessary connections in your schematic and include the manufacturer provided schematic for the development board being used. Every project is using a Microcontroller or FPGA. This "core" module of your project must have a schematic created by you. In other words, **you must recreate the schematic** for the main computational device in your project, but you only have to include the minimum connections necessary for your product.
- All schematics will include a BOM (Bill of Materials) that includes every part, part number, description, package used, manufacturer, distributer, cost, and quantity.

Power Management

All power requirements should be accounted for and shown in a schematic as well as an included power budget. If a battery is used, then an appropriate discharge curve should be included along with a description of the power components used, approximate efficiency and if you are maximizing your battery capacity effectively.

Project Management – WBS, Gantt Chart, and the 490B 5 Demo Contract

WBS - A Work Break-Down Structure should include a decomposition of all deliverables relevant to your project/product and should be updated to reflect the final design.

Gantt Chart - A Gantt Chart should also be created which includes each main task, all the subtasks and at a minimum be broken down into a week by week chart which includes all the tasks and the engineers in the team that have been assigned to the task. Use the Work Break-Down Structure in conjunction with the 5 Demo Contract to help guide the timeline and sequence of the tasks that must be completed.

5 Demos Contract - List and describe 5 functional "milestones" of your project. In other words, what building blocks are required for the entire project to work. These "building blocks" should be demonstrable, prototyped, and testable. These will be the 5 demos throughout the 490B semester that lead up to the entire working project. Each demo may be an independent aspect of the project or build off the previous one. Each demo

should have a measurable outcome that is stated, in other words, what will the instructor see that determines success and what is the acceptable error in the measured output. All three, the WBS, Gantt Chart, 5 Demo Contract must be included in the final report.

Circuit Simulations and Verification

- All projects will include some aspect or verification, either software or hardware verification.
- Simulated in a proper circuit modeling program, i.e. LTSpice or equivalent
- Although not required in every project, any circuit that the instructor sees is subject to inquiry as to the functionality and verification of this component. An LTSpice model of different aspects of our projects, give us the confidence that we aren't wasting our time building something that doesn't have a chance at working. A waveform and appropriate notes/annotations and description should demonstrate the functionality.

Software Verification

At the very least, the final demo should have verified software. If the inputs can change, then all stimuli should be tested and verified to not produce any erroneous data.

I will be using the previous report to look for improvements.

Grading Guidelines

A - All items are included and well defined. Multiple hardware and software verifications have been used and documented adequately. The entire project looks promising and has a good chance of success. There are no obvious unknowns in the design and terminology is used appropriate. Sufficient depth has been achieved, demonstrating a complete understanding of all aspects of the project.

B - All items are included and at least one major hardware and one major software verification has been undertaken successfully and demonstrated adequately.

C - Most items are included and some have not been sufficiently explained or expanded on.

D-F - Some items are included, verification has not been done or is lacking. Obvious questions, holes/unknowns still persist in the design.