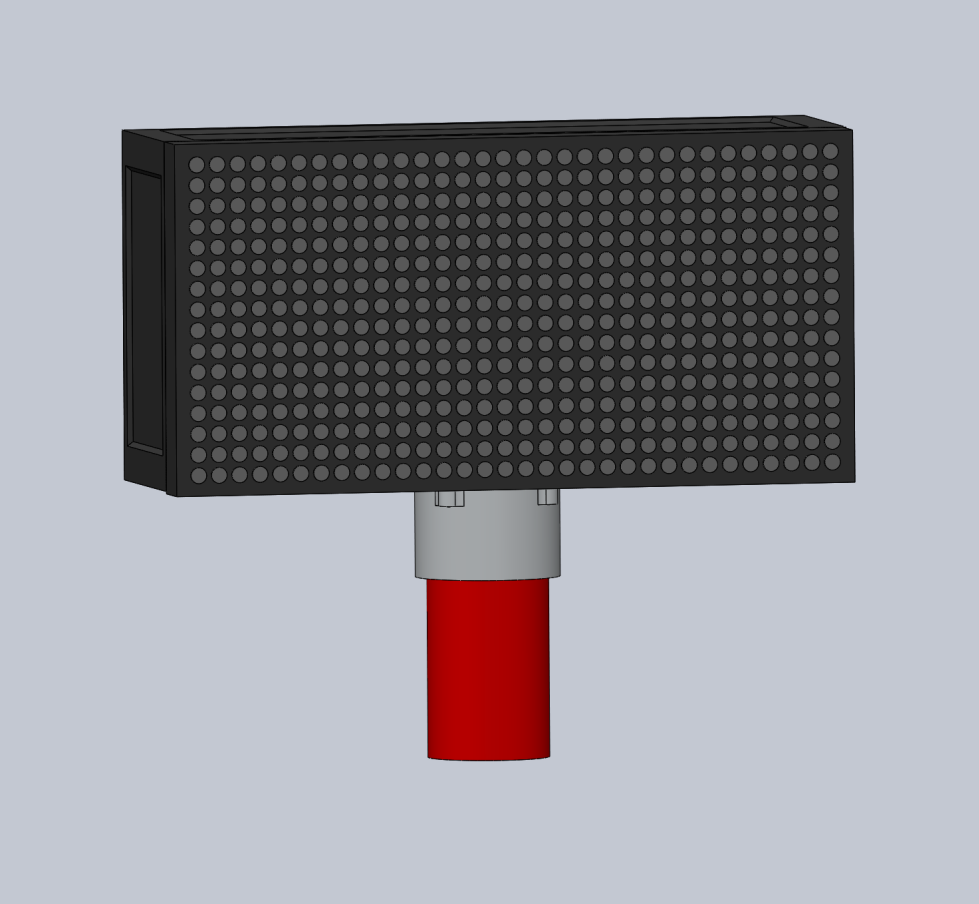

Open Source Rover: Head Assembly Instructions

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Contents

1 3D printing

There are a few components that need to be 3D printed to make the head assembly. You can find the STL files necessary for these prints in the Mechanical/Head Assembly/3D Printed Parts folder of the repository.

