

Open Source Rover: Head Assembly Instructions

Authors: Michael Cox, Eric Junkins, Olivia Lofaro



Jet Propulsion Laboratory
California Institute of Technology

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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.

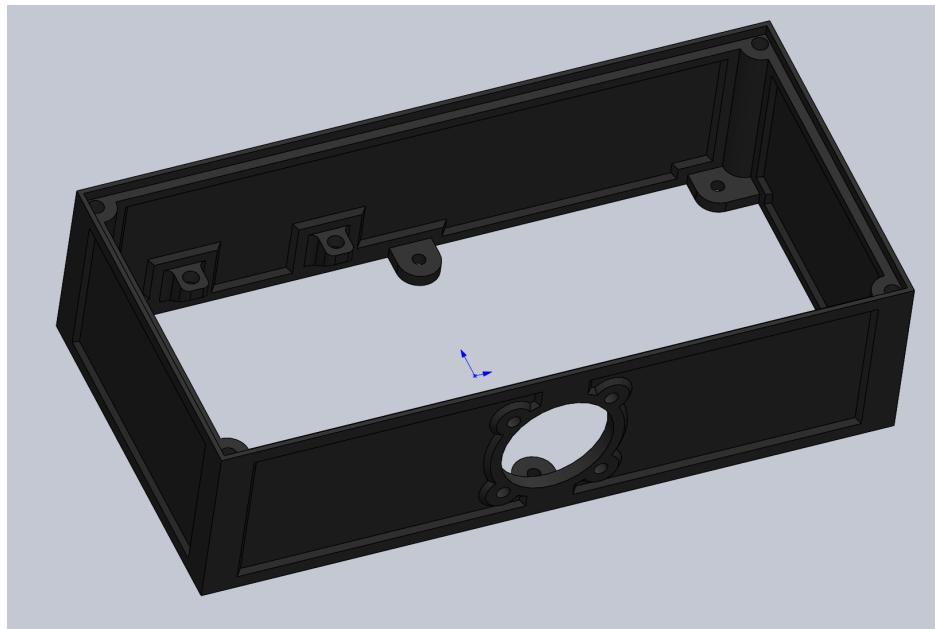


Figure 1: 3D printed Head piece

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 Machining/Fabrication

2.1 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.

3 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	

- 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.

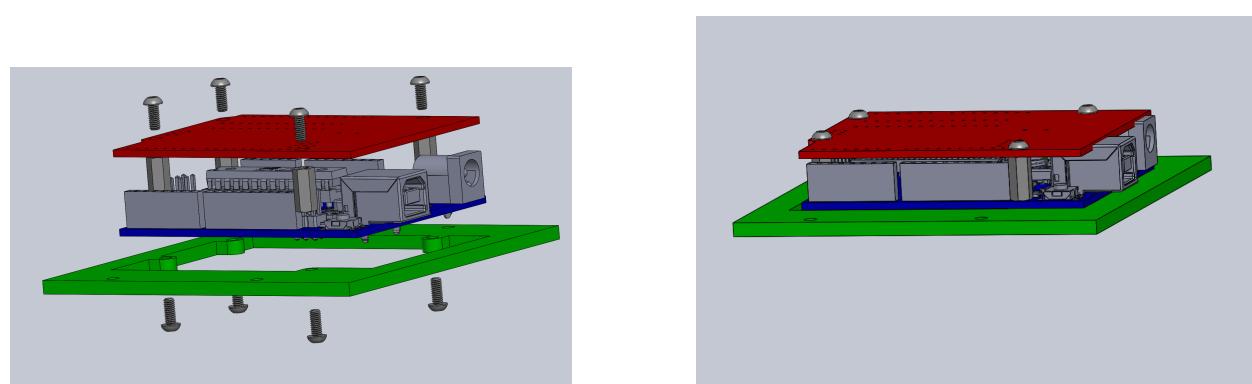


Figure 2: Building Arduino Stack

3 MECHANICAL ASSEMBLY

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.

