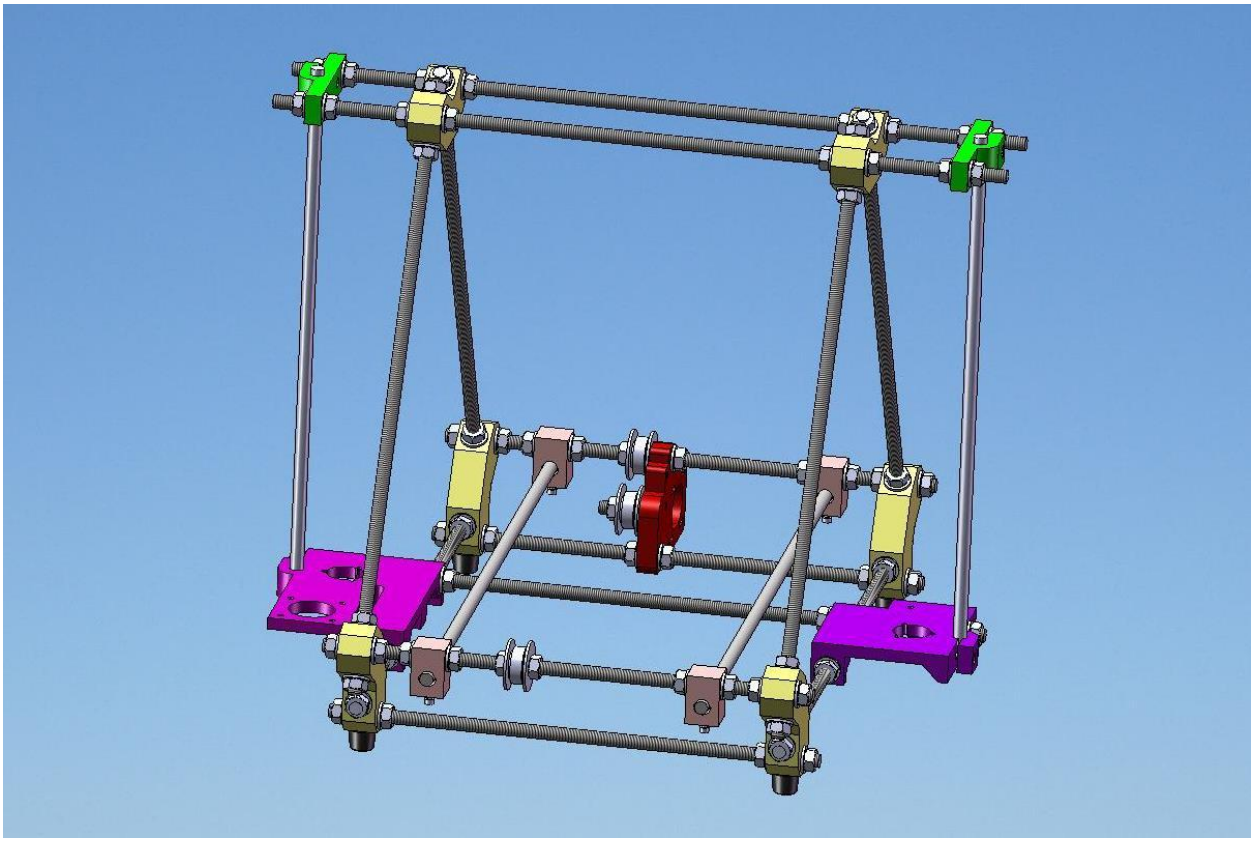
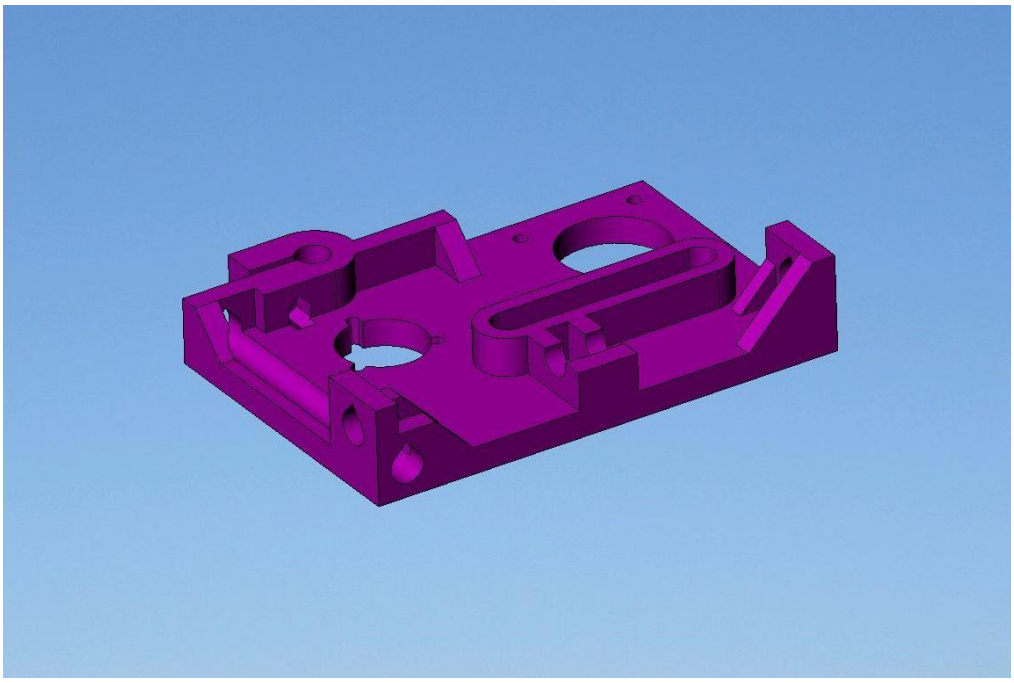
Section 5: **Frame**

The following is the assembly instructions for the frame assembly. The complete Mendel uses a total of 1 of these assemblies. The bill of materials for this assembly is:

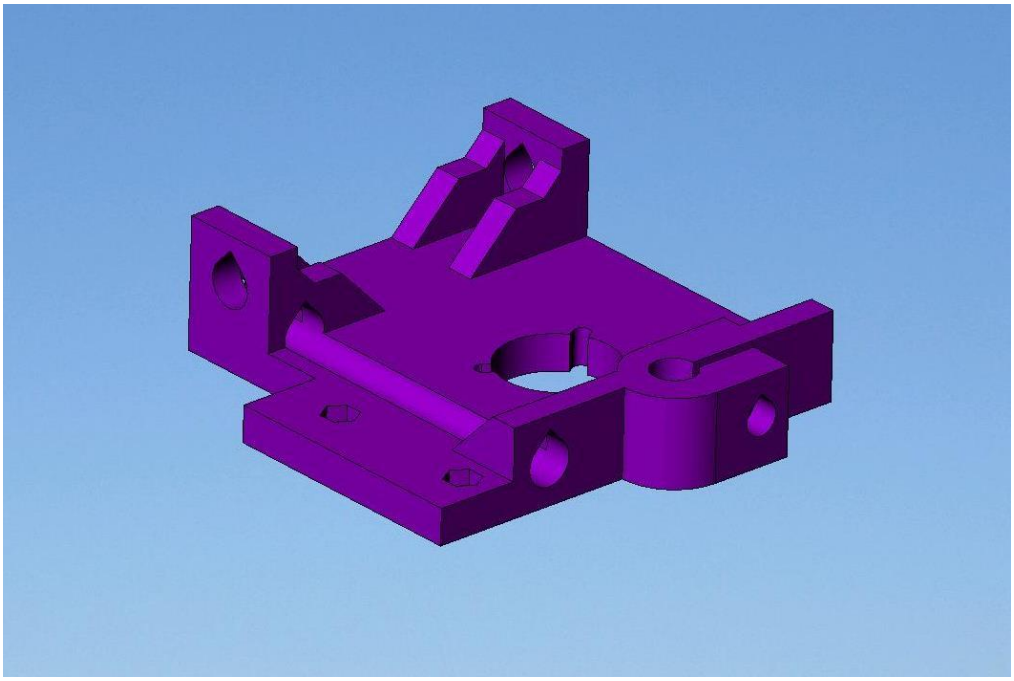
Description	Printed/Made/Purchased	Quantity
frame_vertex_6_off	Printed	6 (use only Sells Mendel one!)
ja_right z_mount	Printed	1
ja_left_z_mount	Printed	1
ja_y_rod_clamp_assm	Made	4
ja_y_motor_mount	Made	1
ja_z _rod_clamp_assm	Made	2
5/16 or M8 threaded rod	Purchased	(1)
M8 or 5/16” smooth rod	Purchased	(2)
M8 Washer	Purchased	64 (must use M8!!!!)
5/16 or M8 Nut to fit rod	Purchased	64
M3 X 12 SHCS	Purchased	2
M3 Nut	Purchased	2
Fender Washer	Purchased	4
608 bearing	Purchased	2

1.) Threaded rod lengths 6 at 370mm, 4 at 294mm, 2 at 440mm, 1 at 418mm (M8 or 5/16”)
2.) Smooth rod lengths: 2 at 330mm, 2 at 402mm (M8 or 5/16”)





The part ja_left_z_mount in the build orientation.

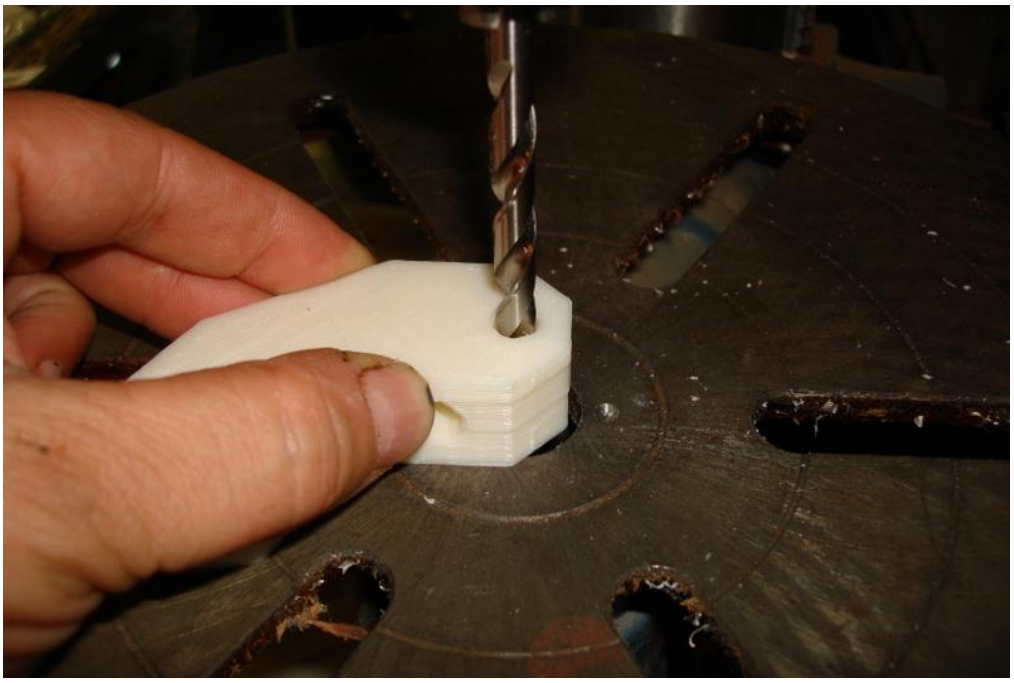


The part ja_right_z_mount in the build orientation.