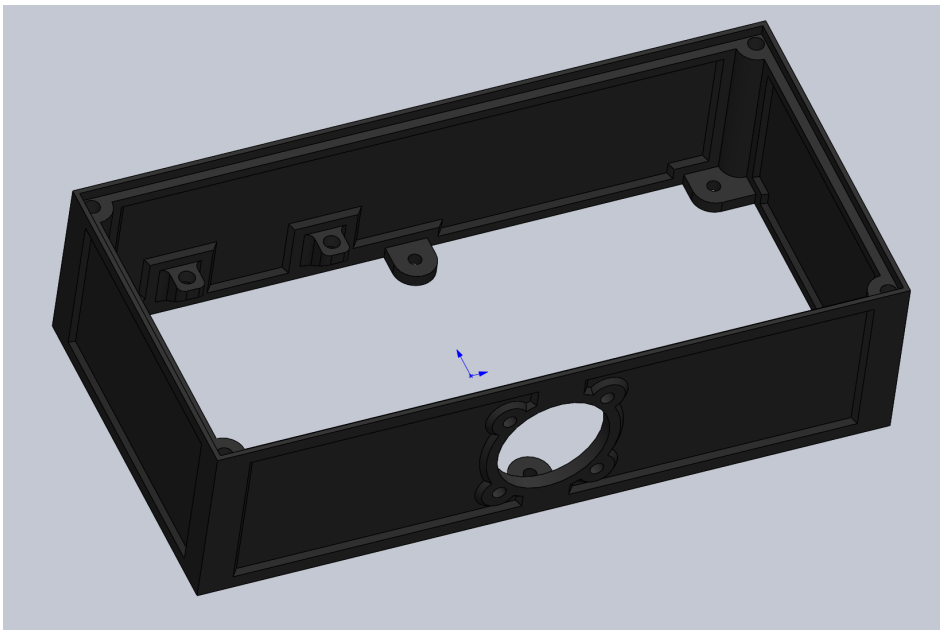


Figure 1: 3D printed Head piece

If you do not have a 3D printer there are a number of online 3D printing services available, an example of which can be found at:

- https://www.makexyz.com/

2 Laser Cutting

There is a plate which mounts the arduino into the head, as well as a back plate for the panel of the head. The 2D cutout files are the .DXF files and can be found on the github under Mechanical - Head Assembly - Laser Cut Parts

If you do not have access to a lases cutter there is an online service which you can order these from below:

- https://www.sculpteo.com

To get the above parts from Sculpteo, go to Laser cutting and then upload these files (with mm selected as units). Hit Next. Make sure scale is set to 100%, change the material to Acrylic, have thickness to 1/8 inch, and then select whatever color you wish.

3 Machining/Fabrication

3.1 Cutting the PVC Pipe

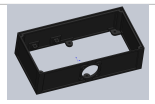
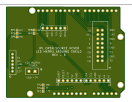
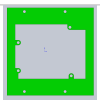
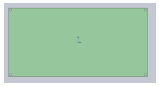
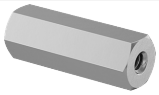
Table 1: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
2" PCV Pipe	S29	1		Vice or V-Clamps	D8		
HackSaw or Bandsaw	D4						

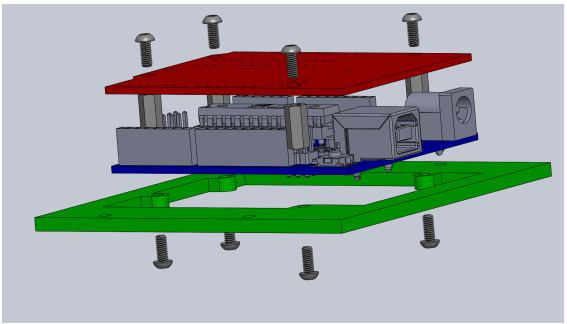
Take the PVC pipe **S29** (this will be the "neck" of the rover) and cut it to your desired length. For reference, we cut our "neck" PVC pipe to be roughly 6 inches long.

4 Mechanical Assembly

Table 2: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
3D Printed Head	S43	1		#6-32x3/8" Button Head Screw	B2	4	
LED Matrix	E37	1		#4-40x1/4" Button Head Screw	B8	12	
Bore Clamping Hub for 1" PVC	S24	1		M2.5 x 6mm	B10	8	
PVC Pipe (Modified)	S29A	1		Arduino Sheild	E2	1	
M3 x 6mm Socket Head Cap screw	B14	6		Laser Cut Arduino Plate	S44	1	
Laser Cut Head Back Panel	S42	1		Arduino Uno	E24	1	
M2.5 x 10mm	T10	4		#4-40 Heat Set Insert	I1	8	

1. **Assemble the Arduino Stack:** Begin by stacking together the Arduino Uno **E24**, Arduino Sheild **E2**, Standoffs **T10**, Screws **B10**, and Arduino Plate **S44** and assemble them in the following stack.



