

Open Source Rover: Rocker-Bogie Assembly Instructions

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1 Machining/Fabrication Steps

Table 1: Parts/Tools Necessary

| Item | Ref | Qty | Image | Item | Ref | Qty | Image |
|------------|-----|-----|---|--------------------------|-----|-----|---|
| 3" Channel | S2 | 4 |  | Metal Hacksaw or Bandsaw | | |  |

1.1 Cutting the Aluminum Channels

On piece **S2**, measure the distance shown in Figure 1 from the edge and mark a straight line from the opposite corner to that point. Cut off the corner along that line¹. In total, you will need 4 of these modified pieces. Cut those now.

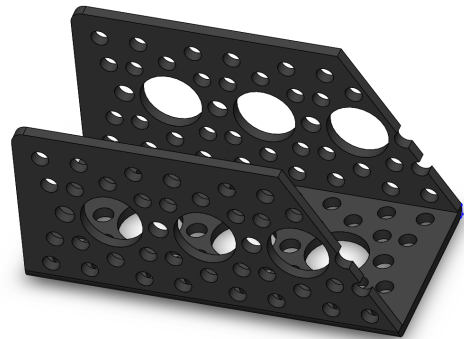
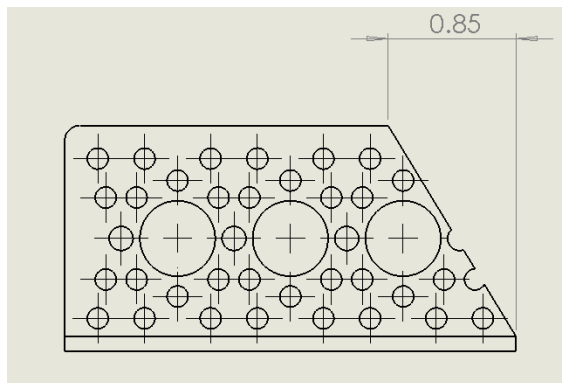


Figure 1: Channel Cutting Dimensions

1.2 Cutting the Aluminum Rod

Take the 4 inch aluminum rod **S18** and cut it down to 3 inches long, indicated by Figure 2². In total, you will need 2 of these 3-inch aluminum rods. Cut those now.

¹We use this piece to make the geometry of the rocker-bogie more structurally reinforced across its lateral bending moment. However, these channels will need to have their corners cut out because of clearance issues further on.

²These cuts keep the rod from sticking out too far from either end of the rocker-bogie pivot joint

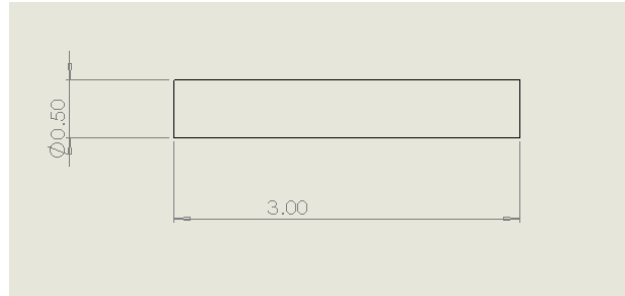





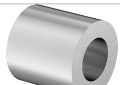












Figure 2: Aluminum Rod cutting dimensions

2 Mechanical/Structural Assembly

The Rocker-Bogie assembly is what attaches your wheels to the rover's body and allows it to climb over obstacles.

Table 2: Parts/Tools Necessary

| Item | Ref | Qty | Image | Item | Ref | Qty | Image |
|-------------------------------|------|-----|---|------------------------------|-----|-----|---|
| 3" Channel (Modified) | S2A | 4 |  | #6 Washer | W1 | 28 |  |
| 3.75" Channel | S3 | 4 |  | 0.5" Nylon Washer | W3 | 12 |  |
| 9" Channel | S5 | 2 |  | #6x1/4" Standoff | T1 | 32 |  |
| Pattern F Bracket | S7 | 8 |  | #6-32x3/8" Button Head Screw | B2 | 52 |  |
| 0.5" Pillow Block | S11 | 4 |  | #6-32x1/2" Button Head Screw | B3 | 32 |  |
| 0.5" Face Tapped Clamping Hub | S13 | 2 |  | #6-32 Locking Hex Nut | B11 | 60 |  |
| 0.5"x3" Aluminum Tube | S18A | 2 |  | Allen Key Set | | |  |
| 0.5" Collar Clamp | S22 | 4 |  | 5/16 Wrench | | |  |

