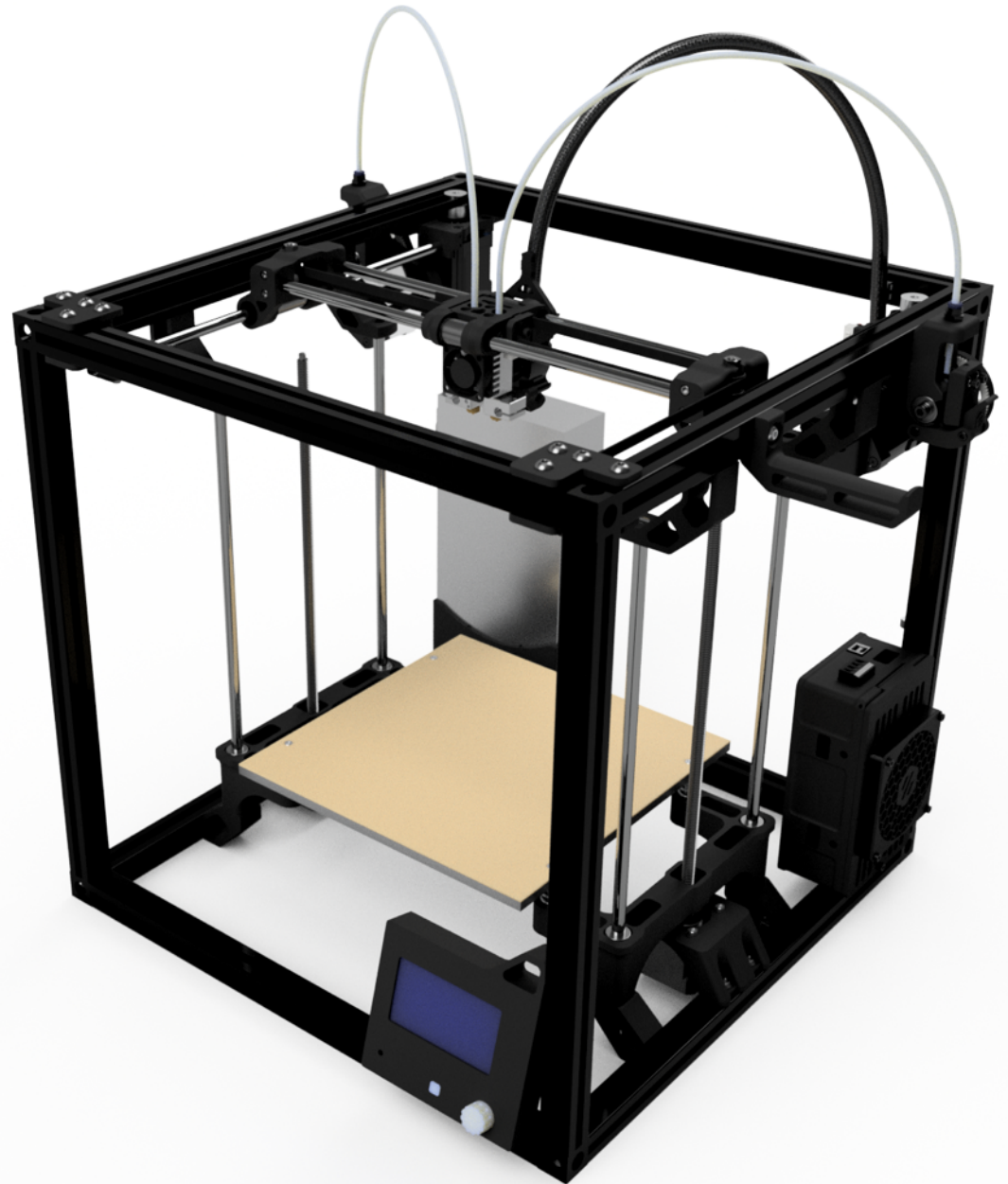


VORON Kit

Assembly Manual



WARNING

You are assembling a 3D Printer. This means you are constructing an automated machine that pushes melted plastic out of a heated nozzle onto a heated slab of aluminum. Both the nozzle and the heat bed can easily burn you. This machine, as all other 3D printers, runs on electricity, which may harm or kill you or others when handled improperly. There are also a lot of moving parts while the printer is operating, so treat this as a machine, and keep your body parts outside the frame perimeter during operation.

Please be careful

Follow the instructions and don't skip steps. Their order is outlined here for a good reason, and taking shortcuts will most likely mean disassembling something later.

If you run into insurmountable issues, the VORON sub-reddit community ([/r/voroncorexy](https://www.reddit.com/r/voroncorexy)) is always there to help.

SECTION A : PREP

Greasing the bearings

Linear bearings usually come covered in a thin oil. This oil is intended for transport only, and should not be used as the only means of lubrication. You'll need to pack the linear bearings using the included tube of PTFE grease.

It's almost impossible to over-pack the bearings, as the shafts will push out any excess grease when inserted.

To properly pack the bearings with grease without using a specialized tool, squeeze some grease into the end of the bearing. Hold one end of the bearings closed with your thumb, and drive one of the 8mm shafts into the other end. Apply **very gentle pressure**, as you don't want to pop the seals on the bearings. Once you see the grease being squeezed out of each seal, remove your thumb from the end, and push the shaft all the way through to remove any excess grease. Run the bearing up and down the shaft to fully distribute the grease and wipe off any excess.

This procedure will force the grease into the ball raceways and provide long-lasting lubrication and noise reduction.

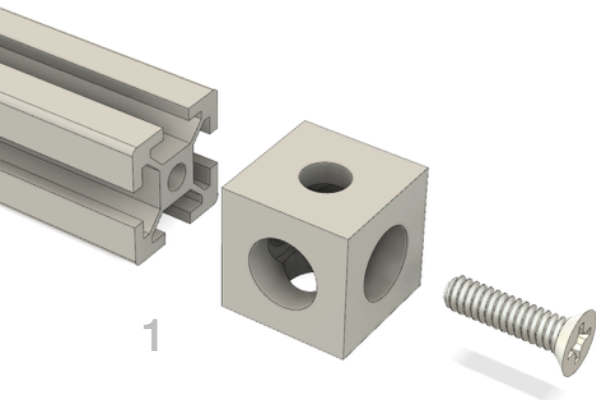


(base procedure courtesy of [dgcaste](#))

SECTION 1 : FRAME

Items Required:

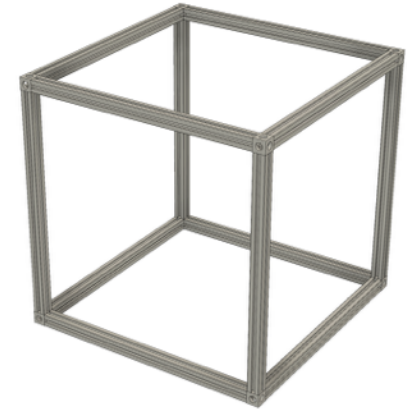
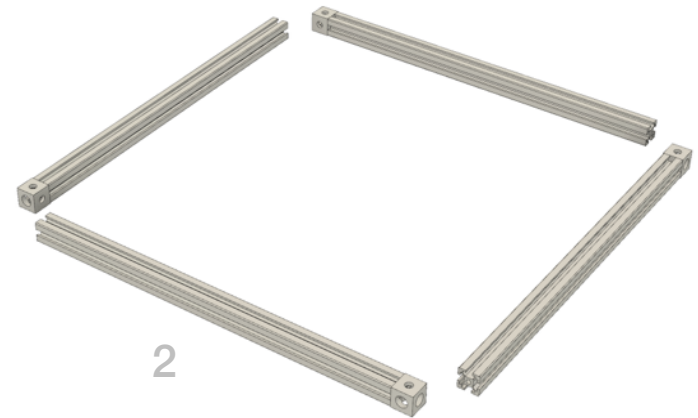
- Aluminum Extrusions
- Aluminum Corner Cubes
- Phillips head thread-forming screws



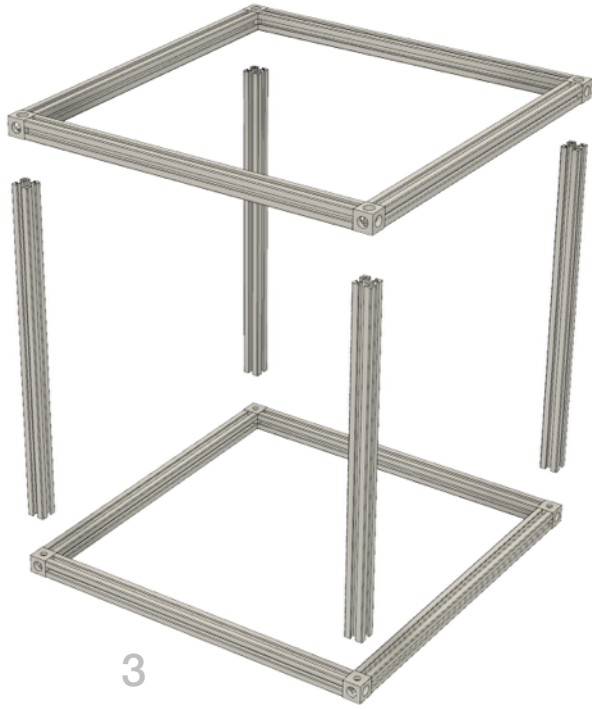
Step 1: Pre-assemble 8 extrusions by attaching a corner cube to one of the ends. Use the thread forming screws for this. Tighten it slightly, and back it out 1/8 of a turn so it can rotate. Repeat until you have all corner connectors attached.

Go slowly Apply ample pressure on the screw as you drive it in. You don't want to strip it.

Step 2: Lay out the extrusions in a square so all smaller holes are facing up, then join them together using the thread forming screws. Repeat this for the remaining 4 extrusions. You'll now have 2 frame squares which will form the top and bottom of the frame.



4



Step 3: Join the top and the bottom square using the remaining 4 extrusions. Now find the flattest surface, and place the still loose frame onto it. Tighten down all screws in the bottom portion of the frame, while applying pressure to the extrusion you are tightening. This will ensure the surfaces of the extrusions remain perpendicular to the surfaces of the corner cubes.

Flip the frame over and do the same procedure on the top of the frame. Now tighten the screws that hold the verticals in place.

Go through each of the screws one more time and make sure they are all tight.

Congrats! You now have a solid frame to build your printer on. On to the more fun bits.

SECTION 2 : GANTRY

2.1 Y Axis

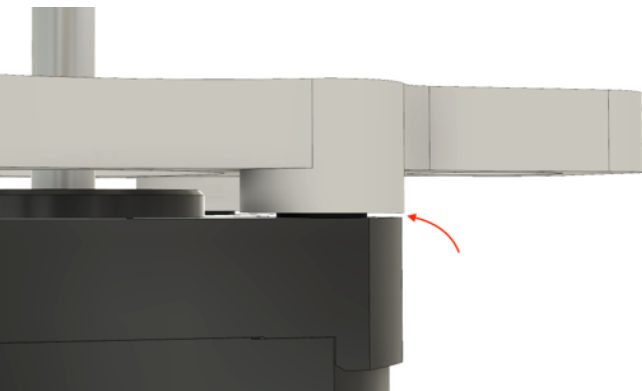
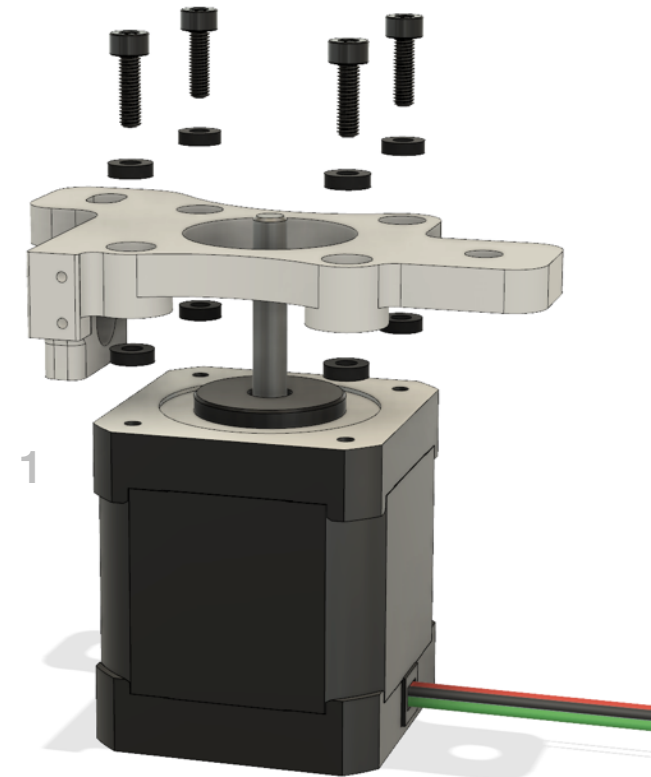
Items Required:

- A and B motor mount printed parts
- Idler and Y shaft retainer printed parts
- NEMA17 stepper motors
- Neoprene washers
- M3 8mm screws
- M3 20mm screws
- M3 hex nuts
- M5 30mm screws
- F695 bearings

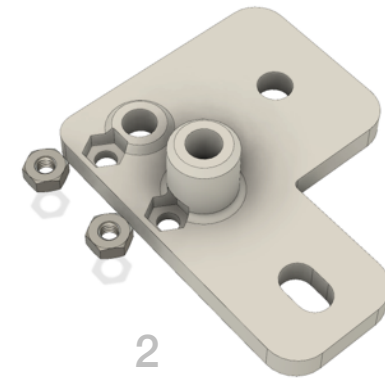
Step 1: Clean out the motor mount holes and secure the motors to the A and B motor mounts using the M3 8mm socket screws. Use the neoprene washers on both sides of the motor mount. This will provide vibration isolation during printer operation. Make sure the motor wires are facing **away** from the Y shaft retainer, as pictured.

Mind the gap: When tightening the socket screws, make sure there is still a visible air gap between the motor and the mount.