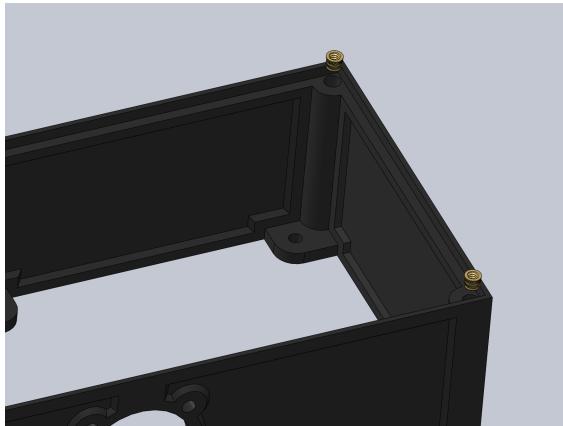


Figure 3: Back panel Inserts

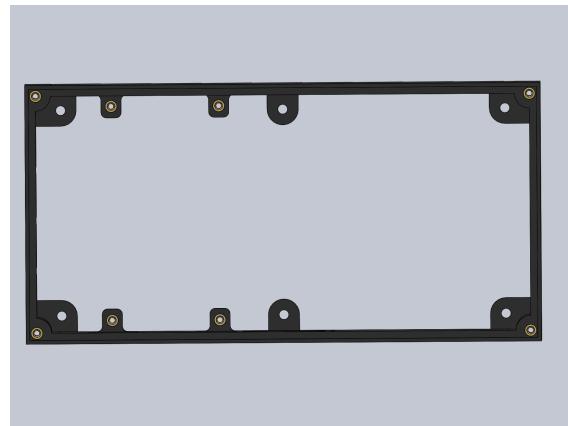


Figure 4: Arduino Inserts

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

3 MECHANICAL ASSEMBLY

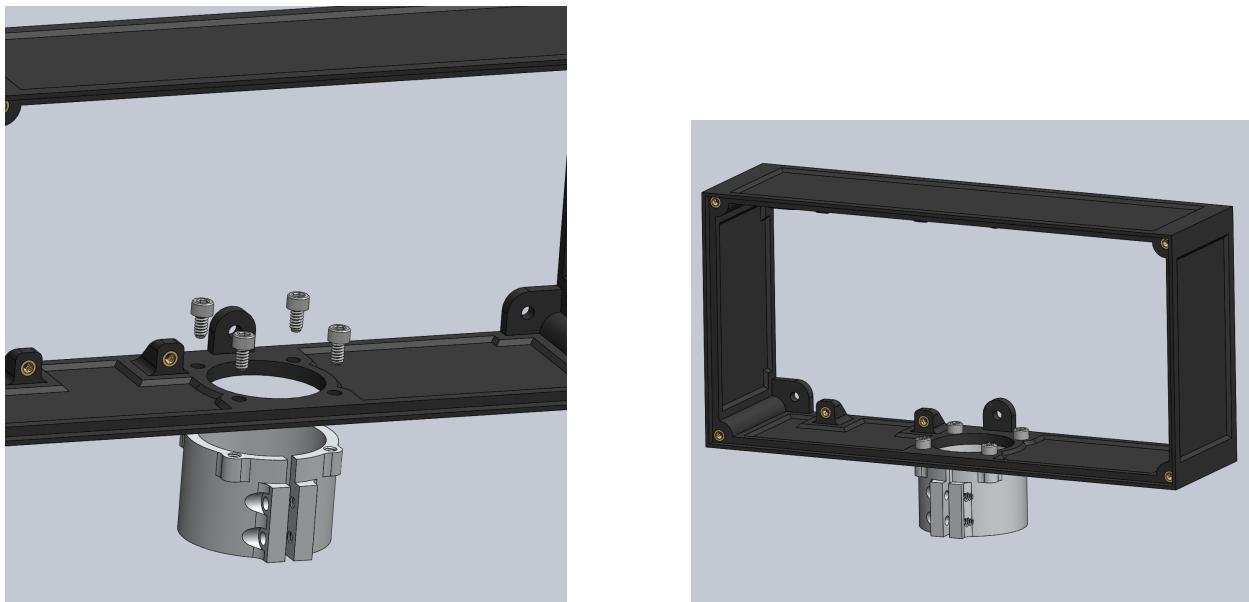