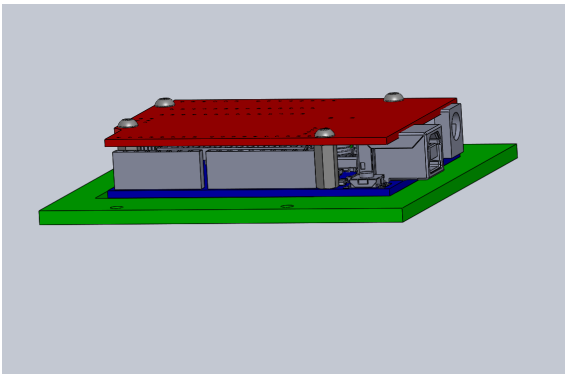


Figure 2: Building Arduino Stack

2. **Inserting the Heat set inserts:** Insert the # 4-40 Heat Set Inserts **I1** into the 3D printed head using a Solder Iron at 460 degrees F, in the locations shown in the following images.

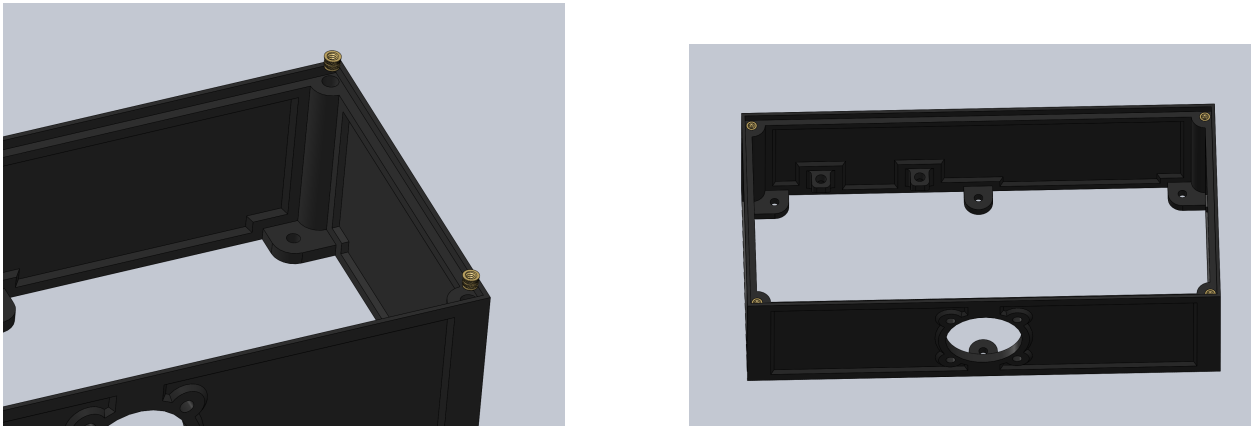


Figure 3: Back panel Inserts

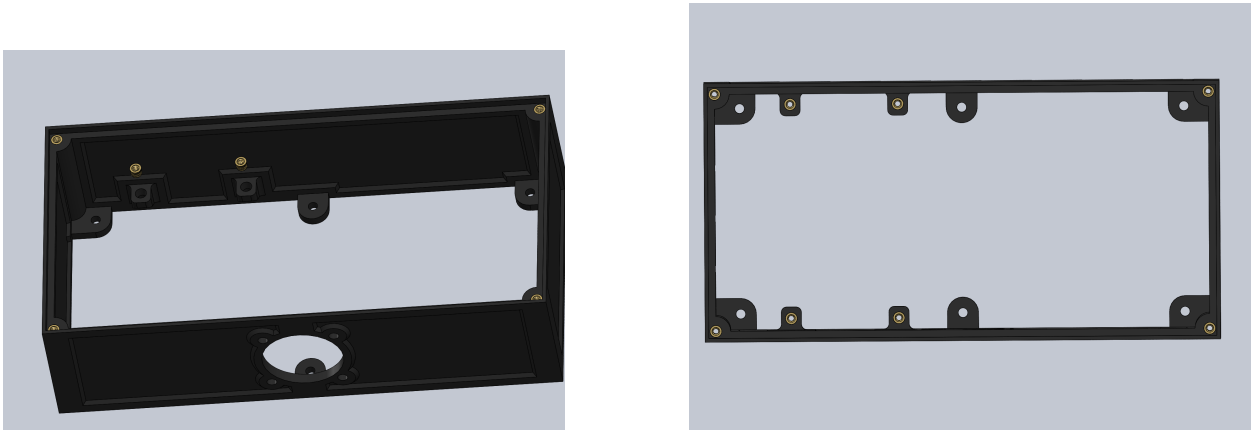


