Group Members: Mack Hall, Jorian Bruslind, Zach Bendt

ECE 342

3/8/19

Final Project Script/Fanfiction

-Start cheesy 90’s music-

-Cut to group members staring at whiteboard covered in overly complex mathematical expressions-

Mack: “No no no, Zach, the flux capacitor should be in *parallel* with the quantum cpu, not in *series*!”

\*to camera\* “Oh hi, I didn’t see you there! This is our group of engineers here at Overworked and Underpaid. I’m the lead useless person, Mack. These two are the ones who actually do all of the work, Zach and Jorian.”

Jorian: “H-”

Mack: “Okay, that’s enough out of you, ya chatterbox! HAHAHAHA”

-Mack’s eyes do not move at all while laughing-

Mack: “Our innovative project has the capability to change \*point to camera\* YOUR life.”

-Hit a button on the laptop to turn on light bulb-

Mack: “Have bright ideas on command! I used to look like this:”

-Cut to picture of Octavius Rex from Spongebob-

Mack: “But then I took control of my life, starting with my power outlets! What do your outlets do all day? Nobody knows! Bet you couldn’t tell me the current draw of your toaster at 3 a.m. Now you can monitor your power draw 24/7 with the brand new Smart Switch.”

-Cut to the Smart Switch spinning on a lazy Susan-

Mack voiceover: “This board allows you to measure the voltage and current flowing through it, which should allow you to calculate how much you are spending on power every month. You can’t trust these electric companies. Did you know they charge you for imaginary power? It’s called \*mocking, with large air-quotes\* “reactive power”, look it up! This product also allows you to set a timer to turn off the plugs whenever you want. That’ll show them! Really stick it to the man! The Smart Switch is also user-programmable using either a smartphone or the power of the internet, so you can stick it to the man on the go.”

-Cut to panning close-up of PCB-

Mack voiceover: “The Smart Switch utilizes two different current sensors to deliver only the most accurate readings straight to the user. The ACS71020 power sensing IC allows us to sample both voltage and current at nearly 400 unique, instantaneous readings per second over the I2C serial protocol. These aren’t you regular power readings, they are being calculated by algorithms coded exclusively by yours truly. The microcontroller stores a number of readings in a proprietary shift register and interprets the data from there using some fancy mathematics.”

Mack: “Speaking of the microcontroller, the ESP32 microcontroller is the brains running this whole thing, much like my fellow engineers here. Jorian, do you want to tell me a little about the microcontroller?”

Jorian: “No”

Mack: “Jorian, come on. Do you know how expensive camera film is?”

Jorian: “NO!”

Mack: “NOT NOW”

Jorian: “I DON’T WANNA”

Mack: “Please, I’ll donate to whatever nerd crap you want me to!”

Jorian: “ The ESP32-WROOM Module has a cost-effective, space saving package which allows for integration into many different applications. It has a built in Bluetooth-Wifi stack and 2dbi PCB antenna which negates the need for specialized testing or bulky RF antennas. It has an integrated 4MB (bytes, not bits) of flash storage space and customizable partitions for EEPROM, and OTA (over the area) space for wifi-flashing. This well rounded - System in chip makes for a versatile microcontroller and an easy selection.

Jorian - With project/laptops in hand: “The project is subdivided into blocks that were assigned to each group member. The high level blocks include; PCB layout, app development, firmware development, and mounting design.”

--Top down Picture of Project-- Jorian voiceover: “The PCB layout was broken into 4 parts, ESP32 section, relay node sections, power section, and input/output plug section. The ESP32 includes a UART-TTL converter for programming the firmware as well as a USB B connection for simple interfacing. The relay node contains a current sensor, relay, and bjt amplifier for relay activation. The power section contains a transformer and efficient 3.3V linear drop out regulator. Finally, the input/output plug section contains the input NEMA standard C13 plug with 5A quick-blow fuse, 5V input MT30 connection (for easy supply power) and 3 output C13 plugs (with individual addressing/current monitoring)