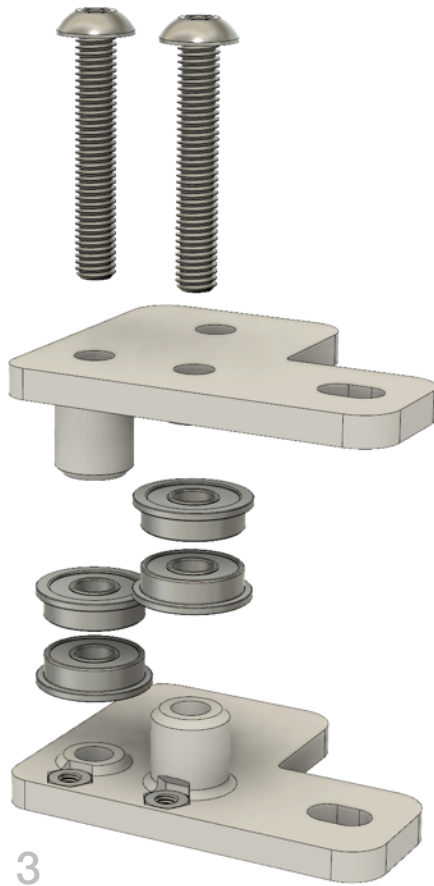
Repeat these steps for the other motor mount.



Step 2: Insert the M3 hex nuts into the bottom idler sections.

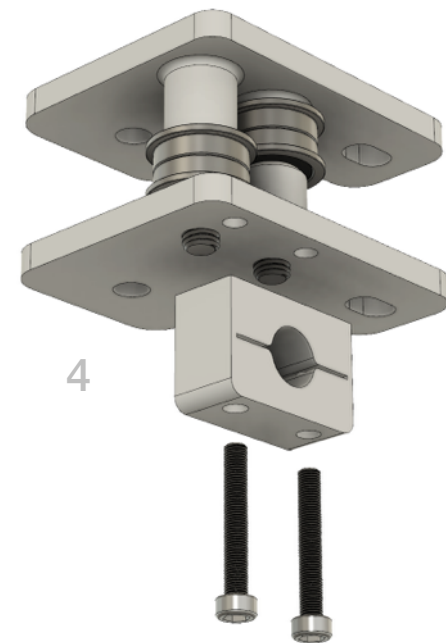


Step 3: Assemble the idler bearing stacks and secure the assembly using the 2 M5 30mm cap screws. Do one turn per screw and alternate to keep them level with each other. **Don't over-tighten.** Remember, you are threading into printed plastic. These screws are only going to experience lateral forces, and the actual force of keeping the two plates together will come from the 4 screws that will secure this part to the frame.



Step 4: Using 2 M3 20mm screws, secure the Y shaft retainer to the bottom of the idler assembly. Don't tighten it fully as we'll need to slide the Y shafts through them.

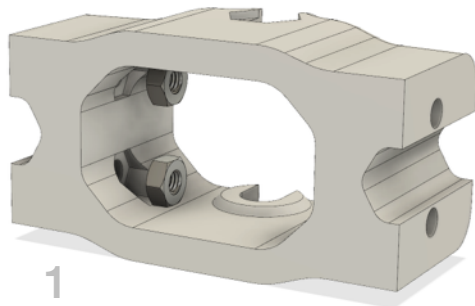
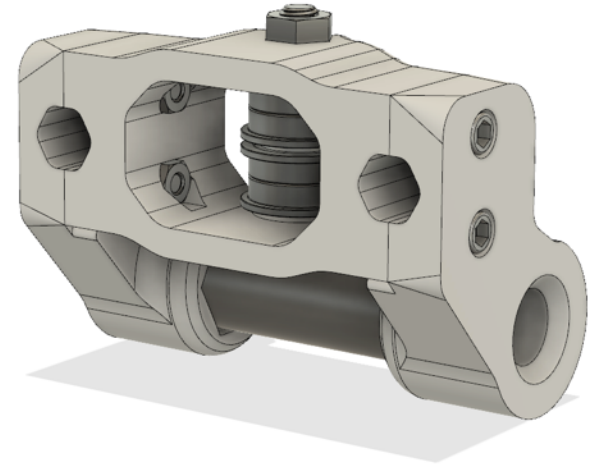
Repeat these steps for the other idler assembly.



2.2 XY Joint

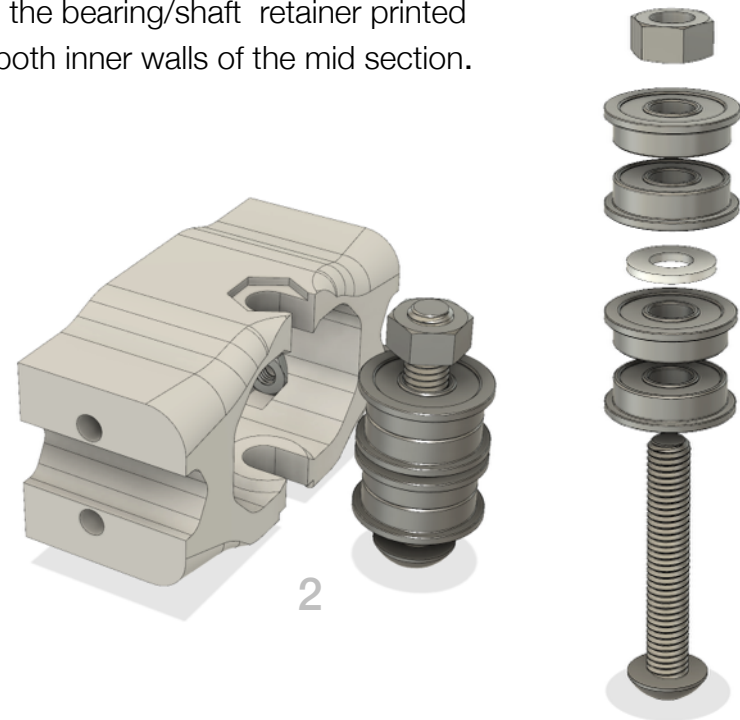
Items Required:

- XY Joint printed parts
- M5 30mm screws
- M5 hex nuts
- M5 washer
- M3 16mm screws
- M3 hex nuts
- F695 bearings
- LM8LUU bearings



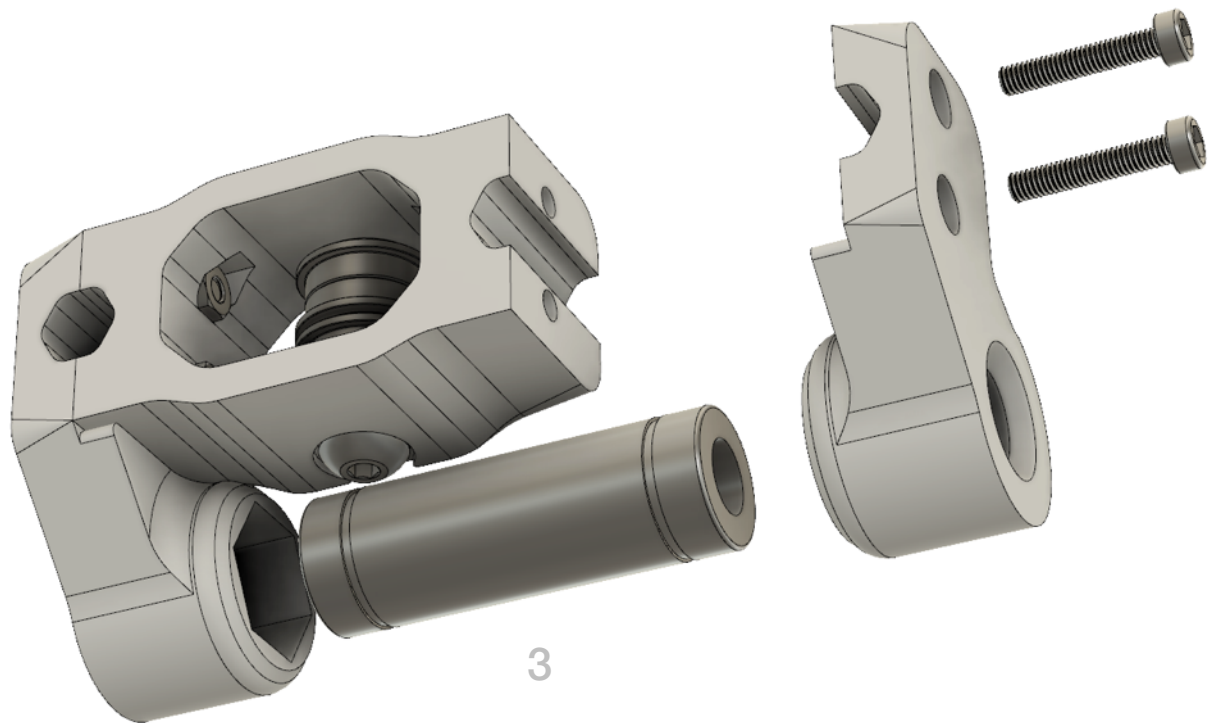
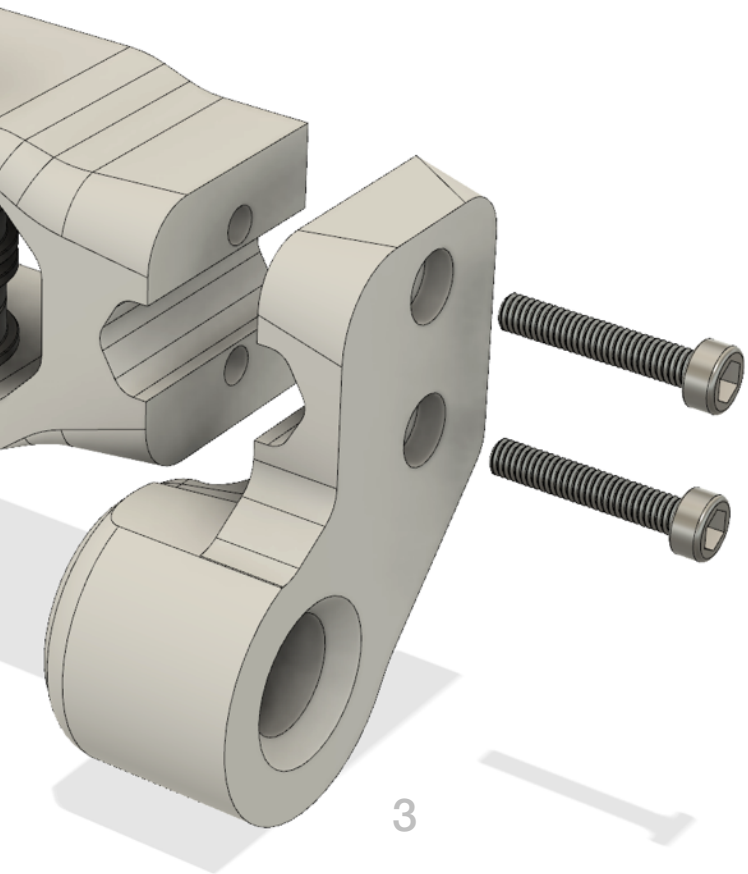
Step 1: Clean out any holes in the bearing/shaft retainer printed parts. Insert M3 hex nuts into both inner walls of the mid section.

Step 2: Assemble the idler stack as shown in the illustration and slide the idler stack into the slots in the back of the XY Joint mid-section. The M5 hex nut should be facing the top.



Step 3: Attach one of the bearing retainer sides using 2 M3 16mm screws. Hold the M3 nuts in place with your finger as to not push them out. Don't tighten them fully as we still need to insert X shafts.

Step 4: Press the LM8LUU bearing into the retainer, and then press the other retainer onto it. Secure it with the 2 M3 16mm screws.

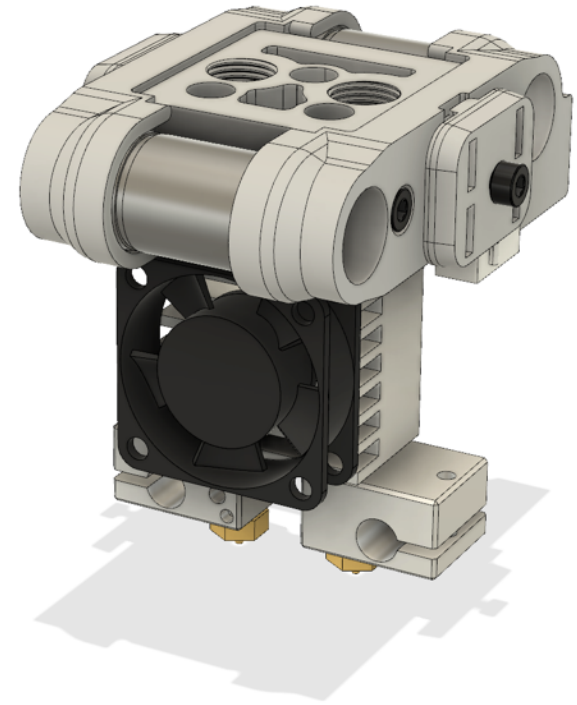


Repeat these steps for the other XY Joint.

2.3 X Carriage

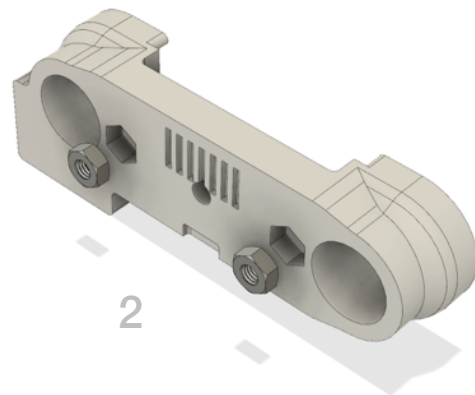
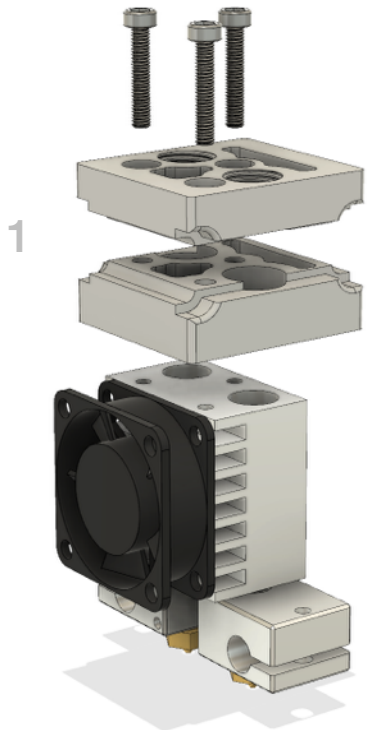
Items Required:

- X Carriage printed parts
- M3 12mm screws
- M3 16mm screws
- M3 40mm screws
- M3 hex nuts
- LM8UU bearings
- E3D Chimera Hotend Assembly
- X endstop switch
- Small Phillips plastics screws



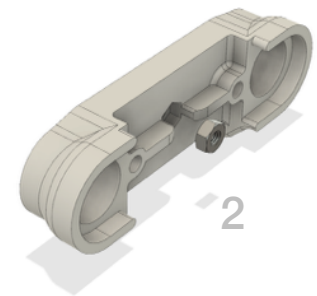
Note: Please refer to the Chimera assembly instructions on the E3D wiki at <http://wiki.e3d-online.com/wiki/Cyclops%26ChimeraAssembly>

Wires are not illustrated for clarity, but the hot end should be fully assembled at this point.