Figure 5: PVC Clamping hub Mount

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

3 MECHANICAL ASSEMBLY

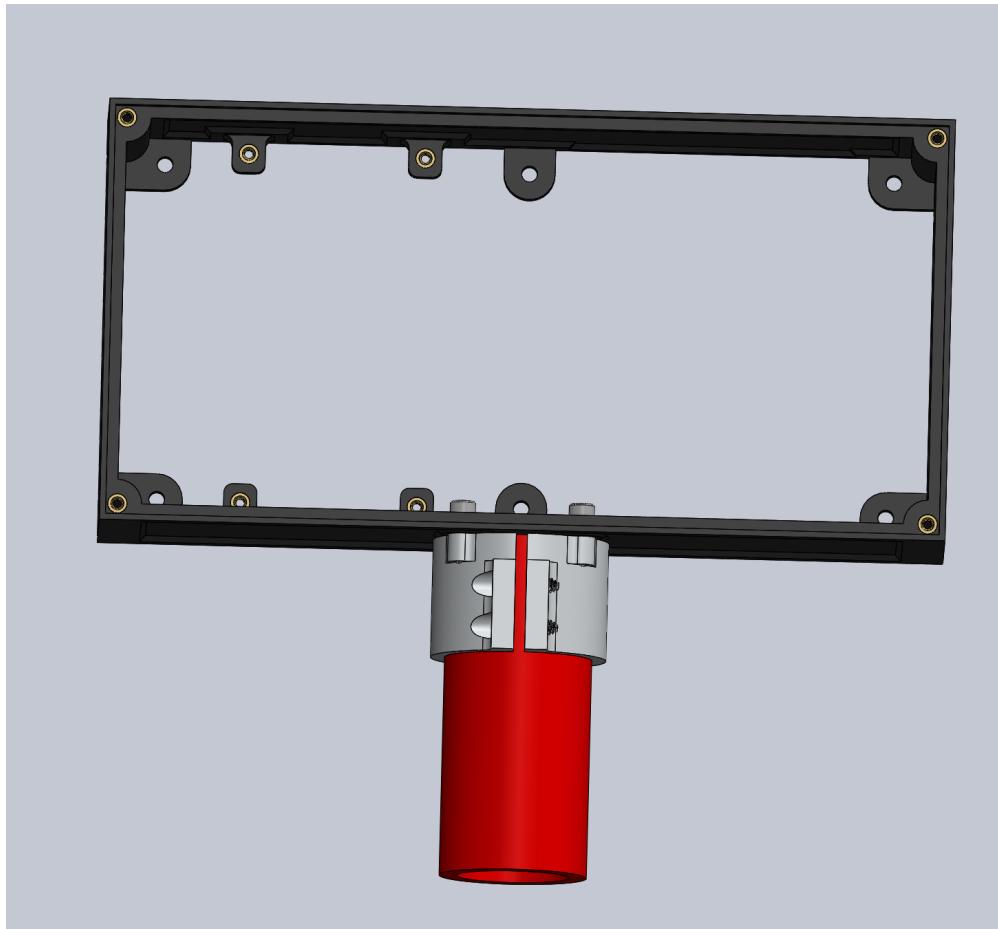


Figure 6: Neck Attachment

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

3 MECHANICAL ASSEMBLY

