



Passive Hanger Structure Kit Assembly Directions



Revisions:

01/28/22 - Internal Release

Recommended Tool List			
Component	Used On	Product Number	Product Photo
Cordless Drill or Driver	Drivers	Not Available from AndyMark	
3/8 in. Magnetic Driver	1/4-20 Thread Forming Screws and 10-32 Nuts	am-2755	
5/32 in. Hex Driver	10-32 Socked Head Cap Screws	am-2751	
1/2 in. - 9/16 in. Combo Wrench	1/2 in. Churro	am-2746	
Rivet Tool	3/16" Rivets	am-2834	
5/8 in. Step Drill Bit	Churro Clearance Holes	am-4360	
1/2 in. Drill Bit	Bushing Hole	Not Available from AndyMark	
3/16 in. Drill Bit	Rivet Holes	am-4273	
#7 or 15/64 Drill Bit	#10 Clearance Holes	am-4613	
Letter F or 17/64 in. Drill Bit	1/4-20 Clearance Holes	Not Available from AndyMark	
21/64 in. Drill Bit	#10 Screw Head Clearance	Not Available from AndyMark	

am-4690 Components			
Component	Product Number	Qty	Product Photo
3.375 Inch Long 0.5 inch Silver Churro	am-2569	2	
2x3 Hole Bracket	am-2954	4	
24.25 Inch Long Inch Silver Churro	am-2974	2	
36 Inch Long Silver Peanut	am-3090-3	1	
1 Inch 90 Degree Gusset	am-3860	8	
72 Inch 0.125 Inch Wall 1x1 Box Tube	am-4204-6	3	
10-32 x 0.5 in. Socket Head Cap Screw	am-1002	20	
10-32 Nylock Nut	am-1042	20	
3/16 in. Diameter 0.126 to 0.25 in. Grip Steel Rivet	am-1226	50	
1/4-20 x 0.75 in. Slotted Indented Hex Thread Cutting Screw	am-1591	8	
1/4-20 x 1.75 in. Thread Forming Screw Hex Washer Head	am-1372	4	
1/4 in. Inside Diameter Fender Washer	am-1421	2	
Peanut Bracket	am-3874	1	

STOP AND READ BEFORE ASSEMBLY:

A similar structure kit was originally created by the Everybot team for the 2022 Rapid React game. The version shown is not the original Everybot structure. This structure is functionally the same though.

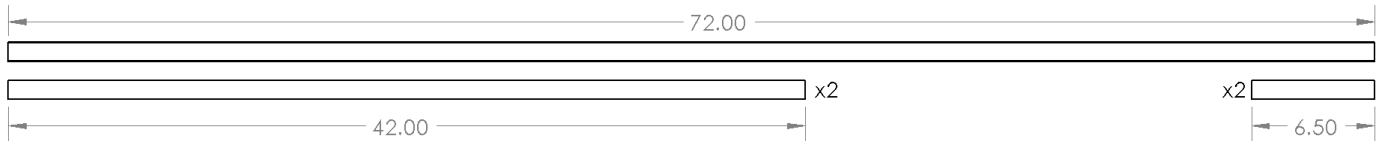
While shown with the Everybot size frame perimeter, this structure kit can still be used with any size configuration of the AM14U5 or AM14U4, however chassis wider than the Long configuration may need to separately acquire longer Churro extrusion for cross members.

This structure kit was designed and intended to be used to support passive hanger assemblies. This kit can be changed and adapted for other uses. Since we cannot account for all of the design choices a team may make, the cross member Churros and Peanut shown in this guide, may be moved where appropriate for your specific build.

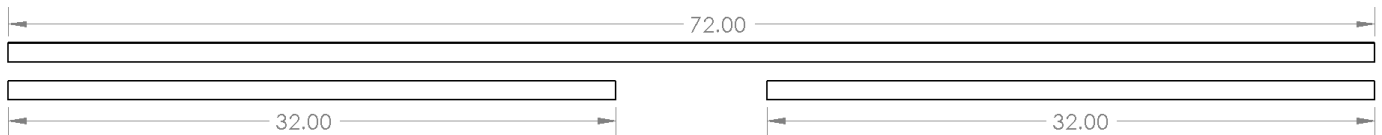
Extrusion Cutting

Note: Several of the extrusions will need cut to size before assembly can begin. The below graphics shows visually the raw size and cut sizes that will be made from the Peanut, Churro, and 1x1 Box Tube. The dimensions shown are cuts to fit the Everybot sized frame perimeter. Wider chassis, like the stock Long AM14U5, will need less cut off the Peanut and Churro.

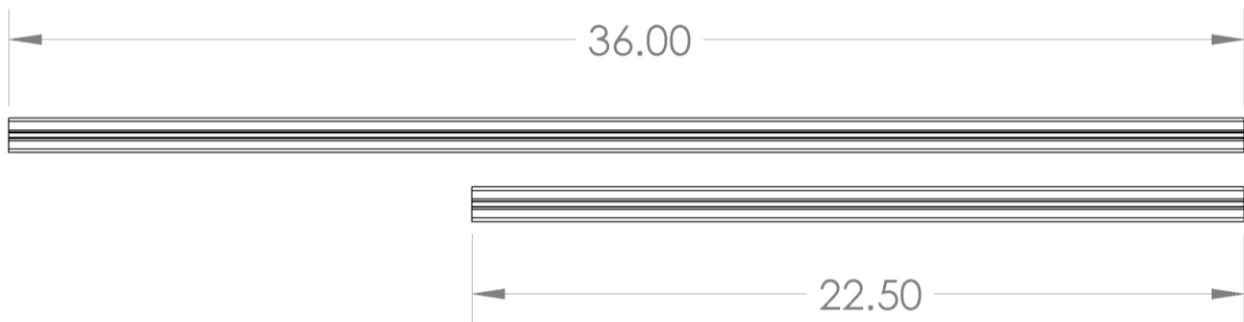
Cut 1: From a 1x1 box tube cut 42" and 6.5" sections. With a second 1x1 box tube, cut a second 42" and 6.5" section.



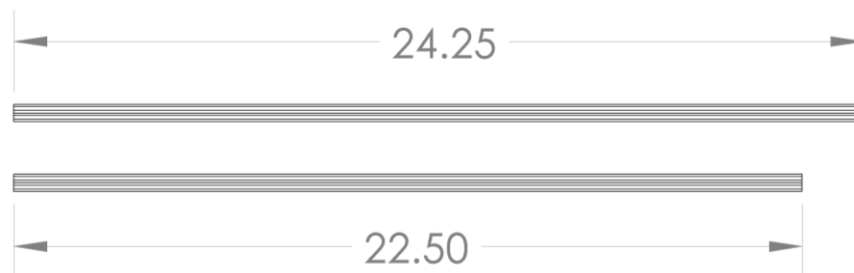
Cut 2: The last 1x1 box tube will be cut into two 32" sections.



Cut 3: The peanut will be cut down to 22.50".