1. **Begin the Rocker Attachment:** Attach 9 inch channel **S5** and the a modified 3 inch channel **S2A** to pattern F bracket **S7** using screws **B2** and hex nuts **B11** making sure to put a 6-32 washer **W1** in between the channels and the bracket. Make sure that the cut modification in **S2A** is angled towards the 9 inch channel as shown in Figure 4.

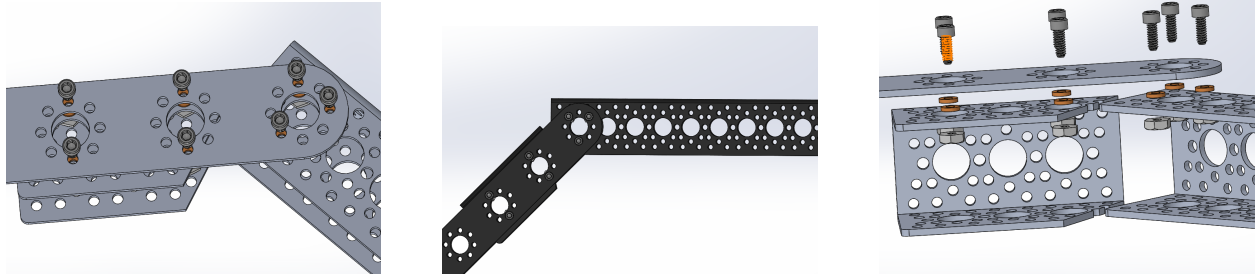


Figure 3: Begin the Rocker attachment

2. **Start the Bogie pivot joint:** Put rod **S18A** through the last hole in the pattern F bracket. Then, assemble the pivot joint by attaching another modified 3 inch channel **S2A** and another pattern F bracket using washers **W3**, collar clamp **S22**, standoffs **T2**, and screws **B3**. Make sure to use the 2nd from the bottom hole on the 2nd pattern F bracket. See Figure 4:

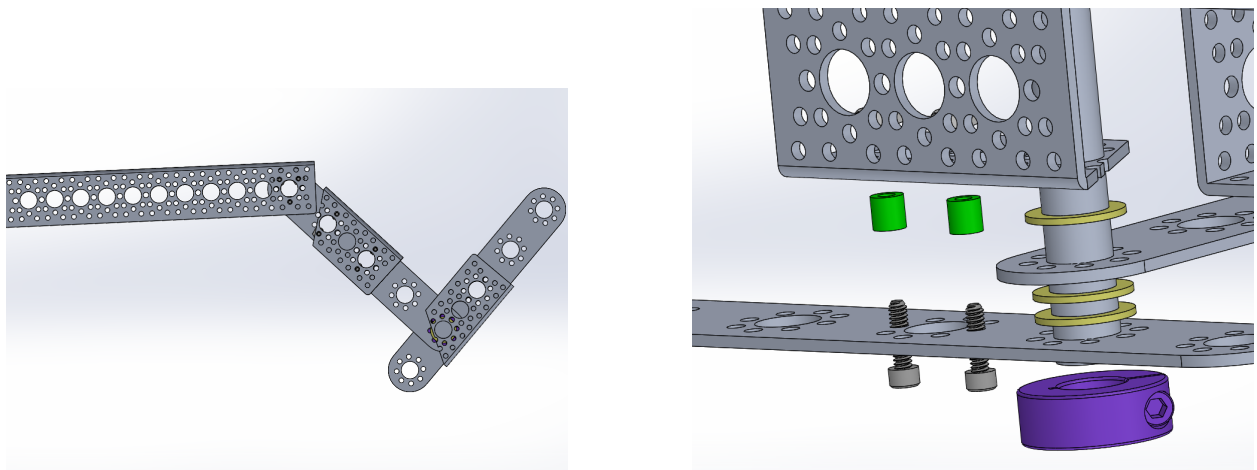


Figure 4: Start Rocker-Bogie pivot joint

3. **Attachment for Front Corner:** Attach 3.75 inch channel **S3** to the top hole of the

pattern F bracket using spacers **T1**, screws **B3**, and hex nuts **B11** as shown in Figure 5.

