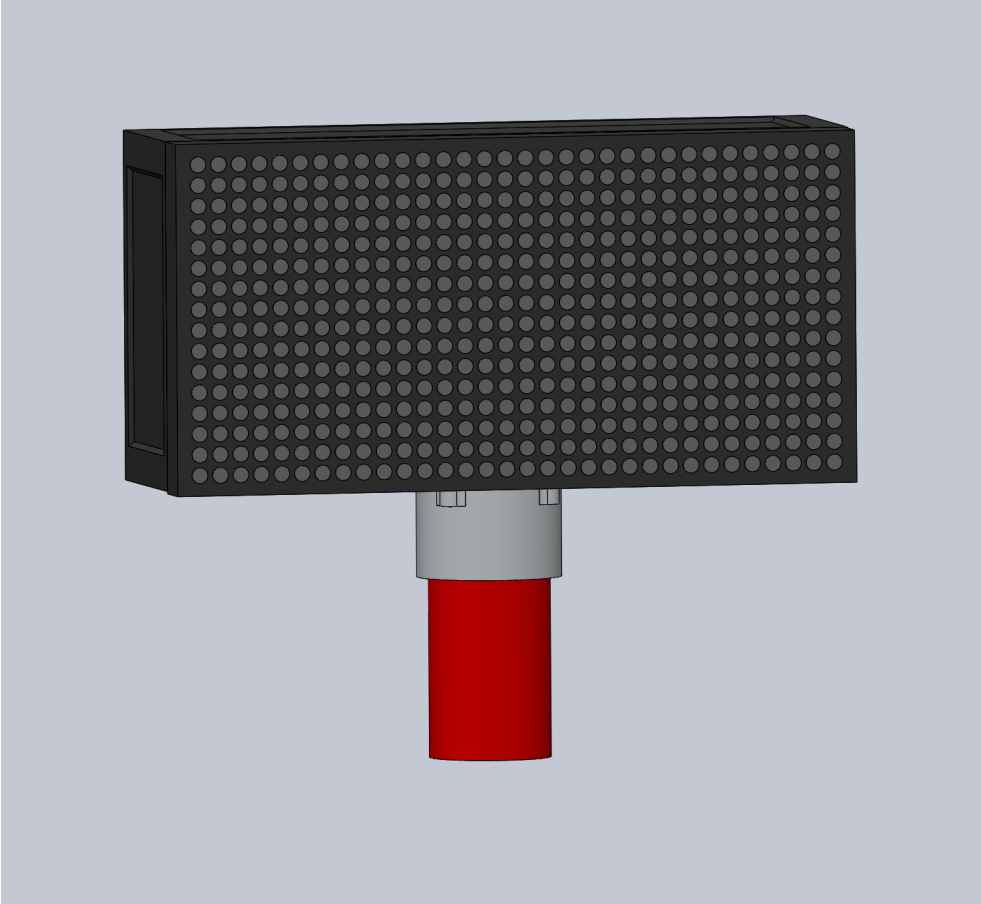

Open Source Rover: Head Assembly Instructions

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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.