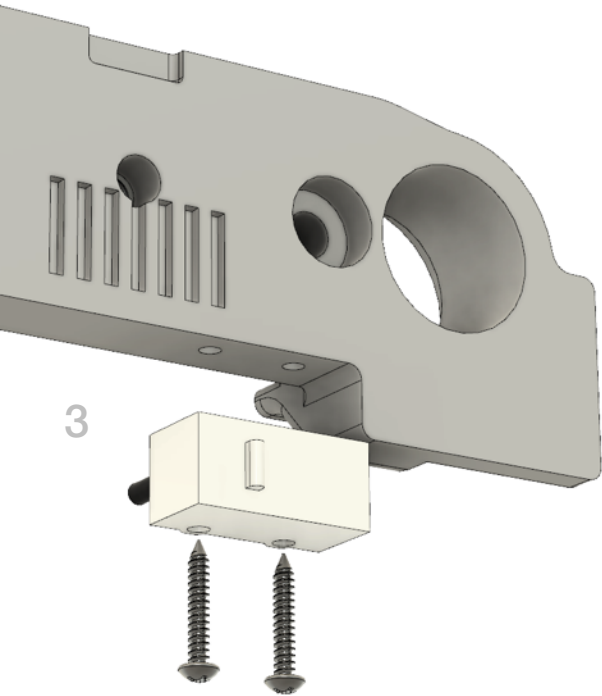


Step 1: Attach the Chimera hot end assembly to the mount parts using 3 16mm M3 screws.

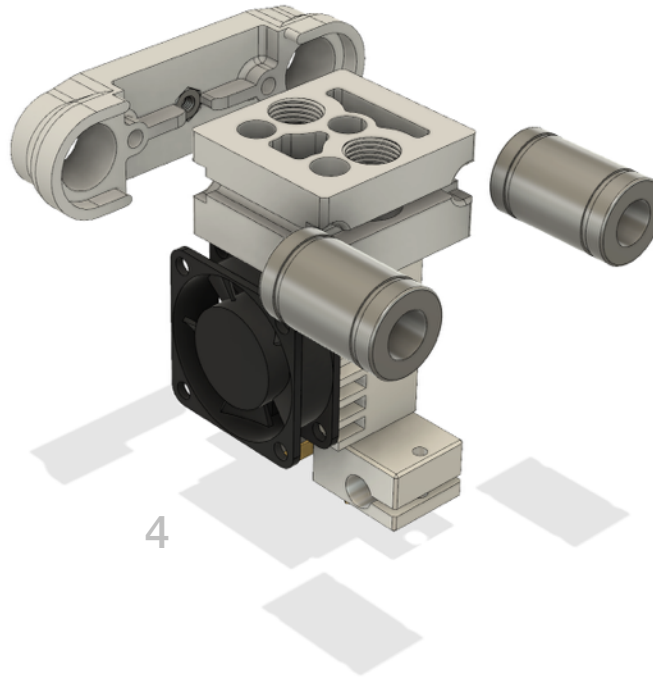
Step 2: Insert the M3 hex nuts into nut traps on each Carriage End



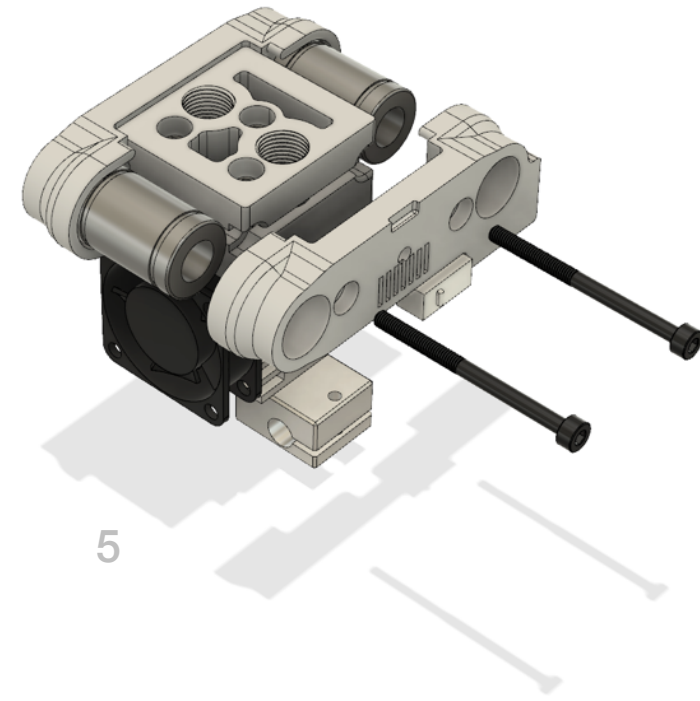
Step 3: Attach the X end stop switch (the one with the shorter wire) to the Carriage End. Use the 2 holes on the printed parts to guide you where the switch should attach.



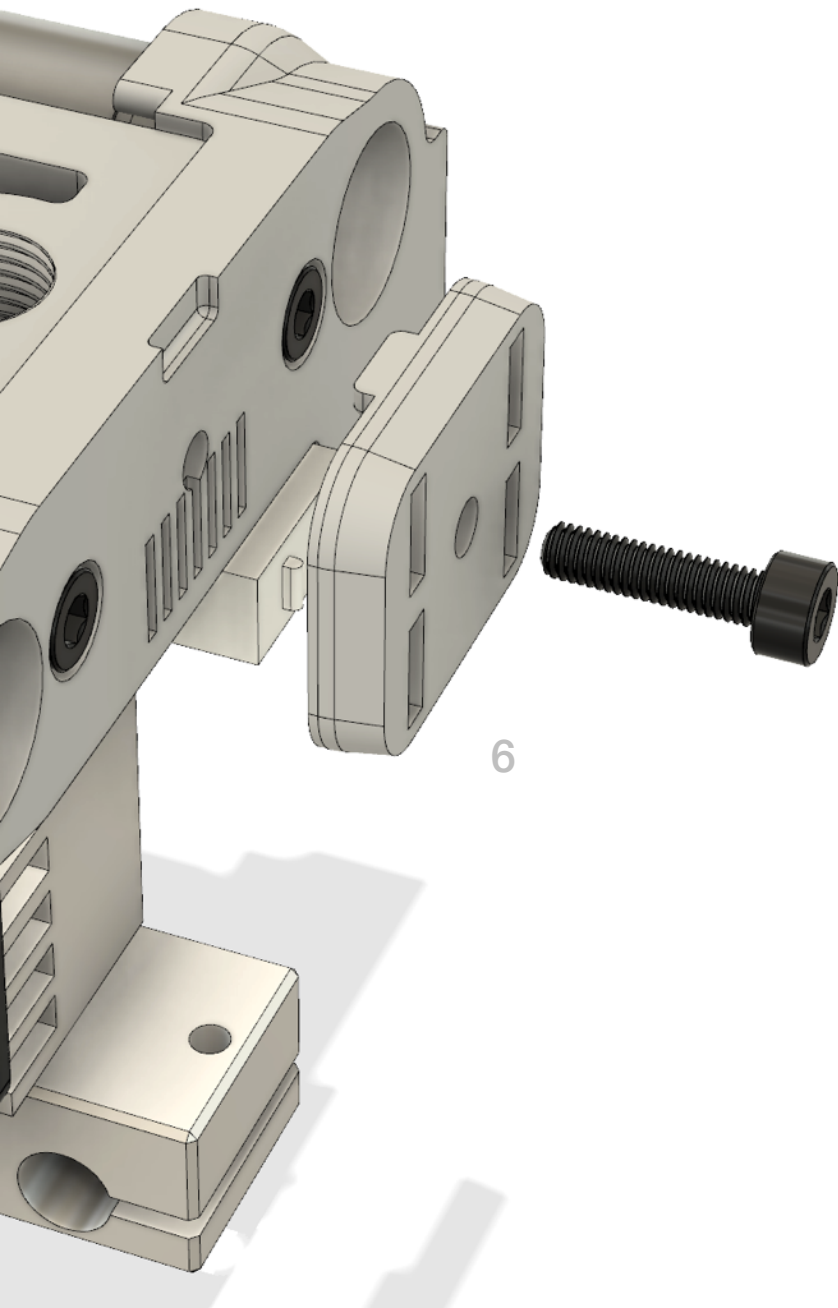
Step 4: Slide one of the carriage ends onto the hot end mount slots and slide the LM8UU bearings (the shorter 2) into the retainers. It'll be a very loose fit. This is intentional and will allow bearings to align before we tighten everything down



Step 5: Slide on the other carriage end, and secure the assembly with 2 M3 40mm bolts. Keep things loose as we'll tighten them after we insert the carriage onto the shafts.



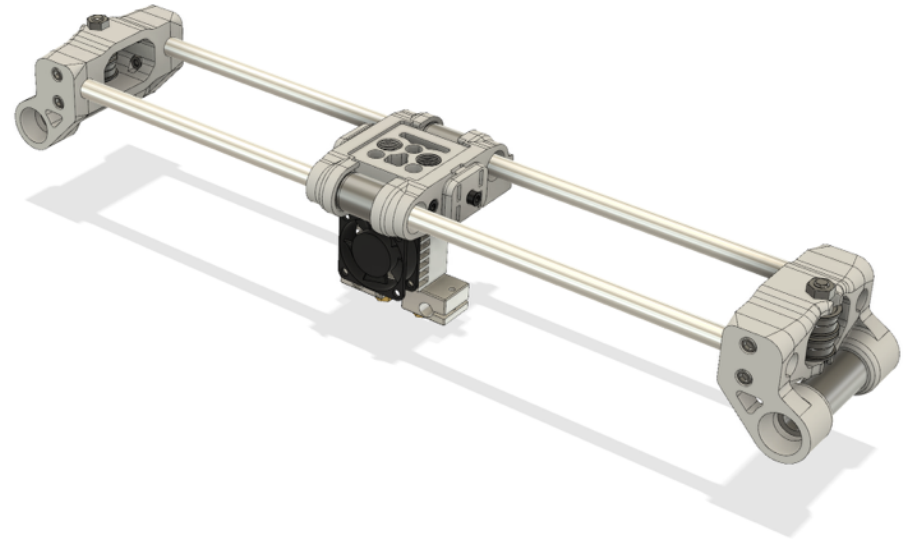
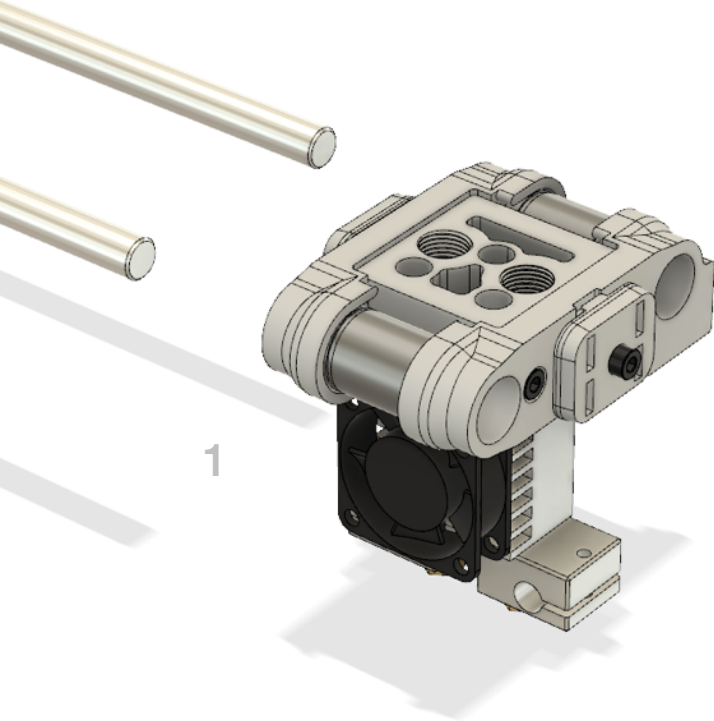
Step 6: Attach the belt clips to each Carriage End. Make sure the locating pin on the clip lines up with the slot on the Carriage End.



2.4 X Axis Assembly

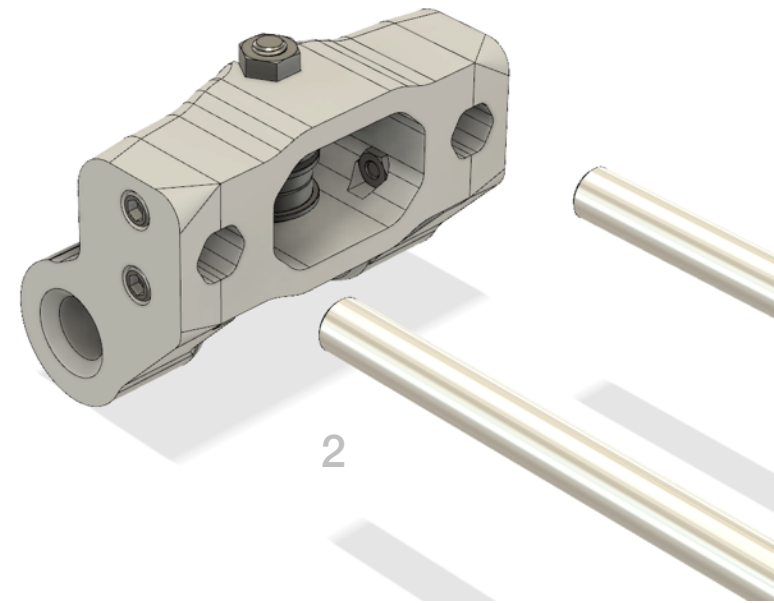
Items Required:

- X Carriage assembly
- XY Joint assemblies
- 8mm shafts



Step 1: Slide the 2 8mm shafts into the bearings on the X Carriage.

