# Weekly Updates - 2/19/19

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# Mechanical Arm Update

- The mechanical arm CAD design is about 80% completed.
- The timing belt that connects the top two pulleys to the bottom pulley is not shown for the lift mechanism.
- A rod that connects the two pulleys to their corresponding mounting platform is not shown.
- The bottom hex nuts shown will not used, but rather a ¾” spacer will be used for a higher lift of the turntable to match the height of the round belt of the motor pulley. Once this change is applied, the belt and the turntable will align and the CAD drawing will be fixed.
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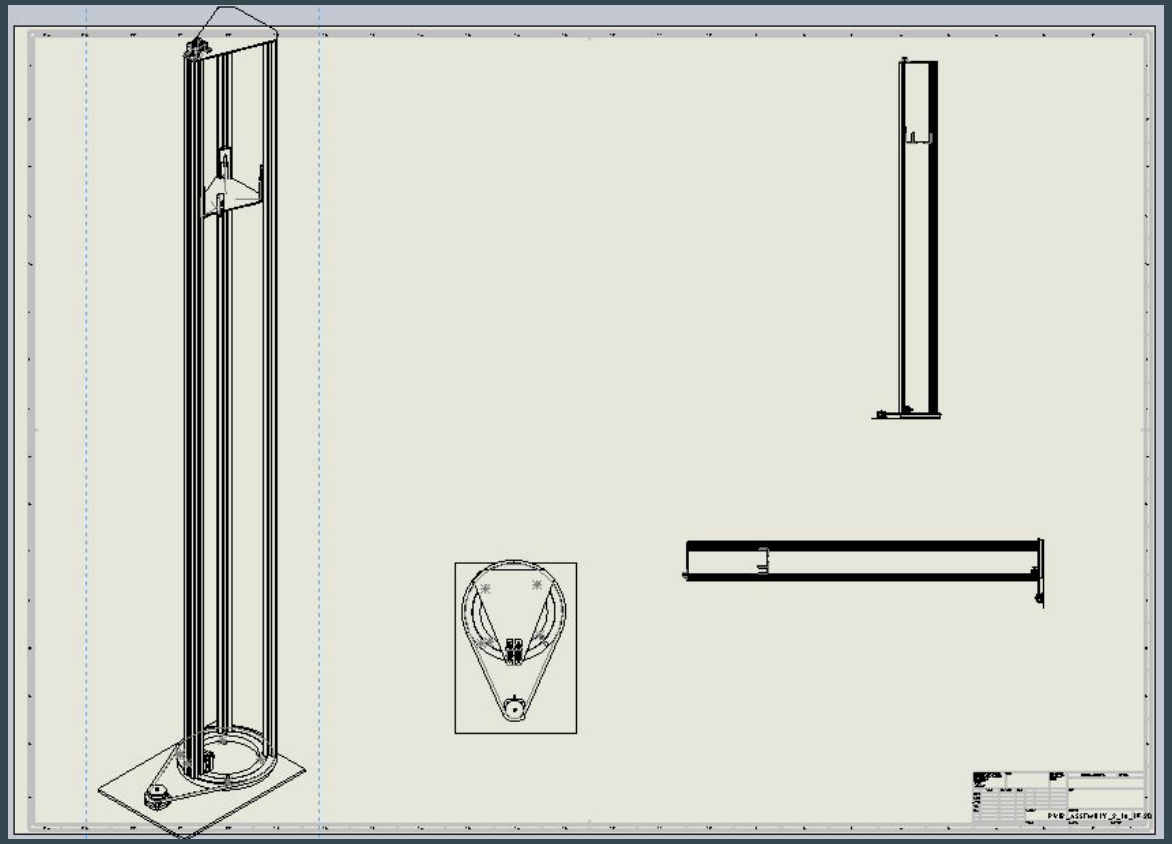
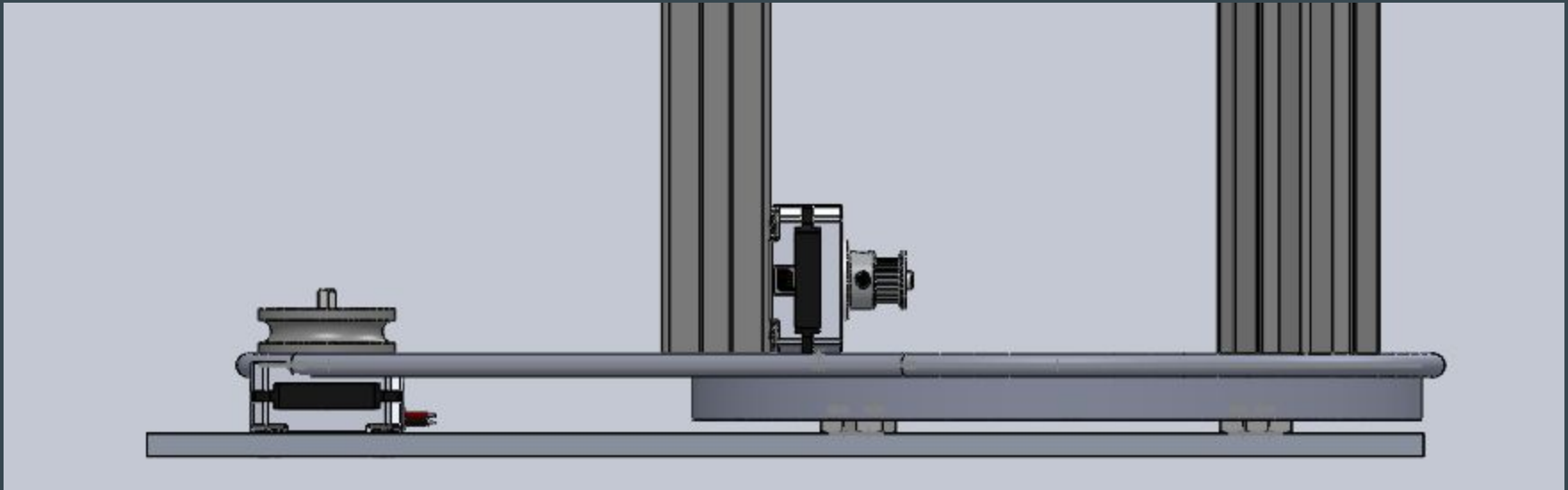
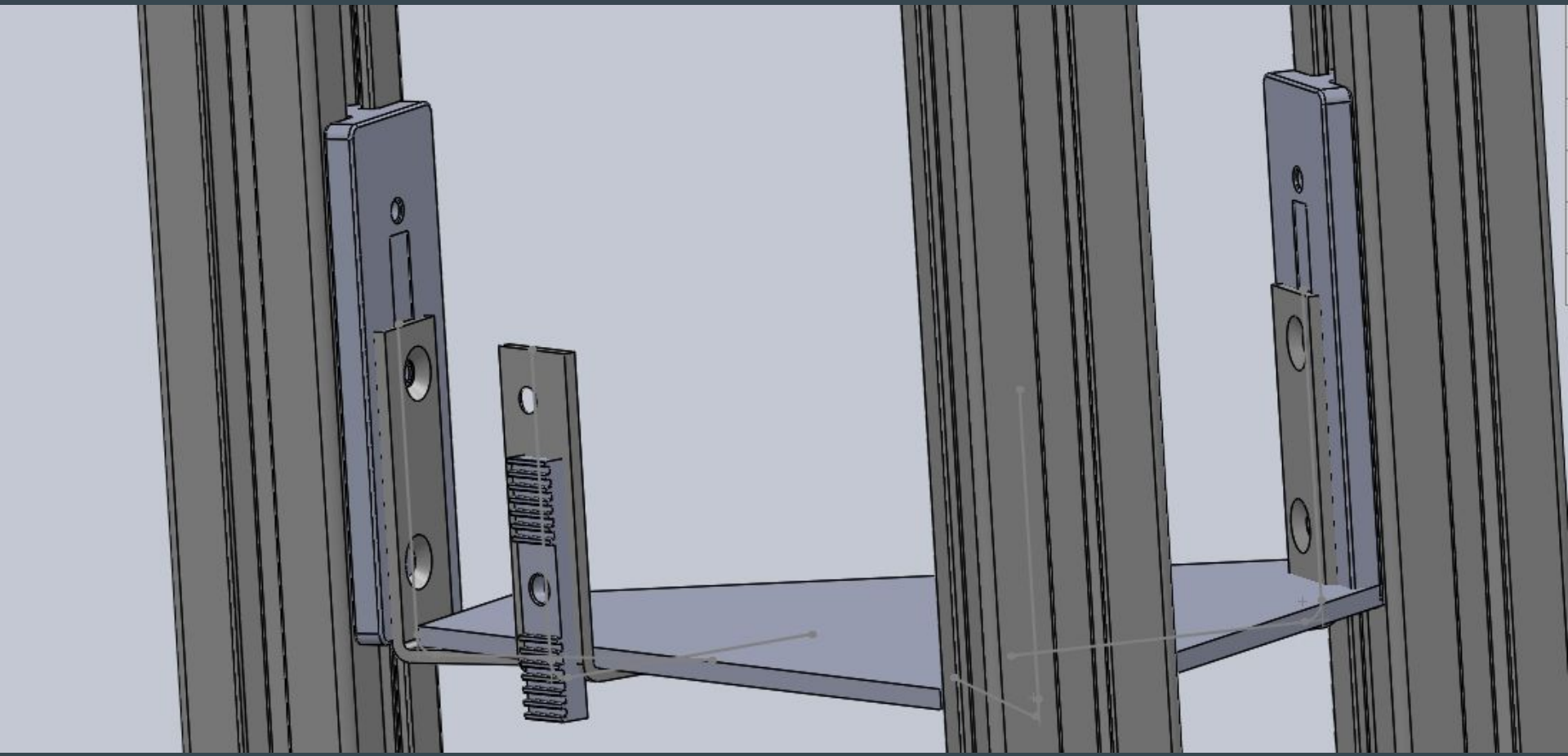
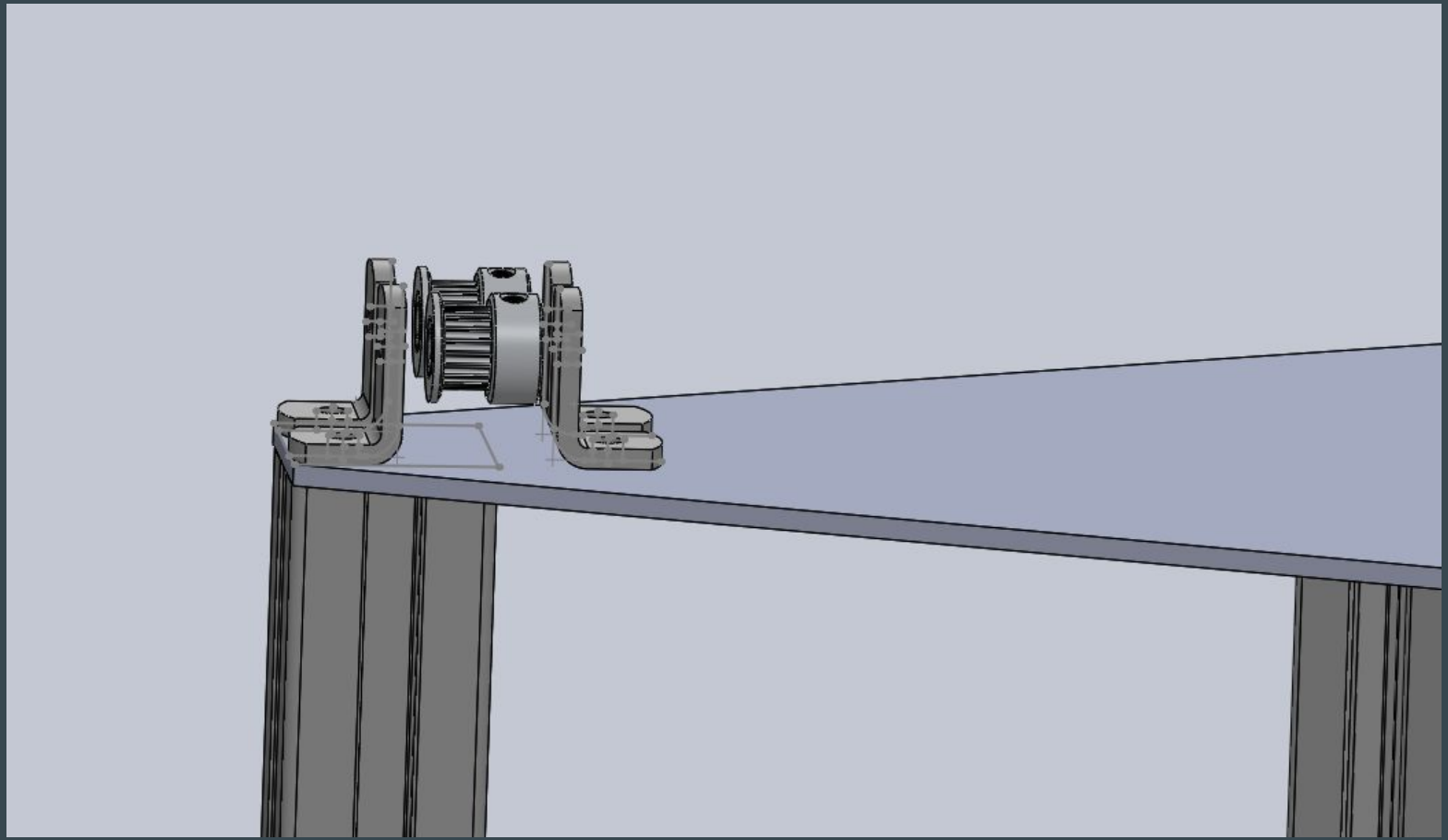
# ARM CAD ISOMETRIC VIEW