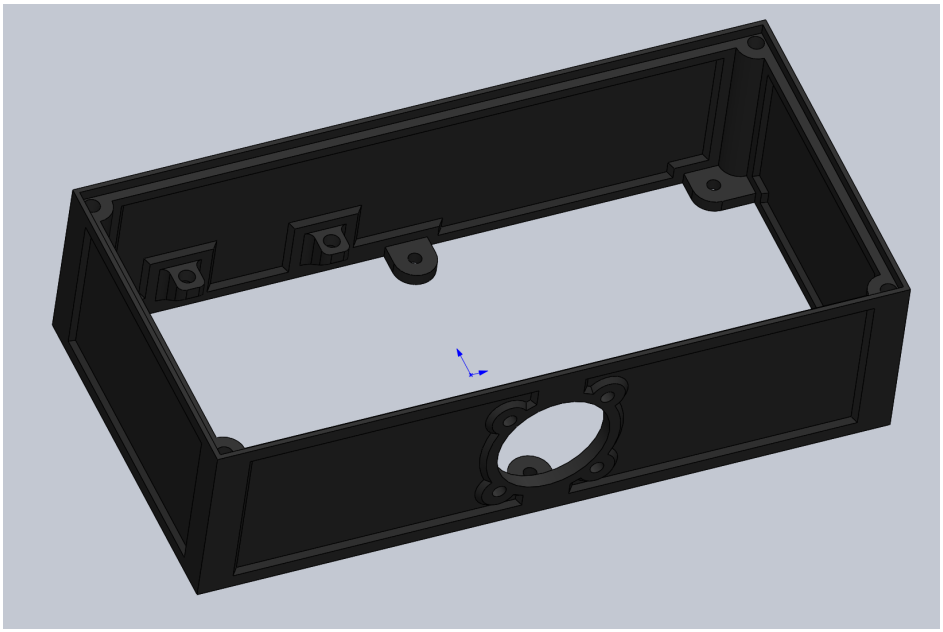


Figure 1: 3D printed Head piece

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/

Print the "head base.STL" piece from the "Mechanical/Head Assembly/3D Printed Parts" folder.

2 Laser Cutting

There is an acrylic 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 in the GitHub repository in the "Mechanical/Head Assembly/Laser Cut Parts" folder.
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 the .DXF files **(make sure**

you select mm as units!). Hit Next. Make sure scale is set to 100%, change the material to Acrylic, set thickness to 1/8 inch, and then select whatever color you wish.

3 Machining/Fabrication

3.1 Cutting the PVC Pipe

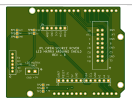
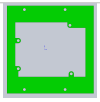
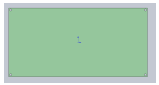
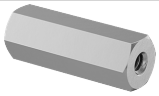
Table 1: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
1" 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 down to 4.5 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 Shield **E2**, Standoffs **T10**, Screws **B10**, and Arduino Plate **S44** and fastening them as shown in Figure 2.

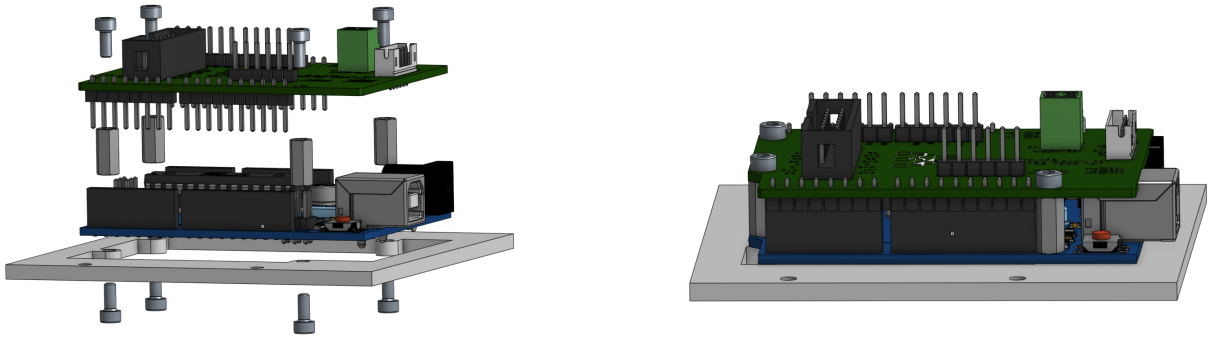


Figure 2: Building Arduino Stack

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 Figures 3 and 4. For more information

on using heat set inserts, see:

- https://www.lulzbot.com/learn/tutorials/heat-set-inserts-tips-and-tricks

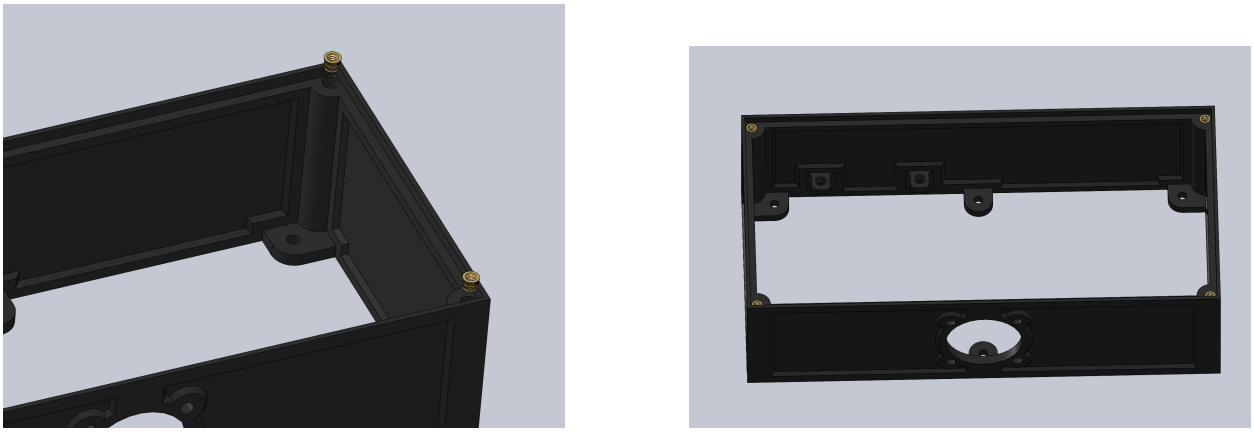


Figure 3: Back panel Inserts

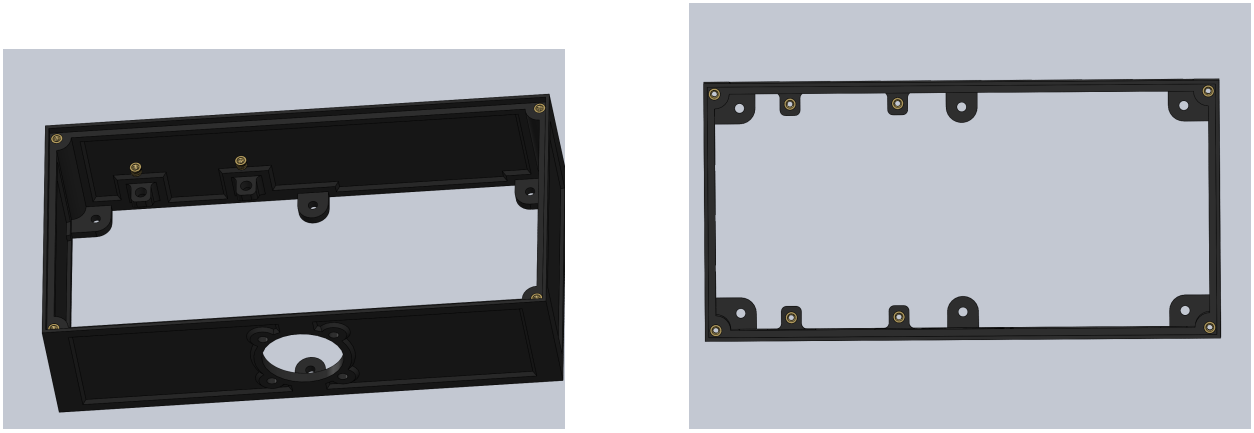
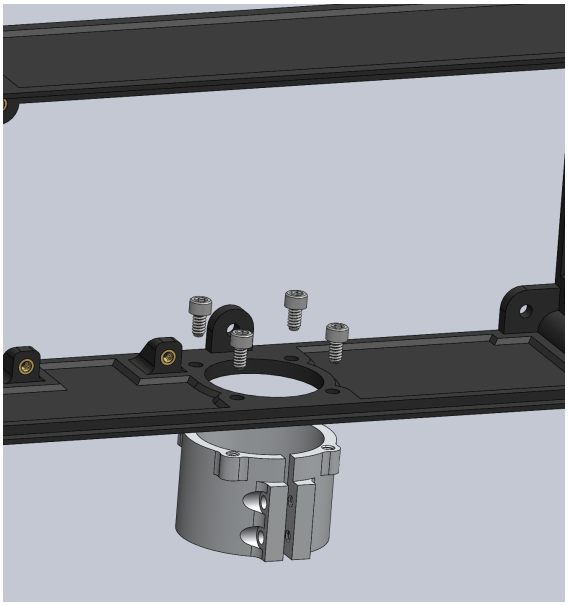