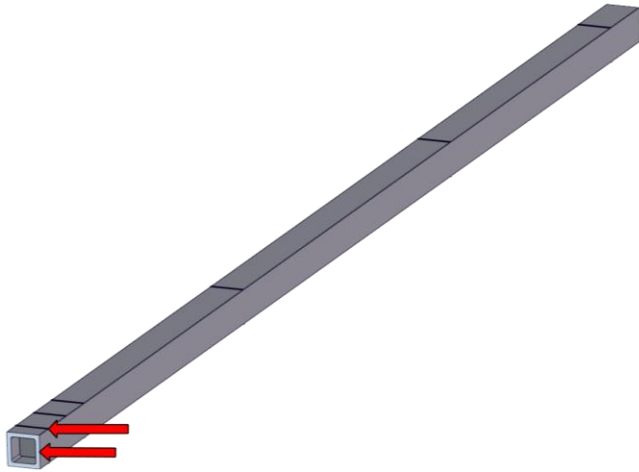


Cut 4: The two long Churros will be cut down to 23.5"

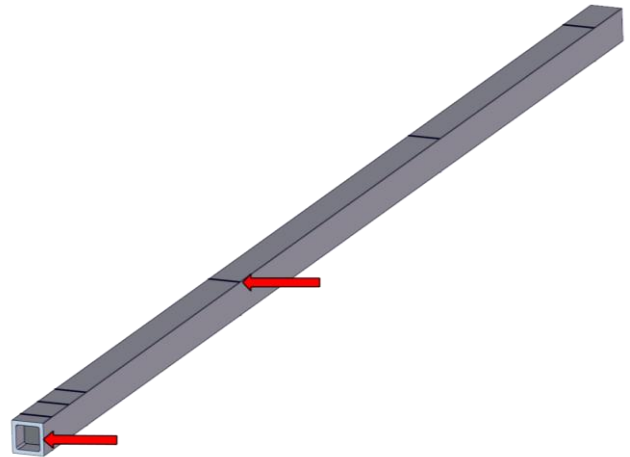


Structure Prep

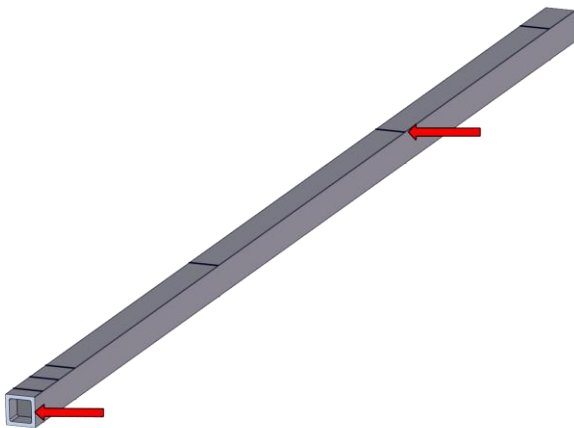
Step 1: On a 42 inch long 1x1 piece, measure from one end and make a line at 5/8 inches, 1-7/8 inches, and at 3-1/4 inches. These locations are noted by the first three lines on the image below.



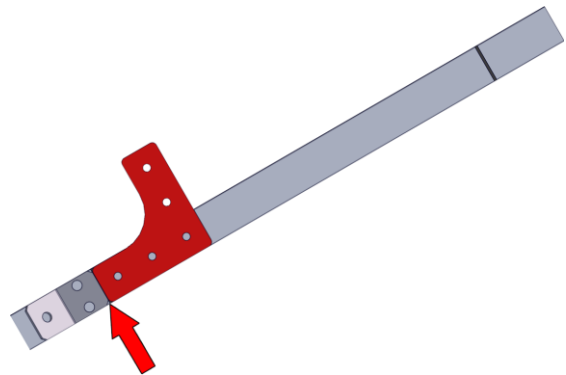
Step 2: The fourth mark will be used for a Churro cross member. Mark this height to clear your other components.



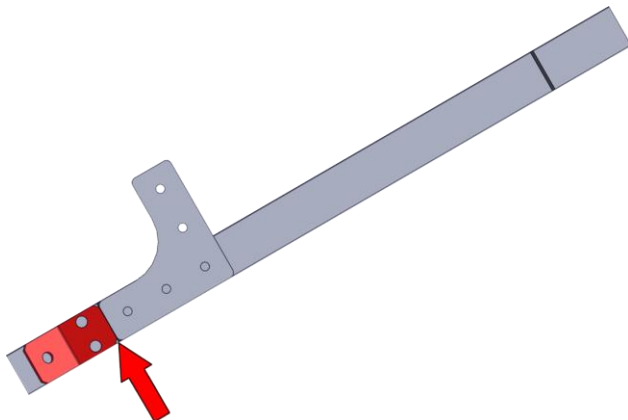
Step 3: Measuring from the same end, now make a line at 28-3/4 inches. This location will **NOT** be drilled at.



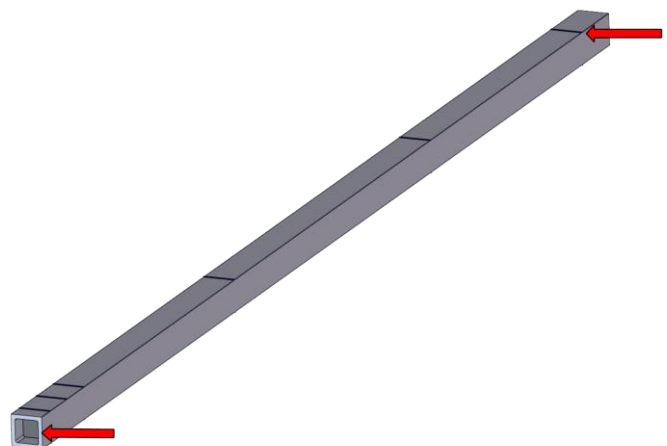
Step 4: Place a 90 Degree Gusset (am-3860) flush with the edges of the 1x1 tube and with the 28-3/4 mark. Translate the three holes from the gusset onto the tube.



Step 5: Place the Peanut Bracket (am-3874) onto the 1x1 with the 2 hole face on the tube. Make the bracket flush with the 90 Degree Gusset. With your marking device translate the two holes onto the 1x1.

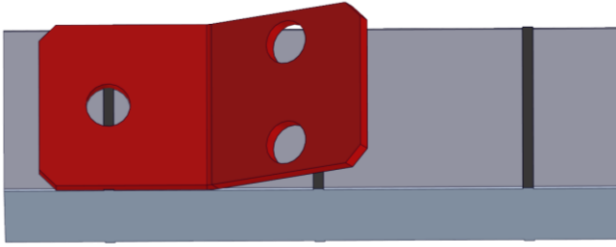


Step 6: Measuring from the same end, now make a line at 39-7/8 inches.