Figure 4: Arduino Inserts

3. **Mount the PVC clamping hub:** Using screws **B2** and attach the PVC clamping hub to the bottom of the 3D printed Head.

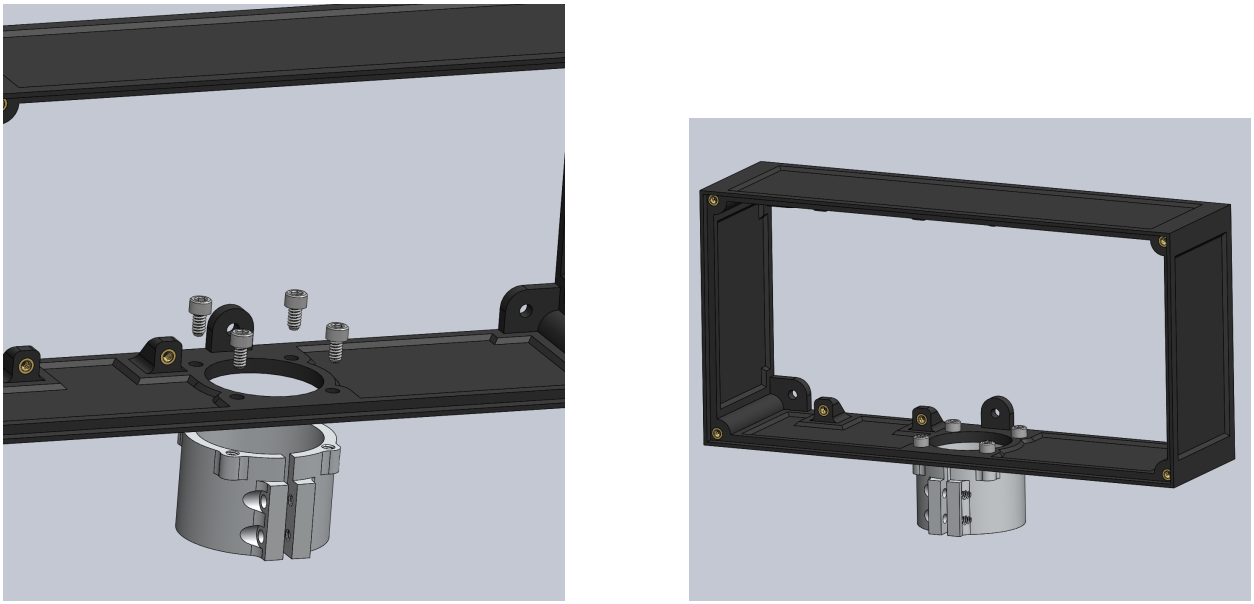


Figure 5: PVC Clamping hub Mount

4. **Attach PVC Pipe:** Slot the PVC pipe **S29** into the clamping hub and then tighten down the screws on the clamping hub