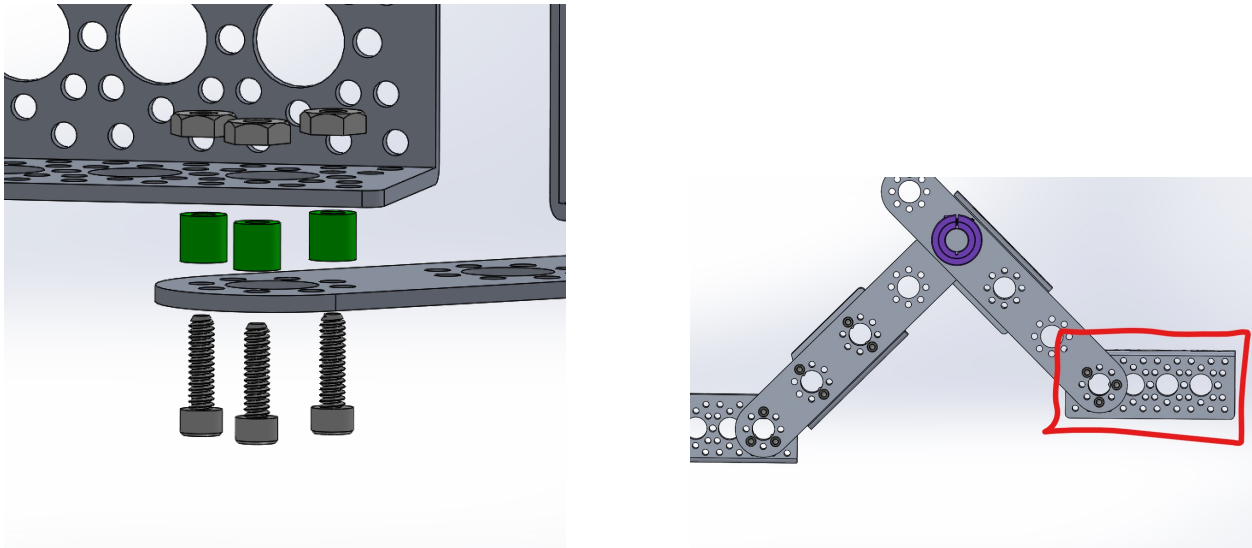


Figure 5: Attaching channel to corner steering

4. **Attachment for middle Wheel:** Attach another 3.75 inch channel **S3** to the bottom hole of the pattern F bracket using spacers **T1**, screws **B3**, and hex nuts **B11** as shown in Figure 6.