# ARM CAD VIEW







# Testing Environment

- “dummy gauges” at variable heights (ex: 4’ 5’ 6’)
- Glass/plastic coverings
- No digital readings
- Foam board with a removable hood
  - 1in x 4ft x 8ft



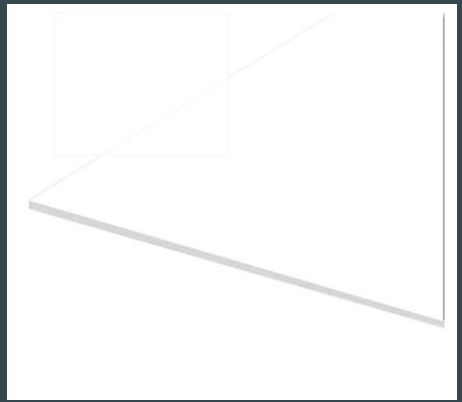

# Structure Alternatives

- 15/32 in. x 4ft x 8ft Plywood - $18.05

https://www.homedepot.com/p/15-32-in-x-4-ft-x-8-ft-3-Ply-RTD-Sheathing-166073/100067329

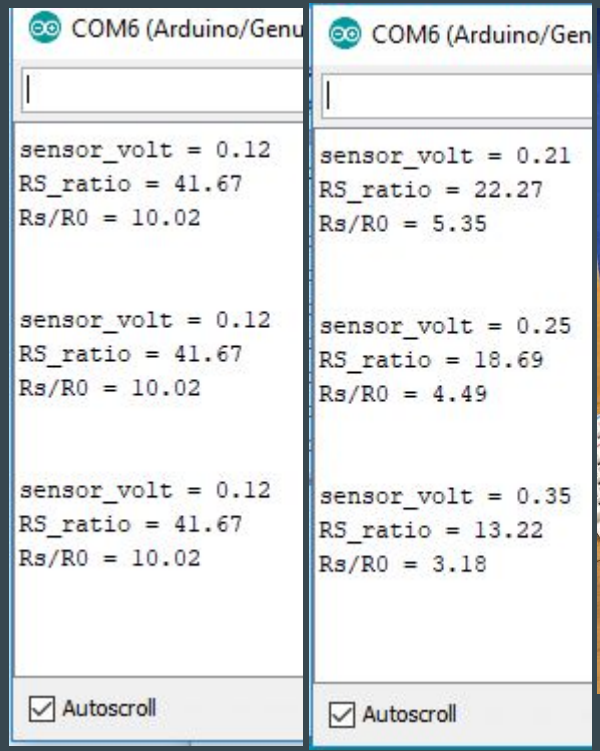
- Foam Board 40” x 60” White - $12.99

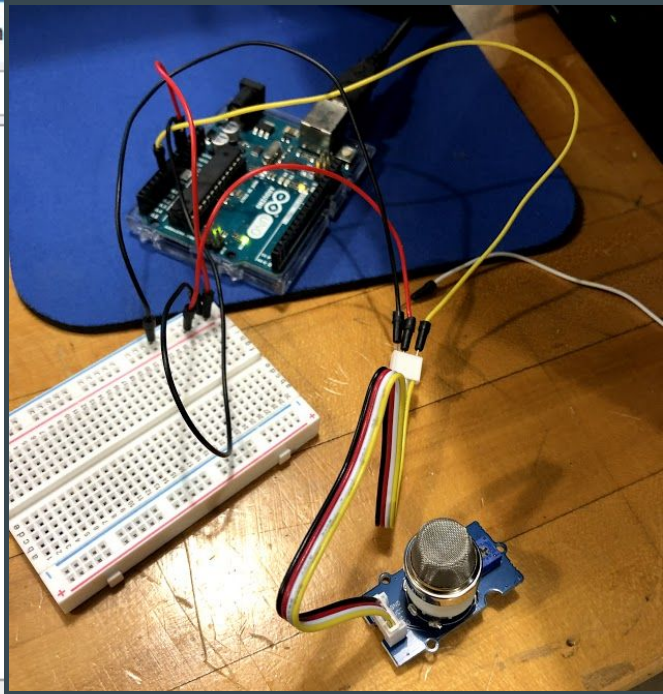
https://www.officedepot.com/a/products/334961/Office-Depot-Brand-Sturdy-Board-Foam/



# Parts Testing

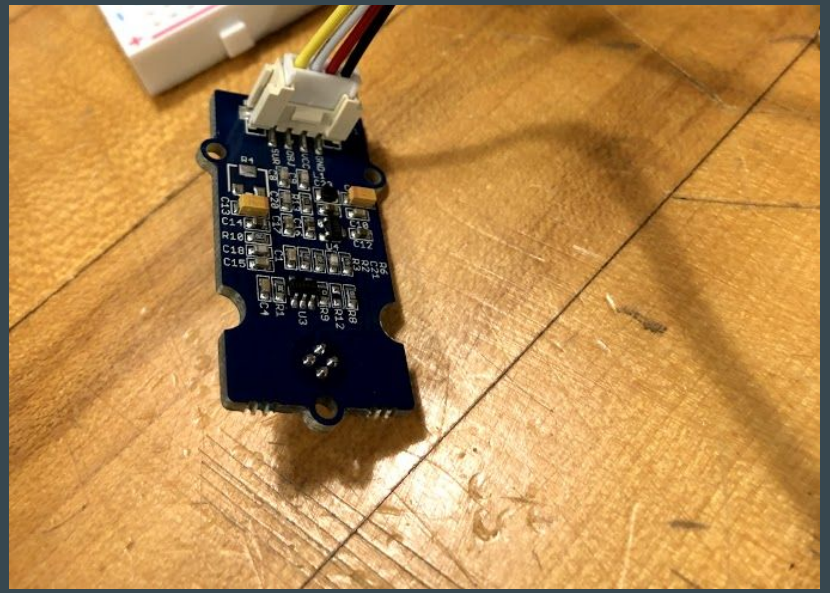
- Grove Gas Sensor MQ2
- 5V/Analog Signal
- Need to test in presence of alcohol
  - Alcohol drastically lowers the Rs/R0 value



# IR Temp Sensor

- 5V/ 2 Analog Inputs
- Surrounding Temp: Yellow Analog In
- Object Temp: White Analog In
- Temp displayed in C
  - Convert to F
- Takes awhile to start displaying a semi-correct temp