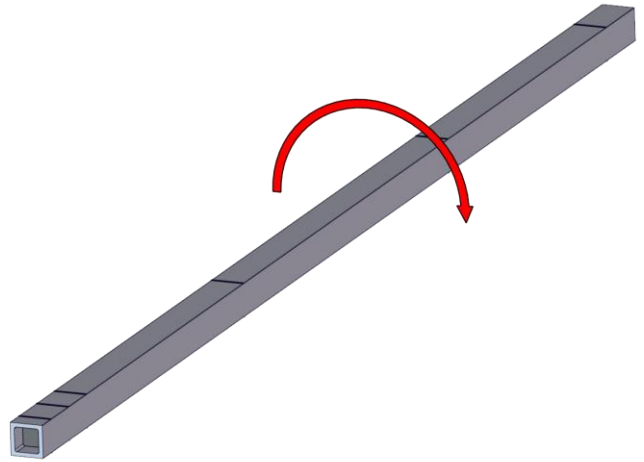


Structure Prep

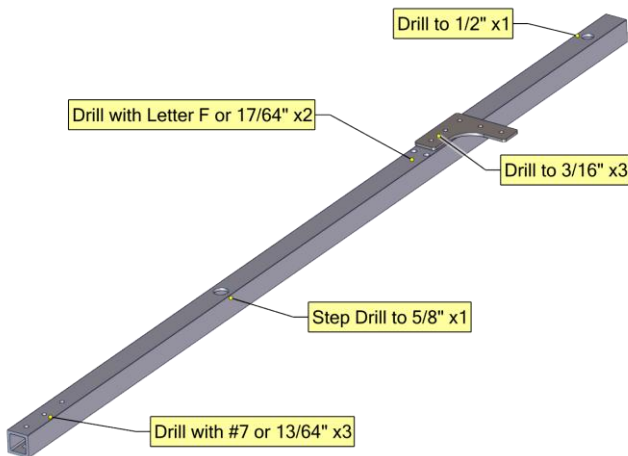
Step 7: Center the Peanut Bracket on the 1x1 tube and slide it over the first four and last lines. Use this to mark the center for drilling at the 5 drill locations.



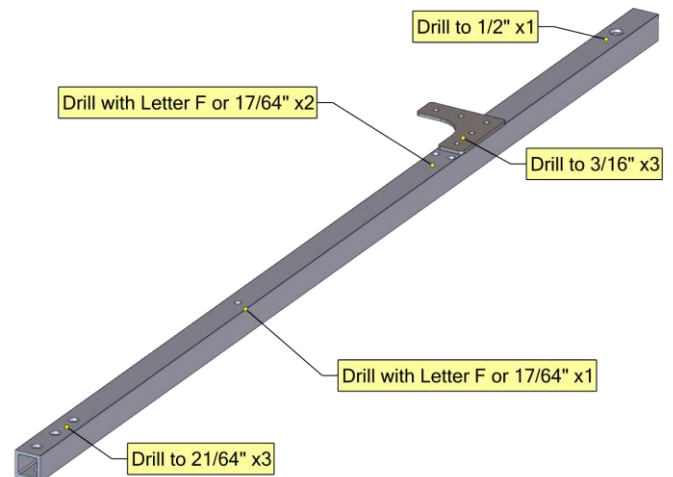
Step 8: Flip the 1x1 over and repeat steps 1 through 7 to the opposing face.



Step 9: On one of the marked faces, drill the listed holes up to the sizes shown on this face only.



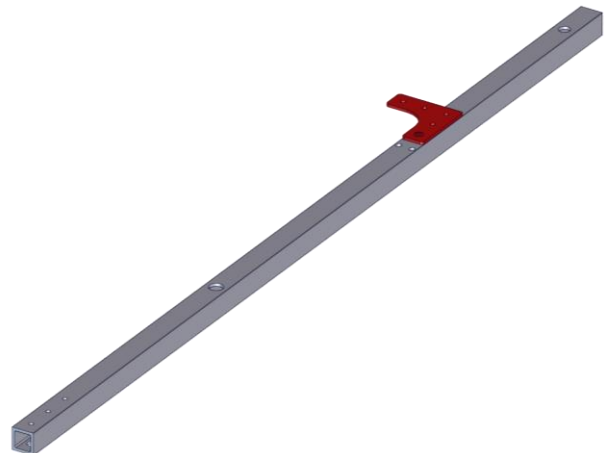
Step 10: Flip the 1x1 over and drill the shown holes up to the listed sizes on this face only.



Step 11: Repeat steps 1 through 10 to create a second vertical 1x1.

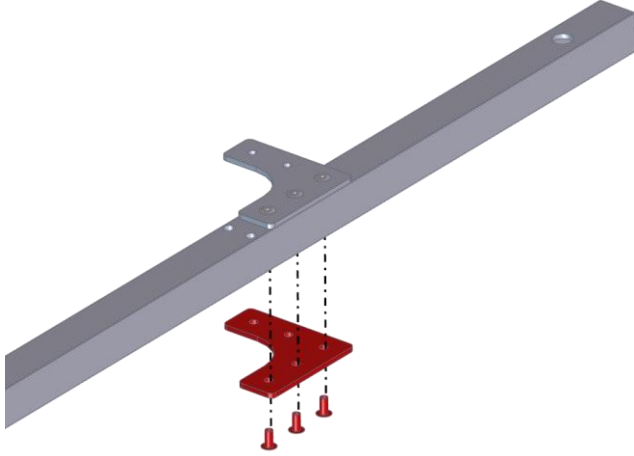


Step 12: Secure a 90 Degree Gusset to the 1x1 at the holes prepared for it with three 3/16 in. Diameter Steel Rivets (am-1226.)

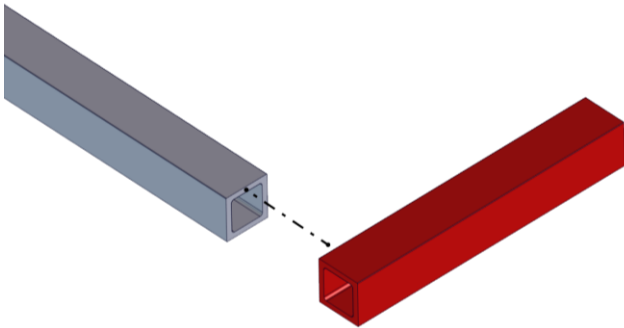


Structure Prep

Step 13: Attach a second 90 Degree Gusset, on the opposite face, pointing the same direction.



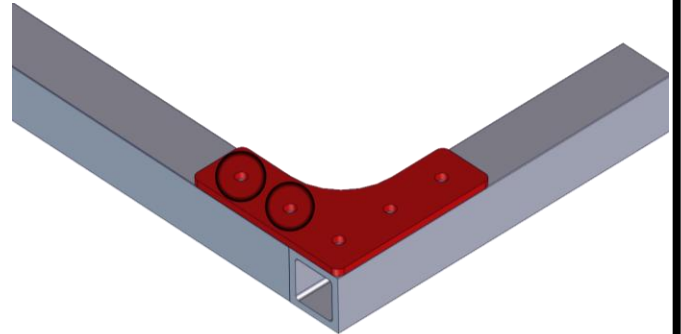
Step 15: Place a 6.5 inch 1x1 piece square to a 32 inch 1x1 piece.