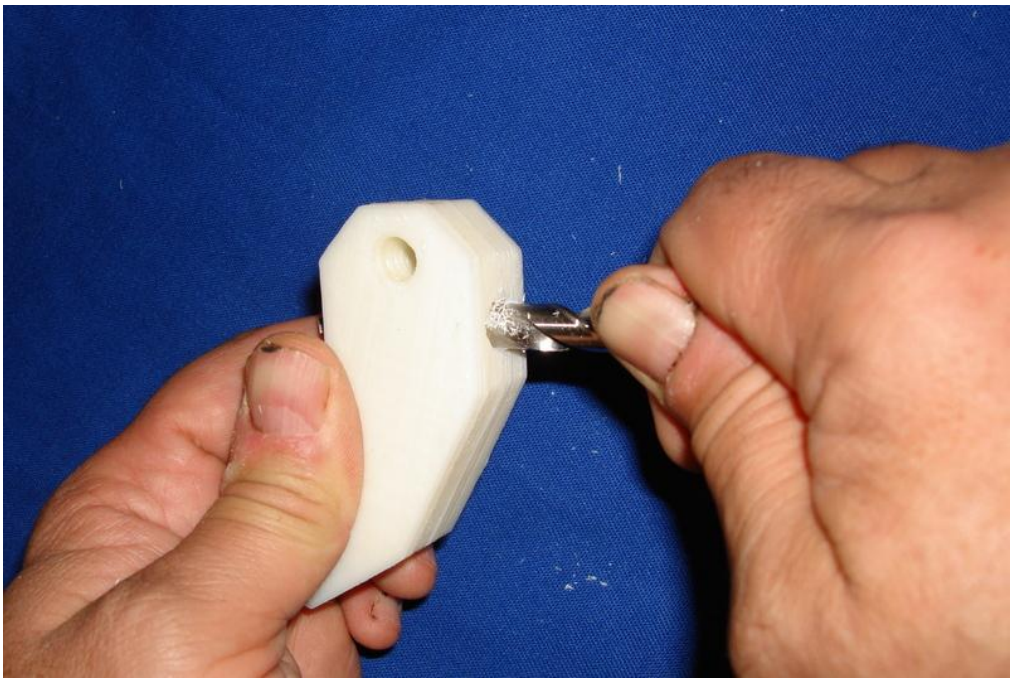
The frame assembly.

This is where we start to see real progress. Here we build and adjust the frame. It is made with the above parts and 6 Sell's Mendel vertices. I believe those frame vertices are superior to the

others, because they are thicker and thus have a better chance of being truly perpendicular to the rods. The down side is that we need to put some small rubber feet on them, to increase the height a bit. The Mendel needs this anyway to not slide around…

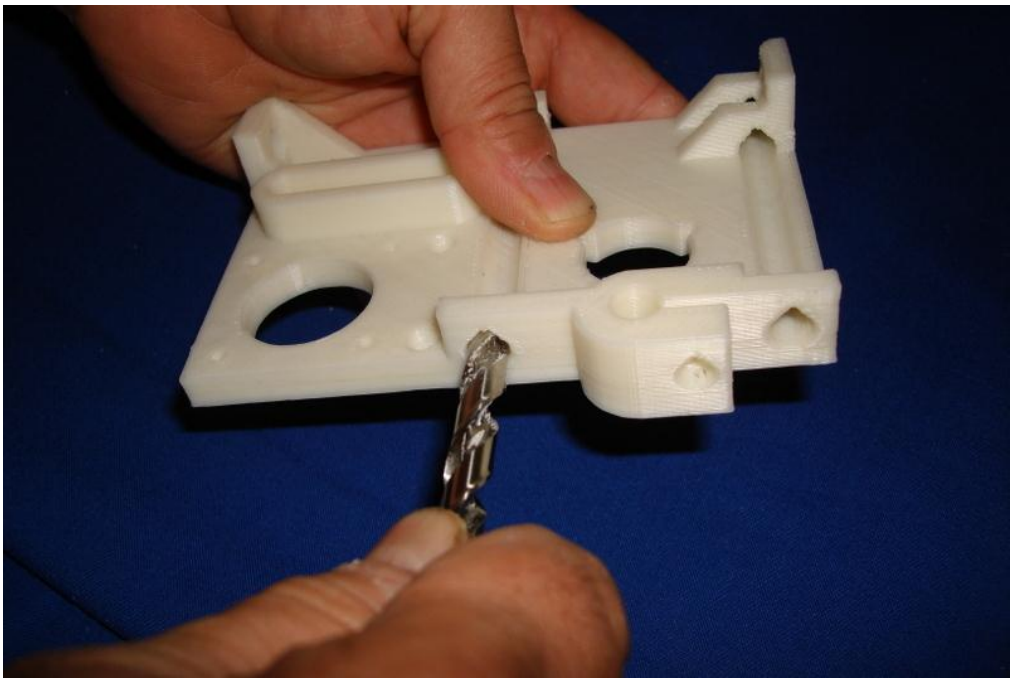


I used a drill press to ream out the M8 holes and be truly perpendicular. This is dangerous, so I turned the drill by hand.

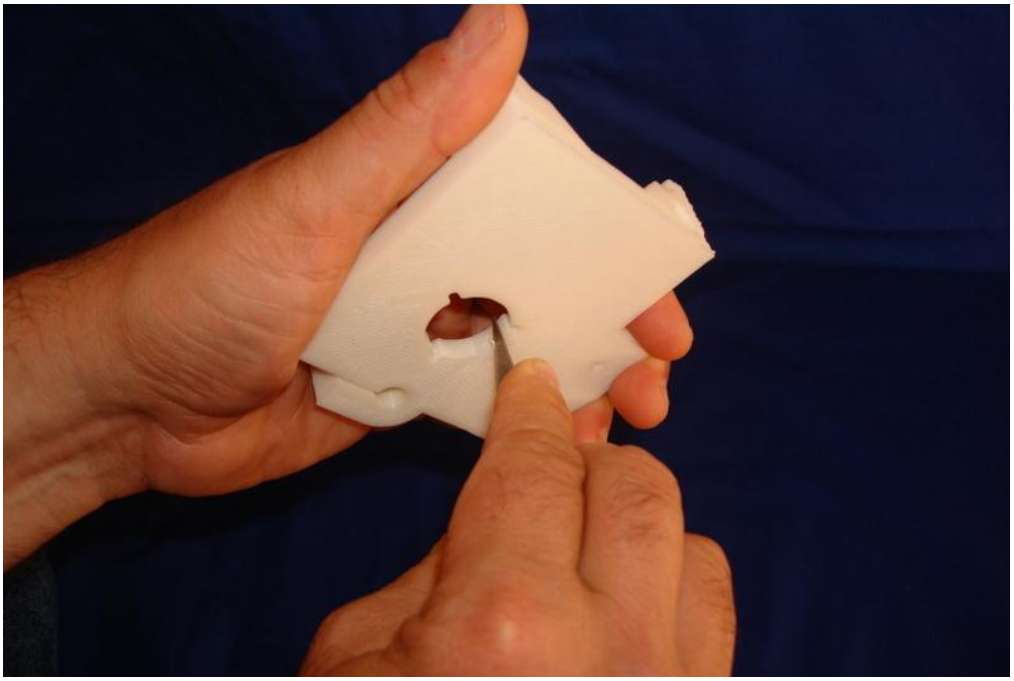


Carefully ream the other holes to size.

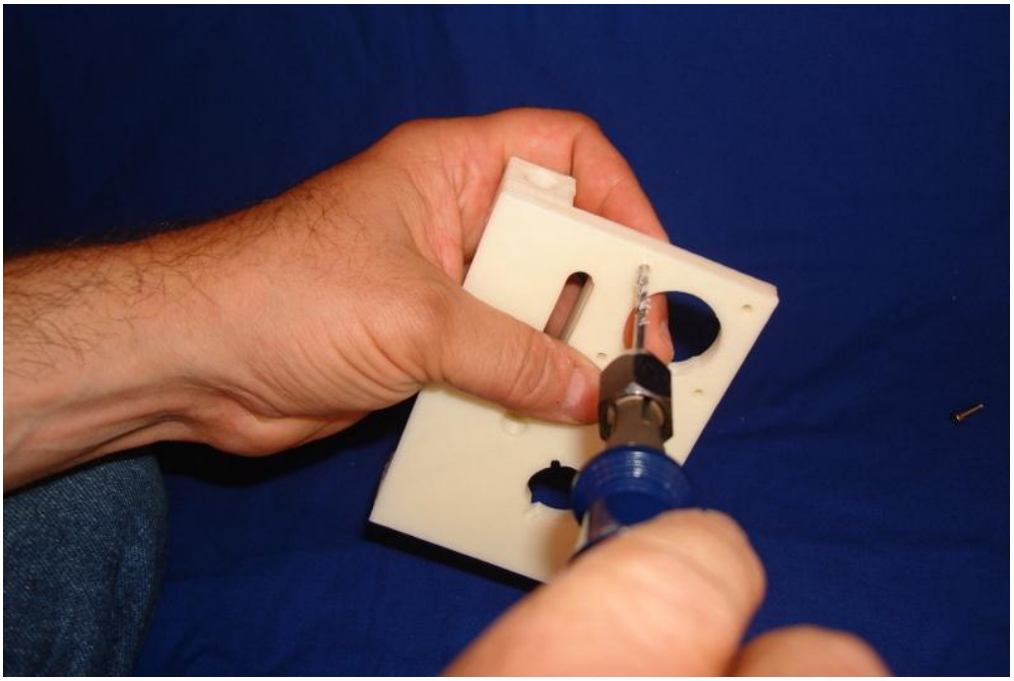
My junk box yielded small feet and small wood screws to attach them. Be sure that the screws do not protrude into the cross holes.