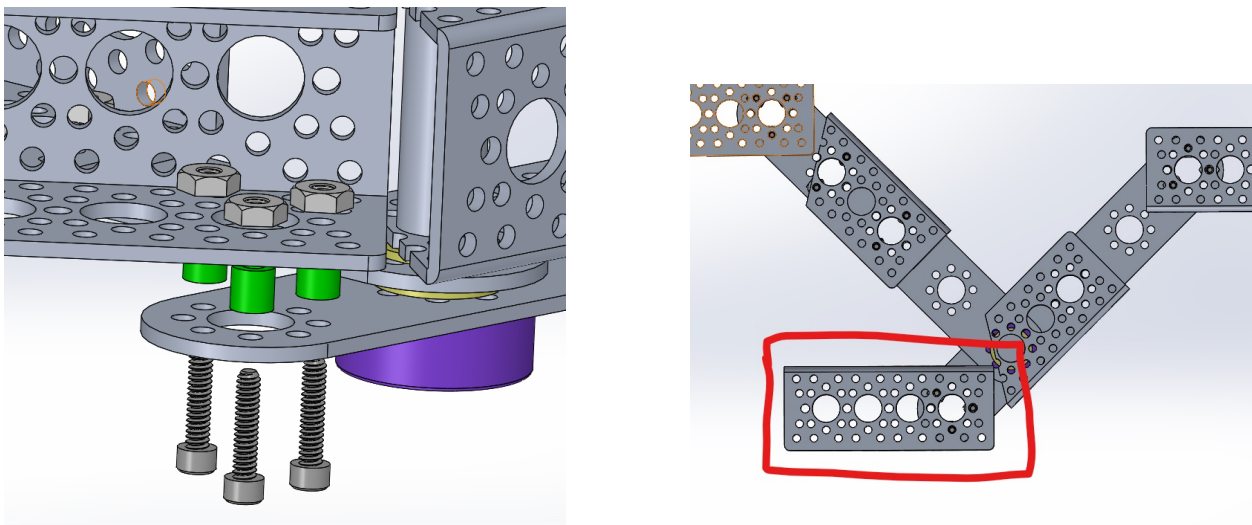


Figure 6: Attachment for middle wheel

5. **Opposite edge of Rocker-Bogie Joint:** Attach another Pattern F bracket **S7** to

the opposite side of the channels using washers **W1** and **W3**, screws **B3**, and hex nuts **B8** as shown in Figure 7.

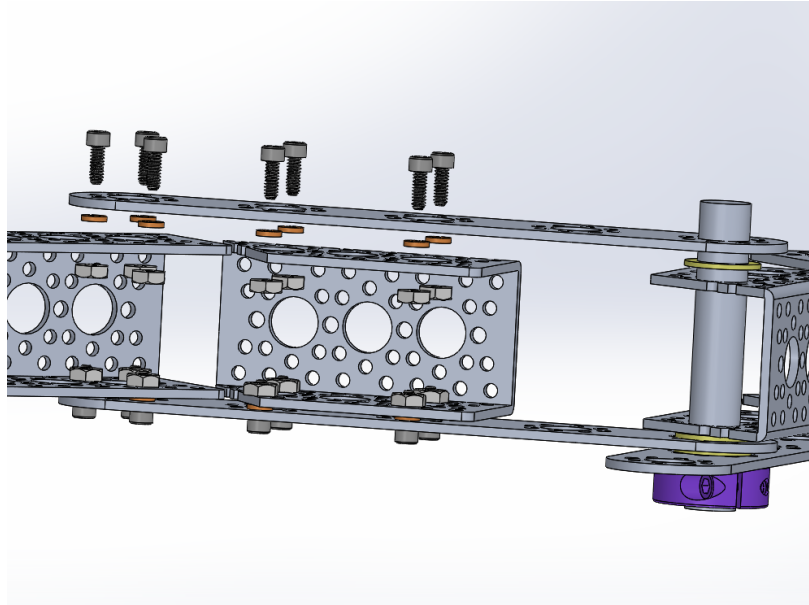


Figure 7: Start the other side of Rocker-Bogie joint

6. **Other edge of Rocker-Bogie Joint Cont:** Using washers **W1**, collar clamp **S22**, spacers **T1**, and screws **B10** attach pattern F bracket to the final connecting channels as shown in Figure 8.