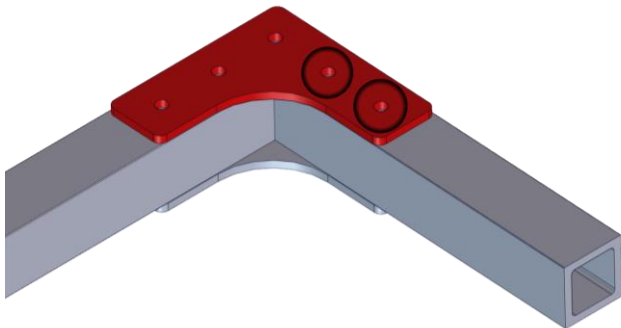
Step 14: Create a mirror with two more 90 Degree Gussets and the other 42 inch 1x1.



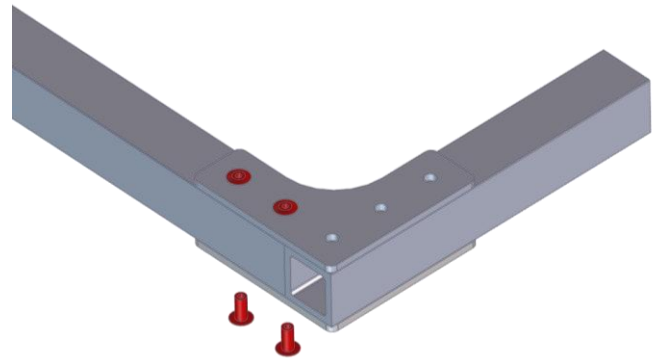
Step 16: Place a 90 Degree Gusset flush with both pieces. Mark and drill the two holes on the 32 inch 1x1 with a 3/16 inch bit.



Step 17: Flip the components over. Mark and drill two more holes in the same manner.

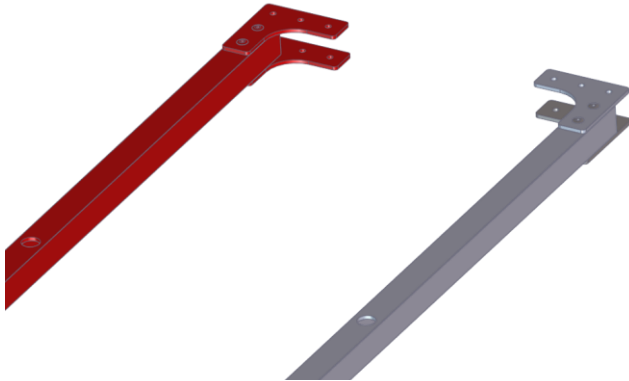


Step 18: Using four rivets, secure the two 90 Degree Gussets to the 32 inch long 1x1.

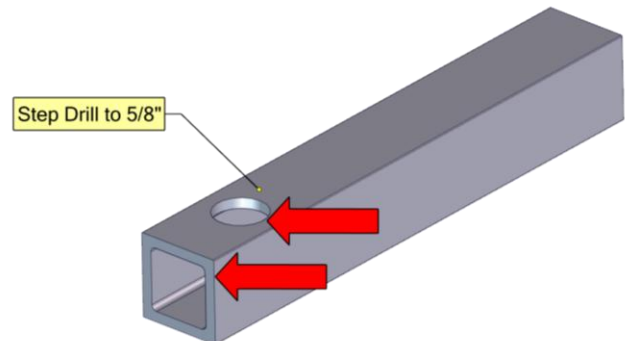


Structure Prep

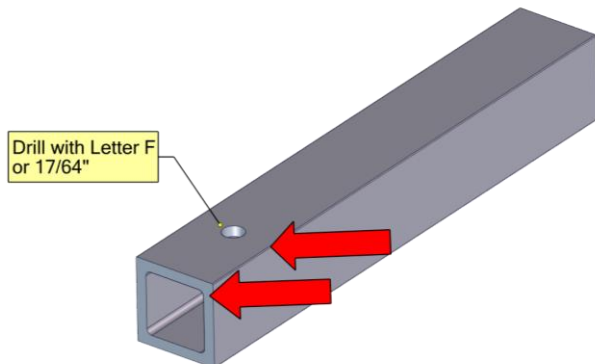
Step 19: Using the same method, create a mirror with the second 32 inch 1x1, four more rivets, and two more 90 Degree Gussets.



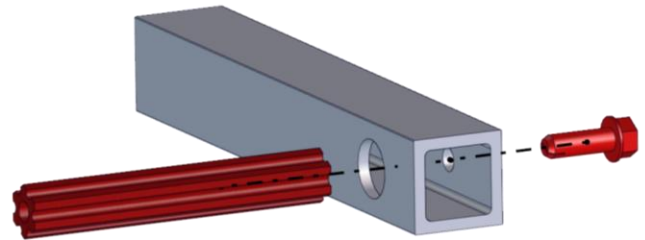
Step 20: Using the measurement and marking methods from before, on a 6.5 inch 1x1, notate a hole one inch from the end. Step drill this hole out to 5/8 inches.



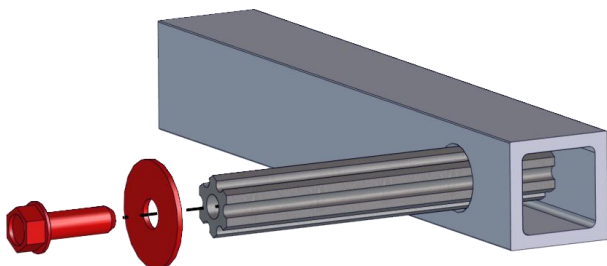
Step 21: Flip the 6.5 inch 1x1 over and repeat the marking and drilling to create a 1/4 inch hole.



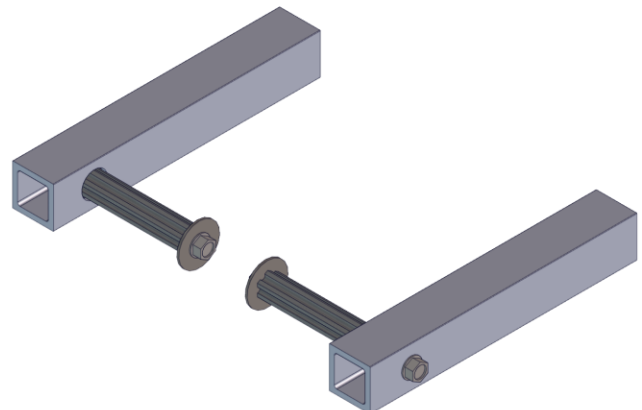
Step 22: Pass a 3.5 inch Churro through the 5/8 inch hole, and secure it to the 1x1 with a 1/4-20 x 0.75 in. Thread Cutting Screw.



Step 23: Place a 1/4 Fender Washer (am-1421) over a second 1/4-20 x 0.75 in. Thread Cutting Screw, and attach to the Churro.

