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Engineering Design Portfolio

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BLE Fitness Tracker

Project Goals

- Design, prototype, and manufacture bluetooth low power wearable fitness tracker
- Create with original Fitbit design in mind while improving price/features with main features including heart rate tracking, sleep tracking, steps tracked, gps, blood oxygen sensor

Key Skills

- Altium designer PCB ECAD
- Overcharge circuit implementation
- Hierarchical Schematics and Layout
- Breadboard prototyping
- PCB manufacturing with PCBWay and SMD and 0201 Component Hand soldering/reflow

BLE Fitness Tracker

Project Features

- Sleep parameters oxygen rate, and heart rate as well as movement for detecting restlessness
- Bluetooth for syncing with phone/computer
- Overcharge circuit for battery protection

Automated Reservoir System

Project Goals

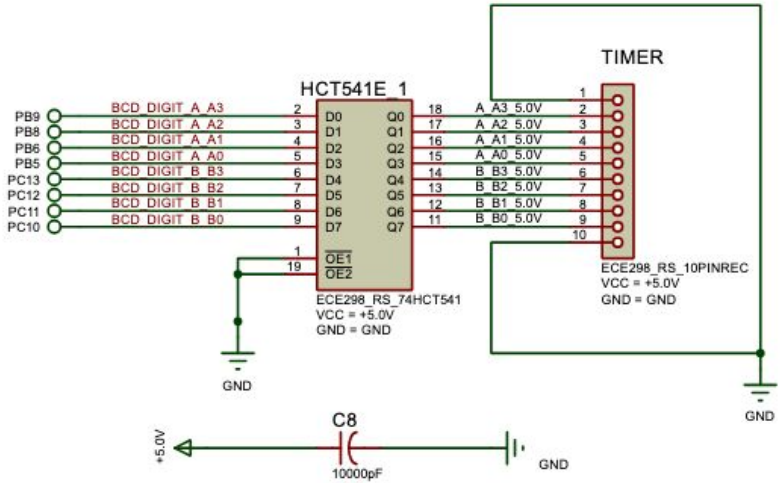
- Design, prototype and manufacture a embedded system controller for energy and price efficient irrigation
- Advance understanding of UART connection by allowing for real time user adjustment

Key Skills

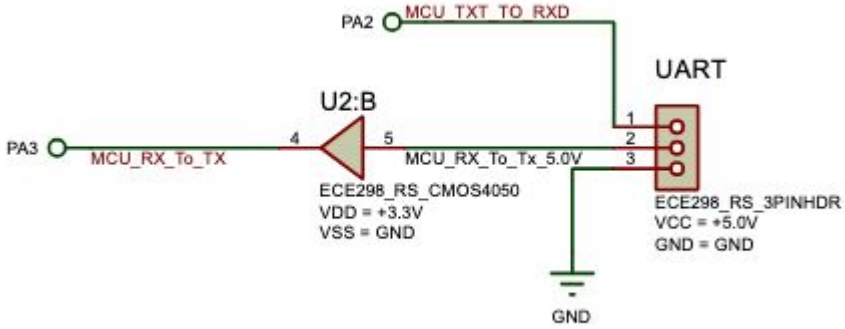
- Proteus Tools for PCB and schematic design
- Breadboard prototyping
- Component Sourcing and BOM Management
- Hand soldering and reflow for 0402 components