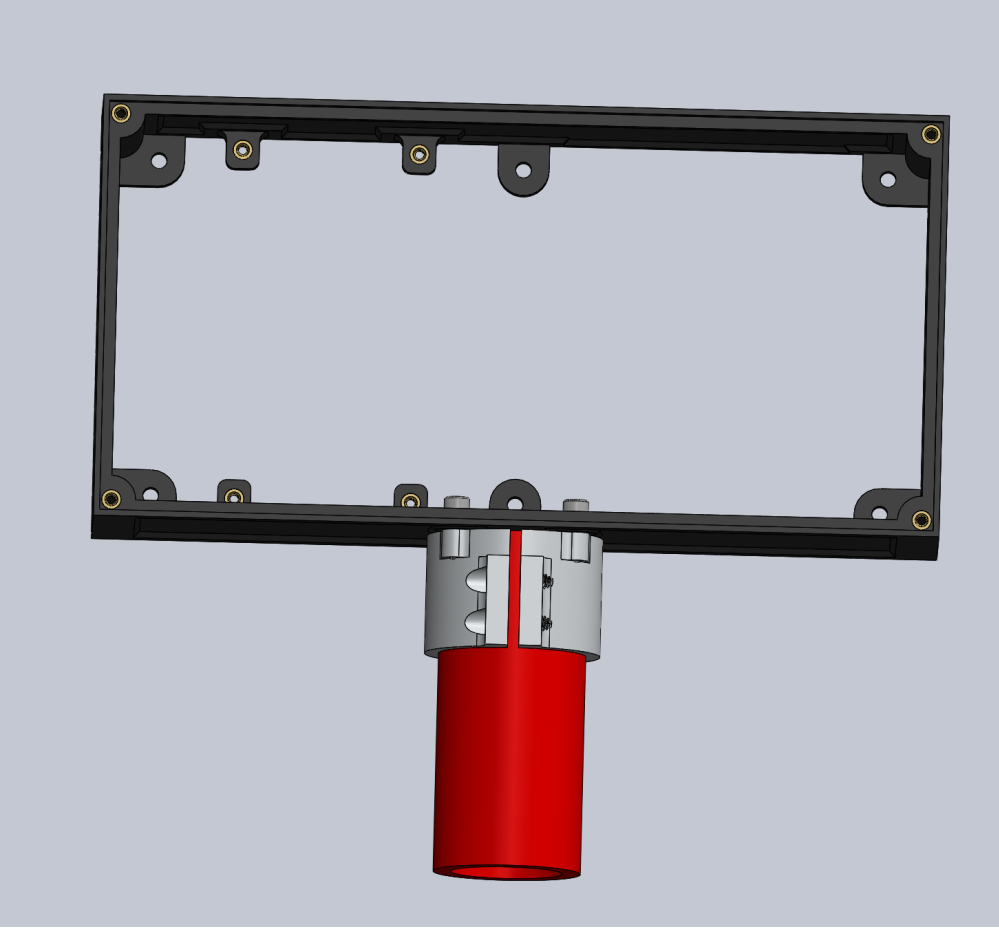


Figure 6: Neck Attachment

5. **Attaching the LED Matrix** Using Screws **B14** attach the LED Matrix **E37** to the front of the Head assembly.