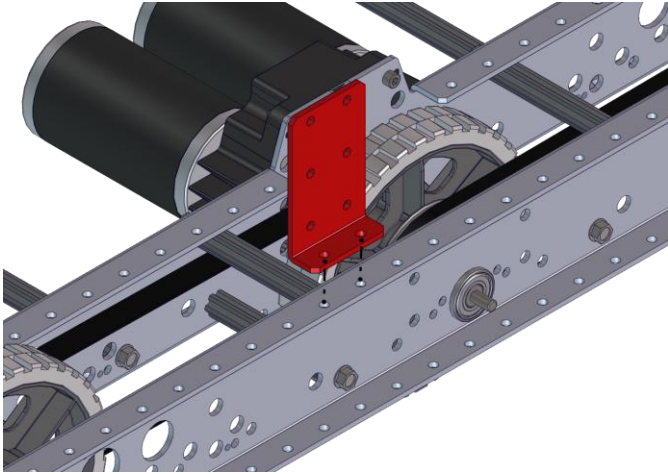


Step 24: Repeat steps 17 through 20 to create a second 6.5 inch 1x1 and Churro assembly.

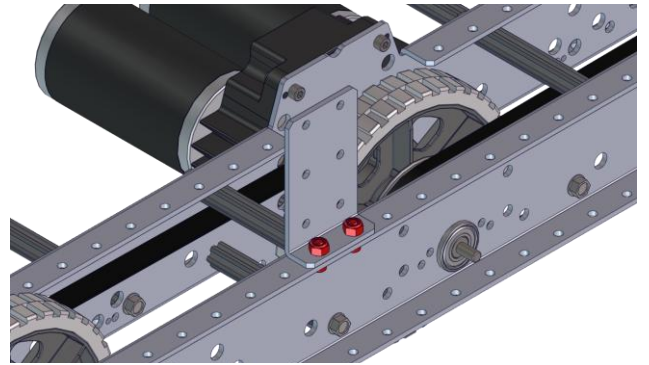


Structure Assembly

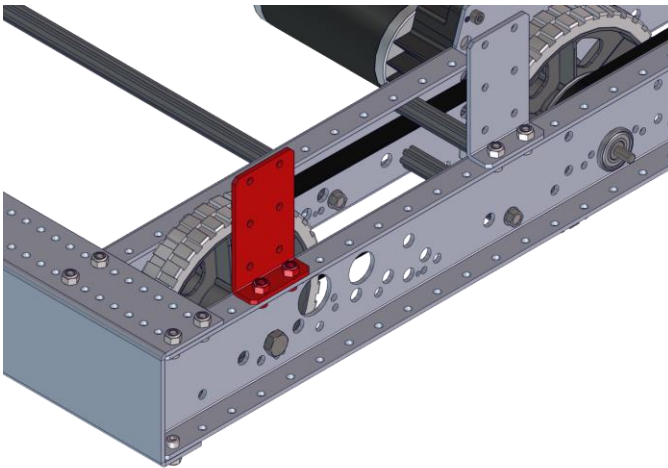
Step 1: Line a 2x3 Bracket (am-2954) with the Outside Plate holes. We're using one hole back from the Toughbox Mini.



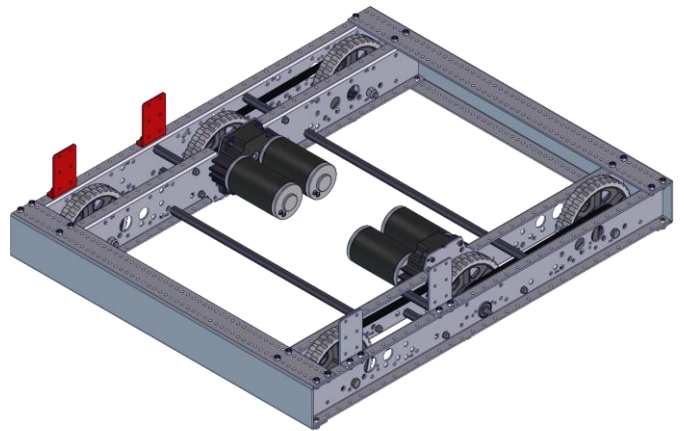
Step 2: Secure the 2x3 Bracket to the Outside Plate with two 10-32 x 0.5 in. Socket Head Cap Screw (am-1002) and two 10-32 Nylock Nuts (am-1042.)
Ensure the plate flange and outside plate flanges are flush.



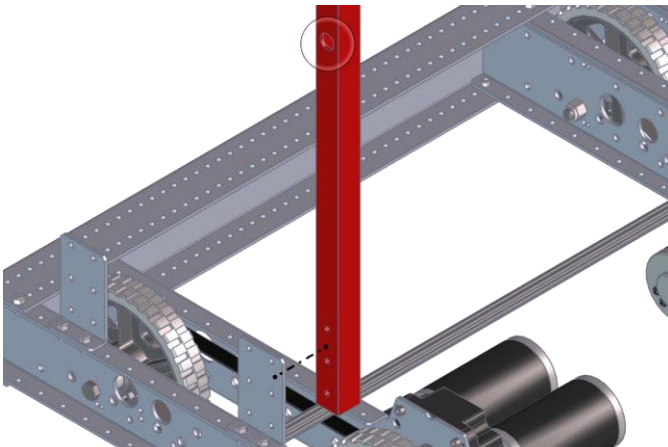
Step 3: Secure a second 2x3 Bracket one hole away from the End Plate.



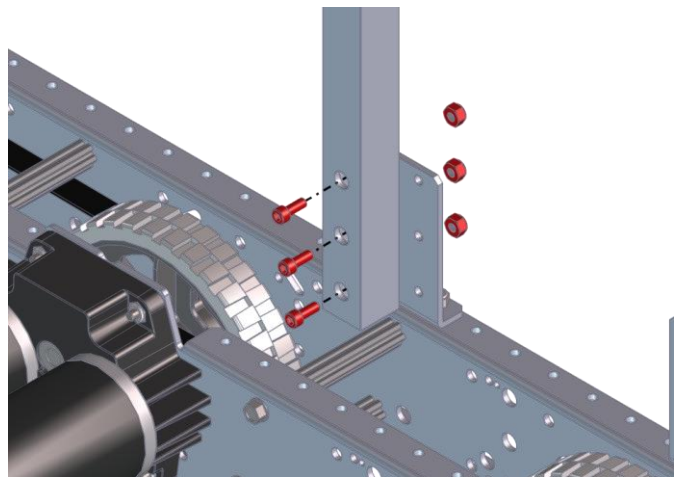
Step 4: Repeat on the opposite side of the chassis.



Step 5: With a 42 inch long 1x1 in hand and the 5/8 inch hole pointing away from the center of the chassis, line the 2x3 Bracket holes nearest the gearbox up with the holes of the 1x1.

