MEAM510 Design Review 2

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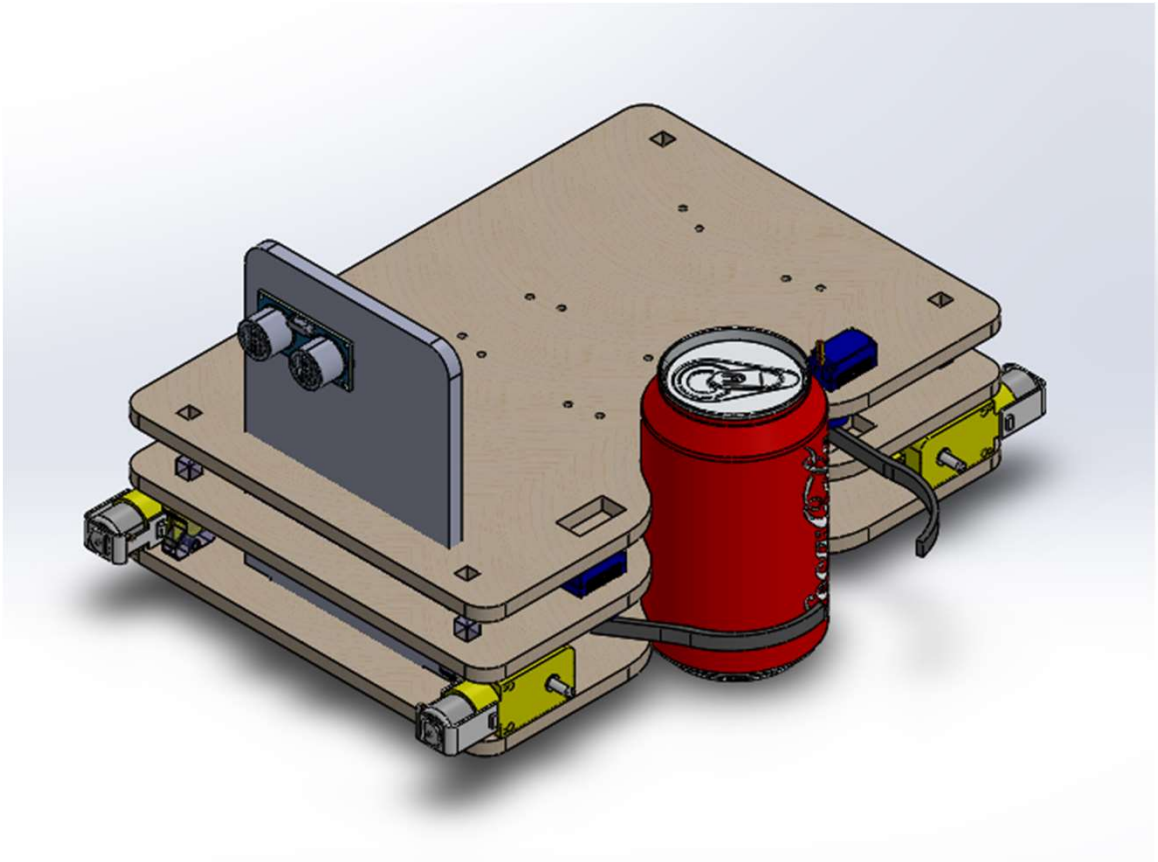
