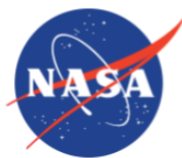


Open Source Rover: Head Assembly Instructions

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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. Based on difficulties we've seen with printing these pieces, we've also included a few different orientations of "printing pads" to help with thermal contraction as shown in Figure 1. These pads help hold the corners down and reduce the warping of the pieces.

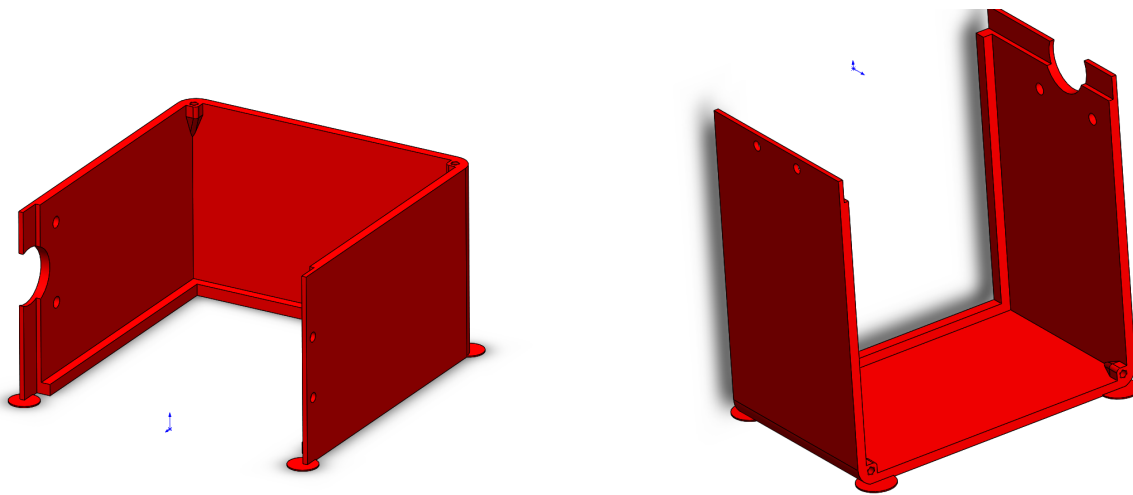


Figure 1: Printing Pads

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/>

(If you decide to use a 3D printing service, we recommend sending them the files *without* the printing pads.)

2 Machining/Fabrication

2.1 PVC Pipe Cutting














Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
2 inch PVC pipe	S29	1		V-clamps or Vice			
Hand Saw or Bandsaw	S18	2					

Take the PVC pipe **S29** and cut it to your desired length of neck height for your rover head.
When we made ours we made it roughly 6 inches long

3 Mechanical Assembly

Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
Head Left Back	NA	1		6-32 x 3/8 Button head Screw	B2	4	
Head Right Back	NA	1		4-40 x 1/4 Button head Screw	B8	12	
Head Left	NA	1		4-40 Locking Hex Nut	B12	4	
Head Right	NA	1		LED Matrix	E8	1	
1 Inch PVC Clamp Bottom Bore	S24	1		Alley Key Set	NA	1	
PVC Pipe	S29A	1		Wrench Set	NA	1	
Logic Shifter PCB		1					

1. **Insert the LED matrix into the head:** Start by taking the LED Matrix **E8** and inserting it on the ledges in the left and right sides of the 3D printed head. Screw together the two sides of the head using screws **B8**.¹.

