ENGI 301 Project Proposal

Remote-Controlled Lighting System

09/16/2022

Eunice Tan

Background Information

- Senior Design Project: to design a self-parking vehicle
- Need a way to communicate between the user and the golf cart used in the project
  - Idea: a fob that communicates with the central processing unit of the motor control to determine state control for the vehicle
- MVP:
  - Must communicate states between Arduino and BeagleBone Black with RF
  - Must show state on LCD screen
  - Ultrasonic sensor induces emergency stop state
  - Four modes: Curbside Parking, Normal Parking, Idle, and Emergency Stop

Background Information

- In order to make the project fun:
  - Fob still outputs states transmitted over an RF transceiver/receiver, but it now controls a string of LED lights
  - Outputs state data to an OLED screen (for simplicity, might change to LCD screen depending on whether I have the time)

Parameters and Specifications

- Hardware Needs:
  - BeagleBone Black
  - OLED screen
  - LED Lights String
  - Arduino Uno
  - Push Buttons
  - RF Transceiver/Receiver (x2)
- Optional Hardware Needs (if I have the time):
  - Ultrasonic sensor
  - GPS module (x2)

Parameters and Specifications

- Software Needs:
  - BeagleBone Black displays state and controls the LEDs
  - OLED screen displays current state
  - LEDs light up differently depending on the current state
  - Arduino Uno decides state transitions and communicates them to the BeagleBone
  - Push buttons decide state transitions
  - RF Transceiver/Receiver communicates between BeagleBone and Arduino
- Optional Software Needs:
  - Ultrasonic sensor contributes to state change; BeagleBone then decides final states
  - GPS modules send location information between Arduino and BeagleBone

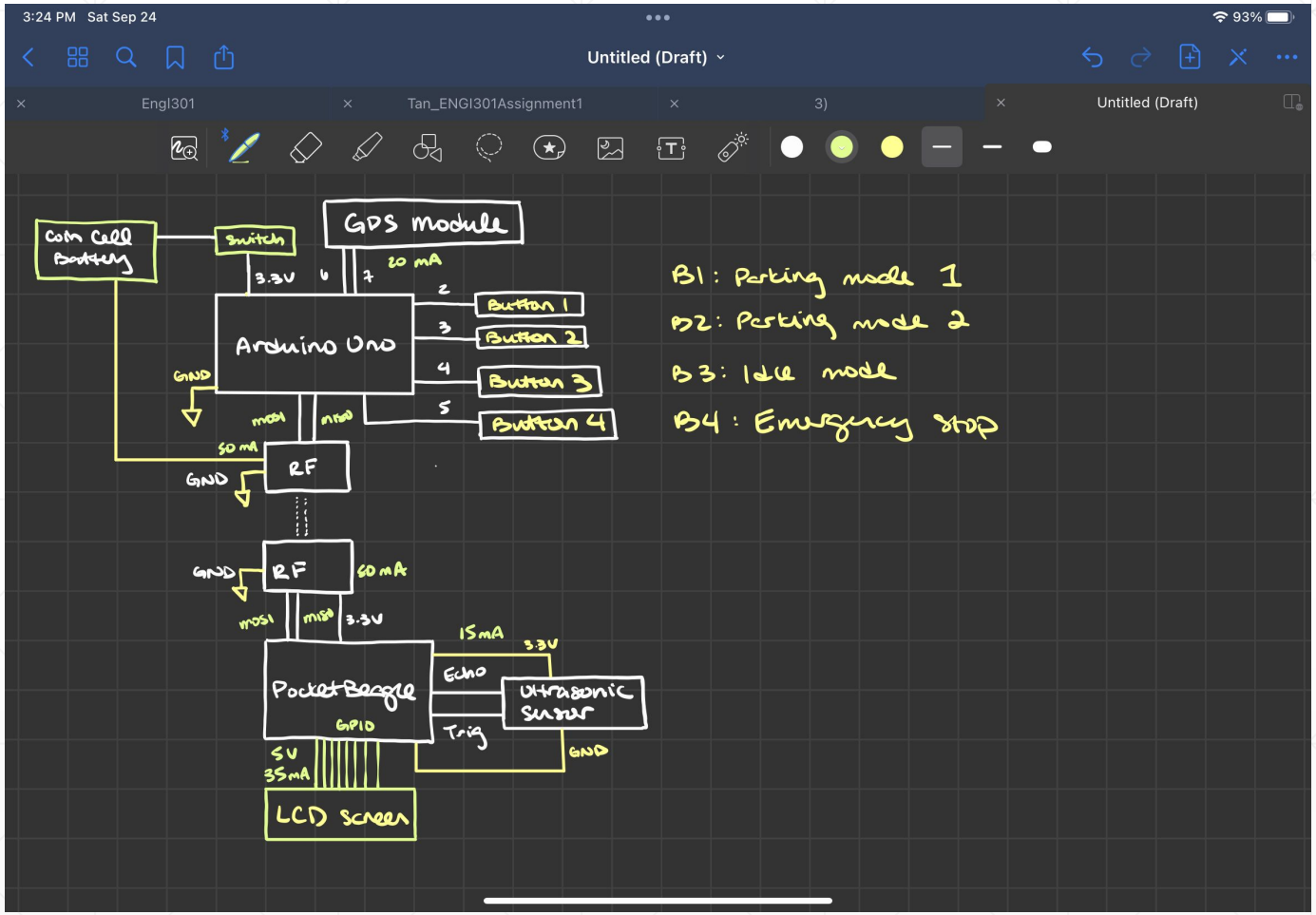
Process

- Create block diagram
- Acquire materials
- Wire up systems
- Implement state transition (Arduino)
- Implement output (Beaglebone)
- Implement RF communication between Arduino and Beaglebone
- Test the system

System Block Diagram

(includes currents and voltages with pinouts)

Concern: LCD uses 5V while all other components work with 3.3V (Arduino…?)



Components

Component	Link to Component
BeagleBone Black	N/A
Arduino Uno	https://www.amazon.com/Arduino-A000066-ARDUINO-UNO-R3/dp/B008GRTSV6
RF Module (x2)	https://www.adafruit.com/product/3071
GPS Module (x1)	https://www.adafruit.com/product/746
OLED Screen	https://www.adafruit.com/product/2719
Ultrasonic Sensor	https://www.adafruit.com/product/3942
LED Lights String	https://www.adafruit.com/product/1138?length=1
Push Buttons	N/A
Colored LEDs	N/A

Need all components to be purchased by instructor listed; additional components may be purchased by student