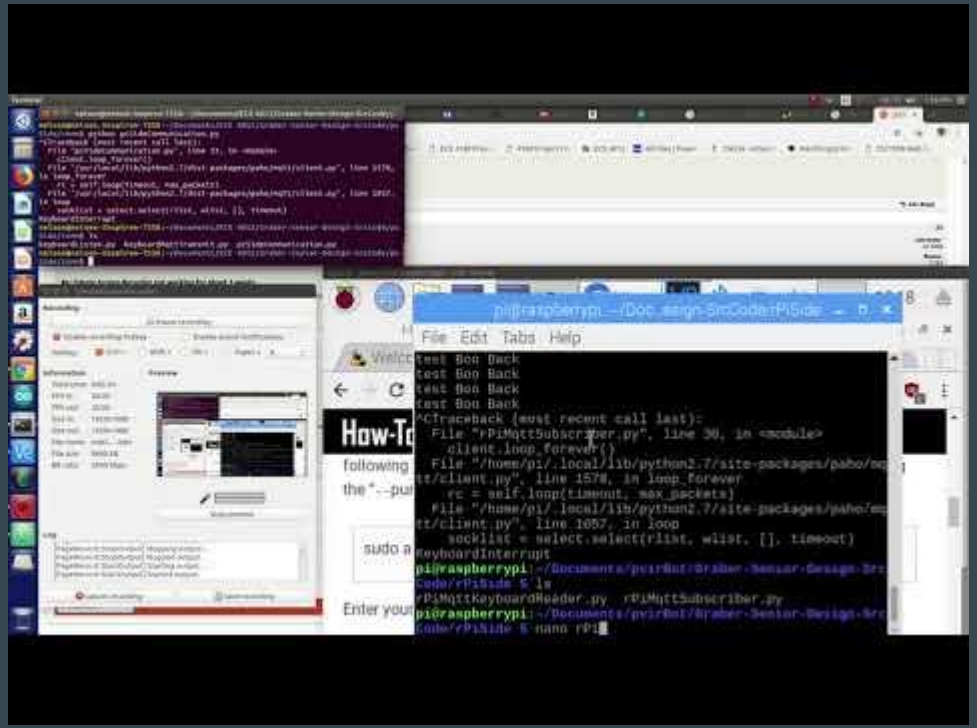


COM6 (Arduino/Genuino Uno)

```
other temp700
Surrounding temperature:27.74    Sensor voltage:0.027V   object temperature:35.13
other temp964
Surrounding temperature:27.74    Sensor voltage:0.025V   object temperature:34.66
other temp921
Surrounding temperature:27.71    Sensor voltage:0.023V   object temperature:34.01
other temp969
Surrounding temperature:27.79    Sensor voltage:0.022V   object temperature:33.76
other temp763
Surrounding temperature:27.74    Sensor voltage:0.021V   object temperature:33.57
other temp352
Surrounding temperature:27.74    Sensor voltage:0.020V   object temperature:33.30
other temp503
Surrounding temperature:27.81    Sensor voltage:0.020V   object temperature:33.34
Surrounding temperature:27.81    Sensor voltage:0.020V   object temperature:33.34
```

