

ENGI 301 Project Proposal

Remote-Controlled Lighting System

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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
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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)
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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)
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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
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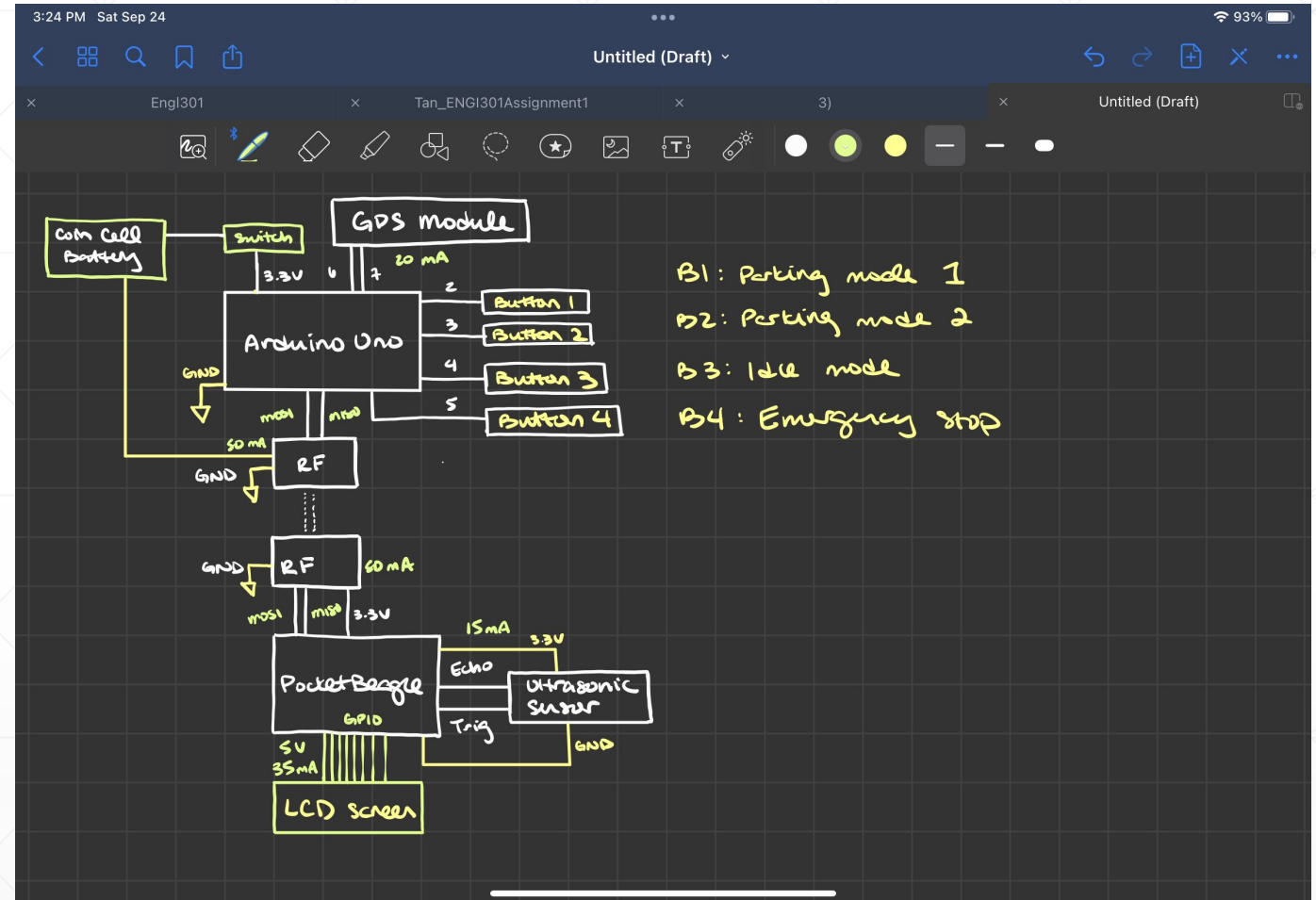
Process

- 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
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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/B008GRTS V6
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