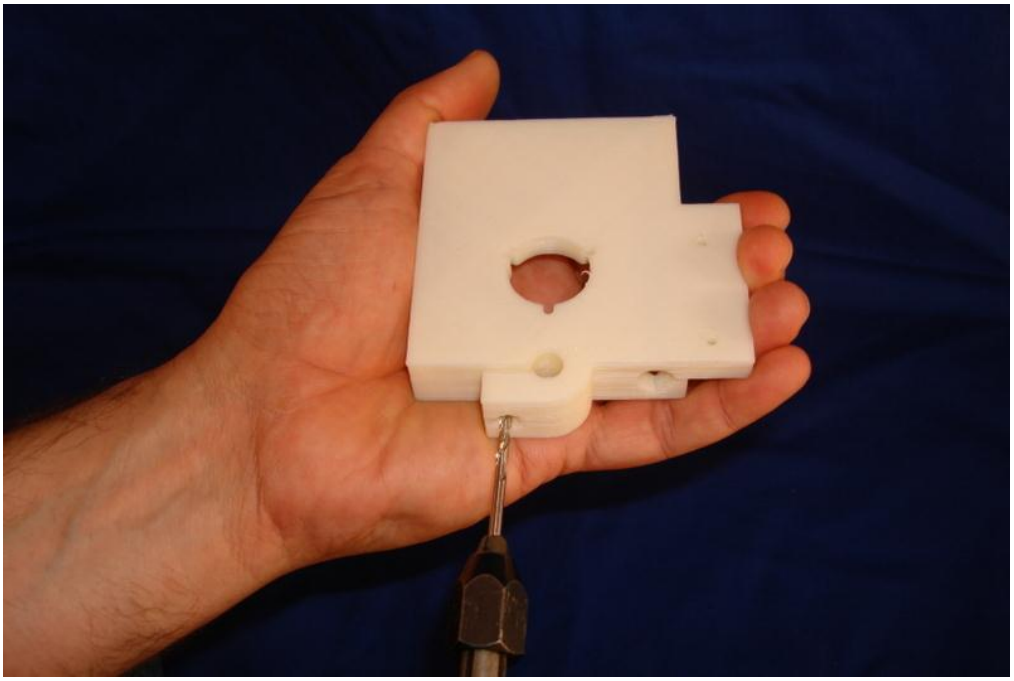
Ream the M8 holes on the right and left z mount.



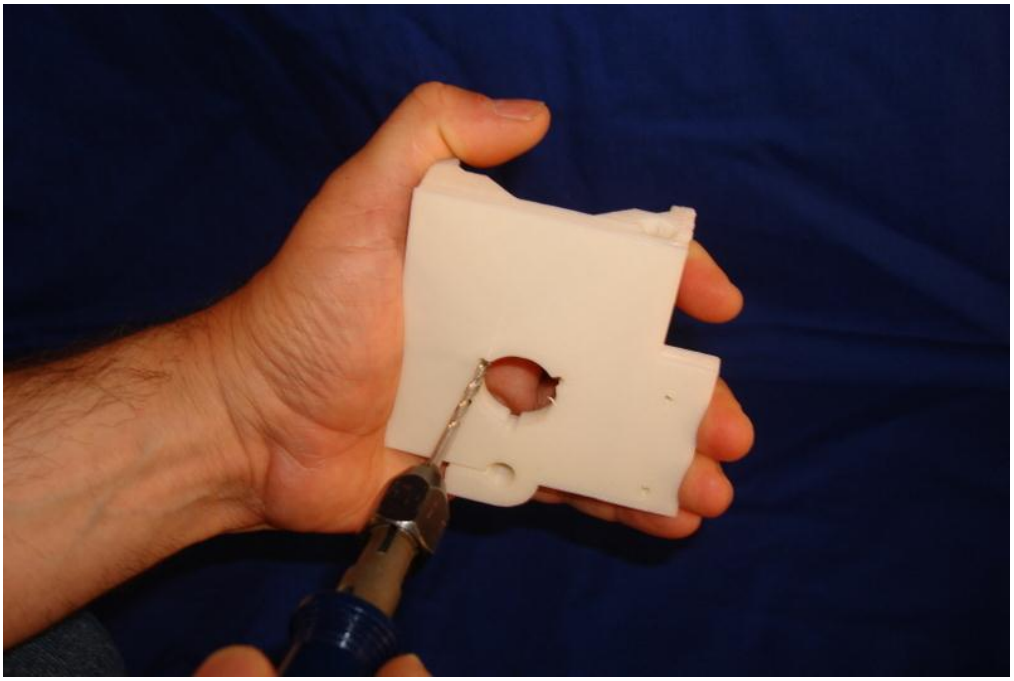
Trim the flashing from the holes for the bearings with Exacto knife.



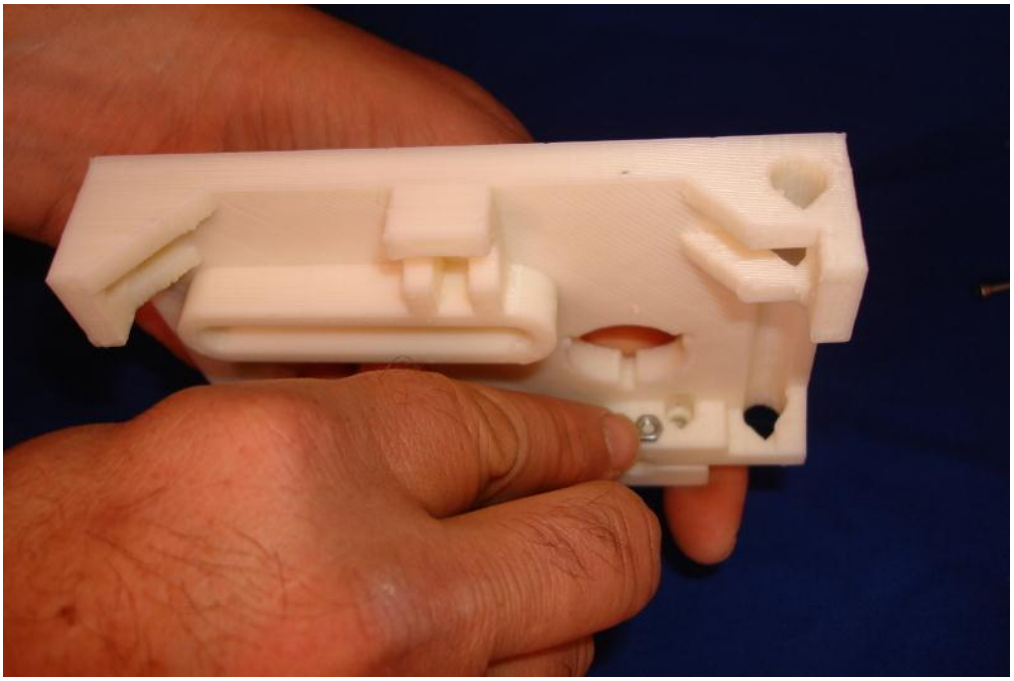
Ream M3 holes by hand.



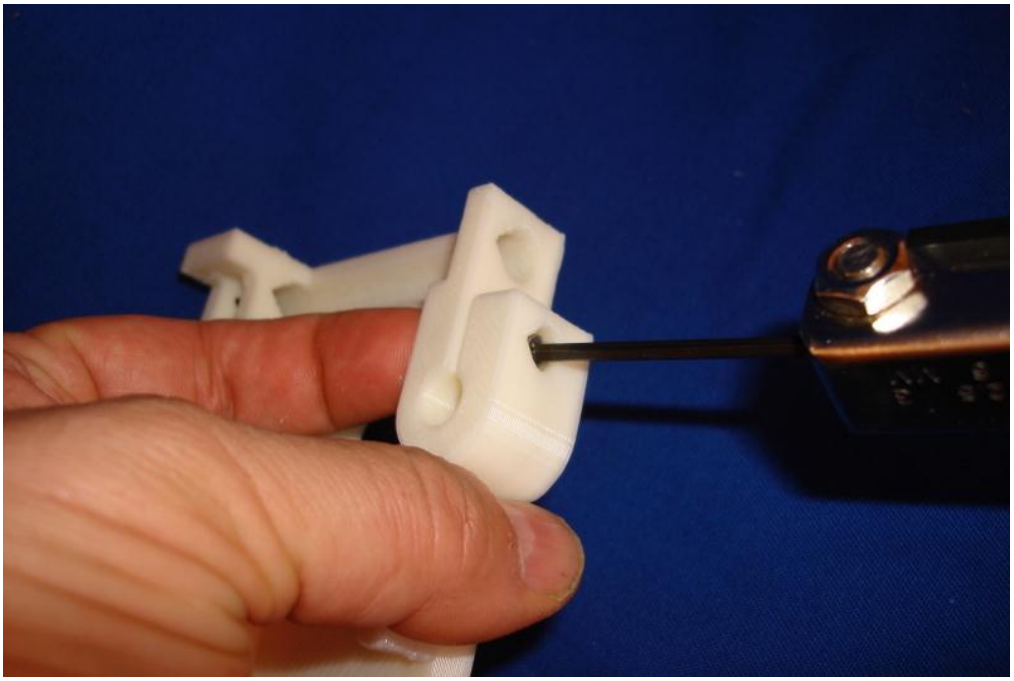
And the one for the z rod clamp.