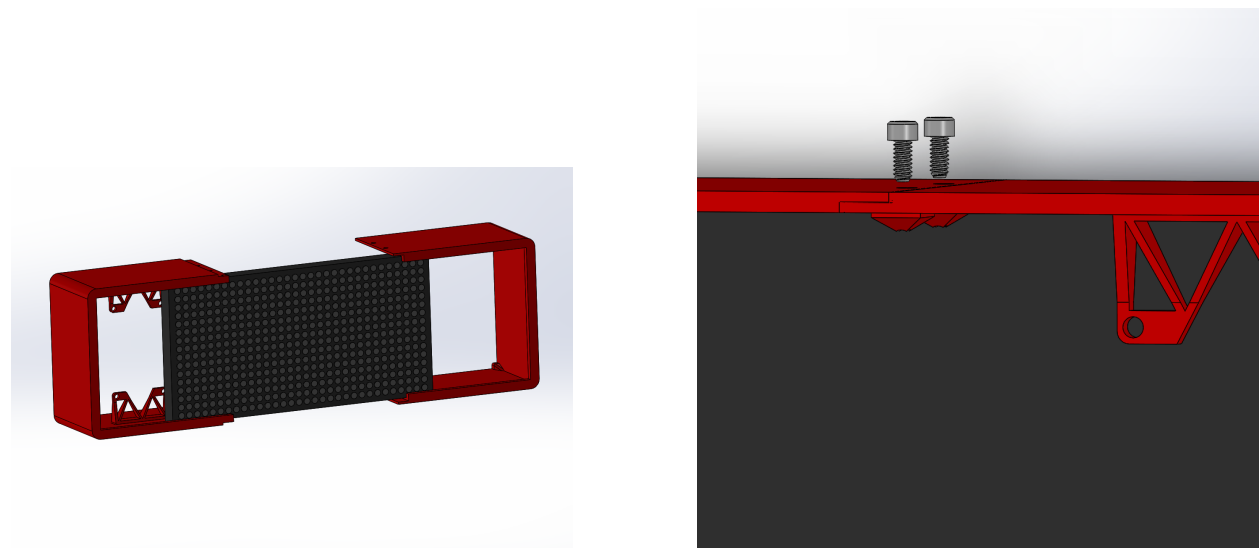


Figure 2: Inserting LED Matrix

2. **Attach the PVC Clamping Hub:** Attach the 1 Inch PVC Clamping Hub **S24** to the bottom of the head using screws **B2**.

¹The size of the holes should be such that you can use a hex key to "thread" the 3D printed holes. If it is too tight, you can use a drill/file to very slightly open up the hole

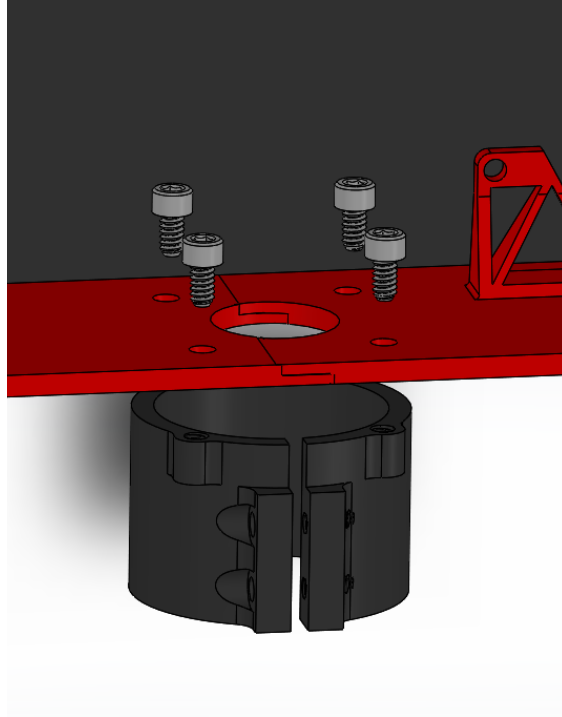


Figure 3: Attach the PVC Clamping Hub

3. **Mounting the Logic Shifter PCB:** Attach the Logic Shifter PCB to the support structure in the 3D printed head using screws **B8** and hex nuts **B12**.

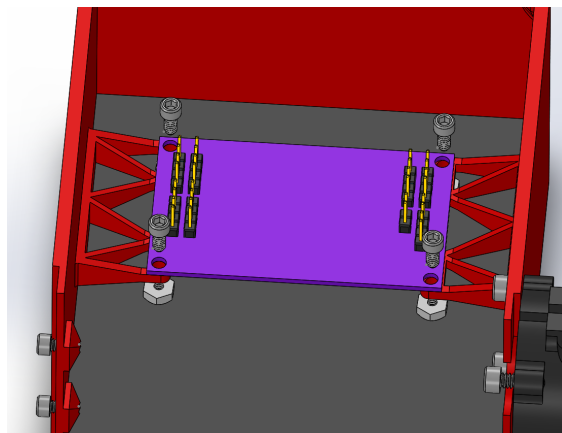


Figure 4: Mounting the Logic Shifter PCB

4. **Connecting to back plane:** Attach the two back pieces together using screws **B8**.