Figure 4: Arduino Inserts

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



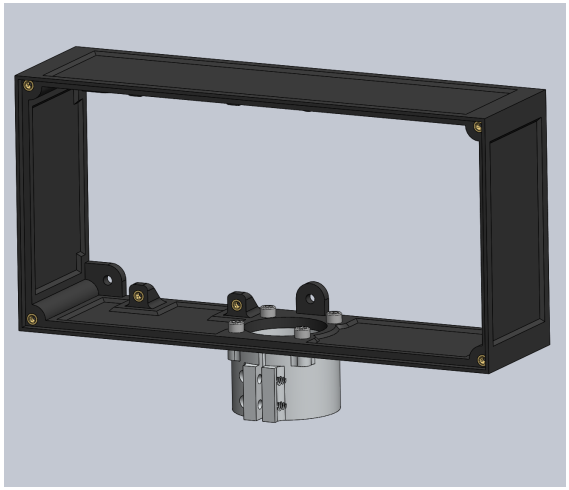


Figure 5: PVC Clamping hub Mount

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

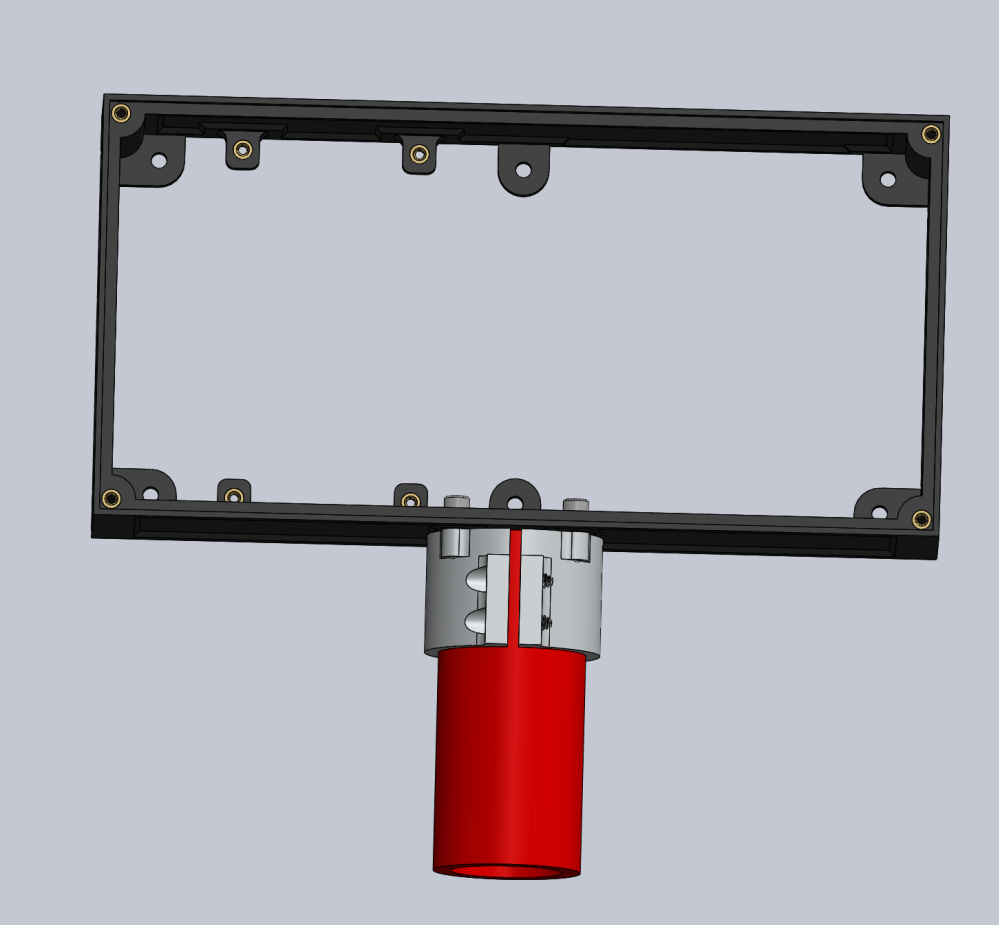


Figure 6: Neck Attachment

5. **Attaching the LED Matrix:** Attach the LED Matrix **E37** to the front of the head assembly using Screws **B14**.