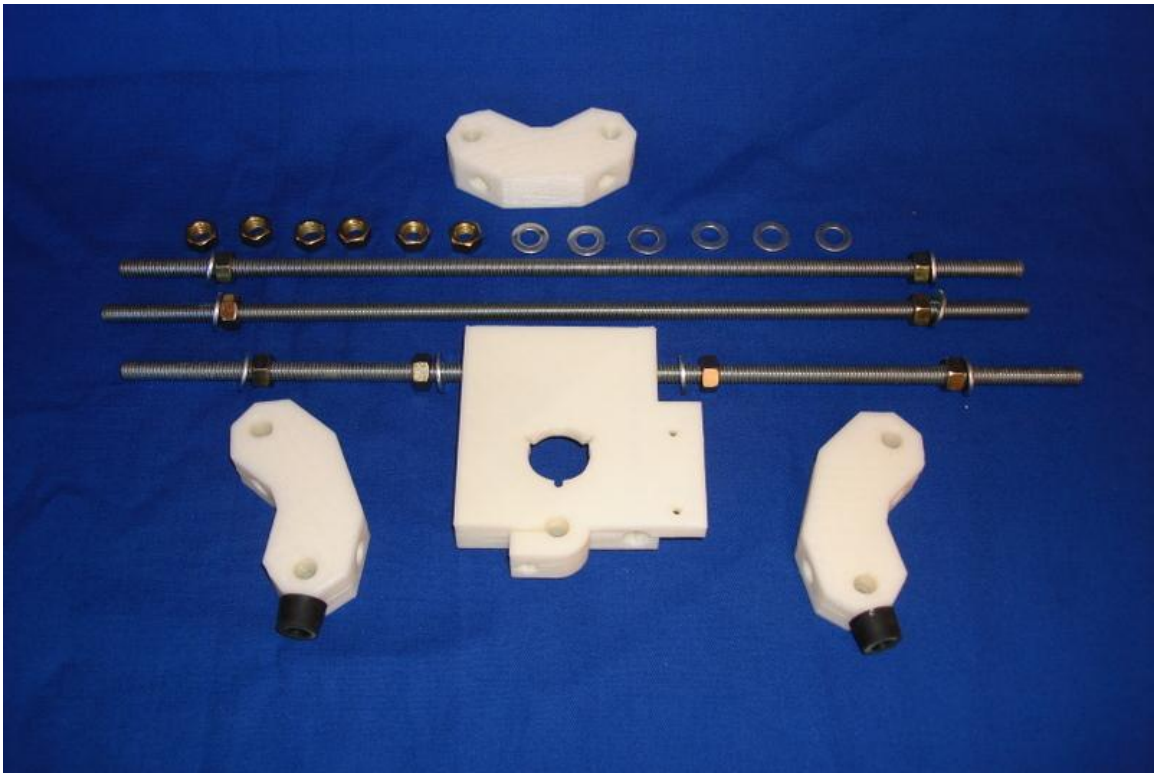
Move the drill in and out to clean up the 3 M3 slots to hold the bearings in.



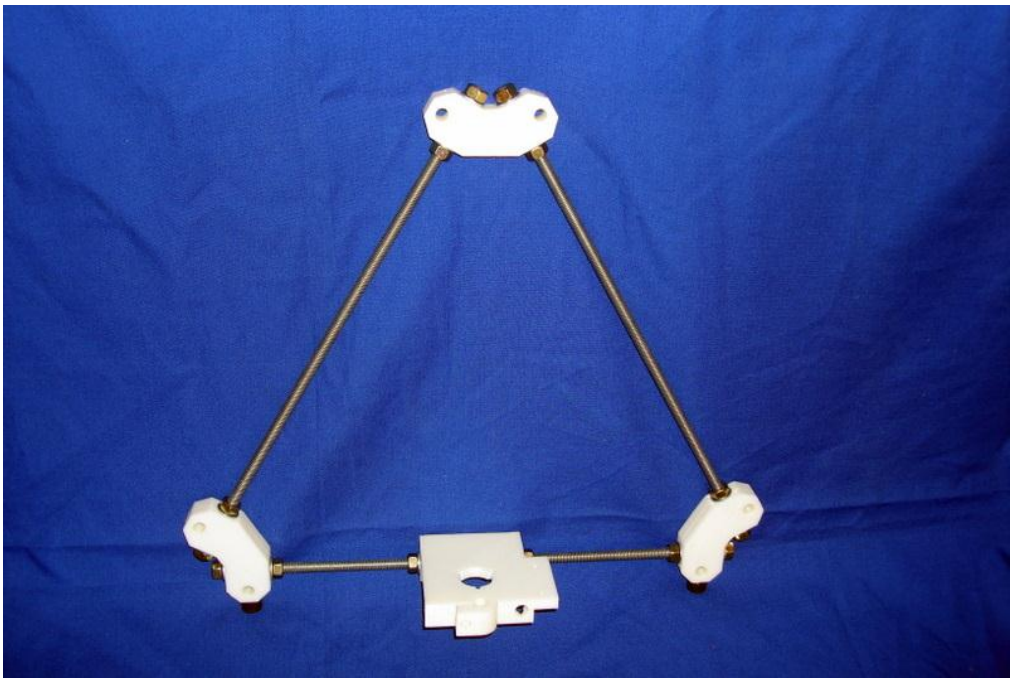
Similar to the z rod support, put an M3 nut in.



And then an M3 SHCS from the other side.

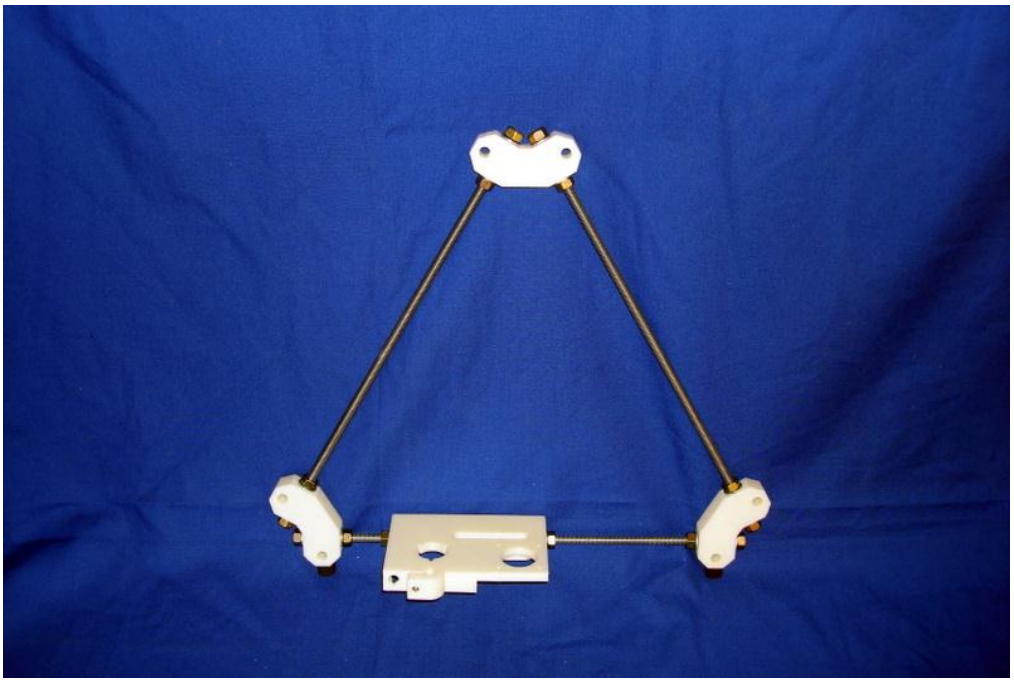


Now gather the parts shown above, and do the partial assembly as shown.

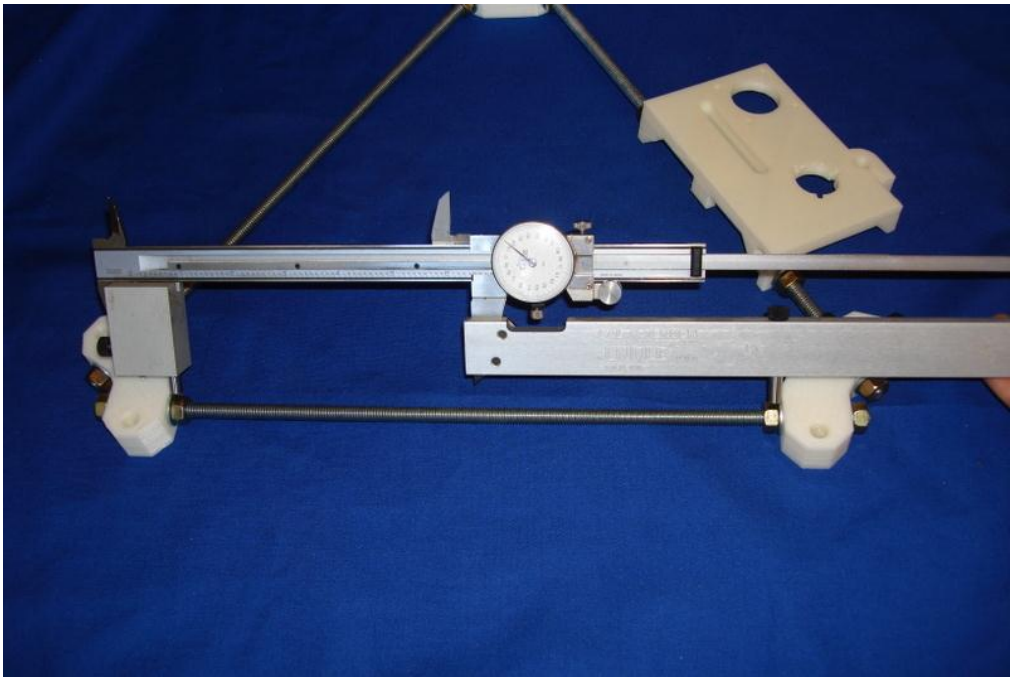


Put the frame vertices on, then washers and nuts and snug a bit.