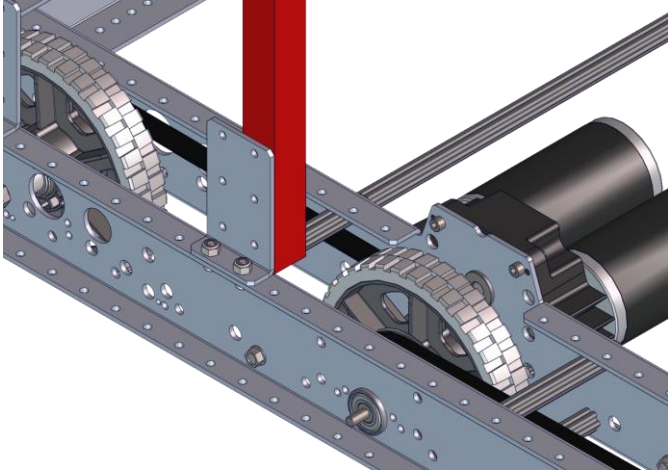


Step 6: Feed three 10-32 x 0.5 in. SHCS through the 1x1 and secure with 10-32 Nylock Nuts.

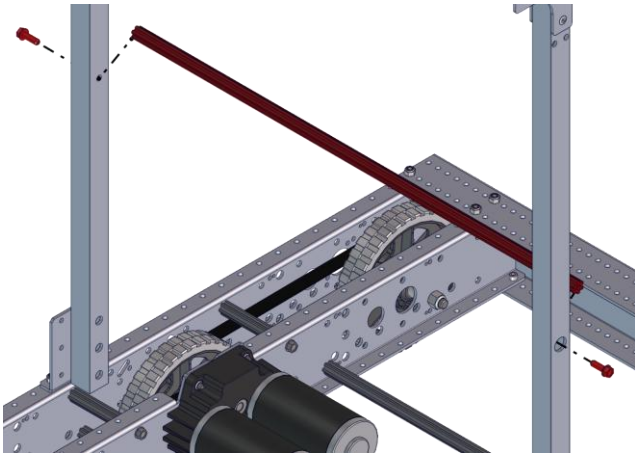


Structure Assembly

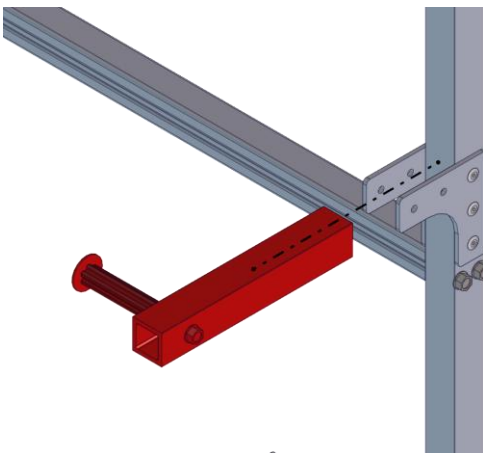
Step 7: Ensure the 1x1 is flush with the edge of the 2x3 Bracket.



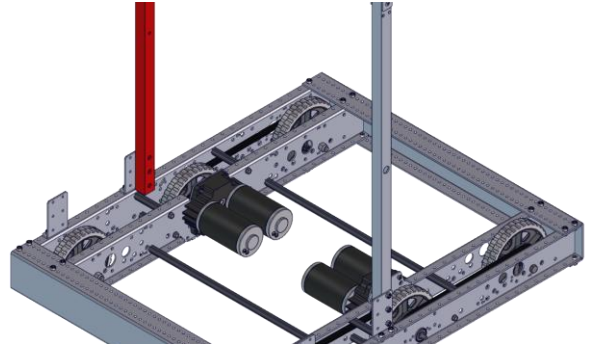
Step 9: Place a long Churro between the vertical 1x1 pieces and secure it to the 1x1 tubes with 1/4-20 x 0.75 in. Thread Cutting Screw.



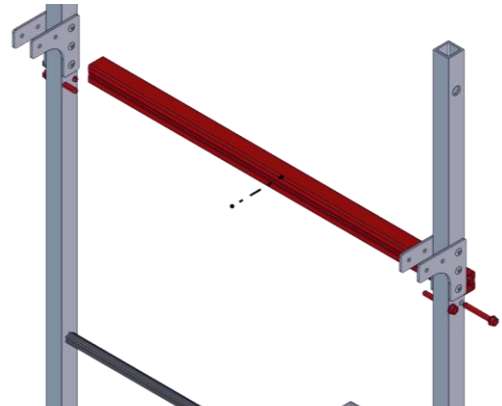
Step 11: Insert a 6.5 1x1 assembly in between the 90 Degree Gussets with the Churro pointing to the center of the chassis.



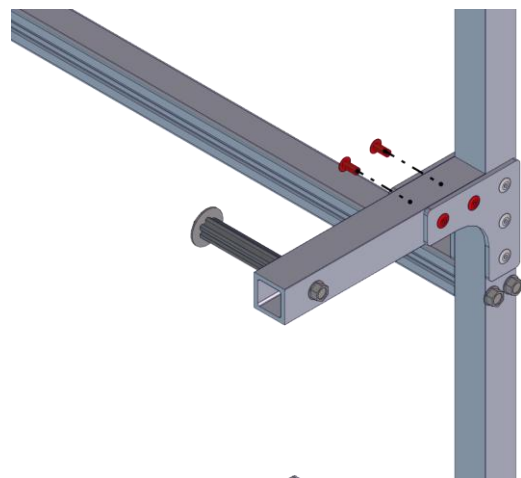
Step 8: Attach the second 42 inch 1x1 in the same manner on the opposing side. **Remember** this component is mirrored. The 5/8 inch hole on the 1x1 should point towards the outside of the chassis.



Step 10: Place the cross peanut between the 1x1 vertical pieces. The peanut should set near flush with the 90 Degree Gussets. Secure the Peanut to both 1x1s with the 1/4-20 x 0.75 in. Thread Cutting Screw.



Step 12: Clamp the assembly in place. Mark, drill, and then rivet the 6.5 1x1 to the 90 Degree Gusset.