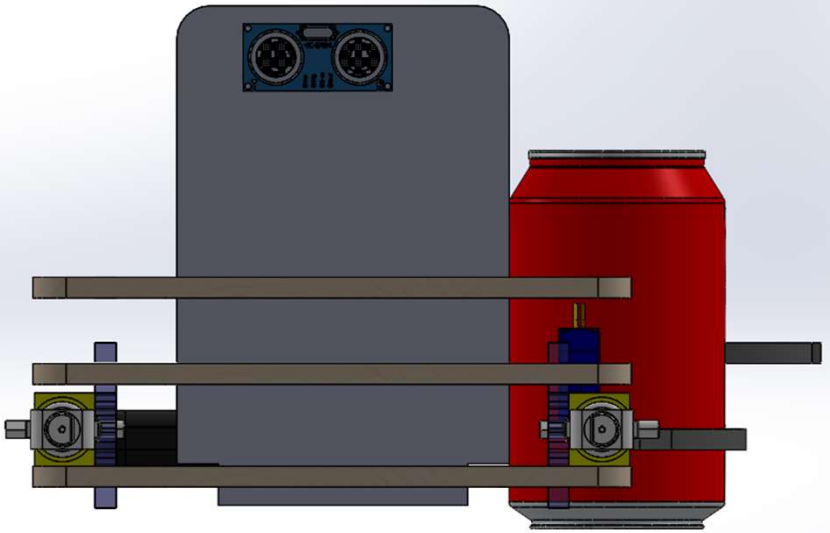
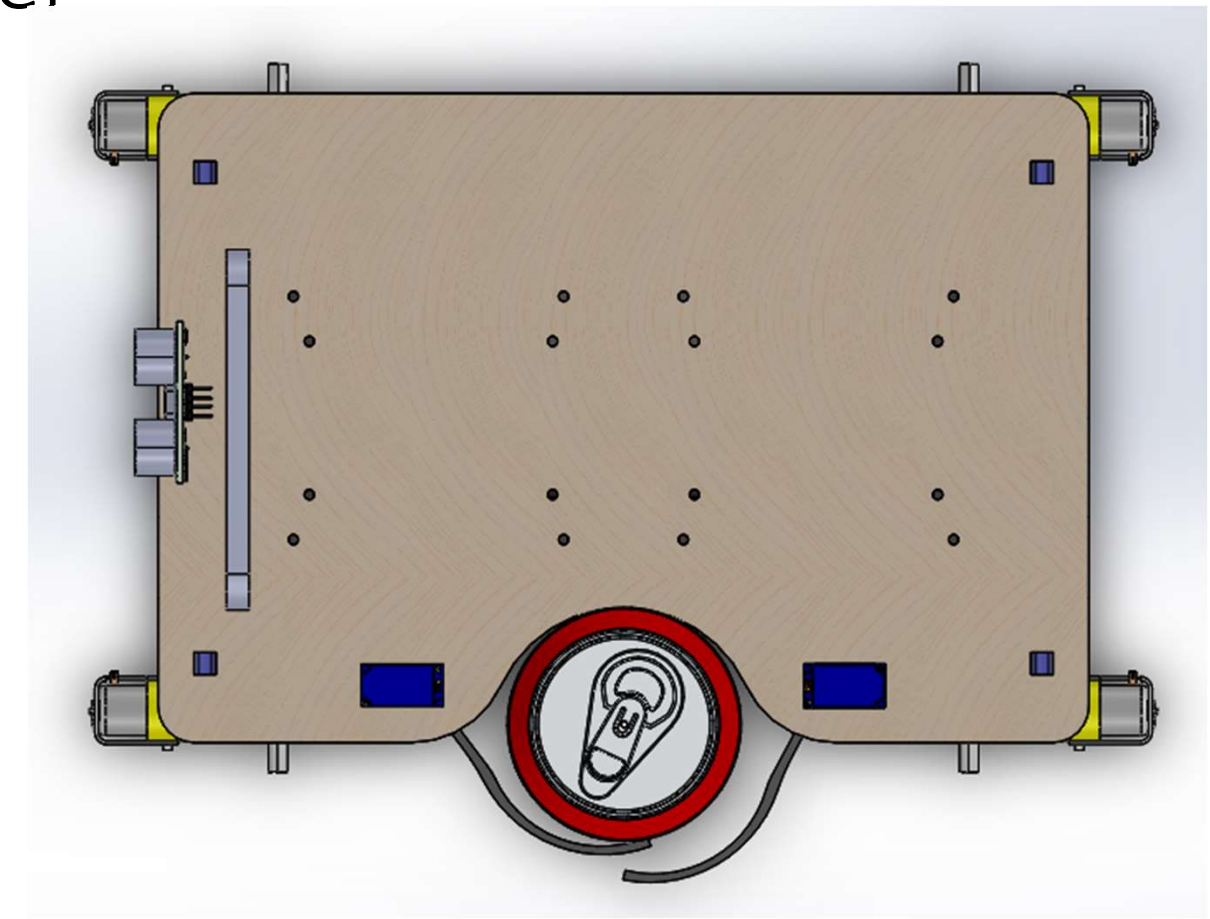
3D Model