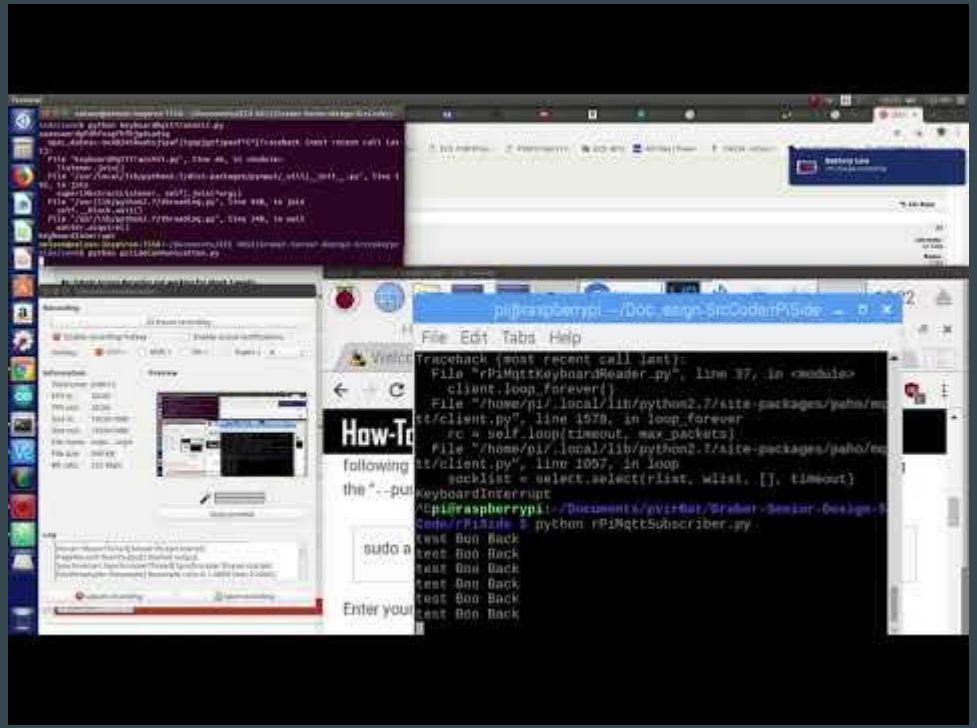
# RPi MQTT Communication

- Demonstration of MQTT setup



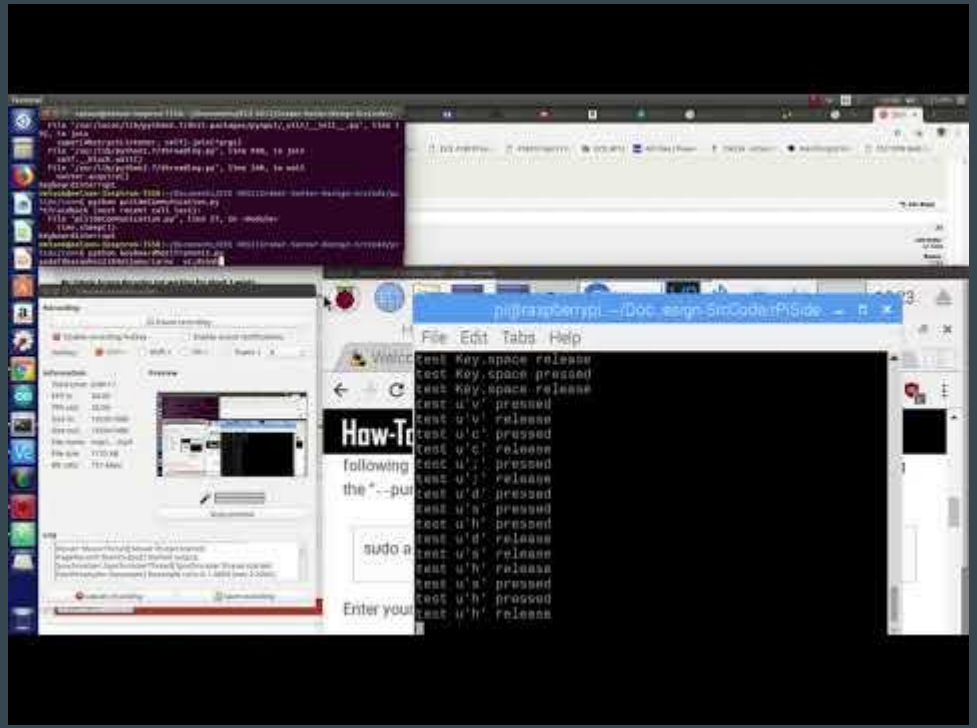
# RPi MQTT Communication

- Demonstration of MQTT Boo back test

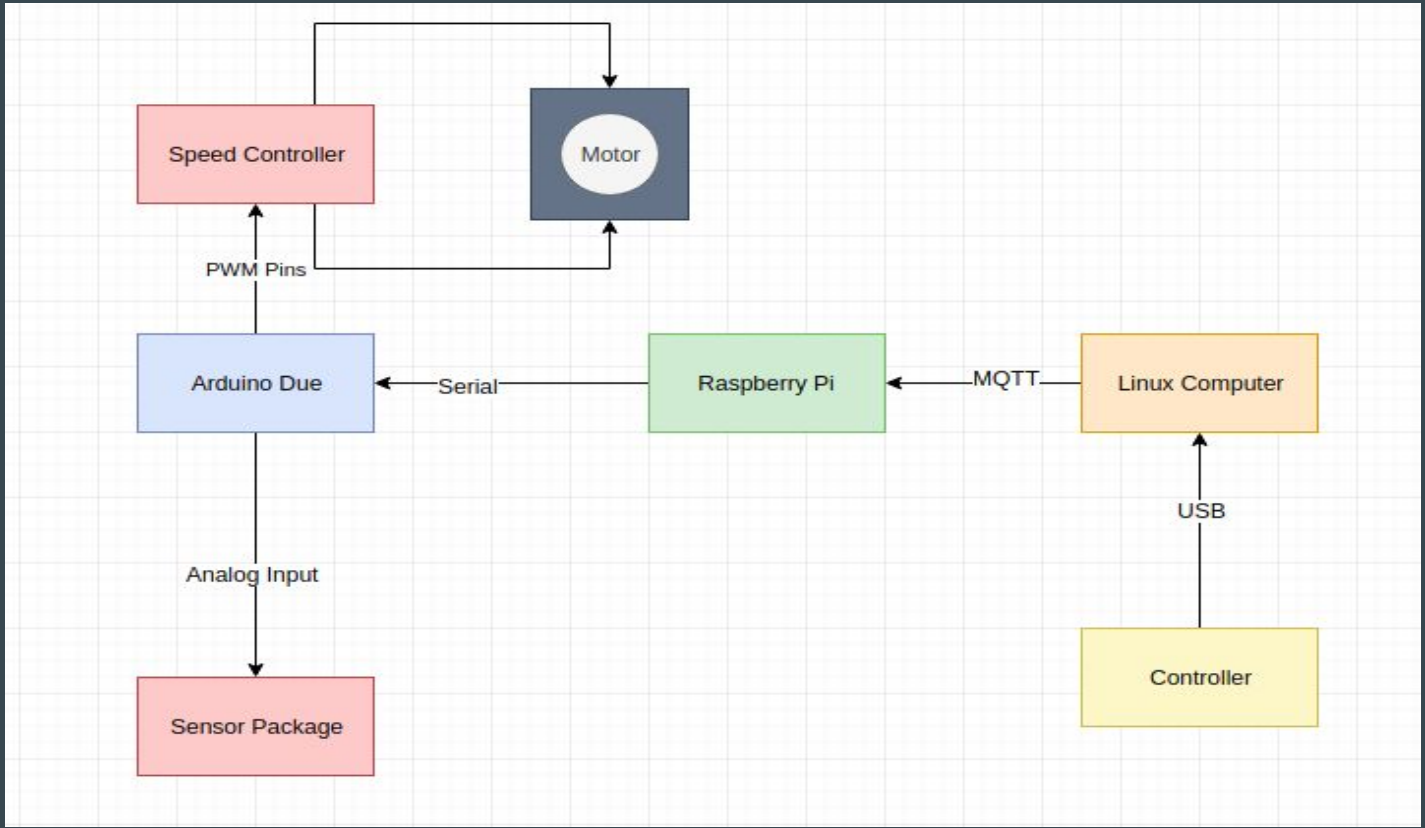


# RPi MQTT Communication

- Demonstration of MQTT Keyboard input test