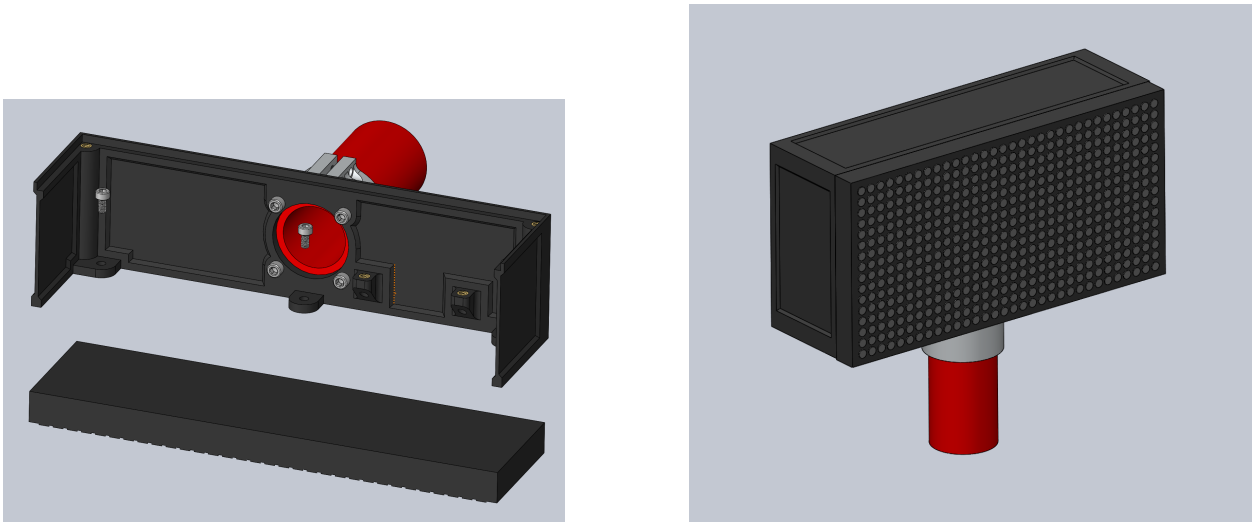


Figure 7: LED Matrix Attachment

6. **Mount the Arduino Inside:** Take the Arduino Plate assembly and mount it using screws **B8** to the Heat set inserts on the posts inside the head

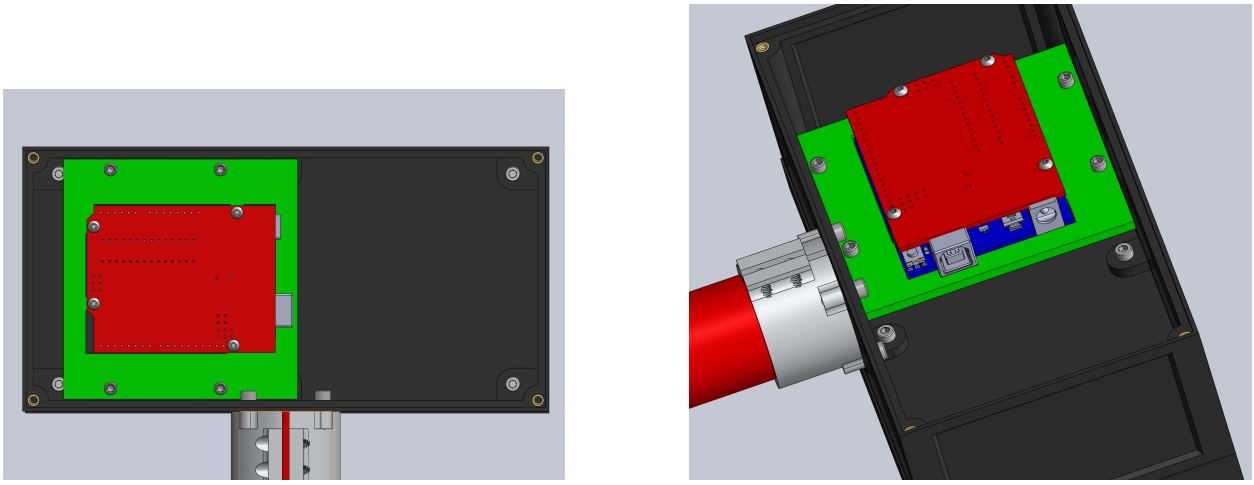


Figure 8: Arduino Plate Integration

7. **Back Plate Attachment:** Attach the Laser Cut Back plate **S42** onto the back of the head assembly using screws **B12**.