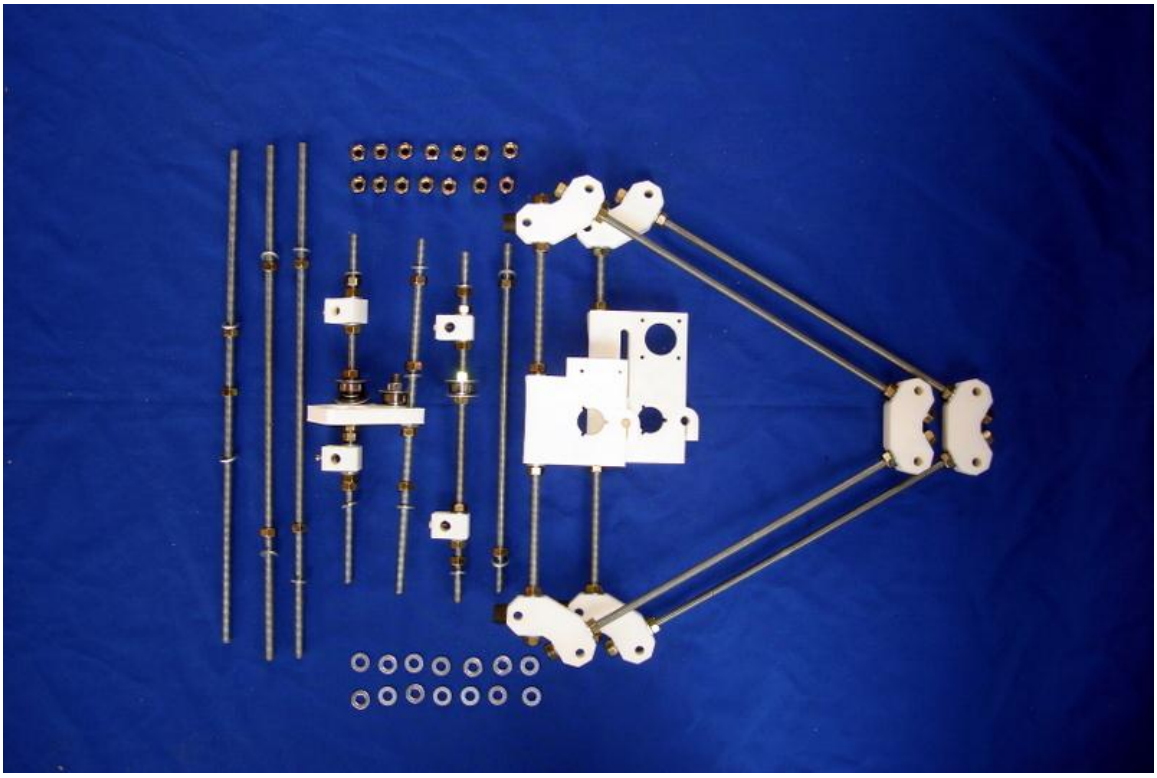
Proceed to gather the other side components and arrange as shown.



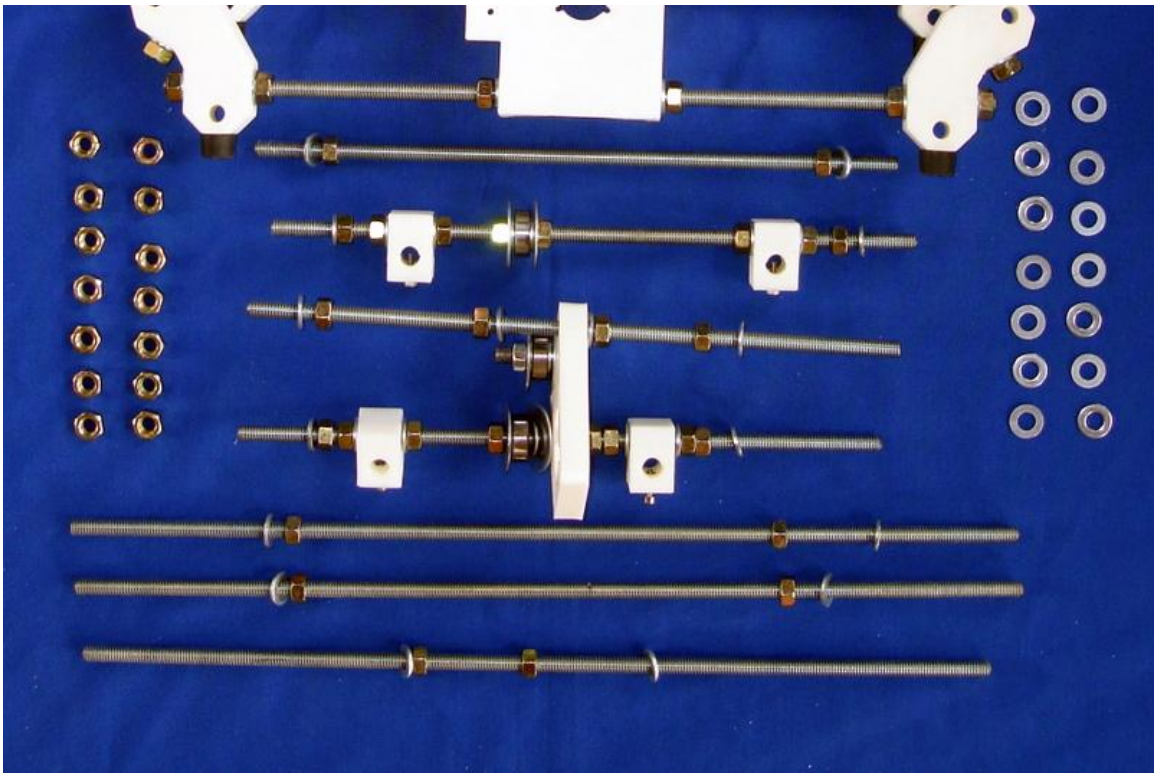
Again, put the frame vertices on, then washers and nuts and snug a bit.



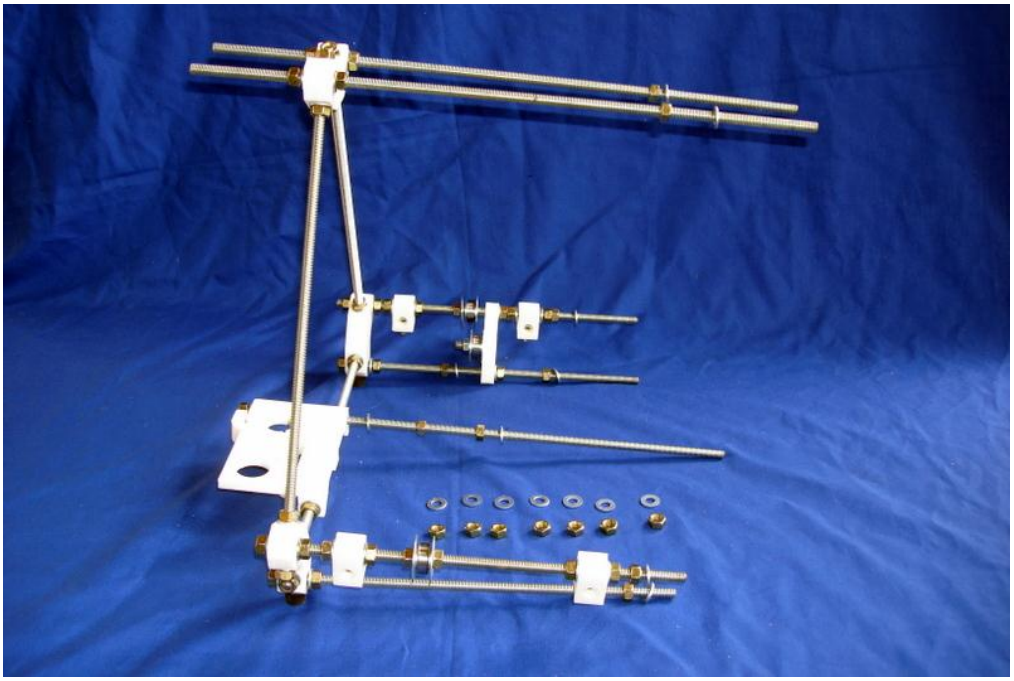
Now set the jigging distance to a uniform 290mm on all sides of both frames. Snug down nuts firmly. I used a caliper extender, but a carefully cut rod as per Sell's Mendel also works.



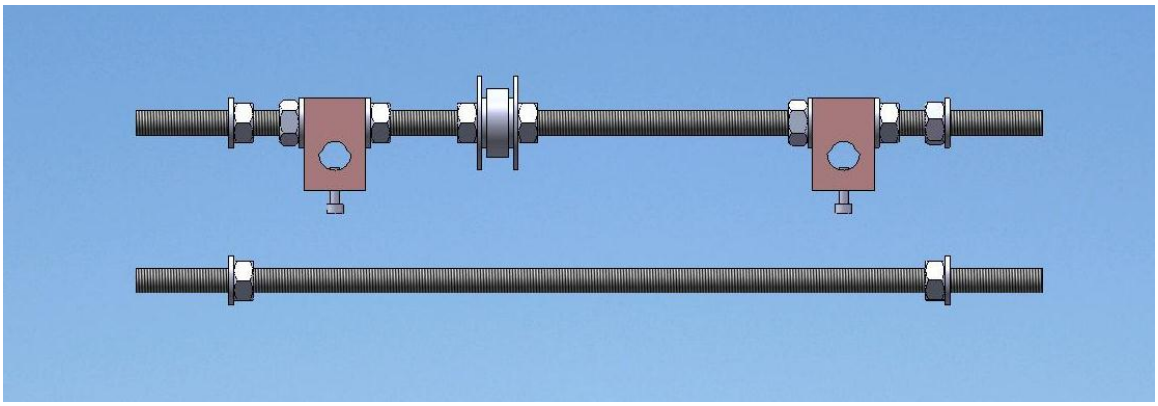
Next gather the 2 assemblies from above, and the following partial assemblies. A detail view of these new parts.



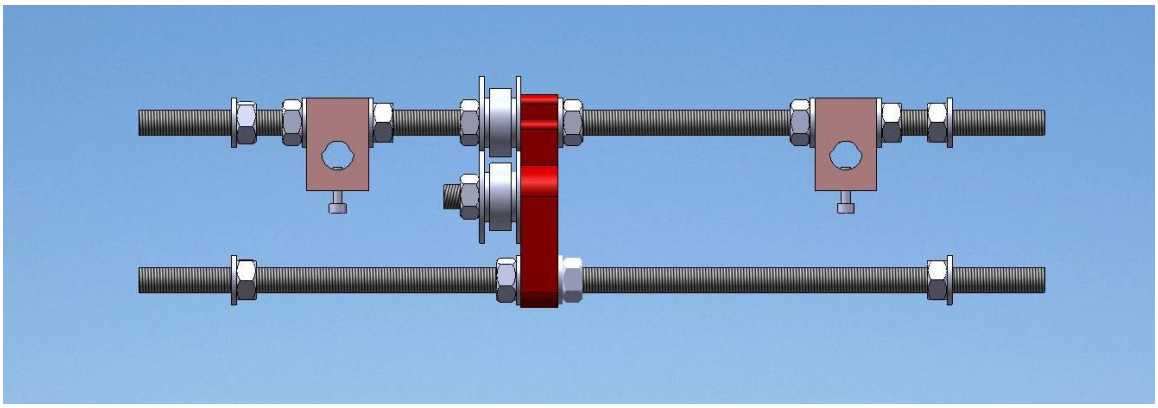
A detail view of these new parts.