Automated Reservoir System

Timer Schematic

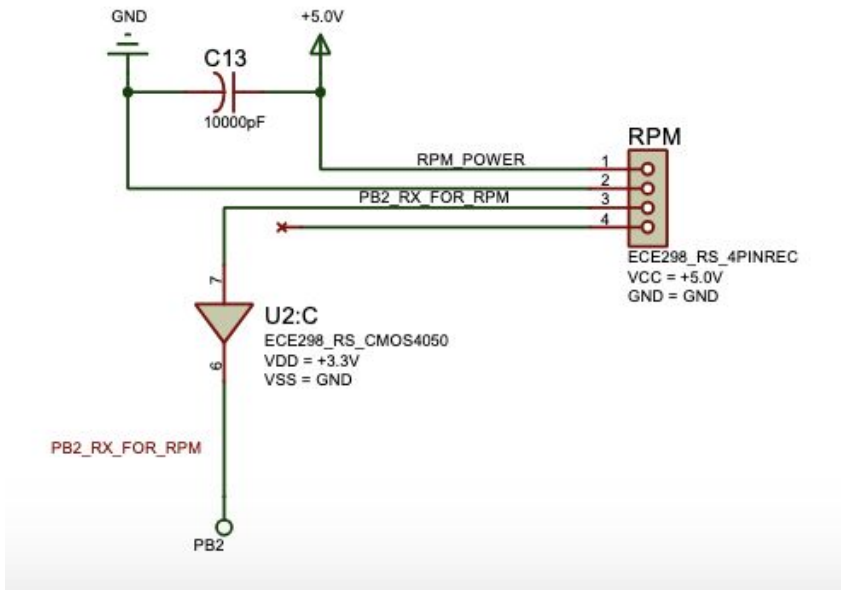


UART Schematic

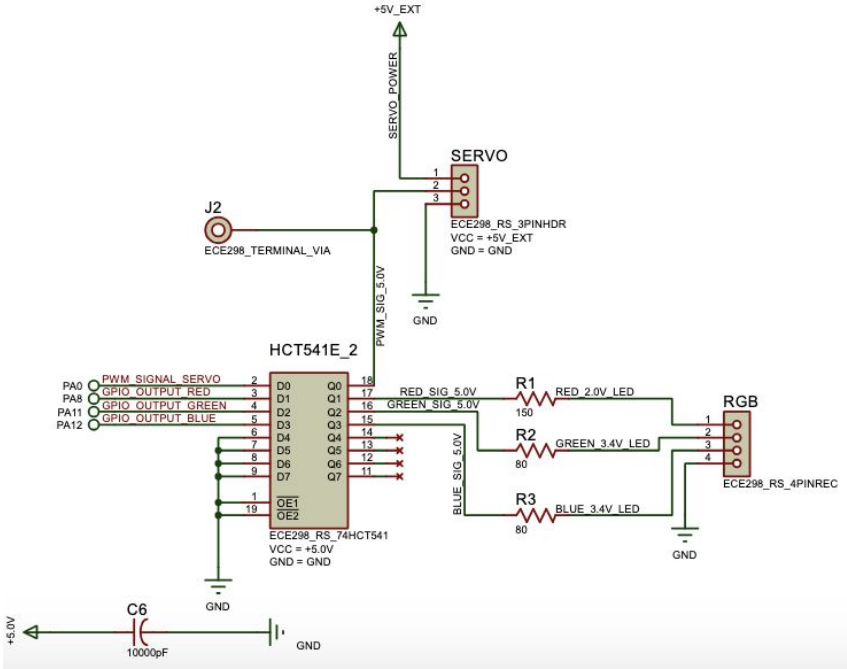


Automated Reservoir System

Servo Motor RPM

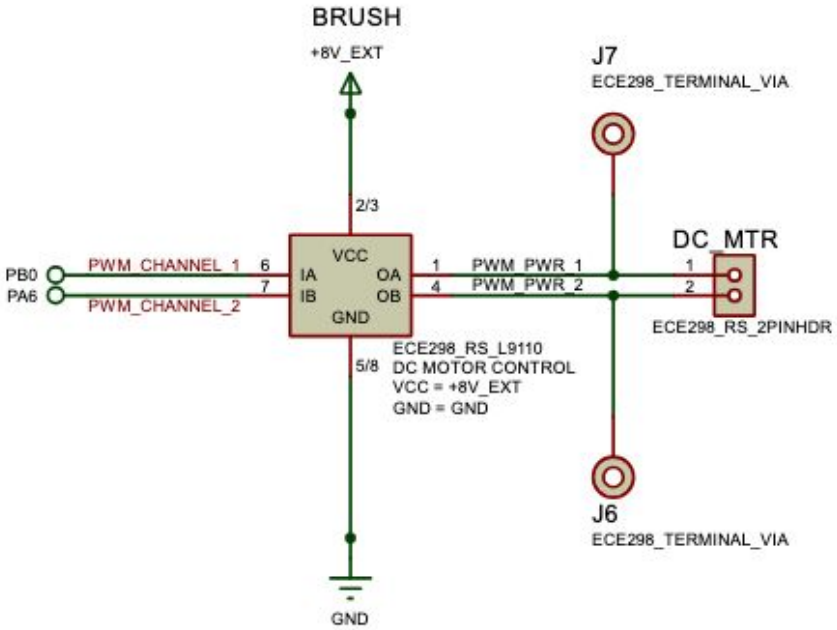


Reservoir Indicator



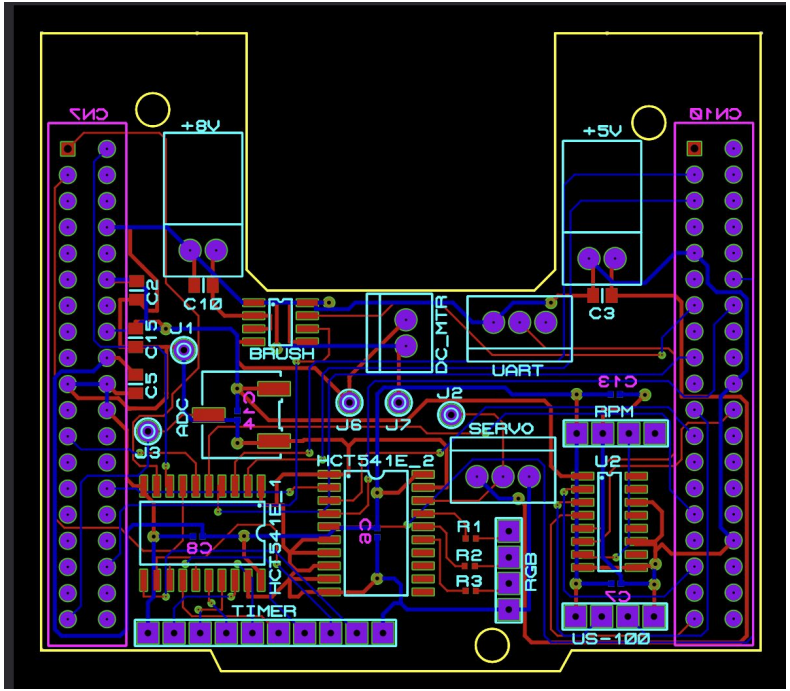
Automated Reservoir System

DC Motor



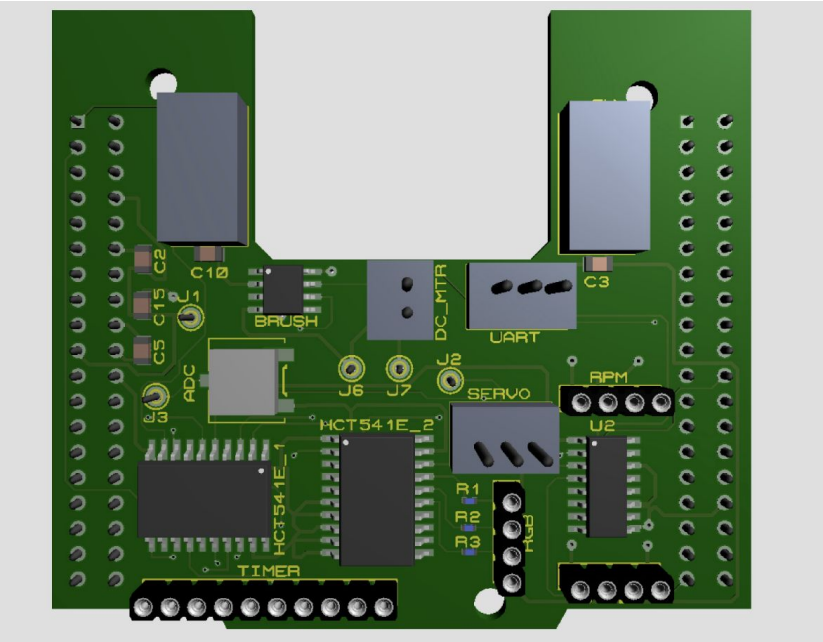
Automated Reservoir System

PCB Schematic

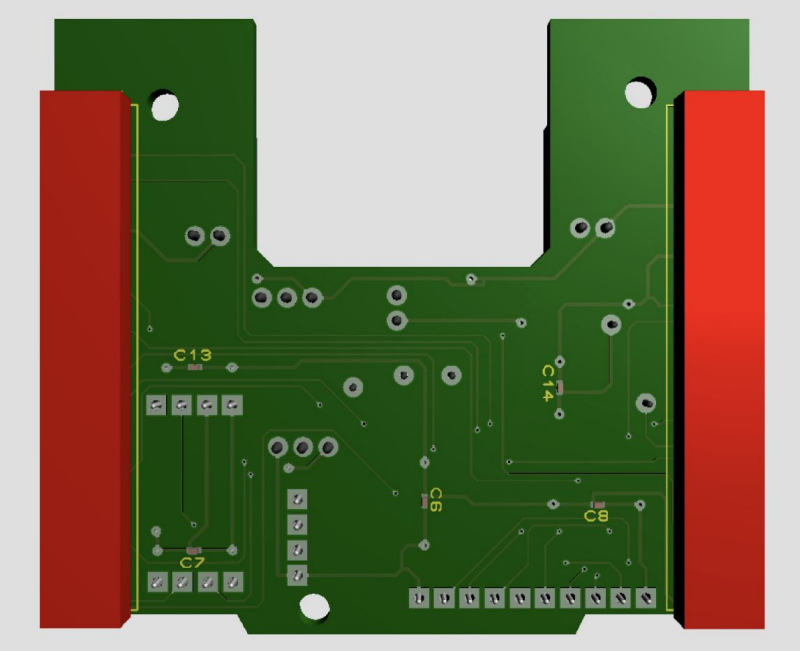


Automated Reservoir System

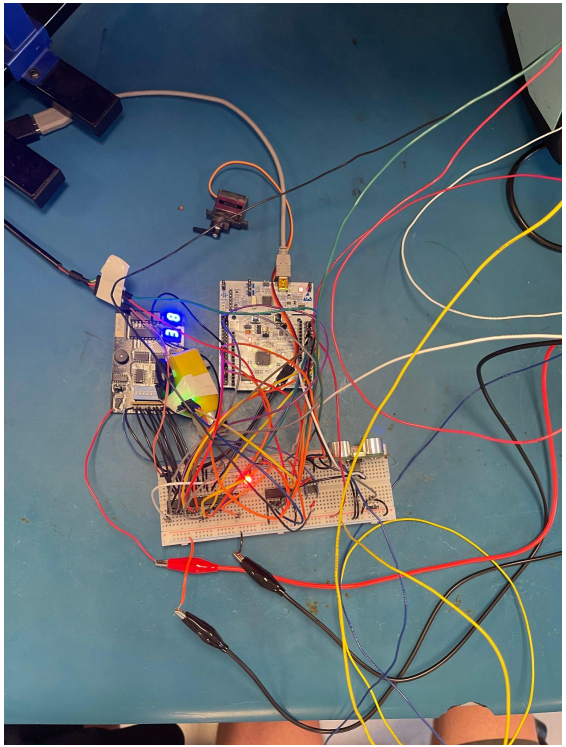
CAD of PCB Front



CAD of PCB Back



Automated Reservoir System



cmdexec