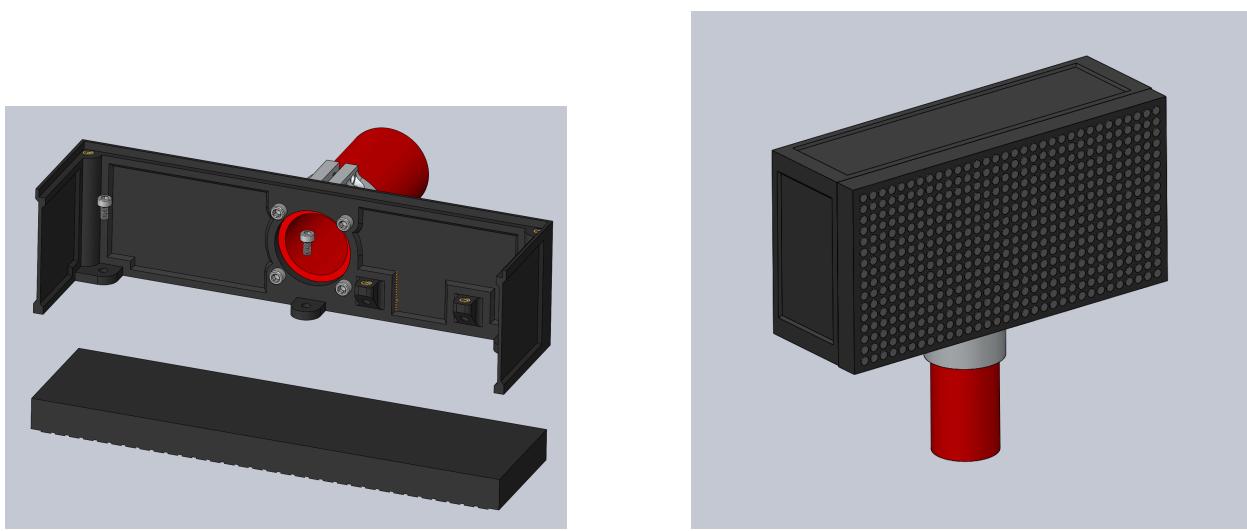


Figure 7: LED Matrix Attachment

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

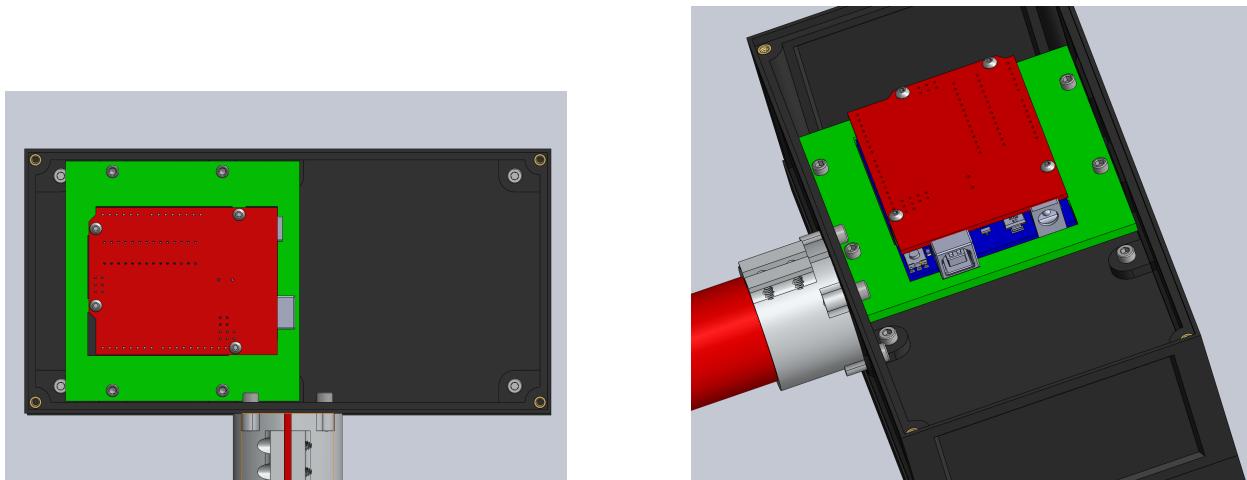


Figure 8: Arduino Plate Integration

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

3 MECHANICAL ASSEMBLY