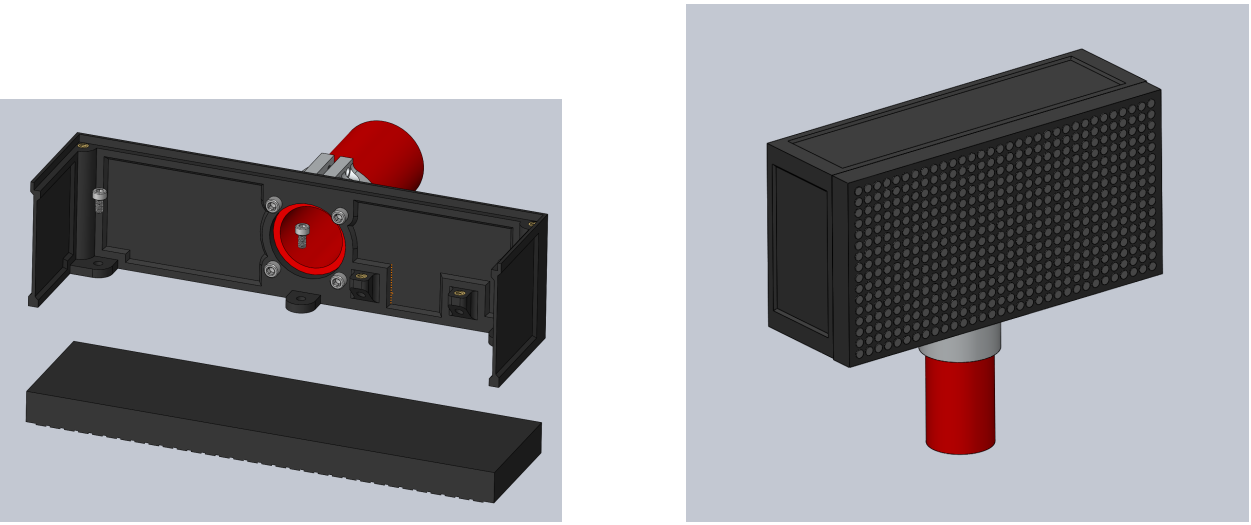


Figure 7: LED Matrix Attachment

6. **Mount the Arduino Stack:** Take the Arduino Plate assembly and mount it using screws **B8** to the heat set inserts on the posts inside the head as shown in Figure 8

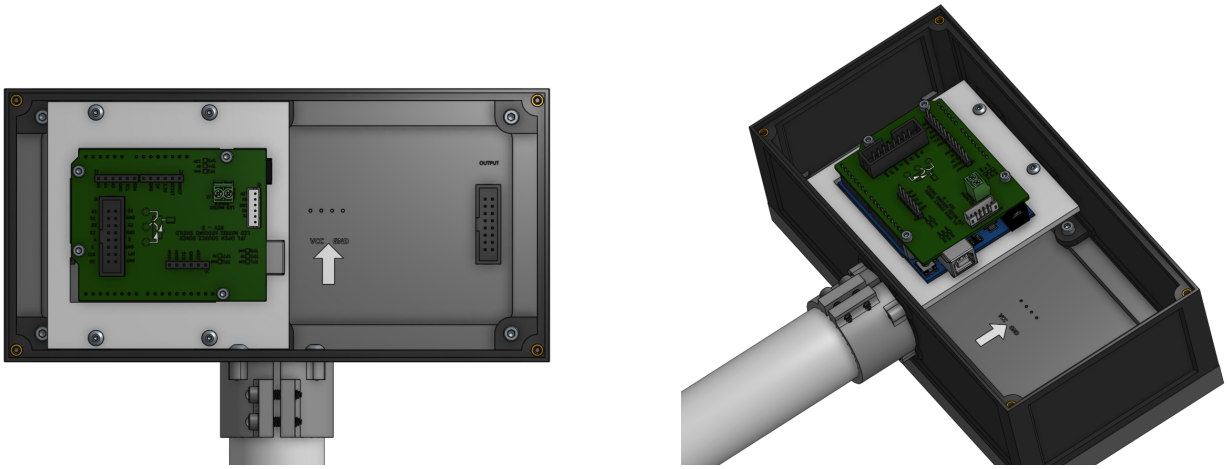


Figure 8: Arduino Plate Integration

7. **Back Plate Attachment:** Attach the Laser Cut Back Plate **S42** onto the back of the head assembly using screws **B2**.