Project Goals

- Design for use a python software tool to easily launch sandboxed programs using either Sandboxie or Docker
- Allowed for option of separate UserHomes to provide fully sandboxed environments

Key Skills

- Docker
- Sandboxie
- Python
- Working with OS/Bash commands for mass launching

Moisture Zone

Project Goals

- Design, prototype and manufacture a simple STM32 based moisture detection system for lawns
- Provide a more sustainable way to automatically turn on and off sprinkler systems based on moisture
- Advance understanding of I2C by connecting multiple sensors to a main MCU node for different lawn areas

Key Skills

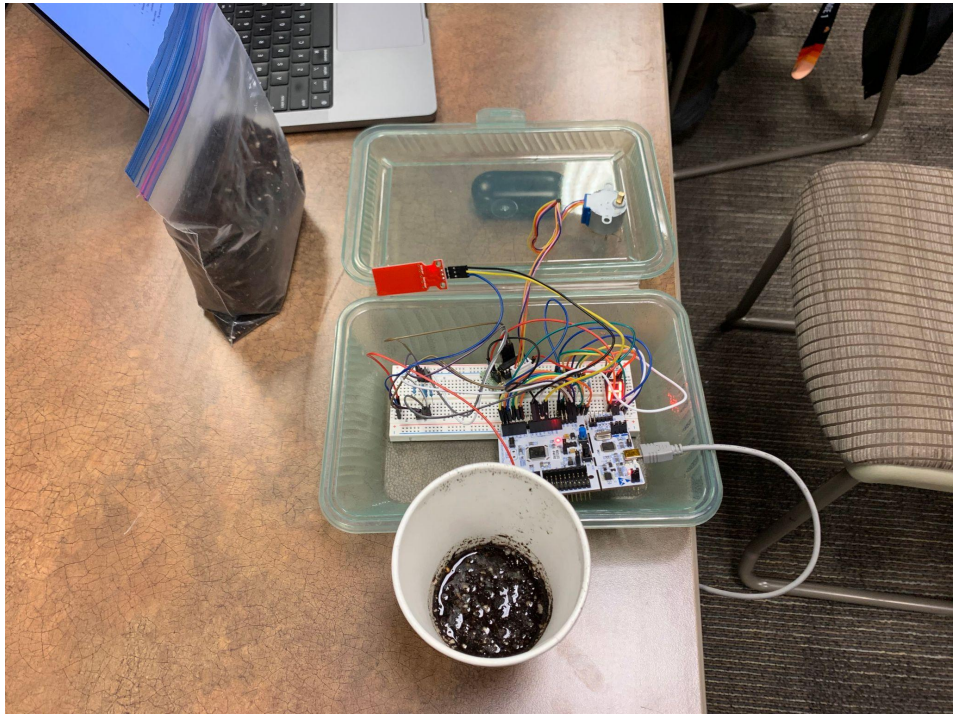
- KiCad for simulating connections
- AutoCad for creating main enclosure for MCU module and UI
- Altium for creating wire schematics for power and signal to each moisture sensor
- Breadboard prototyping
- Component Sourcing and BOM Management

Moisture Zone

Project Features

- Automatic detection of moisture every 10 microseconds
- GUI option for exact moisture vs friendlier showing low, high and medium
- DC brushless motor to mimic sprinkler system for watering the lawn

Full Breadboard Implementation



Moisture Zone

CAD of PCB Front