3D Model



Sensor List

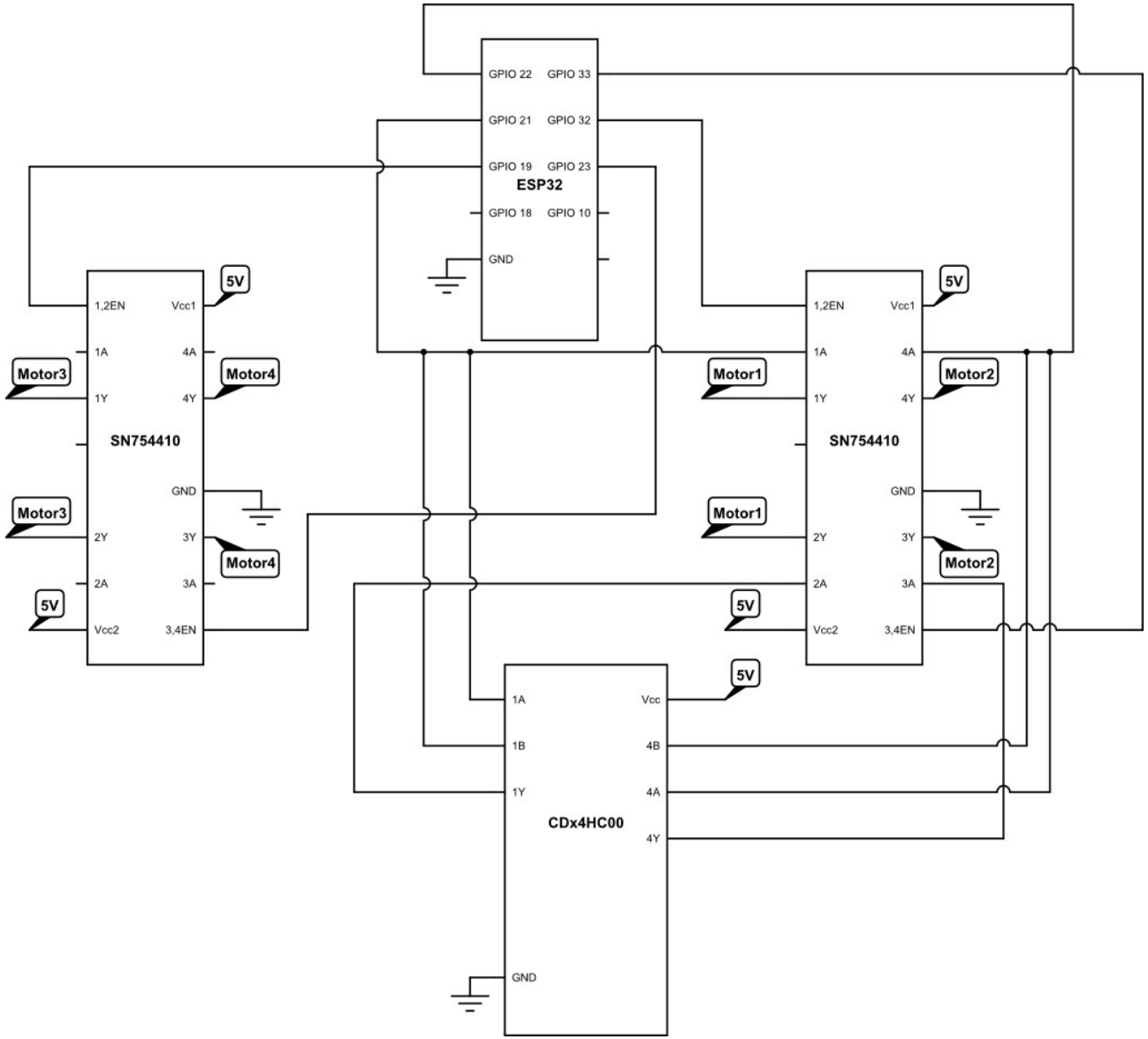
Range	Sensor	Quantity	Seller
Long	Sharp IR	1	Amazon
Short	ToF Distance Ranging	1	Pololu
Short	Ultrasonic	2	Adafruit