Step 2: Slide the 2 XY Joint assemblies on each end of the 8mm shafts. Don't tighten anything yet as we need things to move around for self-alignment.



SECTION 3 : Z TOWERS

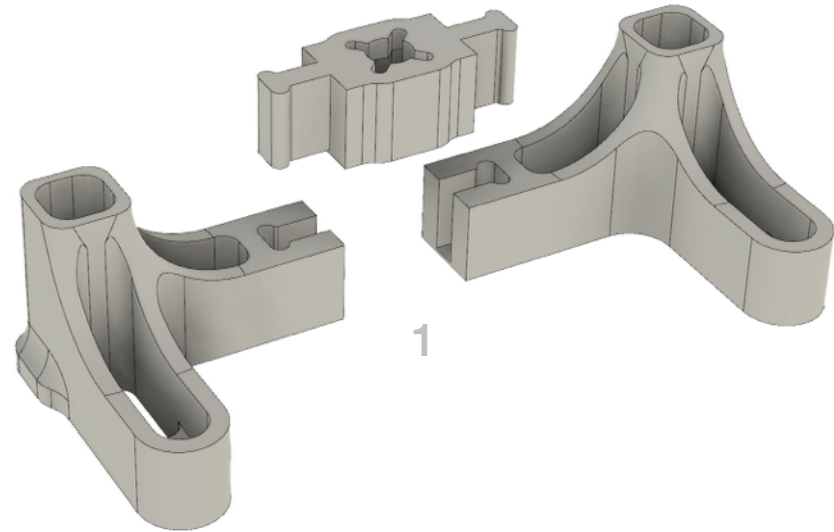
Items Required:

- Z Tower printed parts
- 8mm shafts
- TR8x8 NEMA17 linear motors
- TR8x8 nuts
- LM8LUU bearings
- M3 8mm screws
- M3 lock nuts
- M3 washers

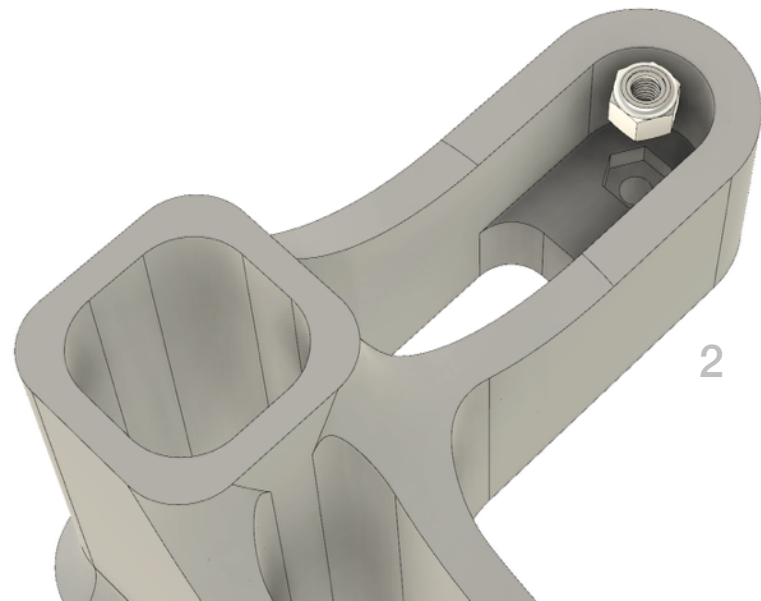
Prep the printed parts by clearing out the Z motor mount holes. Everything else should be ready for assembly as is.

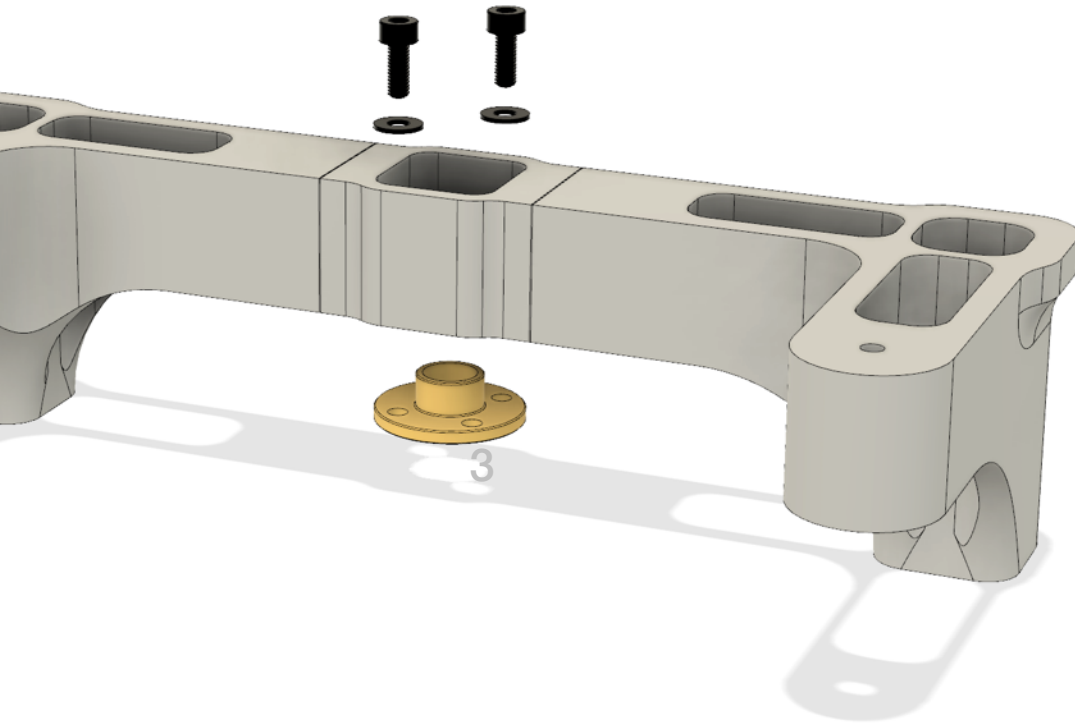


Step 1: Snap the 3 bed carriage parts together as illustrated. You'll likely need to apply significant pressure to get the midsection seated properly in the 2 bed support arms.



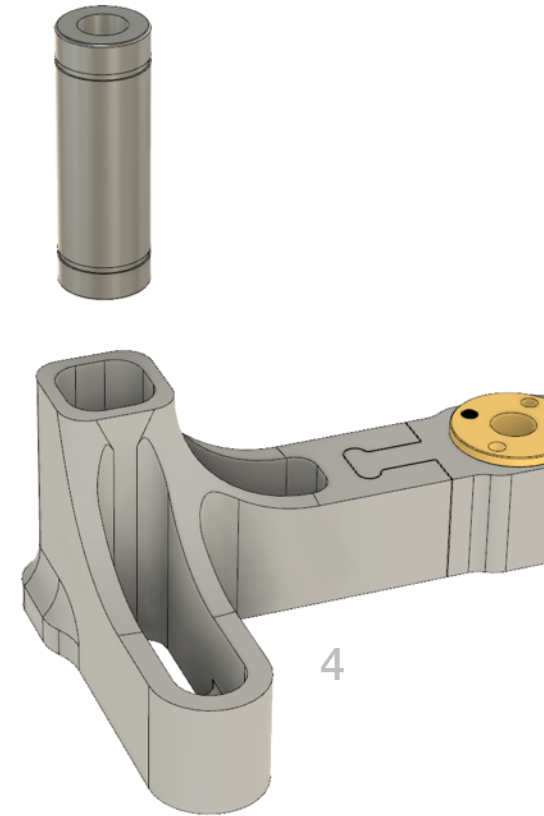
Step 2: Press the M3 locking nuts into the nut traps in the bed carriages.





Step 4: Press the LM8LUU bearings into the bed carriage retainers. They should be snug.

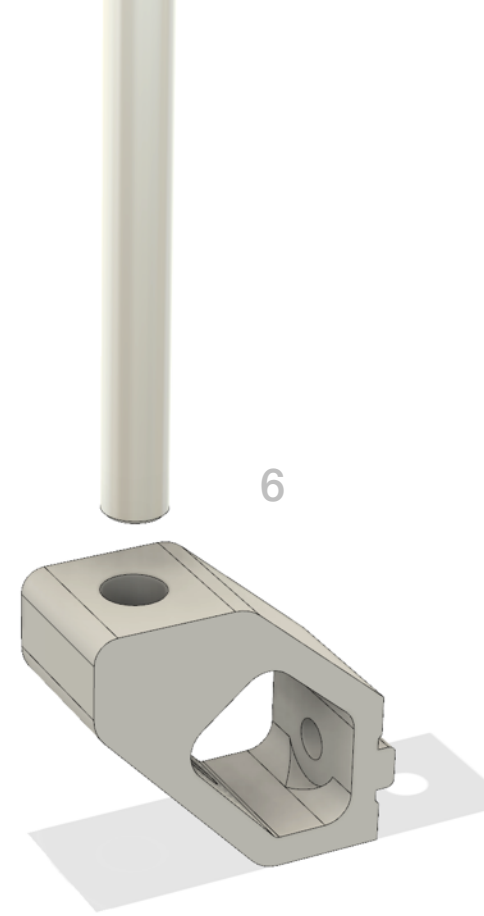
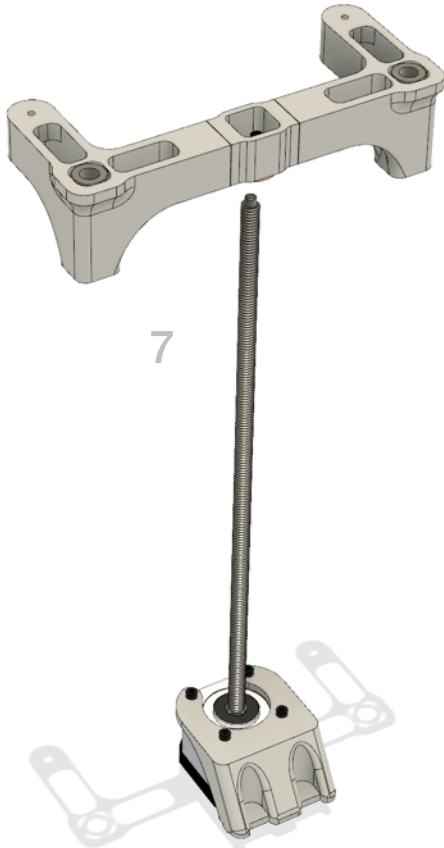
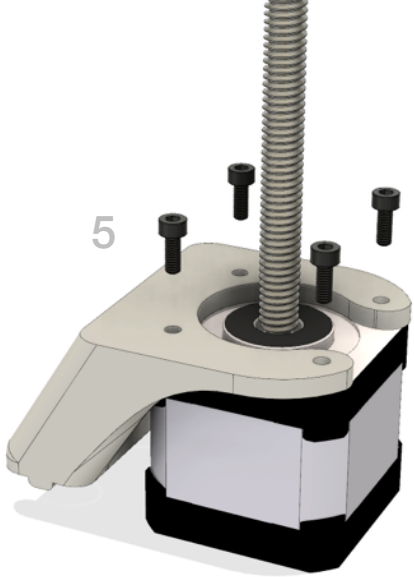
Step 3: Insert the lead screw nut into the retainer in the middle of the bed carriage, and secure it using 2 M3 8mm screws and 2 M3 washers. Use any of the holes diagonal to each other.



Step 5: Secure the Z motor mount to the lead screw motors using 4 M3 8mm screws.

Step 6: Press the 8mm shafts into the lower Z shaft retainers. You may need to clean out the hole a little if they are too hard to get in. The shafts need to seat all the way into the hole to clear the gantry at the top.

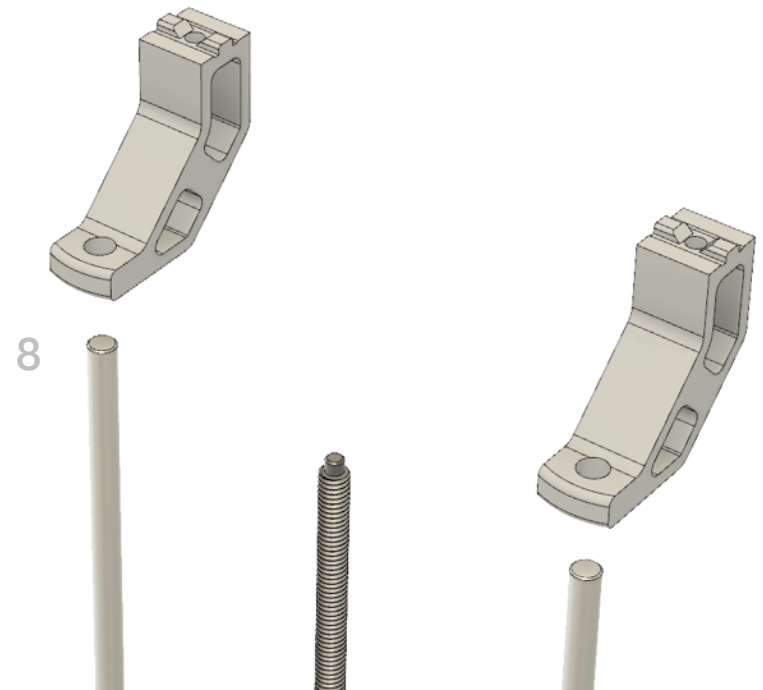
Step 7: Screw the lead screws into the bed carriage.





Step 8: Insert both 8mm shafts into the bed carriage bearings and cap the shafts with the upper Z shaft supports.