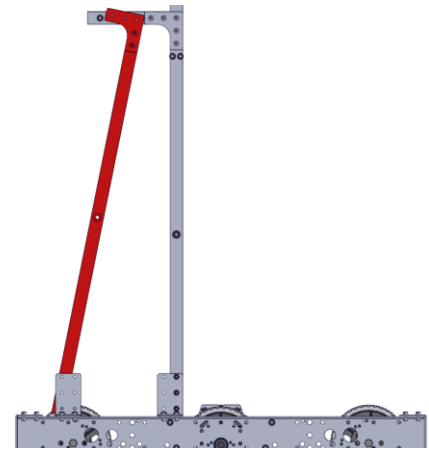


Structure Assembly

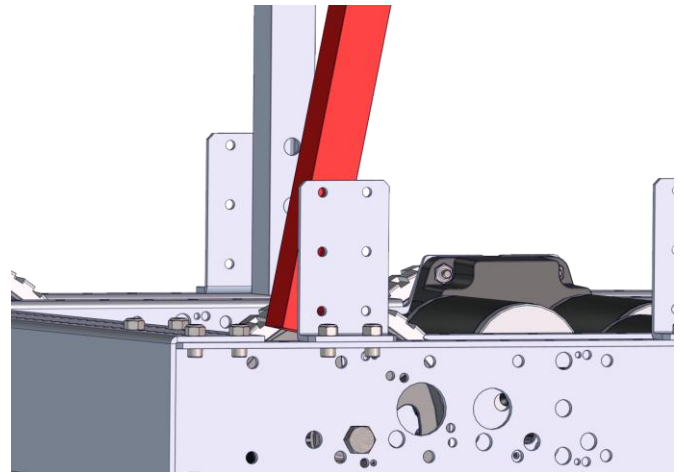
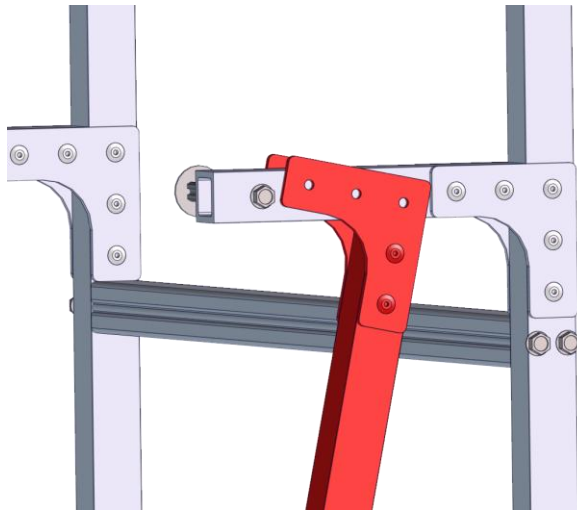
Step 13: Mirror this operation on the opposing side of the chassis.



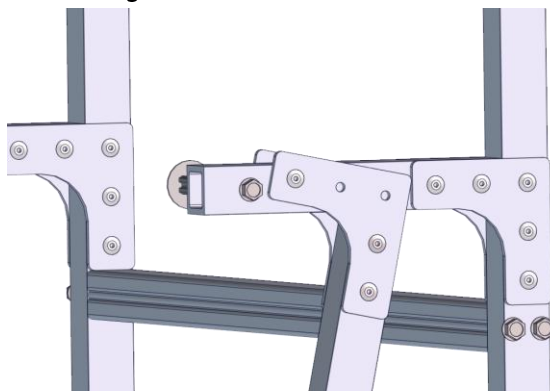
Step 14: This next step requires some patience. Place the 32 inch 1x1 assembly onto the chassis, with the 90 Degree Gussets over the 6.5 inch 1x1.



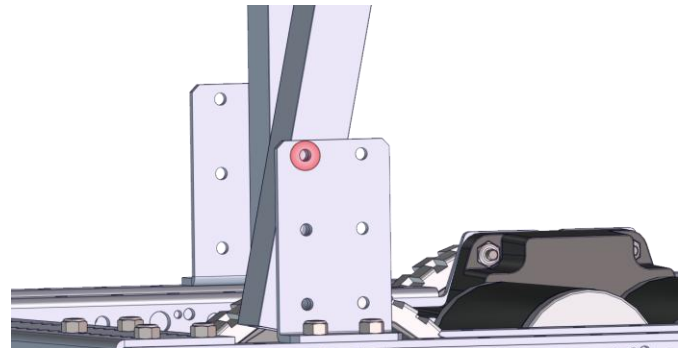
Step 15: Move the assembly around while trying to satisfy these two conditions. 1) The three holes of the 90 Degree Gussets must exist over the 6.5 1x1. 2) The 1x1 tube must cover three holes of the 2x3 bracket.



Step 16: Clamp the assembly in place when the conditions are met. Drill and rivet **one** hole location of the 90 Degree Gusset.

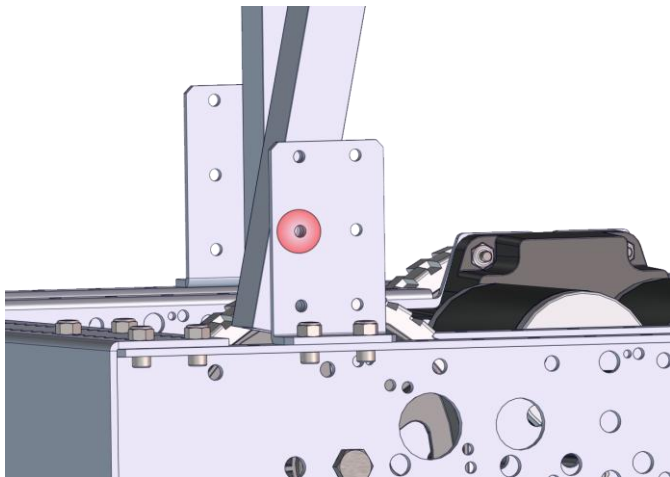


Step 17: Match drill the first hole of the 2x3 Bracket to the 1x1. Drill all the way through the tube. Temporarily place a 10-32 x 0.5 in. SHCS into the hole to help hold the position.

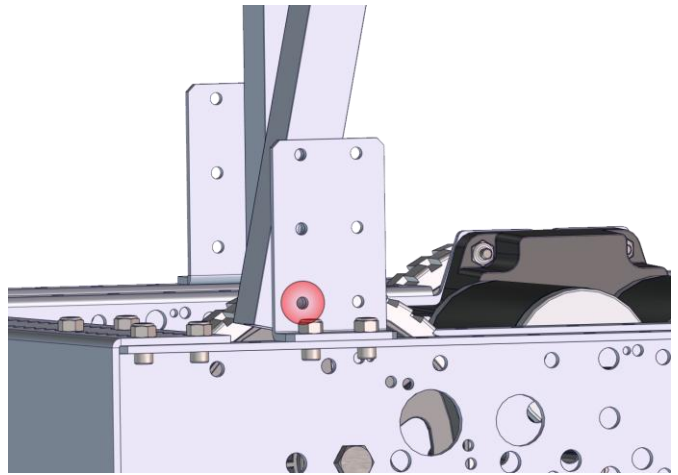


Structure Assembly

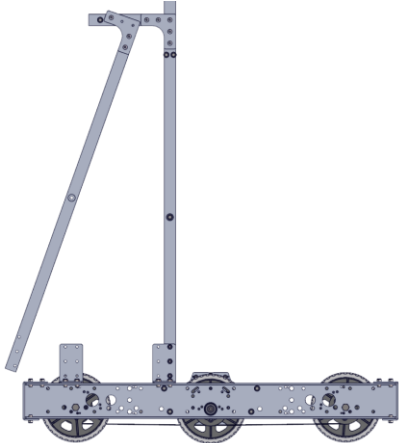
Step 18: Match drill the second hole through to the other side of the 1x1.