# (Corrected) Communication Scheme

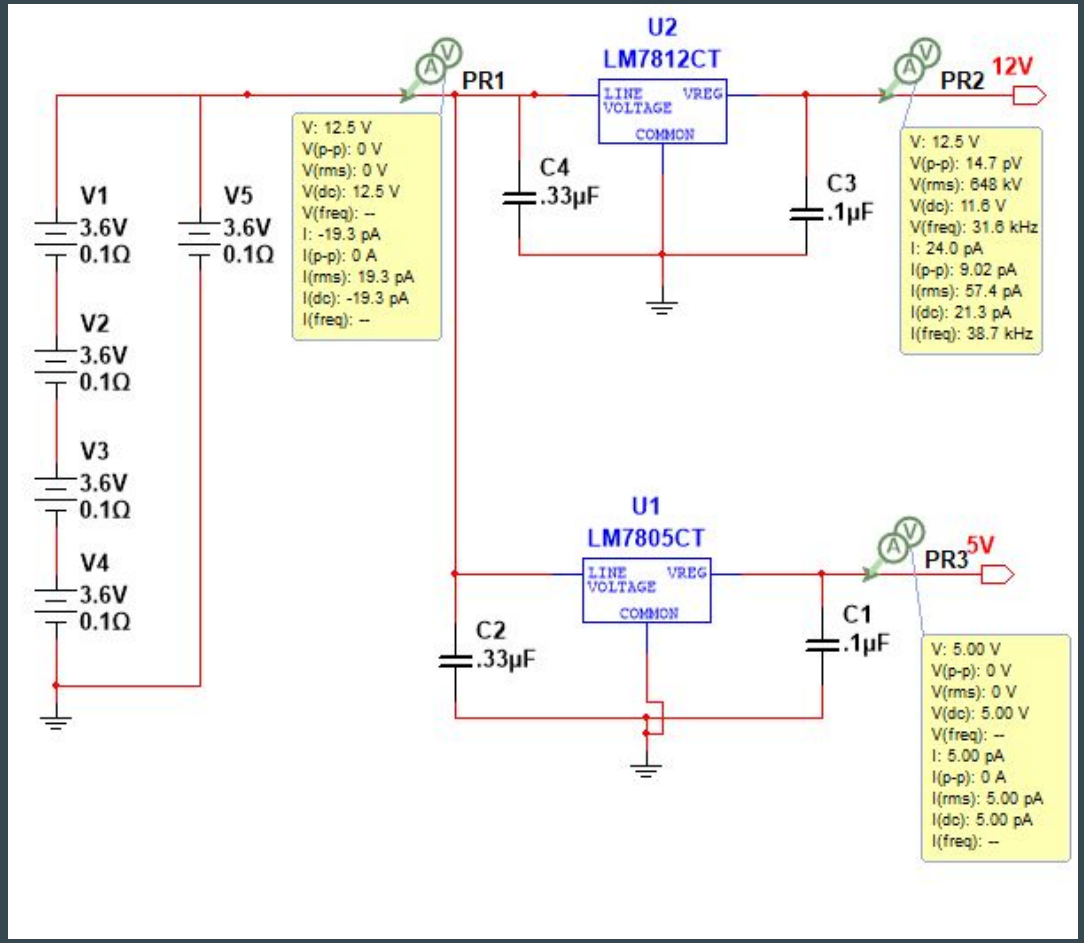


# Power Schematic

Using max amps that devices could be using:
- Each motor using 2.5A (9max)
- .9A for Arduino/Sensors
- 2.5A for Pi

12V regulated will power the Motors and Arduino
-there is a 5V output pin on the arduino that the sensors will use
5V regulated will power the RPi