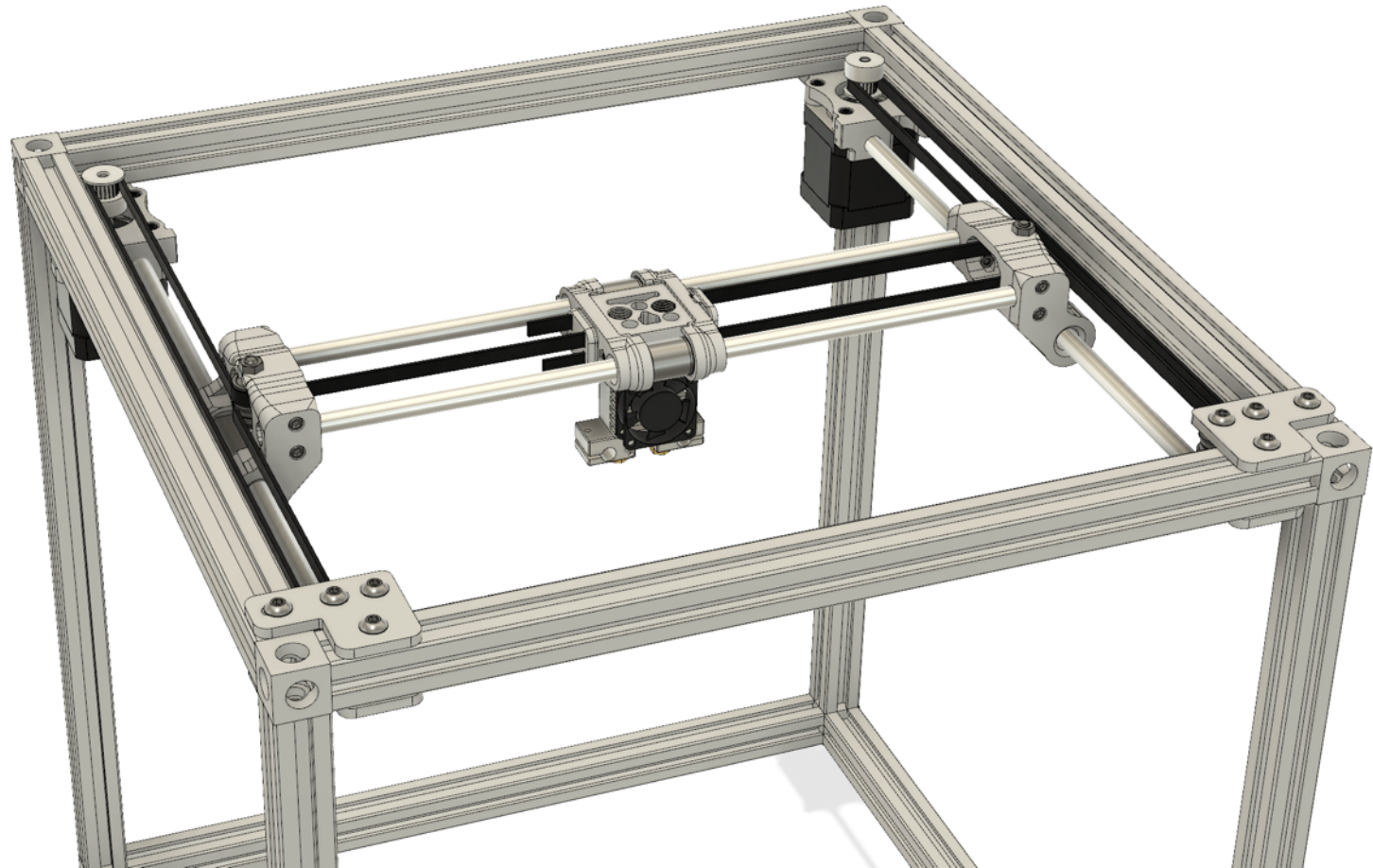
Repeat these steps for the other Z tower.



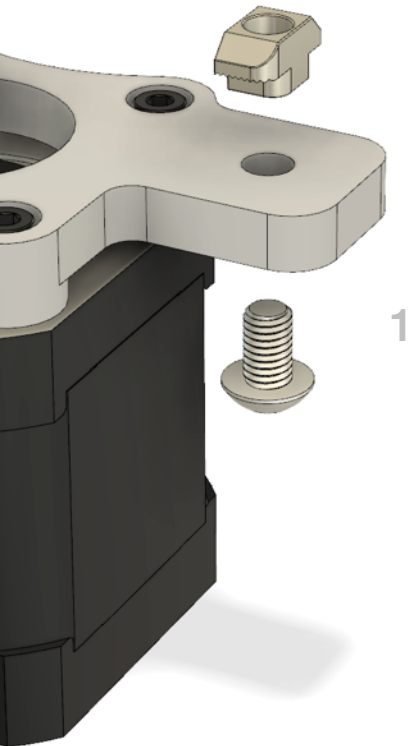
SECTION 4 : GANTRY INSTALLATION

Items Required:

- Assembled gantry components
- Frame
- GT2 belts
- GT2 toothed pulleys
- M5 10mm cap screws
- T-nuts

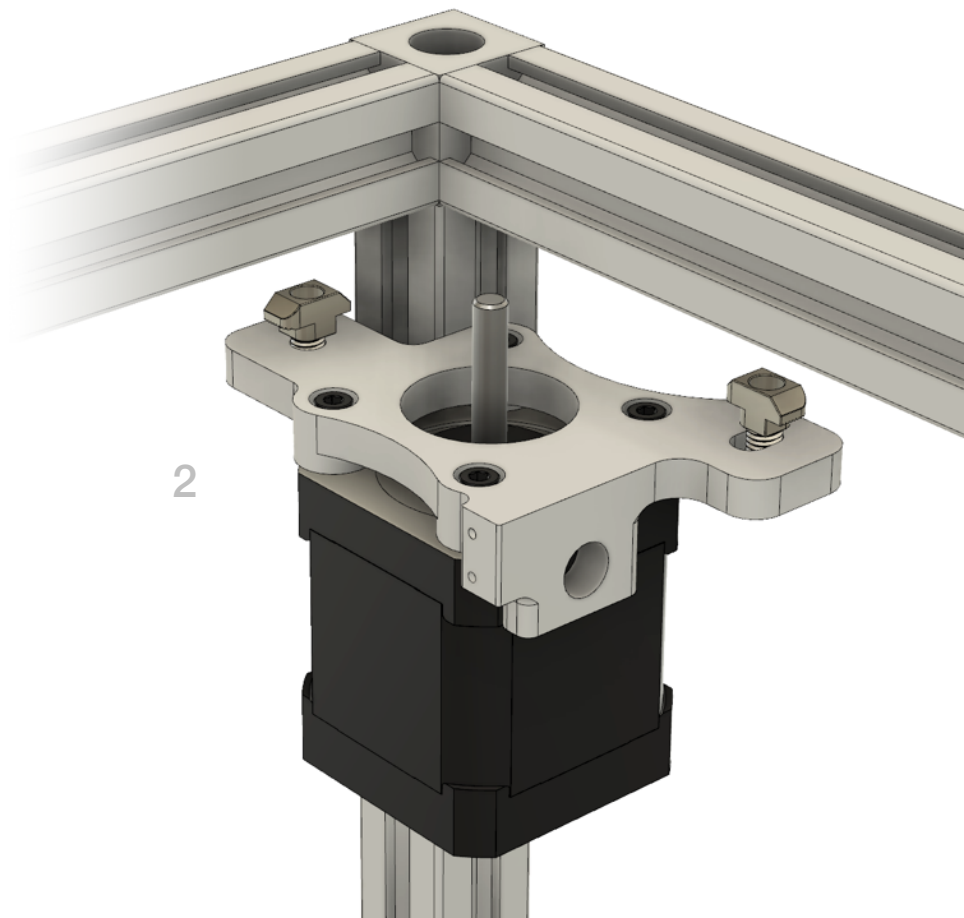


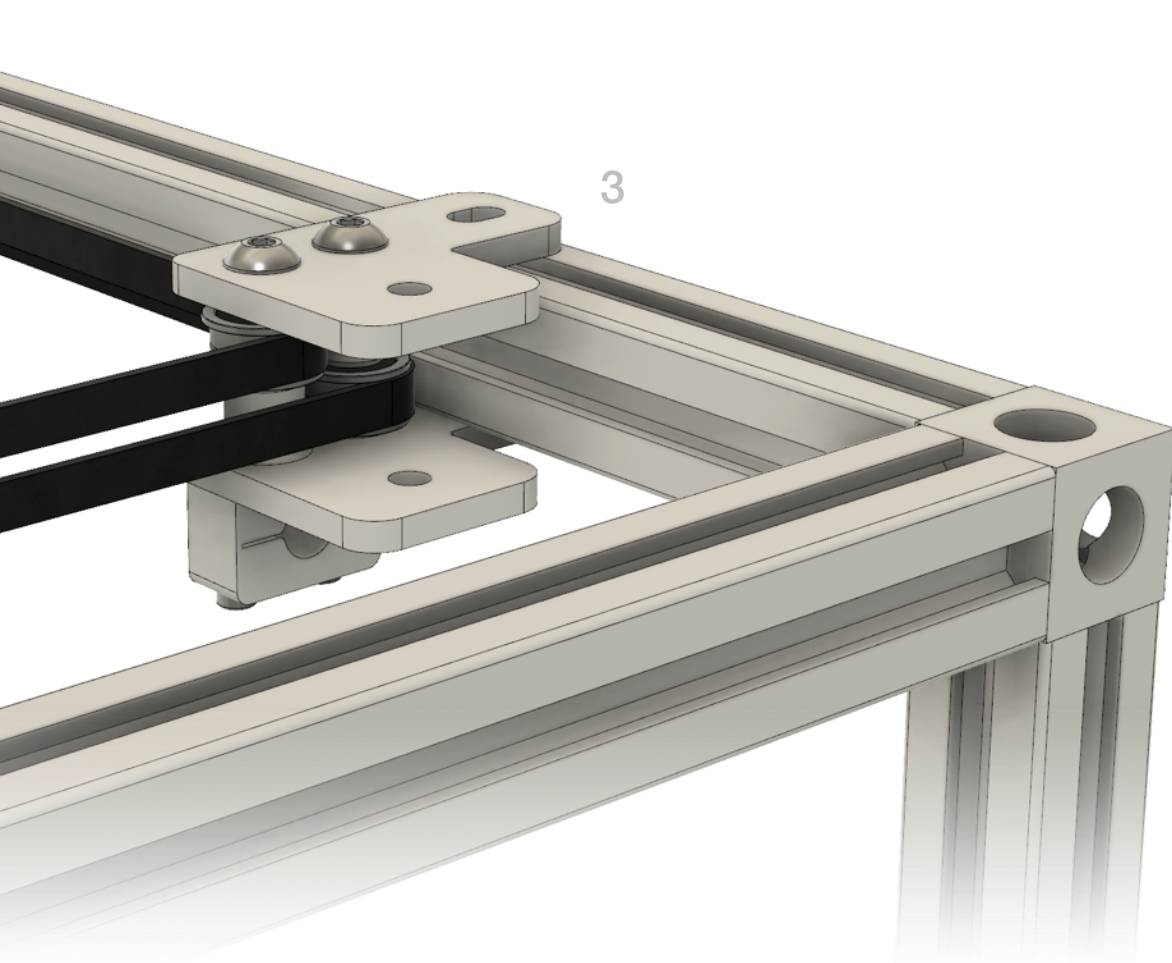
Step 1: Insert the M5 cap screw into the A motor mount and add a t-nut on the other side. Don't tighten it down, just a one turn will get it secured. Once the nut is inserted into the extrusion, it will rotate, locking itself in place.



This is the method we'll be using for almost all extrusion mounts

Step 2: Install the assembly into the back right corner of the frame. Don't fully tighten it yet, as we need this piece to move a little to allow for gantry alignment. You'll feel the nut twist and grab the inside. That's a good stopping point.



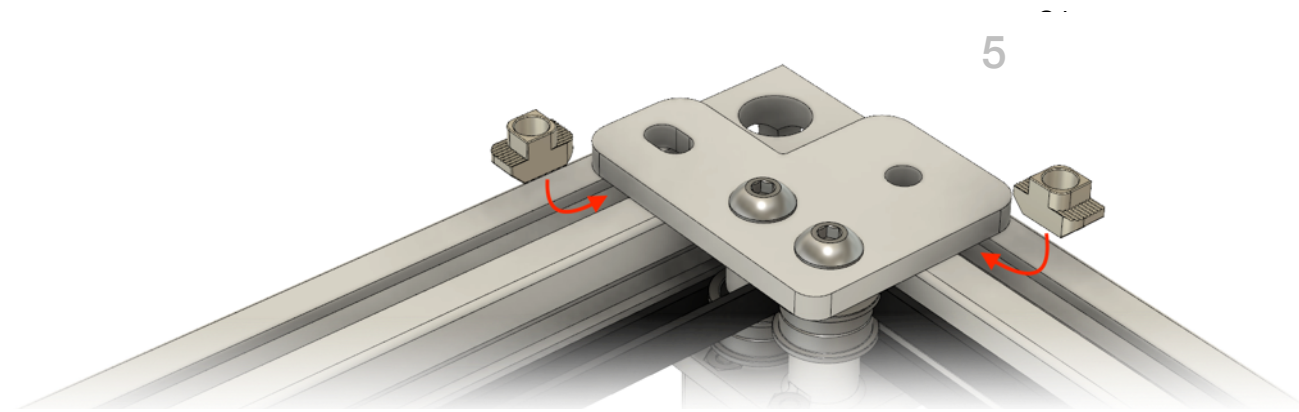


Step 3: Wedge the idlers into the side extrusions so you have access to the front. It's easier to route the belts into them now than later.

Route the belts around the idlers. Make sure the belt teeth are facing the idlers, and keep the 2 runs of the belts parallel on the front.