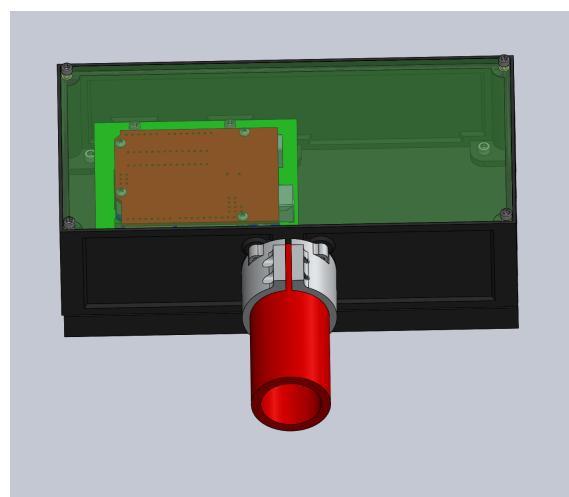
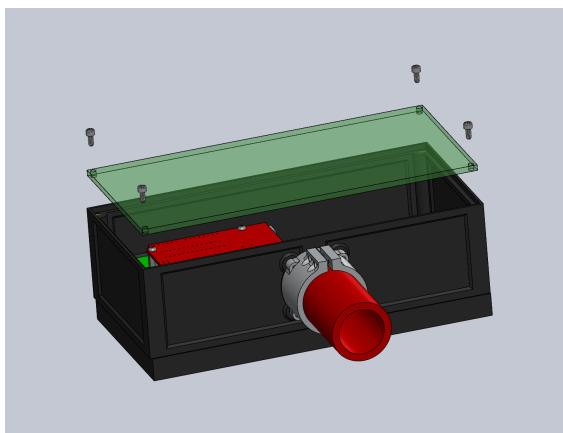


Figure 9: Back Panel Assembly

The Head is now finished!

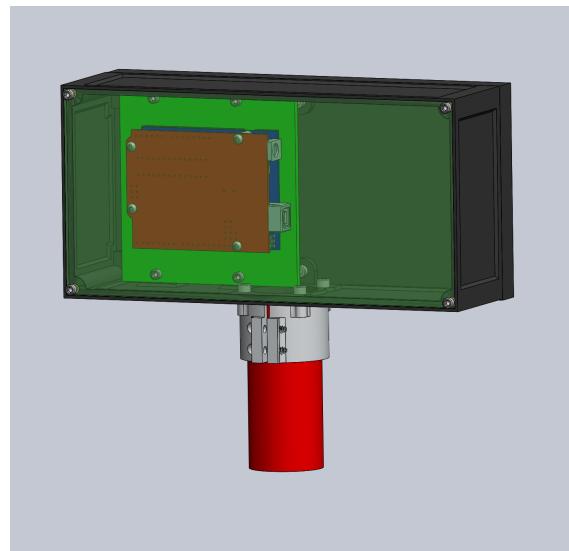
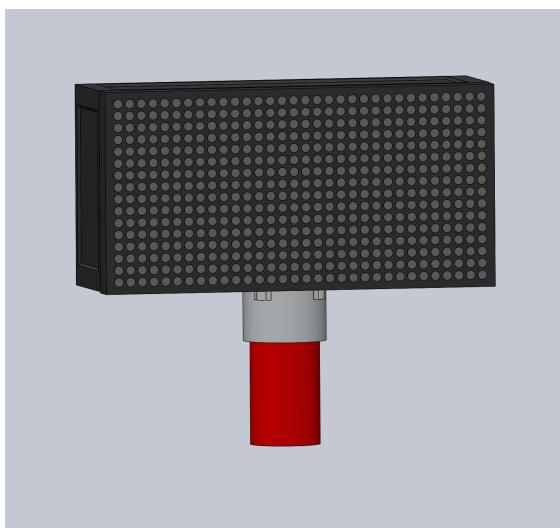


Figure 10: Finished Head Assembly