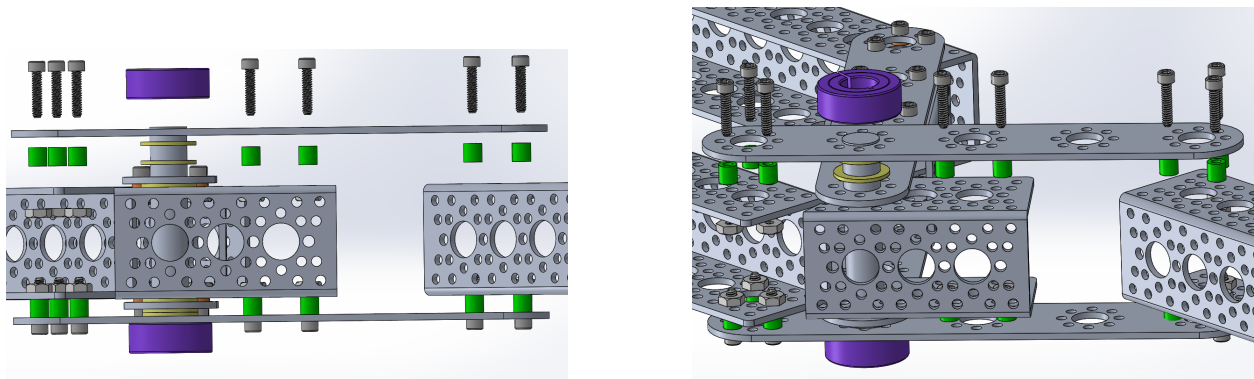


Figure 8: Other edge of Rocker-Bogie joint

7. **Checkpoint:** At this point your rocker bogie joint should look like Figure 9:

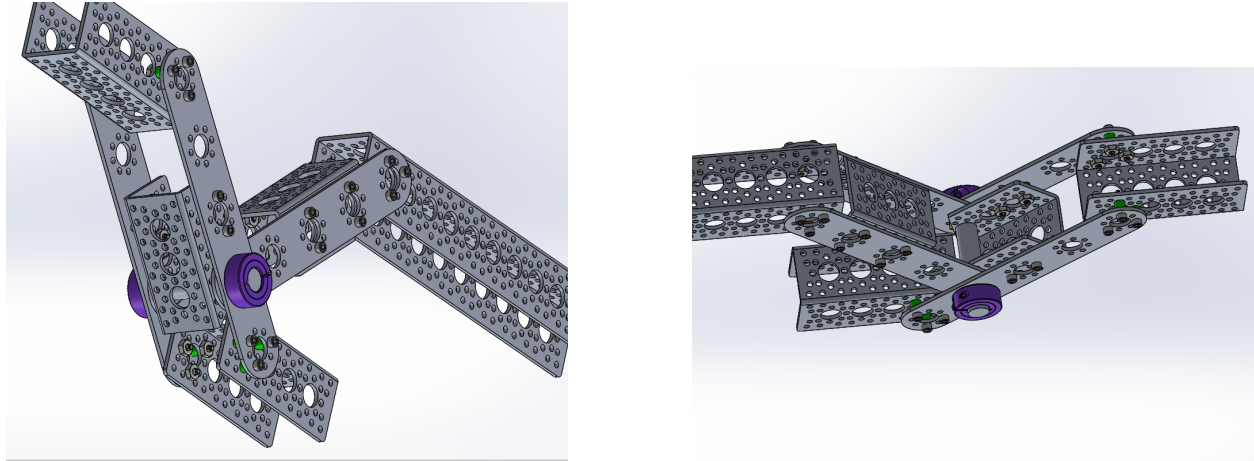


Figure 9: Rocker-Bogie Checkpoint

8. **Attach Bearing Blocks:** Attach two Pillow Bearing Blocks **S11** using screws **B2** and hex nuts **B11** as shown in Figure 10. The bearing blocks should be aligned with the 5th large hole back from the front of the 9-inch U channel.