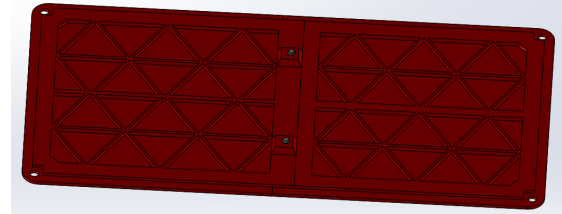
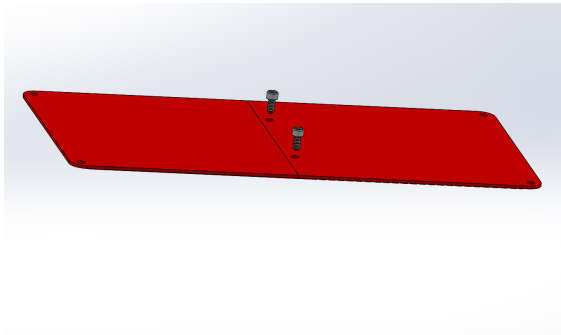


Figure 5: Back Plane connecting

5. **Attaching the Back plane:** Attach the back plane to the rest of the head structure using screws **B8**.

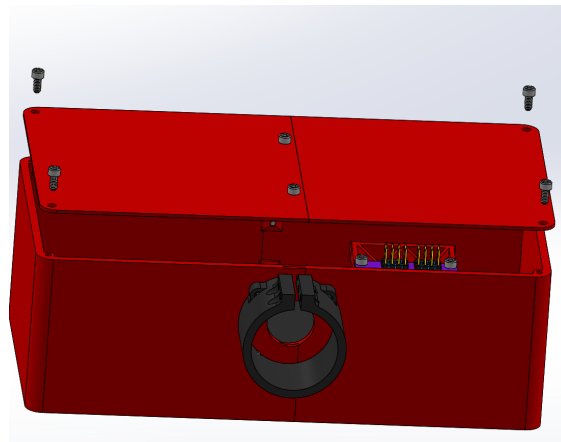


Figure 6: Attaching the Back plane

6. **Attach the PVC pipe:** Slide the length of PVC pipe you want for the neck into the PVC clamping hub and tighten the screws the secure it.

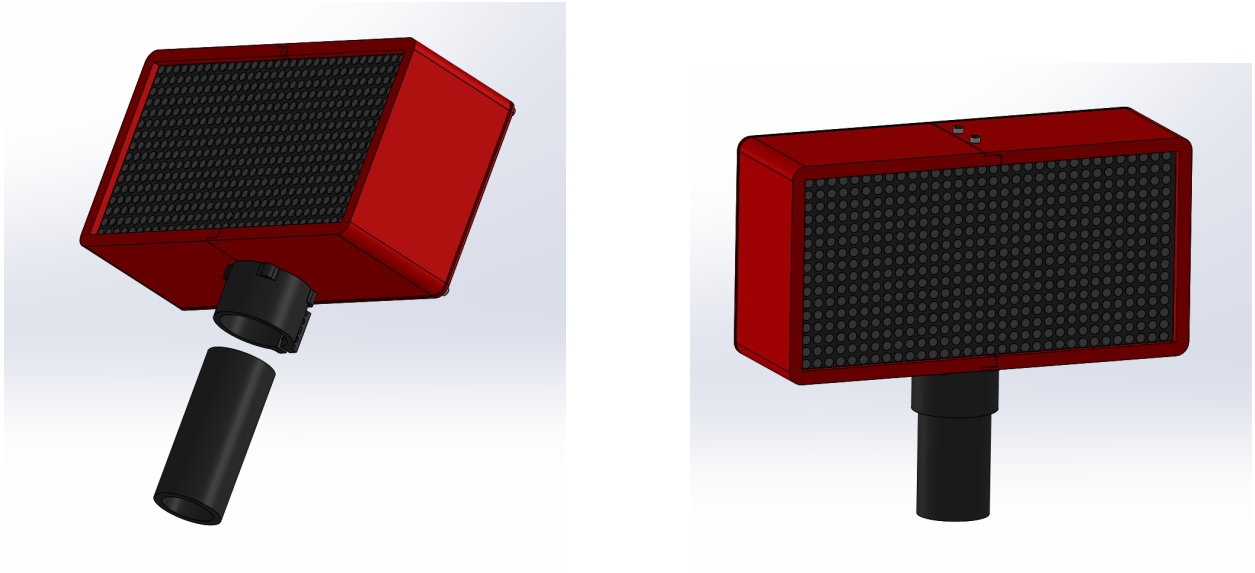


Figure 7: Attaching the PVC pipe