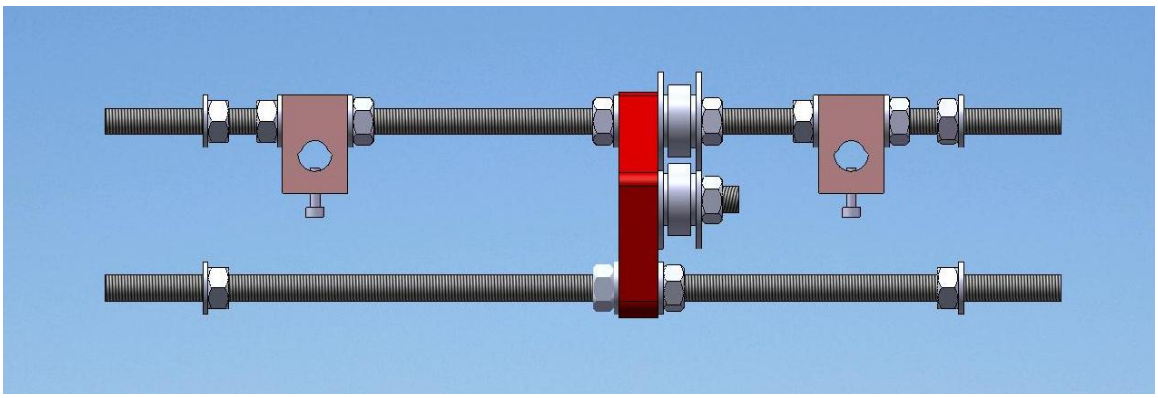
Put these parts through the left side frame, and add washers and nuts to the threaded rods.



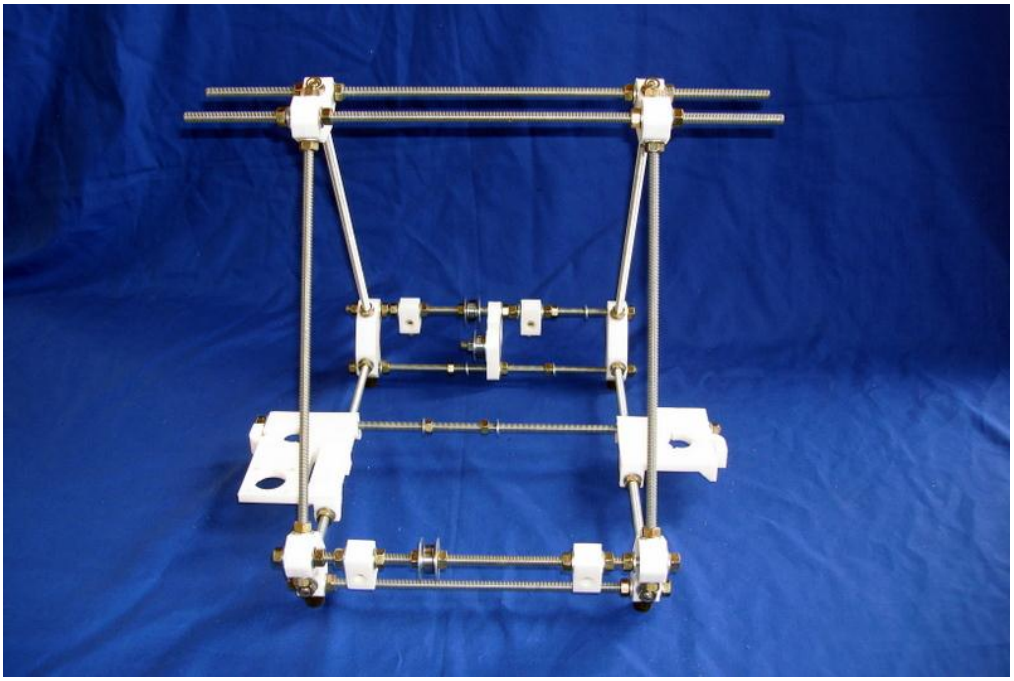
Components on front set of rods.



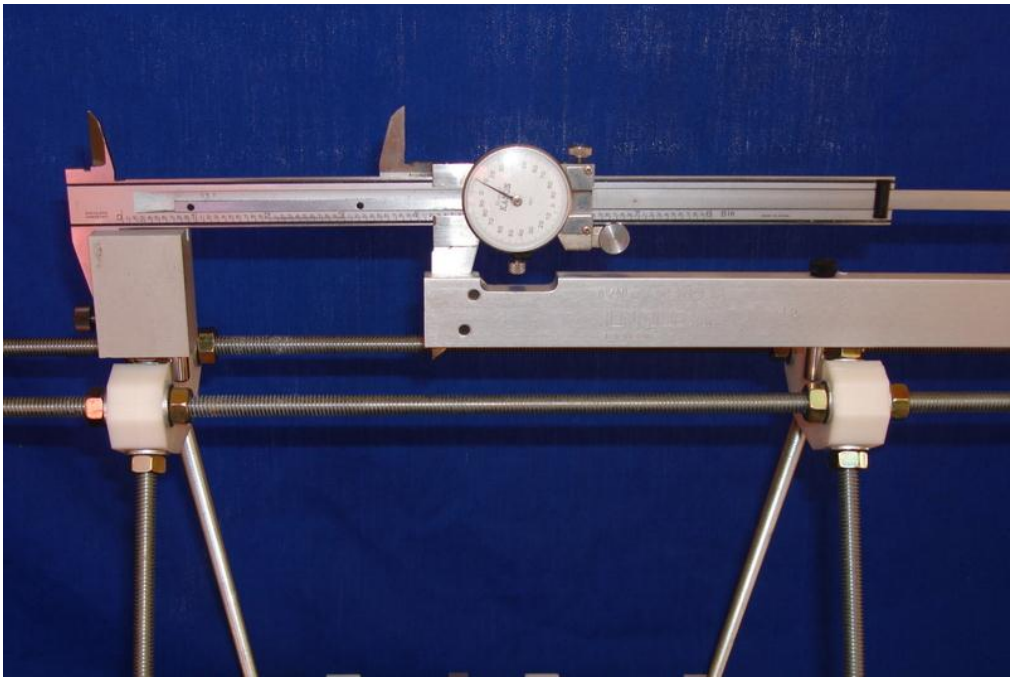
Components on back set of rods, viewed from front (as in above picture).



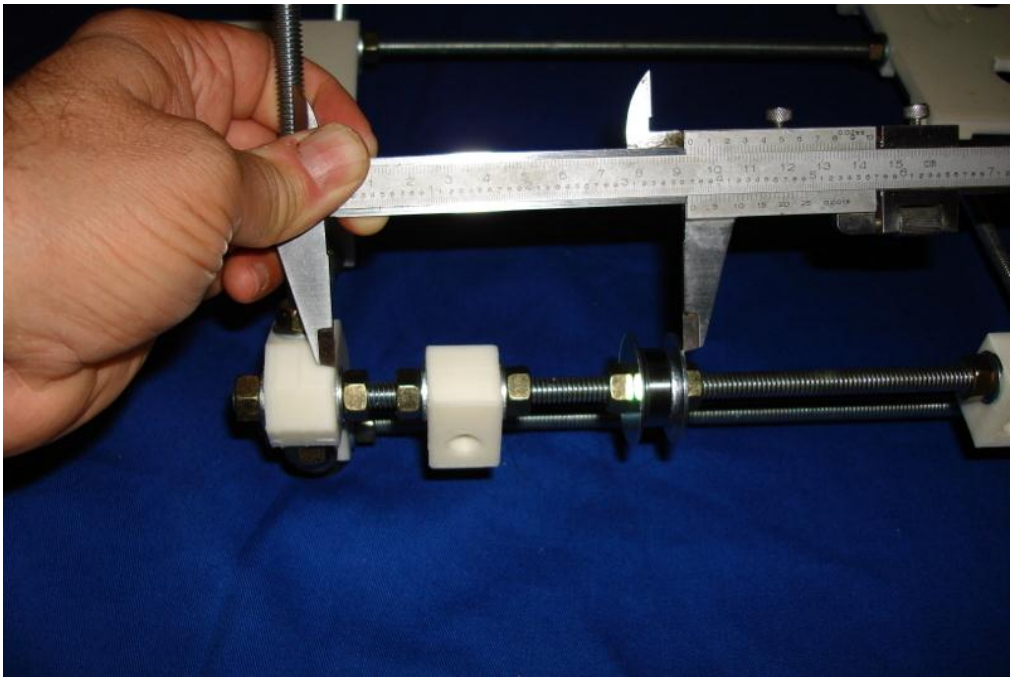
Rear view of same.



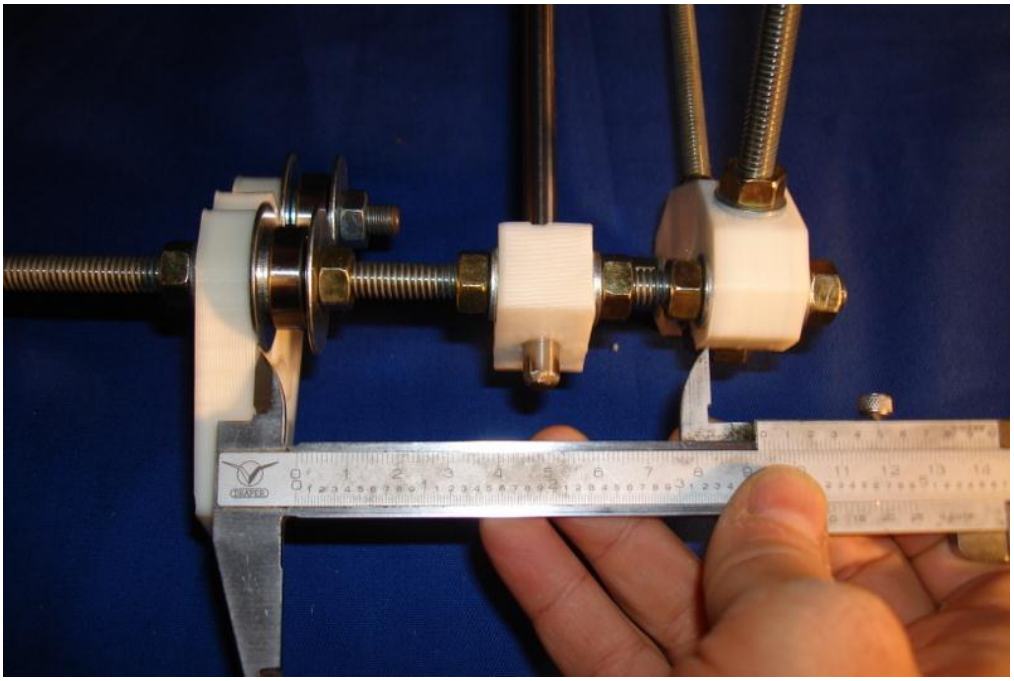
Now add the right side frame and the washers and nuts.