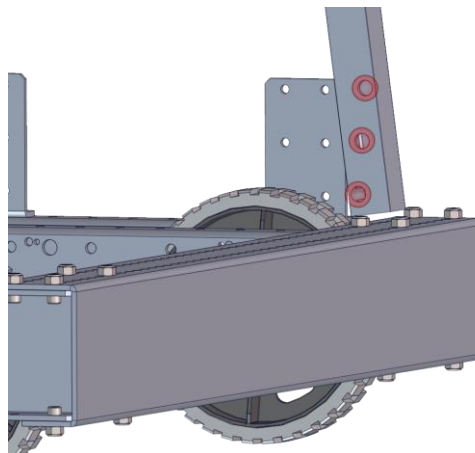
Step 19: Match drill the third hole through to the other side of the 1x1.



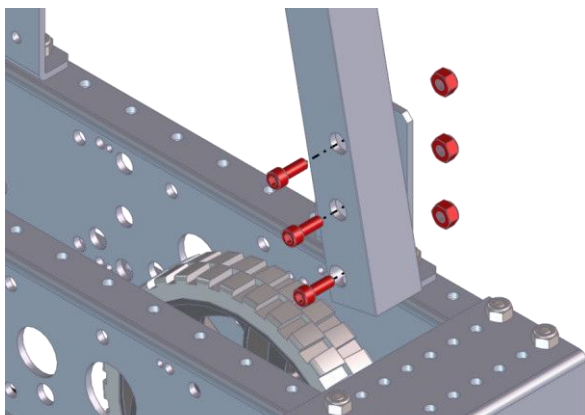
Step 20: Pivot the assembly back slightly to provide access to the three holes.



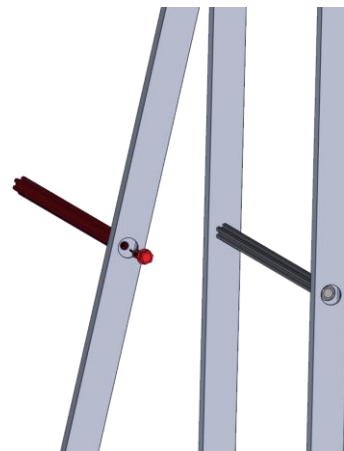
Step 21: Enlarge the three holes up a 21/64" drill bit.



Step 23: Secure the 1x1 to the 2x3 Bracket with three 10-32 x 0.5 in. SHCS screws and 10-32 Nylock Nuts.

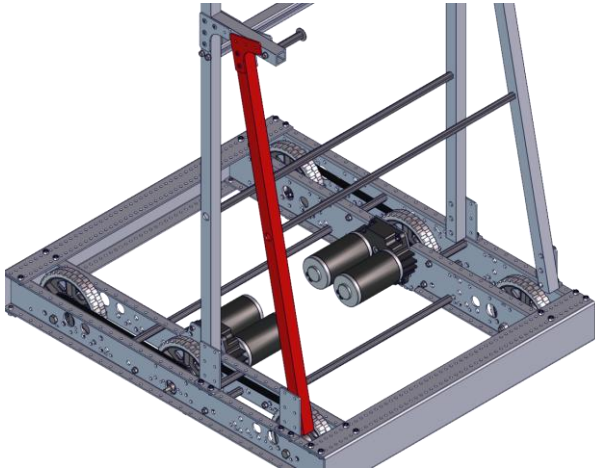


Step 24: Secure the remaining cross Churro to the angled 1x1.

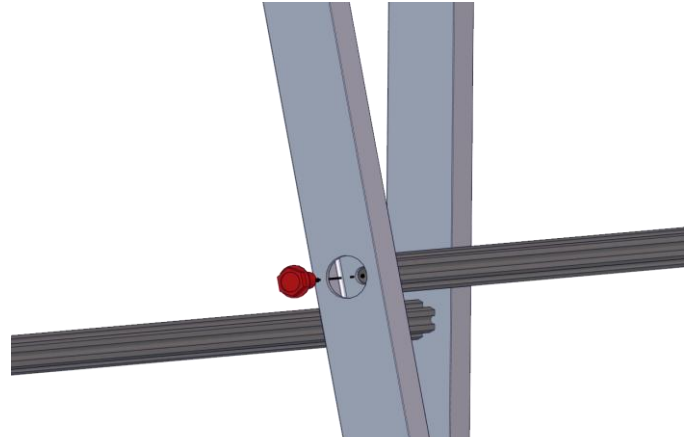


Structure Assembly

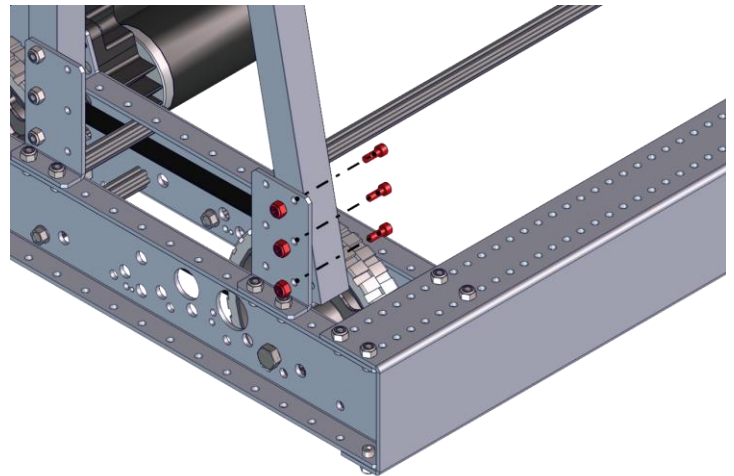
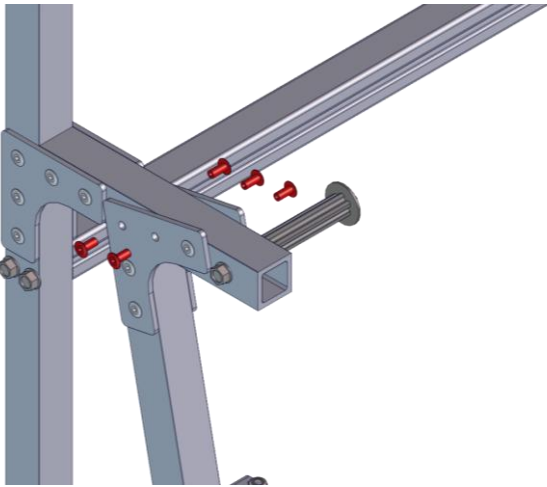
Step 25: Place the second angled 1x1 assembly into place.



Step 26: Loosely secure the assembly to the cross Churro with the final 1/4-20 x 0.75 in. Thread Cutting Screw.



Step 27: Repeat the alignment steps for the second angled 1x1. Secure the 90 Degree Gussets with rivets and the 2x3 Bracket with 10-32 hardware.



Step 28: Work your way around the assembly ensuring all connections are tight and that the structure kit is square. If you have a Passive Hanger Kit, that may now be attached.