Sharp GP2Y0A21YK0F
- Cost: $10.90
- Also available on Adafruit for $14.95
- Analog output can be connected to ADC pin for distance measurements
- Detection range is ~10-80 cm (4" to 32")
- Datasheet1, Datasheet2
- Distance range: 10-80cm / 4-31inches

Ultrasonic Ranging
1. RCWL-1601
   - Cost: $3.95
   - Range: 10cm – 250cm
   - Speed: ~10 samples/sec
   - Beam width: ~75 degrees
2. HC-SR04

Time of Flight Distance Ranging
1. VL6180
   - Cost: $13.95
   - Distance range: 0.5-20cm
2. VL53L0X
   - Cost: $14.95
   - Distance range: 5-120cm

Motor Circuit Diagram



ESP32 Pinouts : Master ESP32

Master ESP32		
D1	Internal Flash, Don't use	
D3	Internal Flash, Don't use	
CLK	Internal Flash, Don't use	
21 / VSPI HD	ToF SCL	
22 / VSPI WP	ToF SDA	
19 / VSPI Q	LINK TO OTHER ESP32	
23 / VSPI D		
18 / VSPI CLK	LINK TO OTHER ESP32	
5 / VSPI CS0	Boot strap pin, must be high on boot	
10 / TXD1	Ultrasonic Trigger	
9 / RXD1	Ultrasonic Echo	
RX0 / GPIO3	used for USB Serial.	
TX0 / GPIO1	used for USB Serial.	
35 / ADC1 CH7		No output driver. No pullup/pulldown. Can use input only.
34 / ADC1 CH6		No output driver. No pullup/pulldown. Can use input only.
38 / ADC1 CH2		No output driver. No pullup/pulldown. Can use input only.
37 / ADC1 CH1		No output driver. No pullup/pulldown. Can use input only.
EN	Drive low to reset chip	
GND / Touch1 / ADC1 CH0	Ground	
3V3	Both 3.3V source if USB powered or externally supplied 3.3V	
CS	Internal Flash, Don't use	
D0	Internal Flash, Don't use	
D2	Internal Flash, Don't use	
VP / GPIO36 / ADC1 CH0		No output driver on this pin. No pullup/pulldown. Can use input only.
VN / GPIO39 / ADC1 CH3		No output driver on this pin. No pullup/pulldown. Can use input only.
25 / DAC_1 / ADC2 CH8		Digital to Analog Converter (can't use ADC2 with WIFI)
26 / DAC_2 / ADC2 CH9		Digital to Analog Converter (can't use ADC2 with WIFI)
32 / ADC1 CH4 / TOUCH9	SHARP IR ADC	
33 / ADC1 CH5 / TOUCH8		
27 / ADC2 CH7 / TOUCH7	(can't use ADC2 with WIFI)	
14 / ADC2 CH6 / TOUCH6/ SPI CLK	(can't use ADC2 with WIFI)	
12 /ADC2 CH5 / TOUCH5 / SPI MISO	Boot strap pin, must be low on boot (can't use ADC2 with WIFI)	
13 / ADC2 CH4 / TOUCH4 / SPI MOSI	Used for USB Serial. (can't use ADC with WIFI)	
15 / ADC2 CH3 / TOUCH3 / SPI SS	Used for USB Serial. Boot strap pin, high on boot (can't use ADC2 with WIFI)	
2 / ADC2 CH2 / TOUCH2	Boot strap pin, default low on boot (can't use ADC2 with WIFI)	
4 / ADC2 CH0 / TOUCH0	(can't use ADC2 with WIFI)	
0 / ADC2 CH1 / TOUCH1	IO0 button, boot strap pin, must be high on boot (can't use ADC2 with WIFI)	
3v3	Both 3.3V source if USB powered or externally supplied 3.3V	
GND	Ground	
5V	5V source if powered from USB or power-in: 5V to 12V	