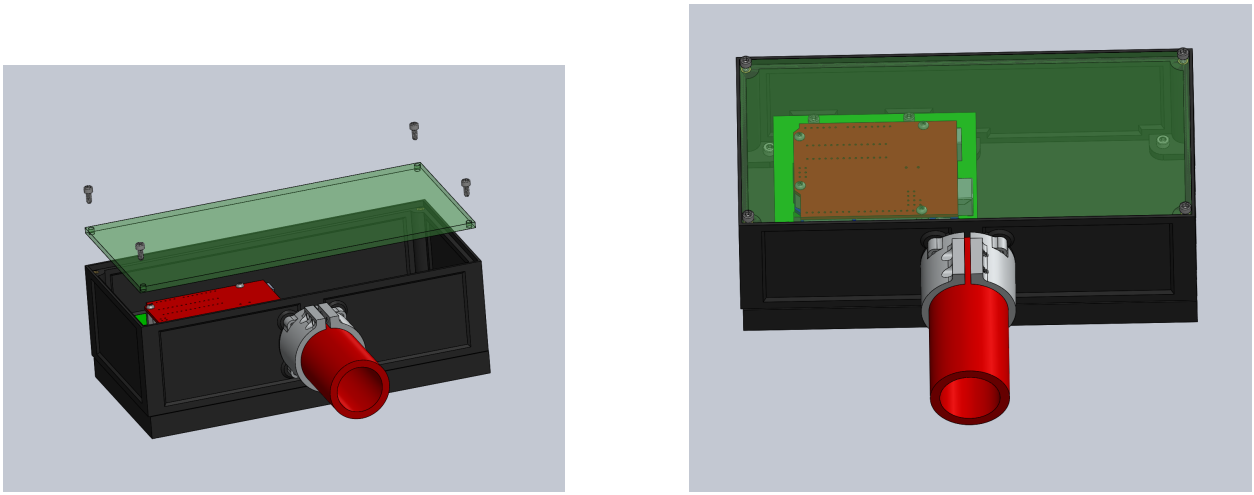


Figure 9: Back Panel Assembly

The head is now finished!

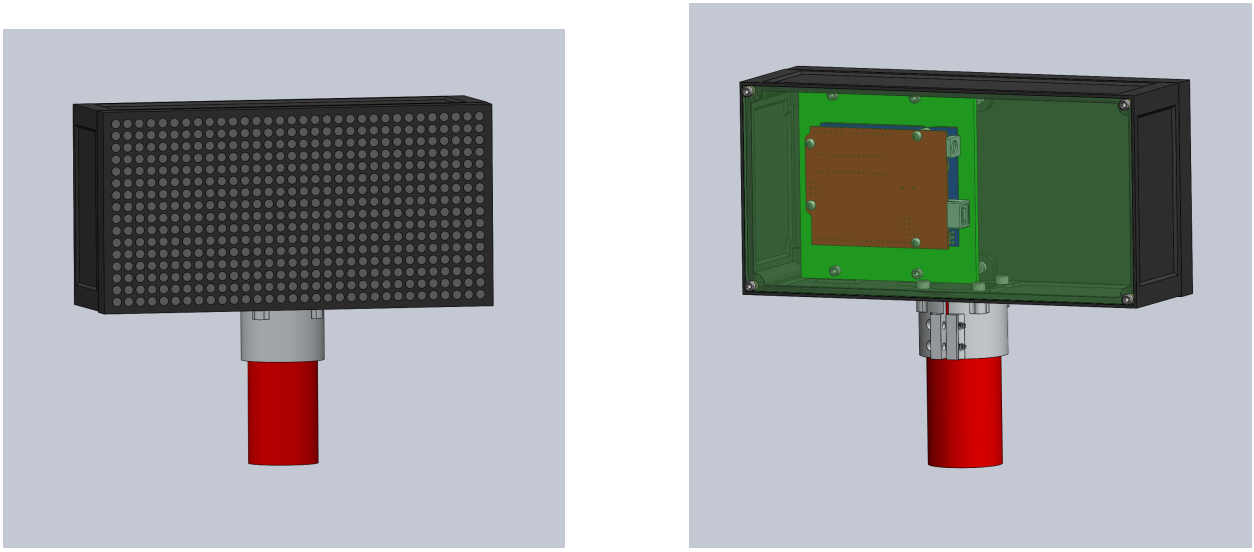


Figure 10: Finished Head Assembly