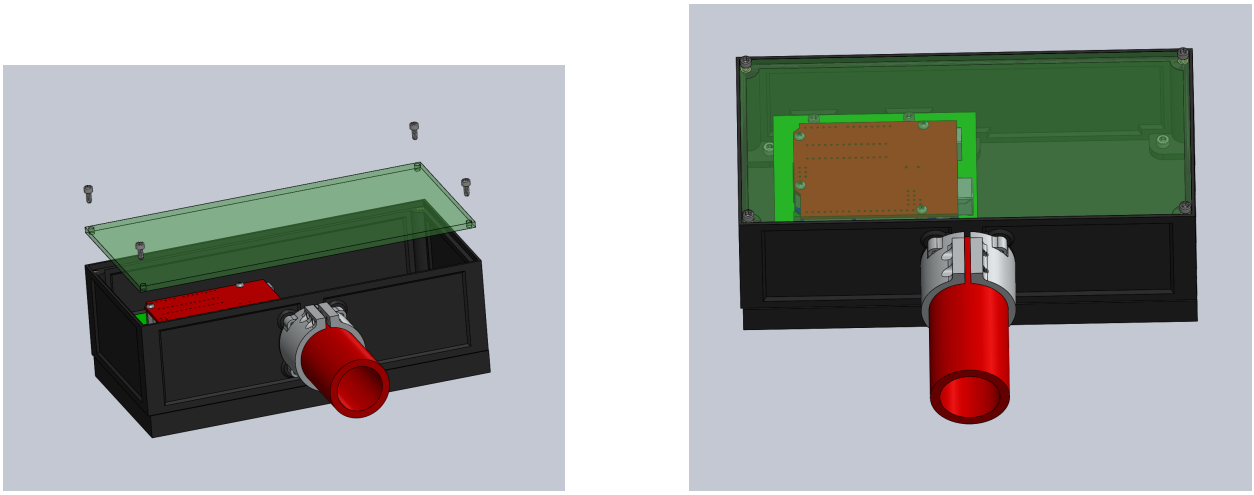


Figure 9: Back Panel Assembly

The Head is now finished!

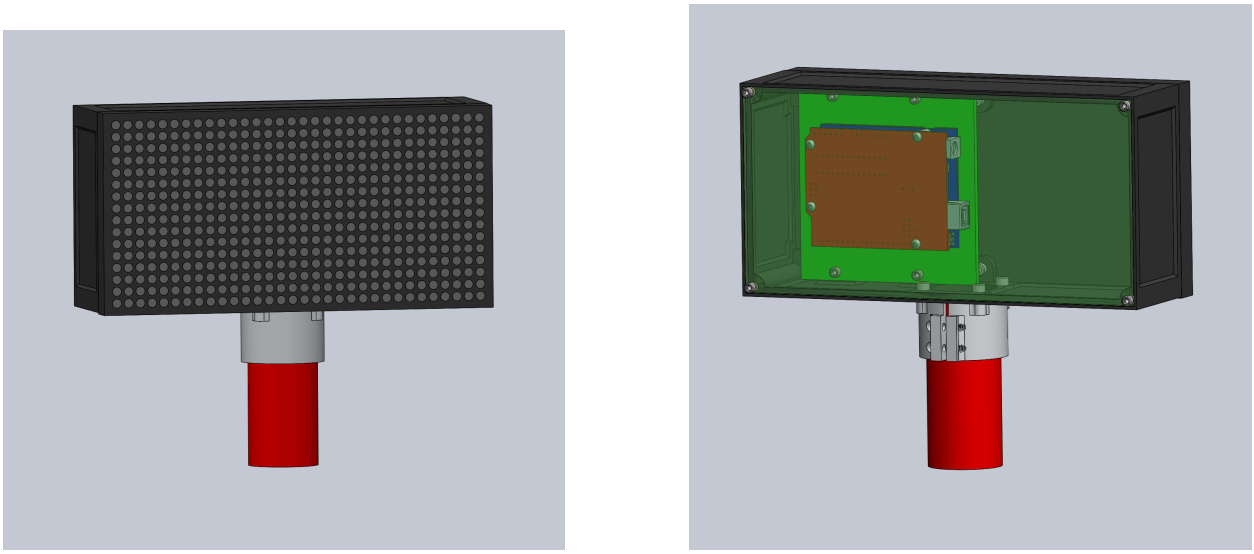


Figure 10: Finished Head Assembly