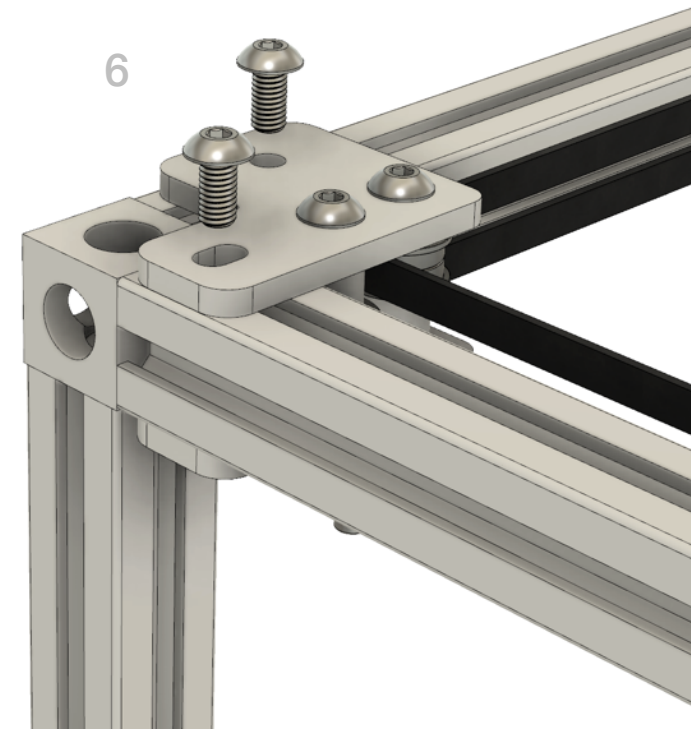
Step 4: Push the idlers forward into the corners. If the belts slip off the idlers, don't panic. We'll get everything lined up later.



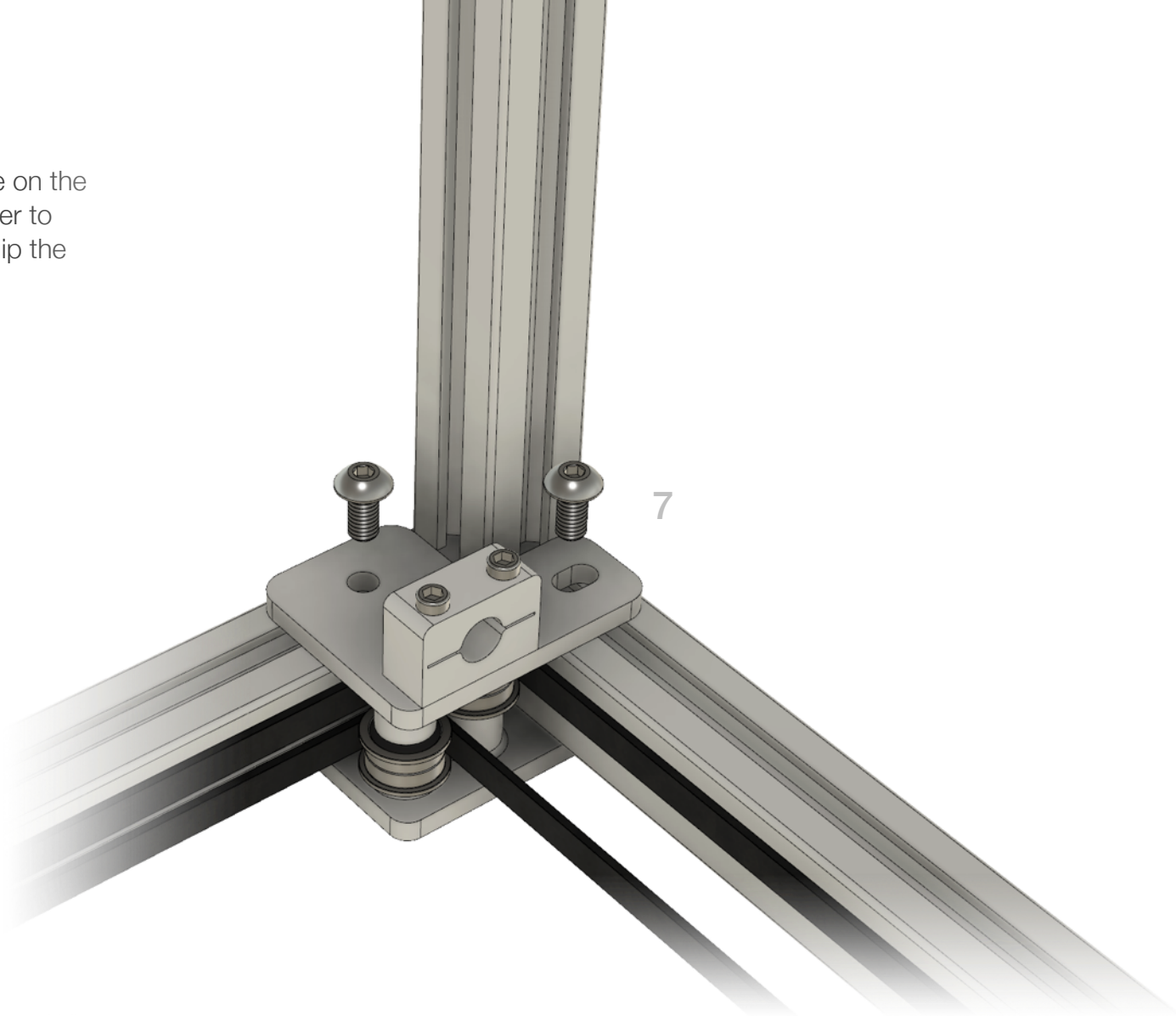


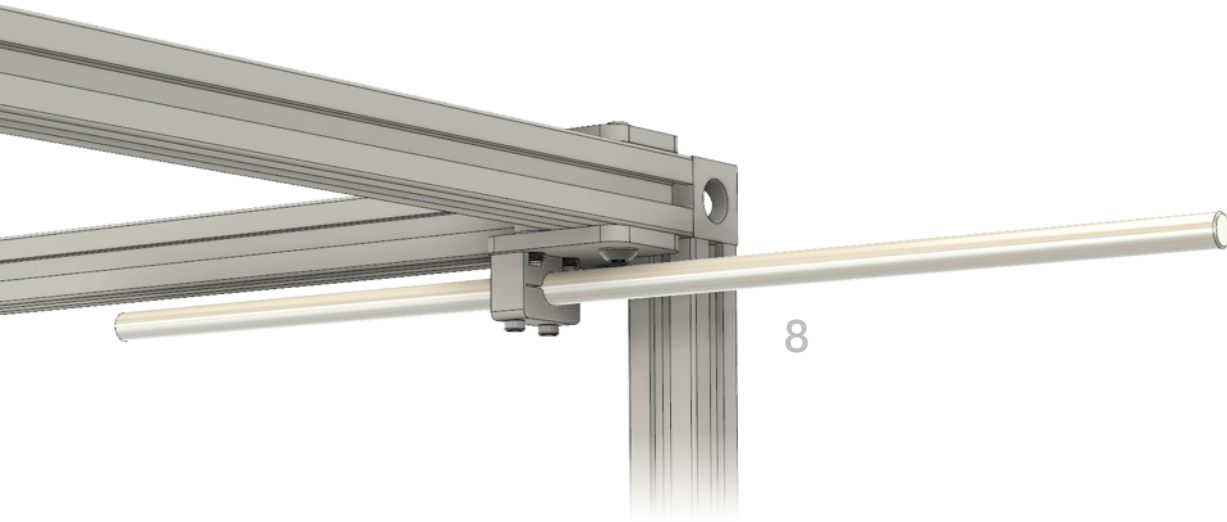
Step 5: Due to the way the idlers are assembled, there's no room to pre-assemble the t-nuts, so they have to be dropped in. Once in the slot, use the hex wrench to push it under and line it up with the holes on the idler.

Step 6: Secure the idlers from the top with M5 cap head screws. As with motor mounts, do not tighten them down completely. They need to be able to move.



Step 7: Repeat the same procedure on the bottom portion of the idlers. It's easier to drop the t-nuts into the slots if you flip the frame over.

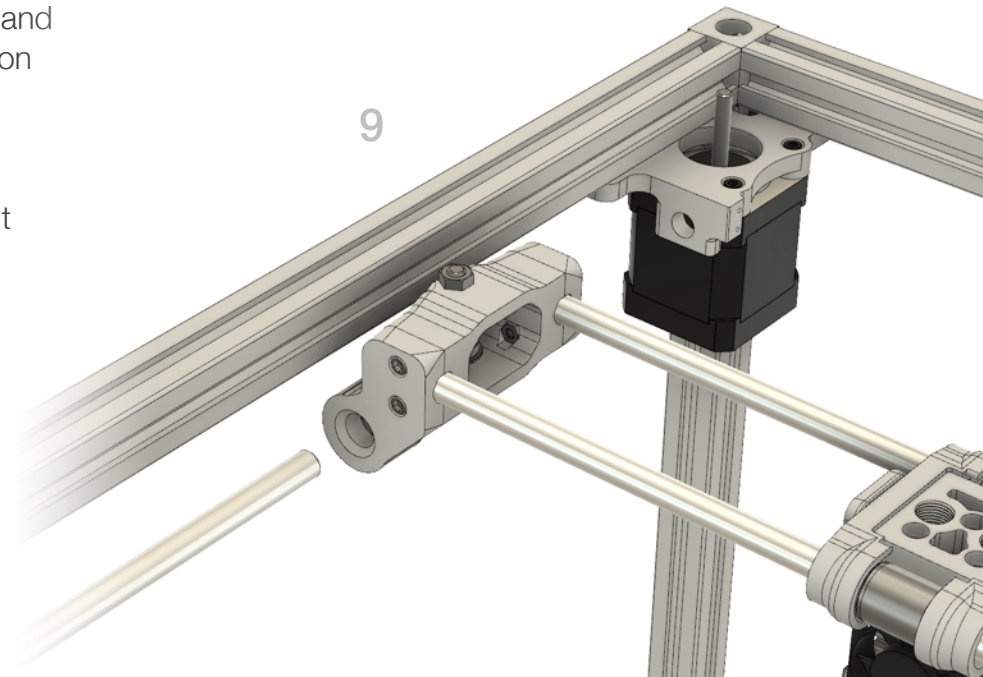




Step 8: Insert both 8mm Y shafts half way into their retainers on the idlers.

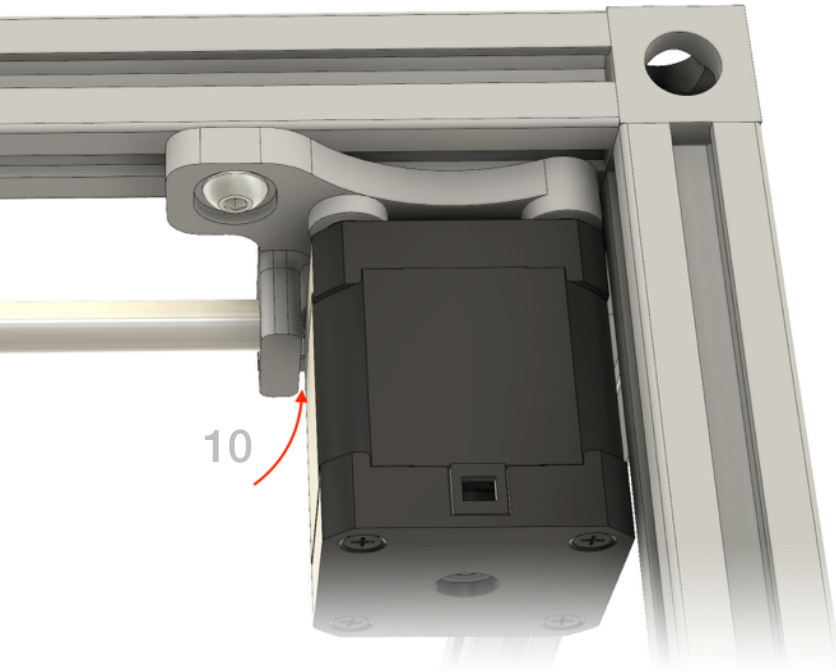
Step 9: Slide the X axis assembly onto the Y shafts. Be careful here and go slow. Don't force the bearings onto the shafts. They should slide on with no force. Play with alignment of the shafts and the X axis to get them to slip on.

Slide the X axis forward and tilt the frame slightly forward to prevent it from sliding off accidentally.

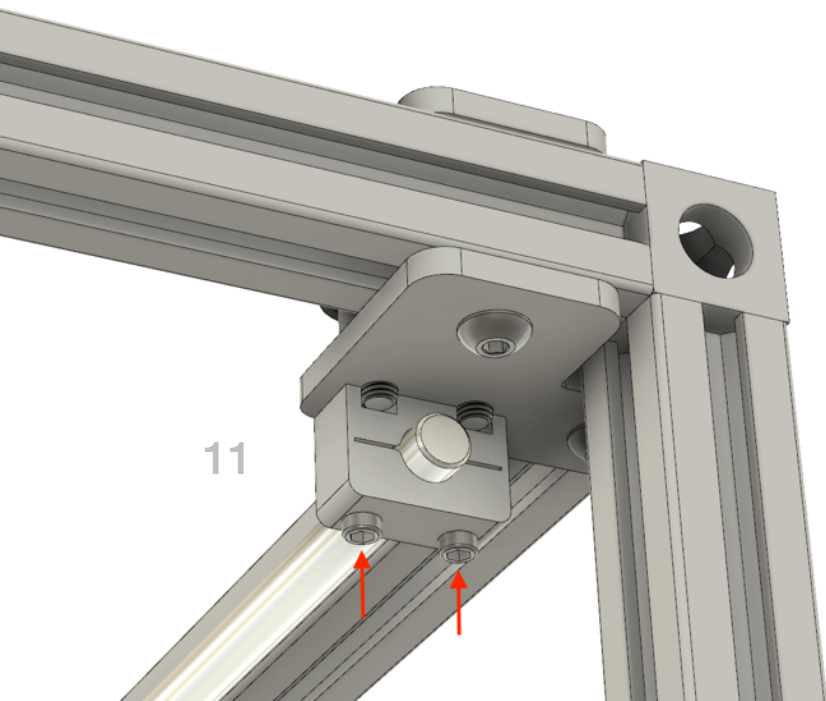


Step 10: Push the Y shafts back into their retainers on the motor mounts.