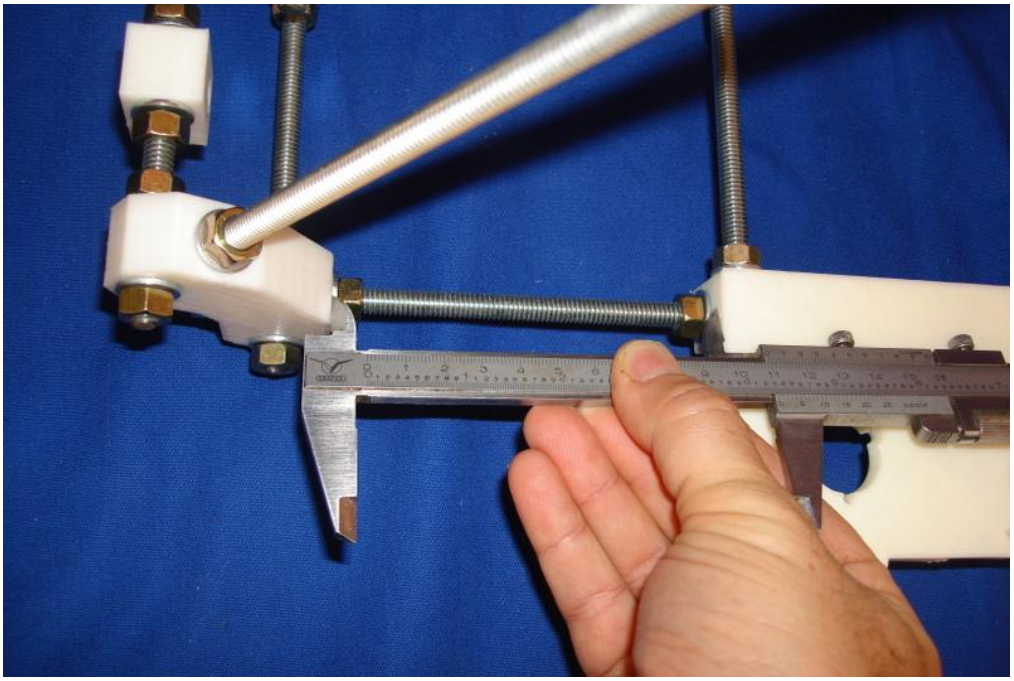
Set the jigging distance (234mm) on all 6 rods and snug all the nuts down.



Set the jigging distance from the far side of the fender washer to the inside of the vertex at 94mm.

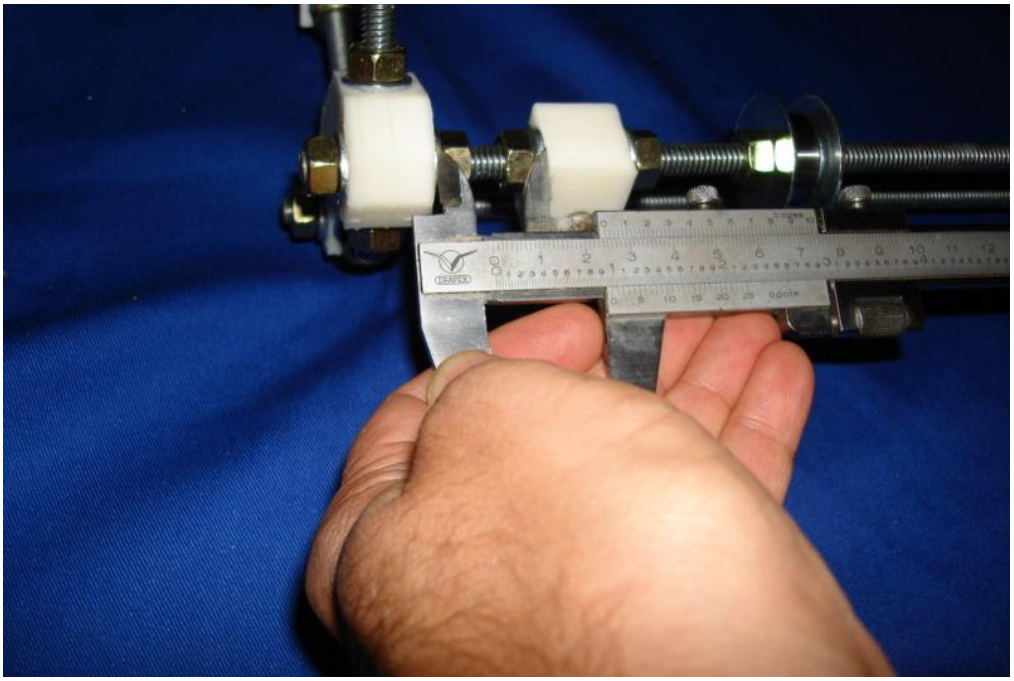


Set the same distance from the face of the y motor mount to the frame vertex.

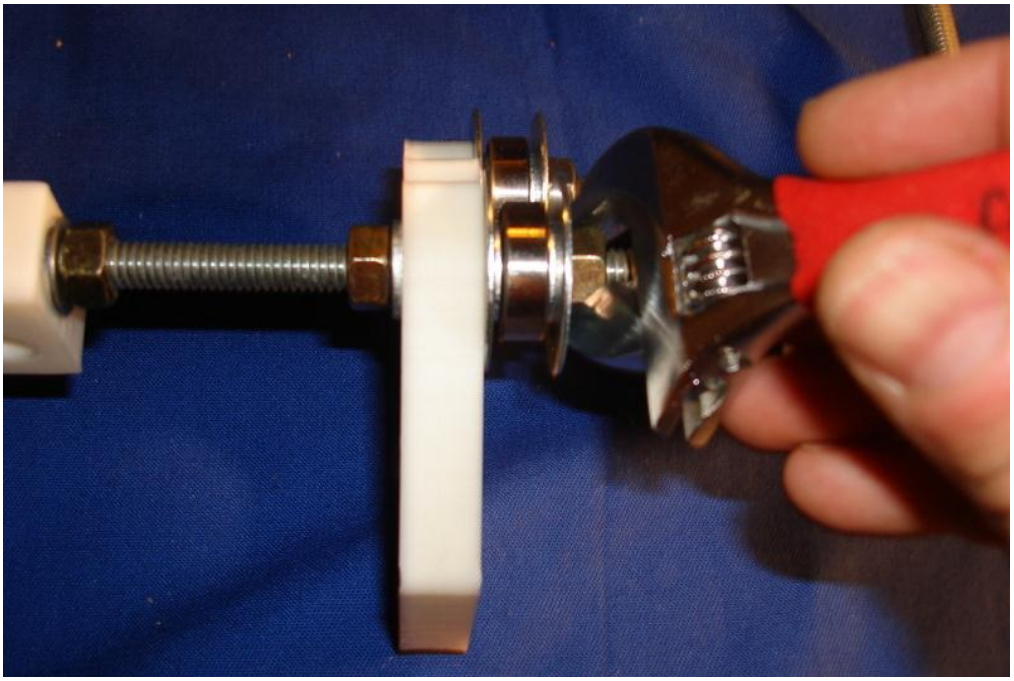


Set the rear jigging distance on the left z mount at 109.5mm.

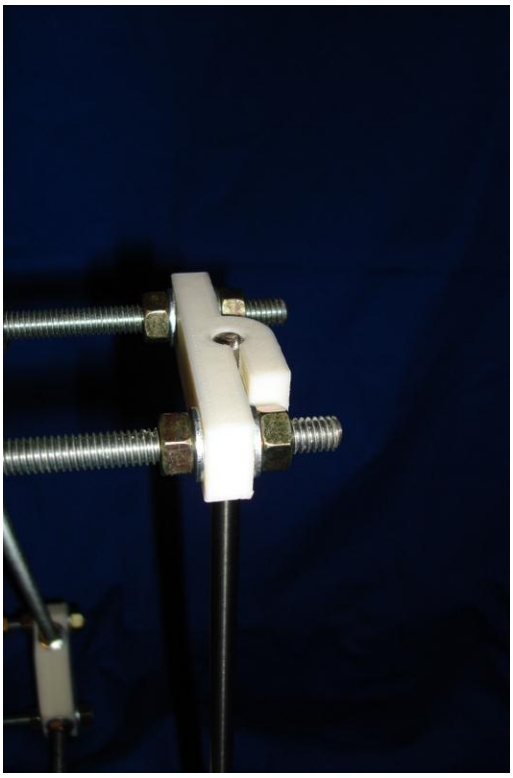
Set the right at the same distance.



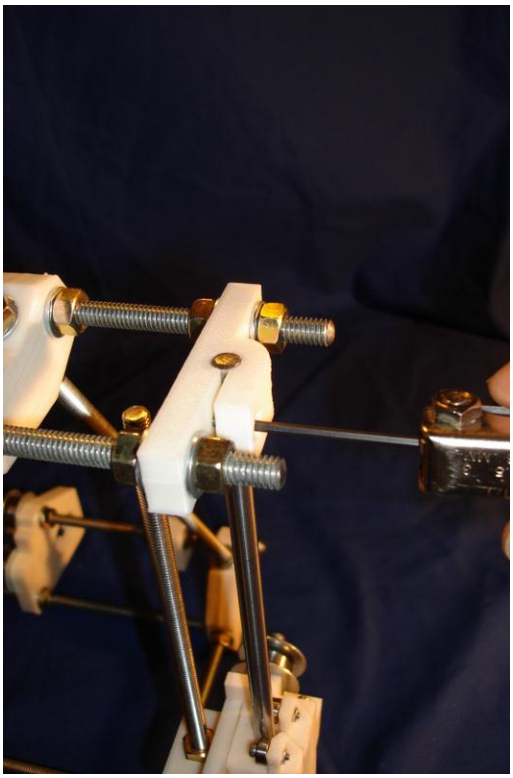
Set distance to the y rod support at 24.5mm, at 4 places.