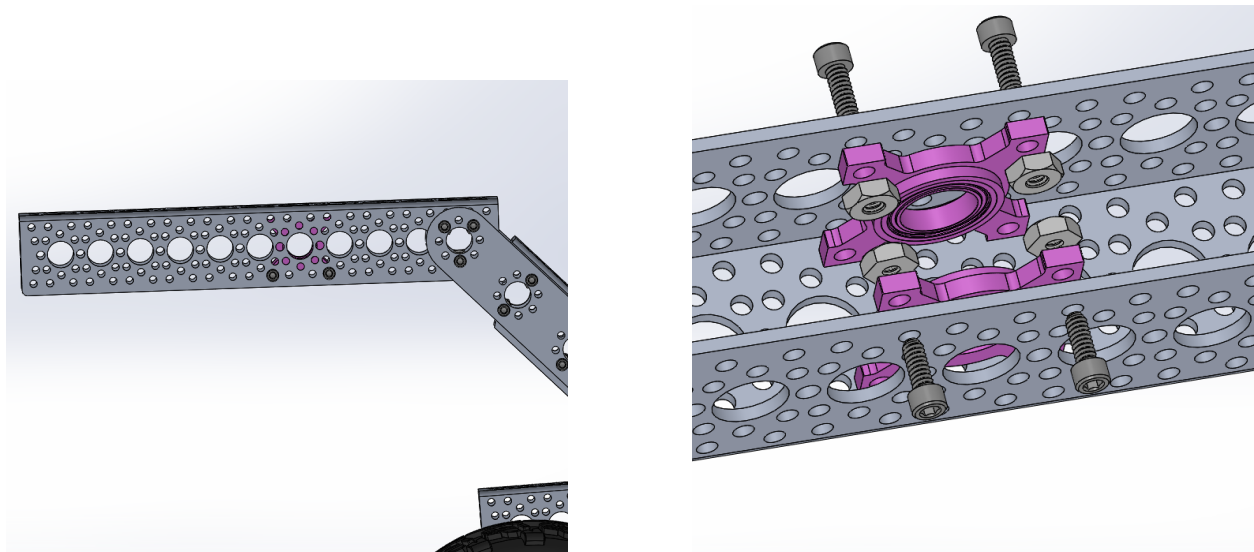


Figure 10: Pillow bearing block attachment

9. **Attach Clamping Hub:** Attach the Clamping Hub **S13** using screws **B2** and hex nuts **B11** as shown in Figure 11. The clamping hub should be centered above where you just placed the pillow bearing blocks.

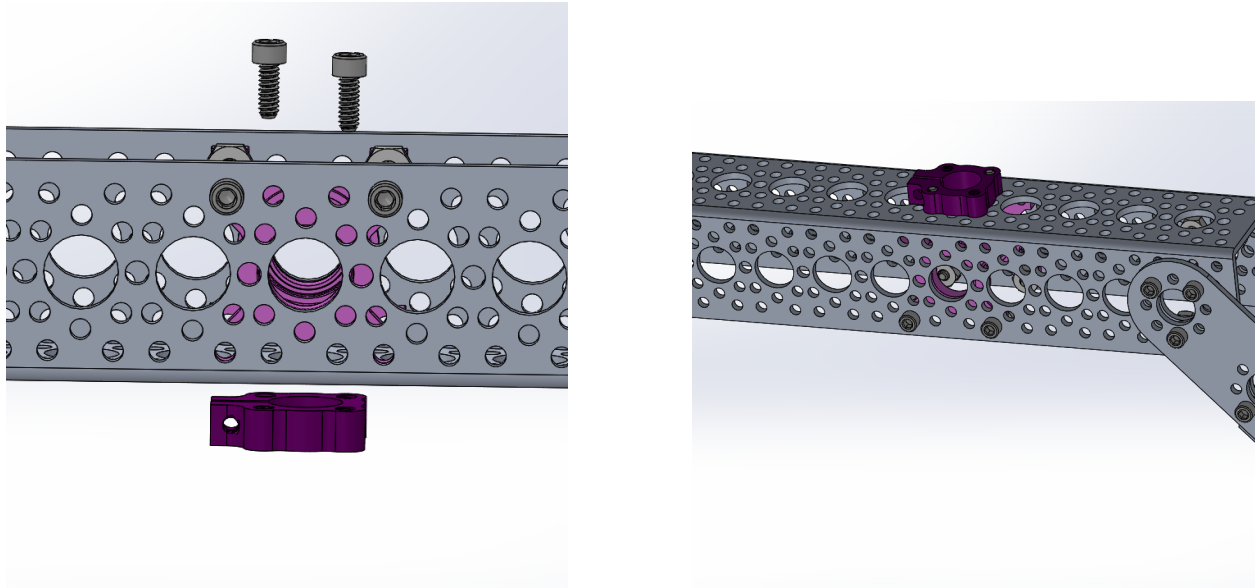


Figure 11: Clamping hub attachment

Your rocker-bogie suspension joint is now complete! Repeat all of section 2 in this document to create the suspension for the other side of the rover.