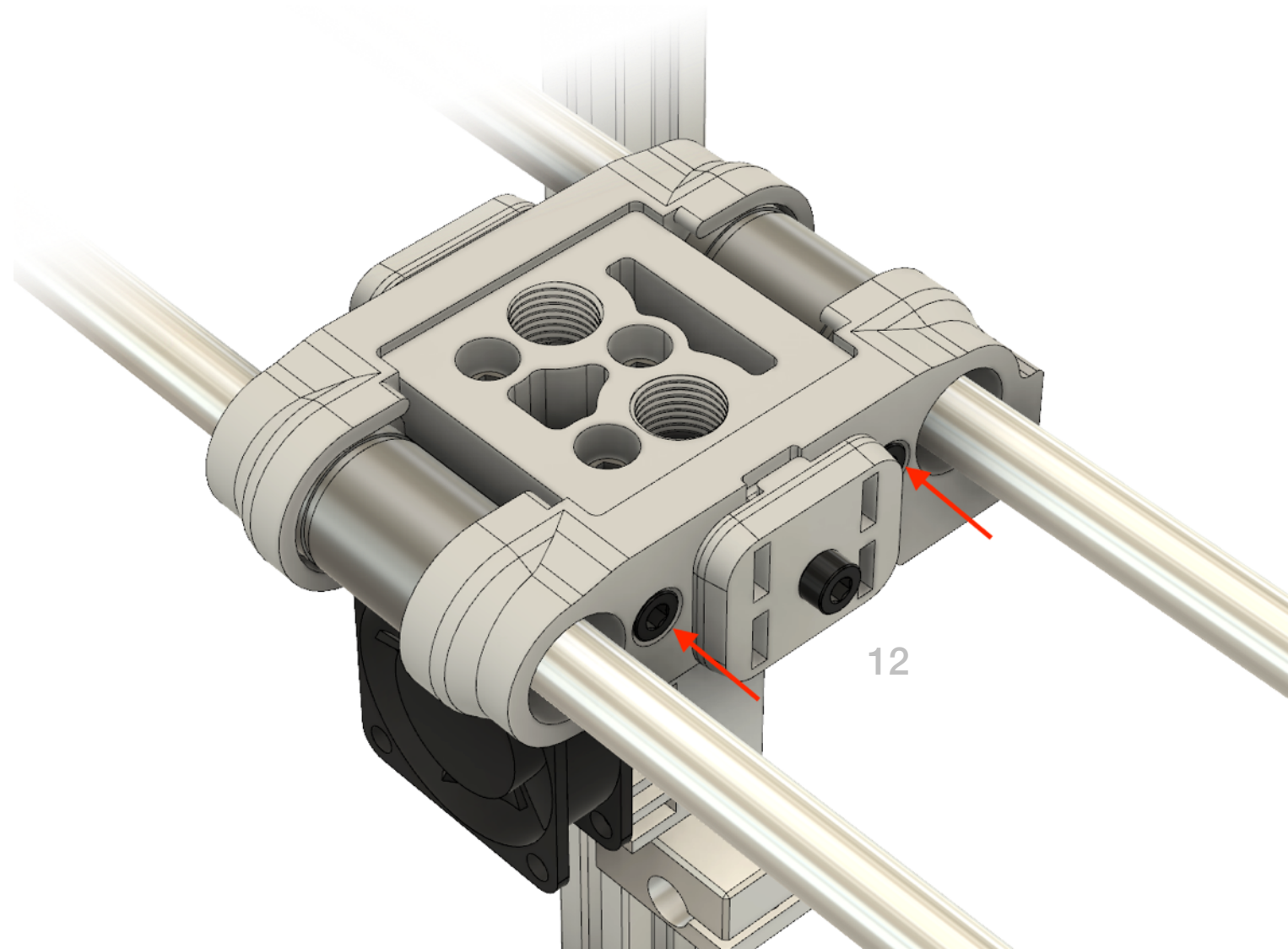
Make sure the shafts are not touching the motors



Step 11: Tighten the Y shaft retainer screws on both sides.



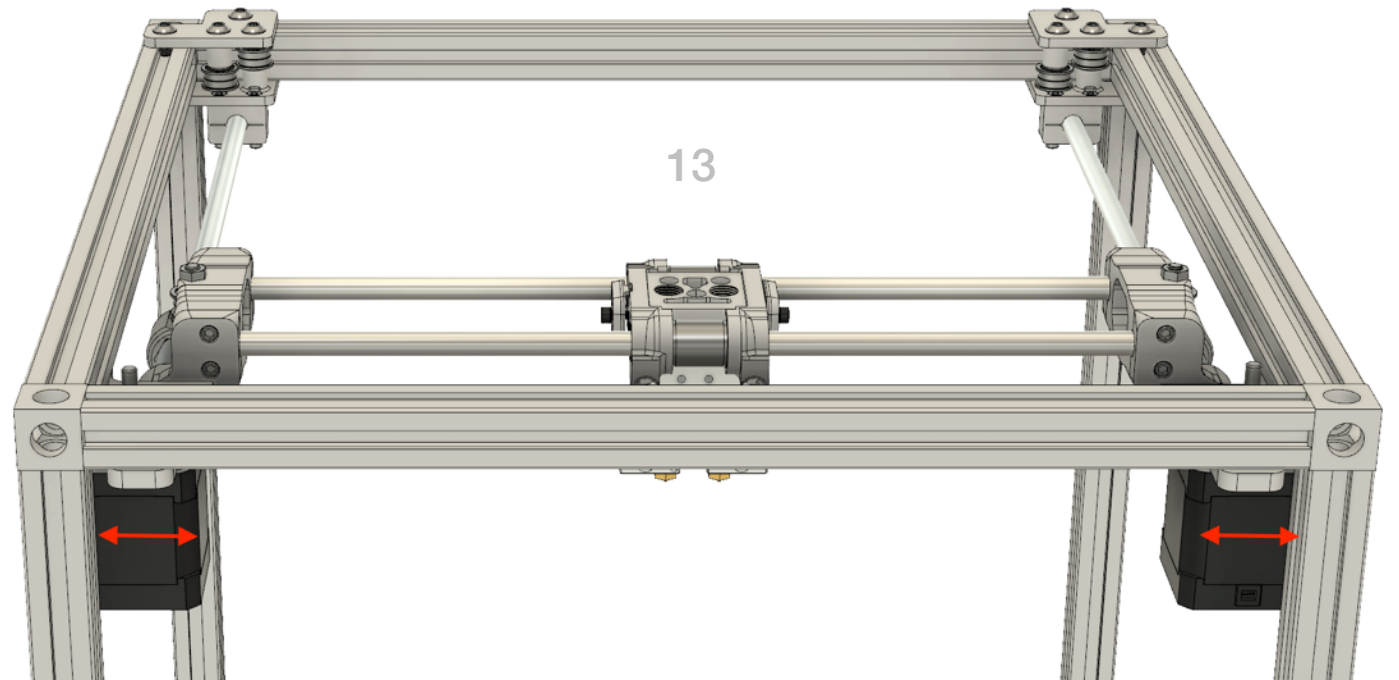
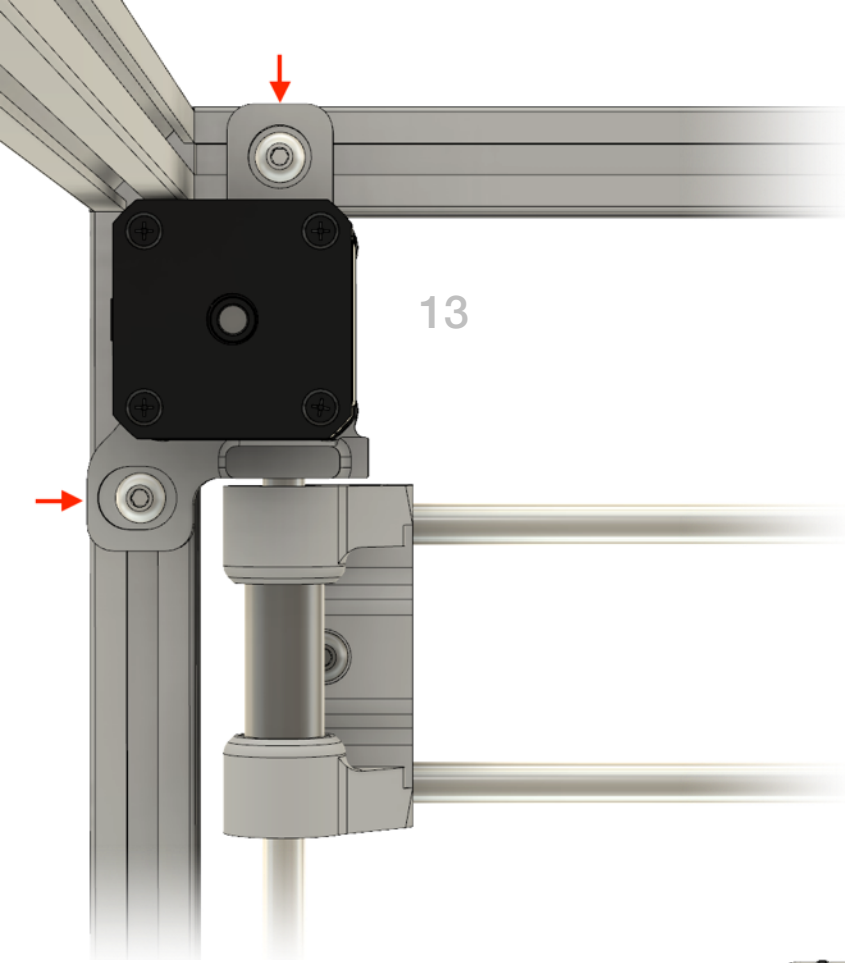
Step 12: Tighten the X carriage bolts. This will secure the X bearings in place. You should not be able to rotate the bearings after they are tightened.



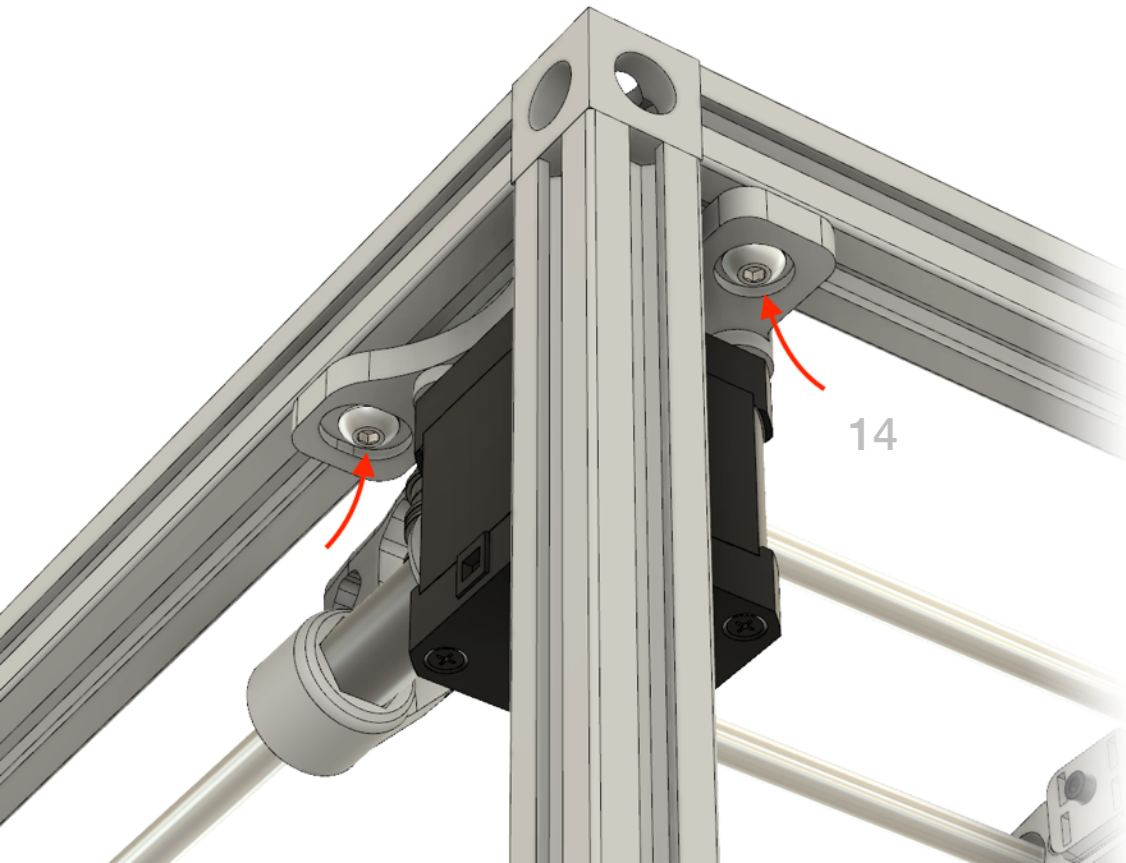
13

Step 13: Slide the X carriage back and align the A and B motor mounts so they are equal on the frame. There should be no part of the motor mount protruding outside the frame.