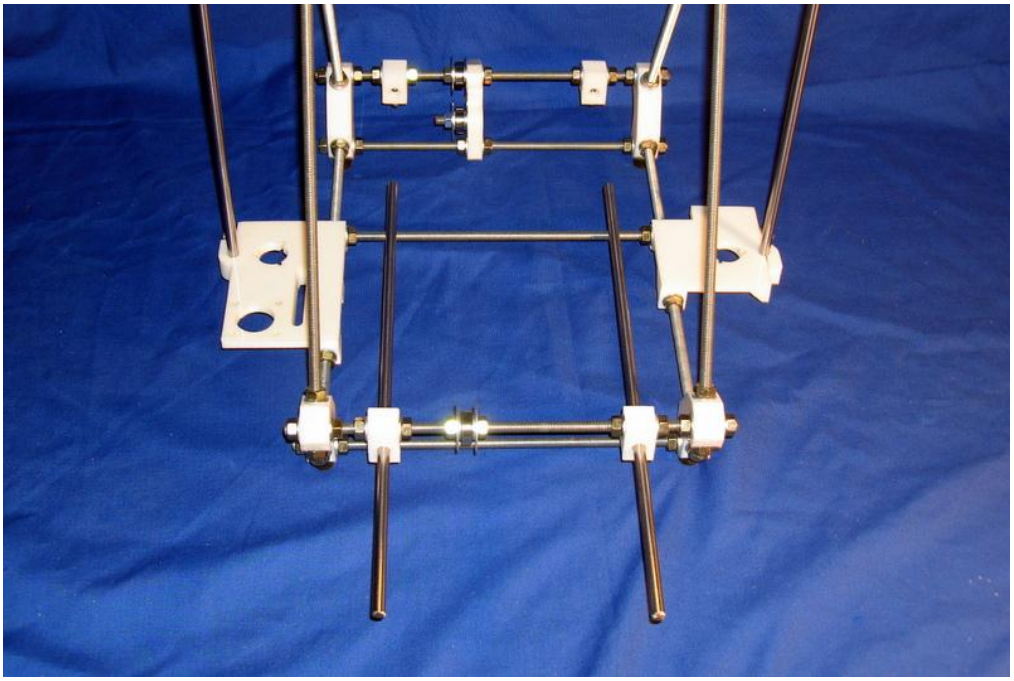
Now snug everything up firmly. EXCEPT nuts on each side of the z mounts. Since those are relatively flimsy parts, put them just snug.



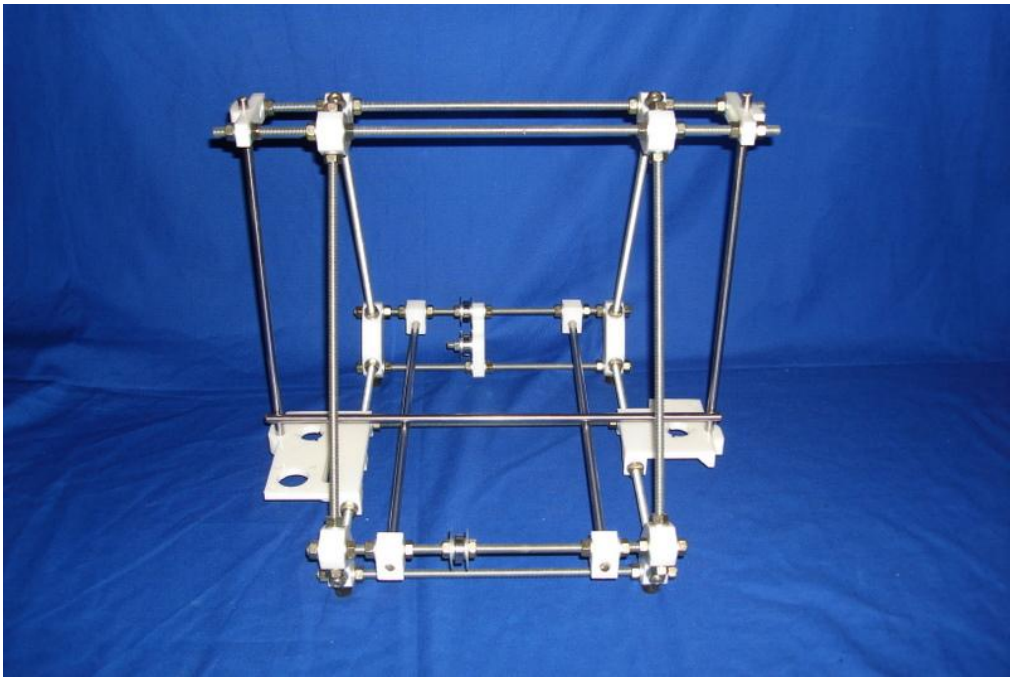
Install the z rod clamps on both the left and right sides, along with the smooth z rod.



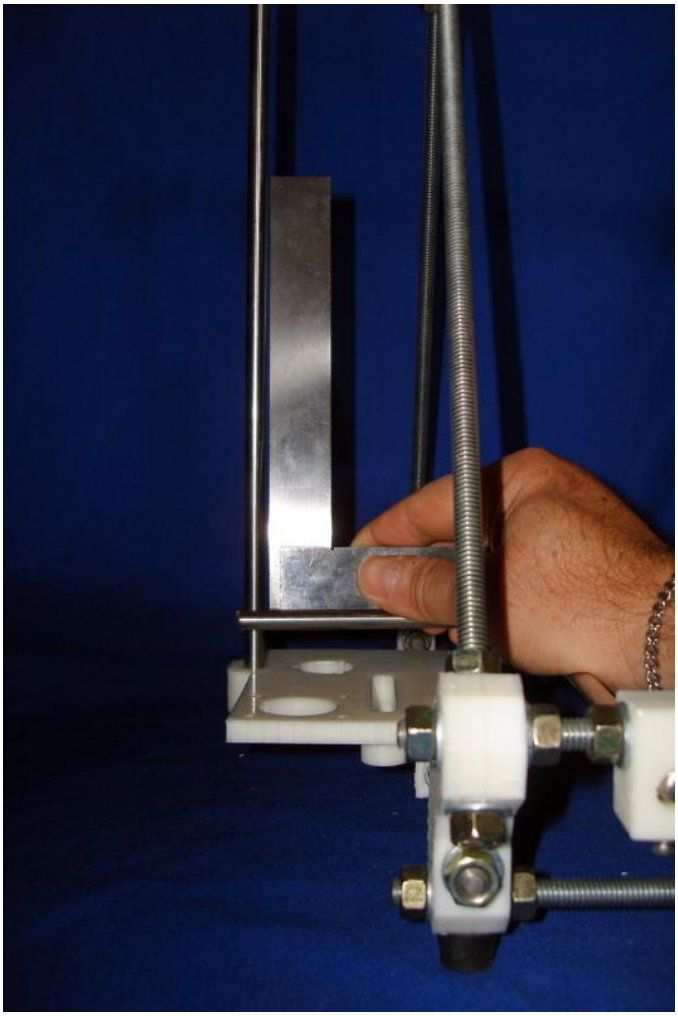
Snug the clamp a bit so the rod does not slip out.



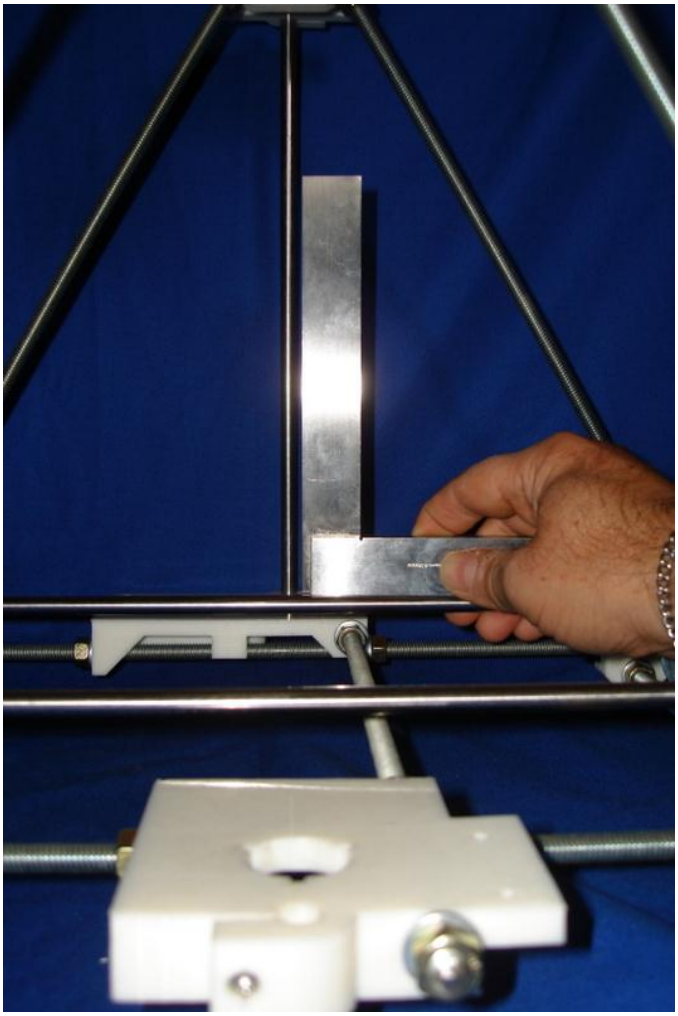
Now slide the y carriage rods into the supports and snug the attachment screws.



WOW, making progress. Now we square it. Place one of the x carriage rods across the y carriage rods as shown.



Using a small machinist’s square, adjust each end to be square by adjusting the position of the z rod support at the top of the rod. Do for both left and right sides. Note that the best way to do this is NOT as shown here. Real machinists put a bright light behind the parts, and look for the thin sliver of light between the square and the part. Squareness judged by brightness... Bright blue sky is also good. YMMV…



Again, with a small machinist’s square, adjust the front to back position of the z mount to achieve a square assembly. Do both the left and right side.