ESP32 Pinouts : Secondary ESP32

Secondary ESP32		
D1	Internal Flash, Don't use	
D3	Internal Flash, Don't use	
CLK	Internal Flash, Don't use	
21 / VSPI HD	Motor 4	
22 / VSPI WP	Motor 4	
19 / VSPI Q	LINK TO OTHER ESP32	
23 / VSPI D	Motor 3	
18 / VSPI CLK	LINK TO OTHER ESP32	
5 / VSPI CS0	Boot strap pin, must be high on boot	
10 / TXD1	Motor 3	
9 / RXD1		
RX0 / GPIO3	used for USB Serial.	
TX0 / GPIO1	used for USB Serial.	
35 / ADC1 CH7		No output driver. No pullup/pulldown. Can use input only.
34 / ADC1 CH6		No output driver. No pullup/pulldown. Can use input only.
38 / ADC1 CH2		No output driver. No pullup/pulldown. Can use input only.
37 / ADC1 CH1		No output driver. No pullup/pulldown. Can use input only.
EN	Drive low to reset chip	
GND / Touch1 / ADC1 CH0	Ground	
3V3	Both 3.3V source if USB powered or externally supplied 3.3V	
CS	Internal Flash, Don't use	
D0	Internal Flash, Don't use	
D2	Internal Flash, Don't use	
VP / GPIO36 / ADC1 CH0		No output driver on this pin. No pullup/pulldown. Can use input only.
VN / GPIO39 / ADC1 CH3		No output driver on this pin. No pullup/pulldown. Can use input only.
25 / DAC_1 / ADC2 CH8	Motor 1	Digital to Analog Converter (can't use ADC2 with WIFI)
26 / DAC_2 / ADC2 CH9	Motor 1	Digital to Analog Converter (can't use ADC2 with WIFI)
32 / ADC1 CH4 / TOUCH9	Motor 2	
33 / ADC1 CH5 / TOUCH8	Motor 2	
27 / ADC2 CH7 / TOUCH7	(can't use ADC2 with WIFI)	
14 / ADC2 CH6 / TOUCH6/ SPI CLK	(can't use ADC2 with WIFI)	
12 /ADC2 CH5 / TOUCH5 / SPI MISO	Boot strap pin, must be low on boot (can't use ADC2 with WIFI)	
13 / ADC2 CH4 / TOUCH4 / SPI MOSI	Used for USB Serial. (can't use ADC with WIFI)	
15 / ADC2 CH3 / TOUCH3 / SPI SS	Used for USB Serial. Boot strap pin, high on boot (can't use ADC2 with WIFI)	
2 / ADC2 CH2 / TOUCH2	Boot strap pin, default low on boot (can't use ADC2 with WIFI)	
4 / ADC2 CH0 / TOUCH0	(can't use ADC2 with WIFI)	
0 / ADC2 CH1 / TOUCH1	IO0 button, boot strap pin, must be high on boot (can't use ADC2 with WIFI)	
3v3	Both 3.3V source if USB powered or externally supplied 3.3V	
GND	Ground	
5V	5V source if powered from USB or power-in: 5V to 12V	

ESP32 Pinouts : Sensors

- **ToF Distance Ranging (I2C)**
  - VIN (2.8V)
  - GND
  - SCL — GPIO 21
  - SDA — GPIO 22
  - GPIO1
  - XSHUT / GPIO0

- **Ultrasonic (ADC)**
  - 5V Supply
  - Trigger Pulse Input — GPIO 9
  - Echo Pulse Output — GPIO 10
  - Ground

- **Sharp IR (ADC)**
  - VCC
  - V_Out — GPIO 32
  - Ground