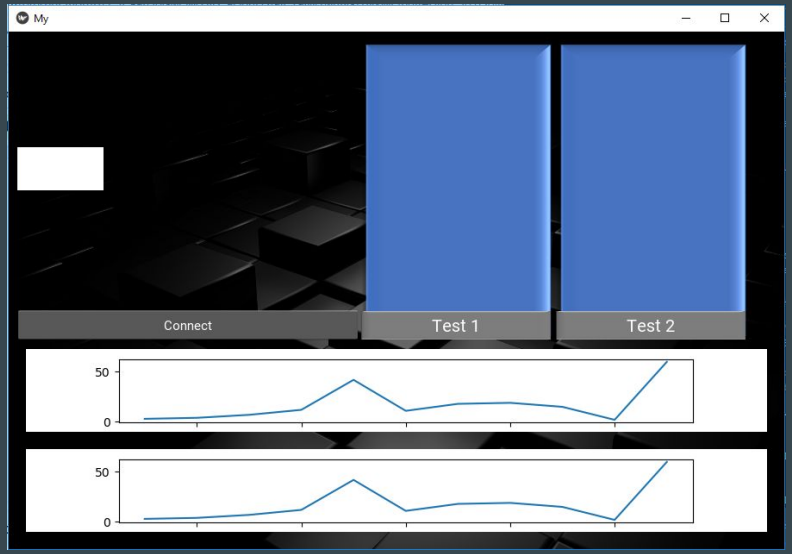
- Heat Generated = (InputV- OutputV) * Output Current
- For 12V regulator:
  - P = (14.4V-12V) * (5.9A) = 14.16W
- For 5V regulator:
  - P = (14.4V- 5V) * (2.5A) = 23.5W

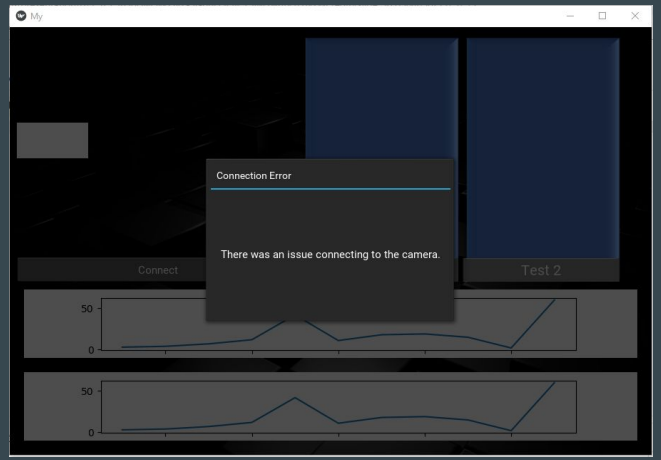


# GUI

Working Aspects:

- Live Streaming
- Log-in window functions
  - Error messages
  - Allows Log-in
- Data Logging
- Error Catching, Formatting, Clean up
- Page Navigation (in progress)
- Live Line Plot working



# Order 1 Status

The following parts have been ordered:

- 2 Grove MQ2 Gas Sensor ($7.53)
- 2 Grove Infrared Temperature Sensor ($9.90)
- 1 30pcs Protoboard set ($10.85)
- 1 130pcs Jumper Wire Kit ($7.89)
- 1 3pcs Solderless Breadboard ($7.99)
- 1 Arduino DUE board ($37.40)
- 1 Waveshare RPi Camera F Module ($25.99)
- 1 Sandisk 32gb micro SD card ($8.90)
- 2 Parallax Carbon Monoxide Sensor ($5.99)

Total of Parts that have come in: $133.88 (parts ordered from Amazon and Digikey)
Order Total: $145.86

# Order 2 Status

- 8 Samsung 30T 21700 Battery ($6.99)
- 2 EFAN 4 Channel Battery Charger ($9.97)
- 4 21700 Battery Tray ($5.25)
- 1 10ft Ethernet Cable ($2.58)
- 1 8” Aluminum Lazy Susan ($17.00)
- 3 6ft T-slots ($17.68)
- 1 USB Breakaway cable for Xbox 360 ($1.99)
- 1 6061 Aluminum plate 12” x 12” , ¼” thick (robot lid) ($17.93)
- 1 6061 Aluminum plate 12” x 24”, ⅛” thick ($36.29)

Order Total: $172.65 (assuming first link was used)

# Order 3 Status

- 1 Test Pressure Gauge (2-½”)($1.61)
- 1 General Purpose Pressure Gauge (2-½”) ($3.59)
- 1 Liquid Filled Pressure Gauge (2-½”) ($4.85)
- 1 Xbox 360 Controller, Wired USB controller ($14.99)
- 4 T-slot sliders ($5.50)
- 3 30mm x 30mm T-slotted profile 6ft ($19.23)
- Timing Belt Kit (Includes timing belt, pulleys, tension spring, clamp mount) ($12.99)
- 5 Zinc-plated steel corner bracket 2” x 2” ($0.92)
- 1 6061 Aluminum plate 12” x 12”, ¼” thick ($17.93) (Arm base)

Order Total: $140.55 (assuming first link was used)

Grand Total: $459.06 Remaining budget: $40.94

# Items to be Discussed

- Task Status: Arm CAD design, Sensor Package Schematic, Control System Design
- Action Items for the week
  - Begin Xbox 360 controller setup/ continue with Arduino serial communication
  - Begin adding meeting transcripts/ summaries to the website