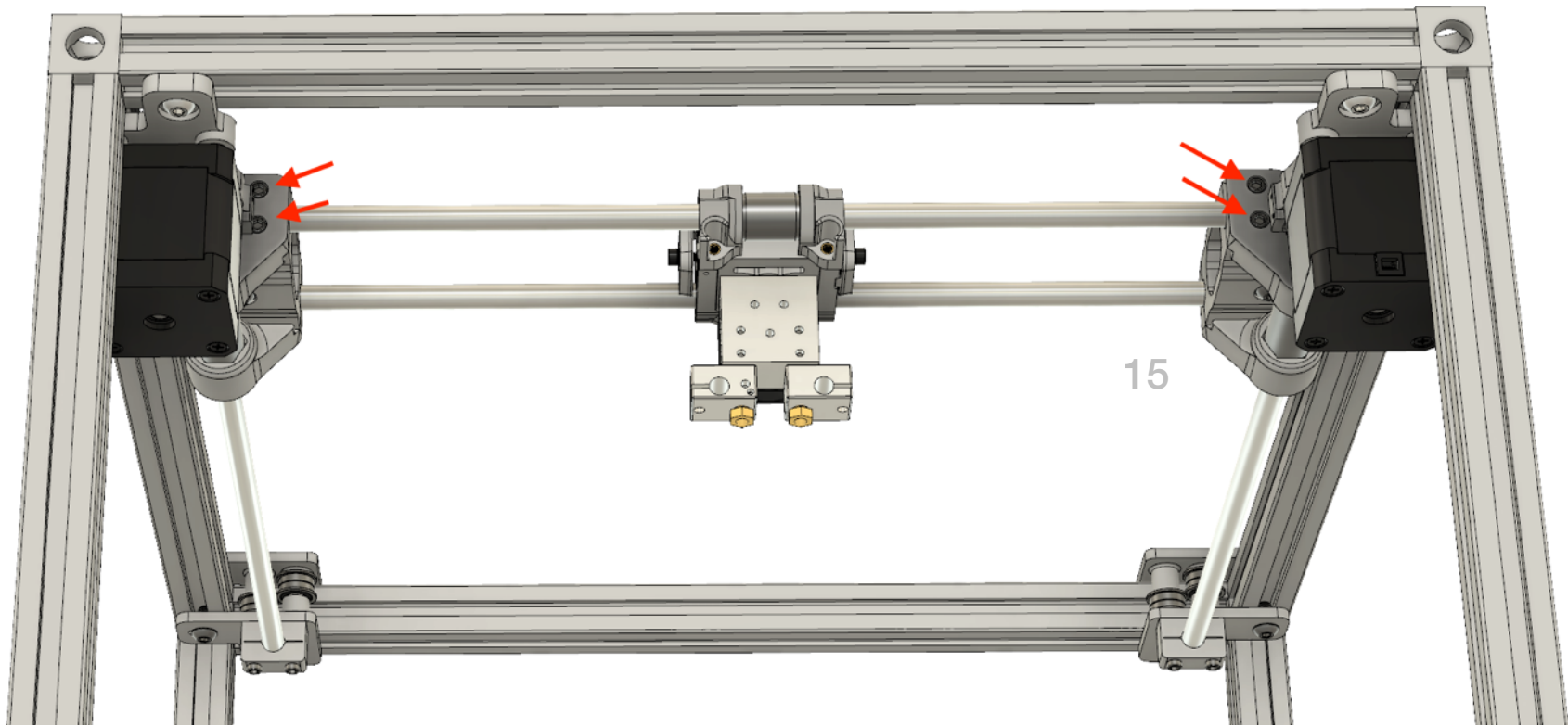
13



Step 14: Tighten the screws on both motor mounts.

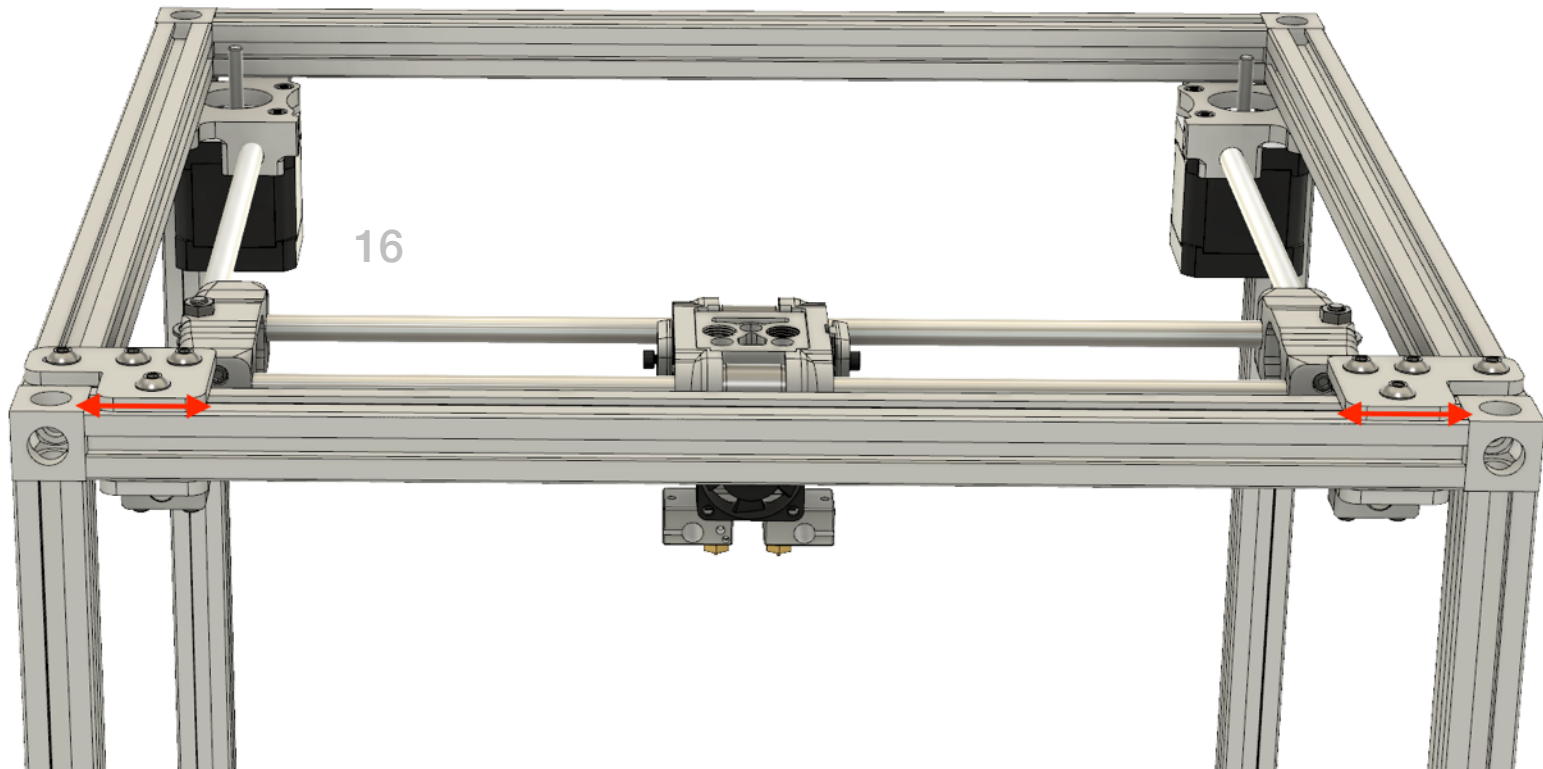


Step 15: Now, tighten the rear screws on the XY Joints. We now have 4 secured points to achieve alignment.

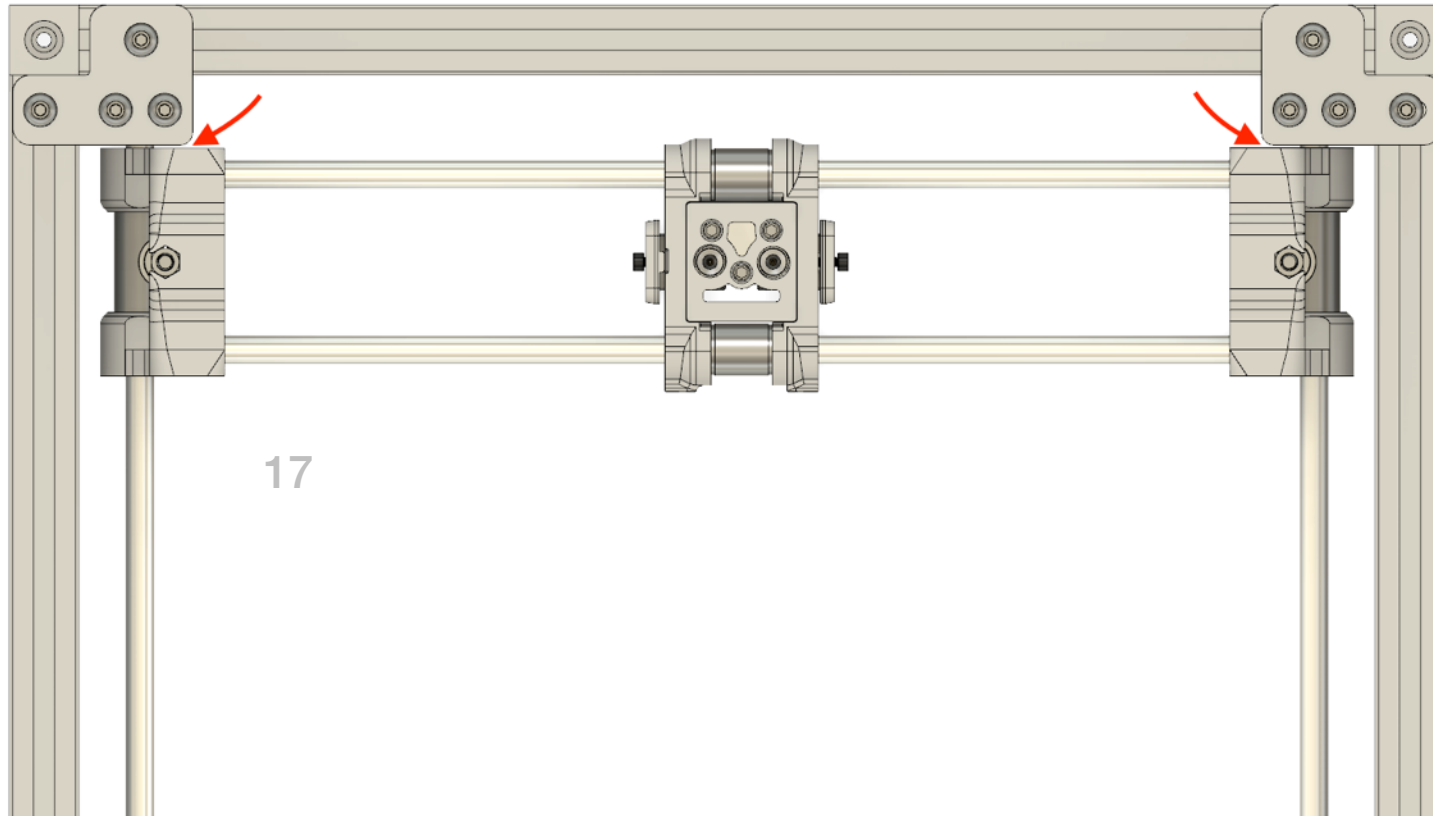


Step 16: Slide the X axis forward. By the time it reaches the idlers, everything would have aligned itself. Move the idlers around until they are even, like you did with the motor mounts and tighten them down.

Don't forget to tighten the bottom 4 screws.

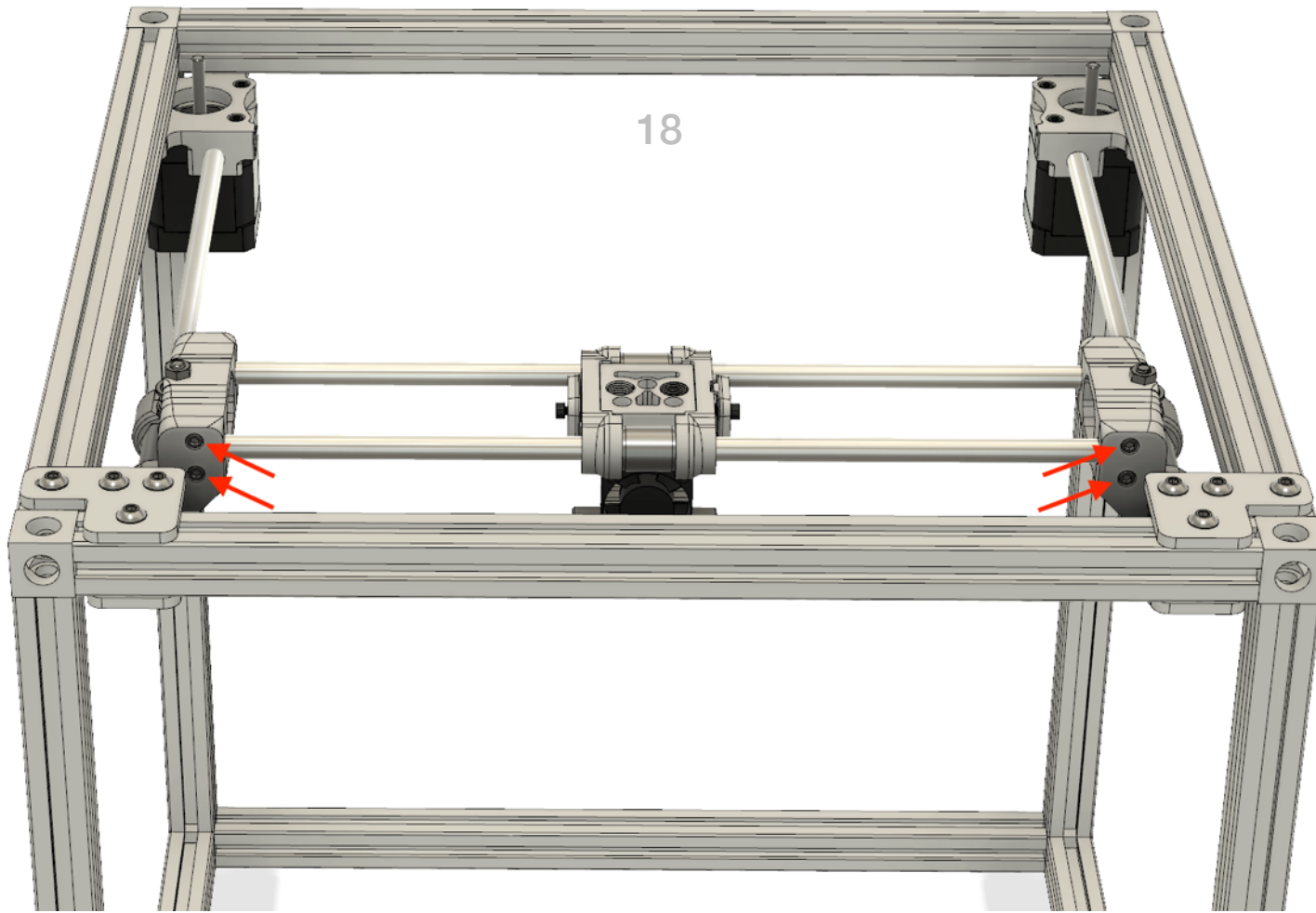


Step 17: Check the gantry for racking. When pushed all the way forward it will be obvious to see a difference in gaps. While the front XY Joint retainer screws are loose, you can tweak the X axis to make fully perpendicular to the Y axis.

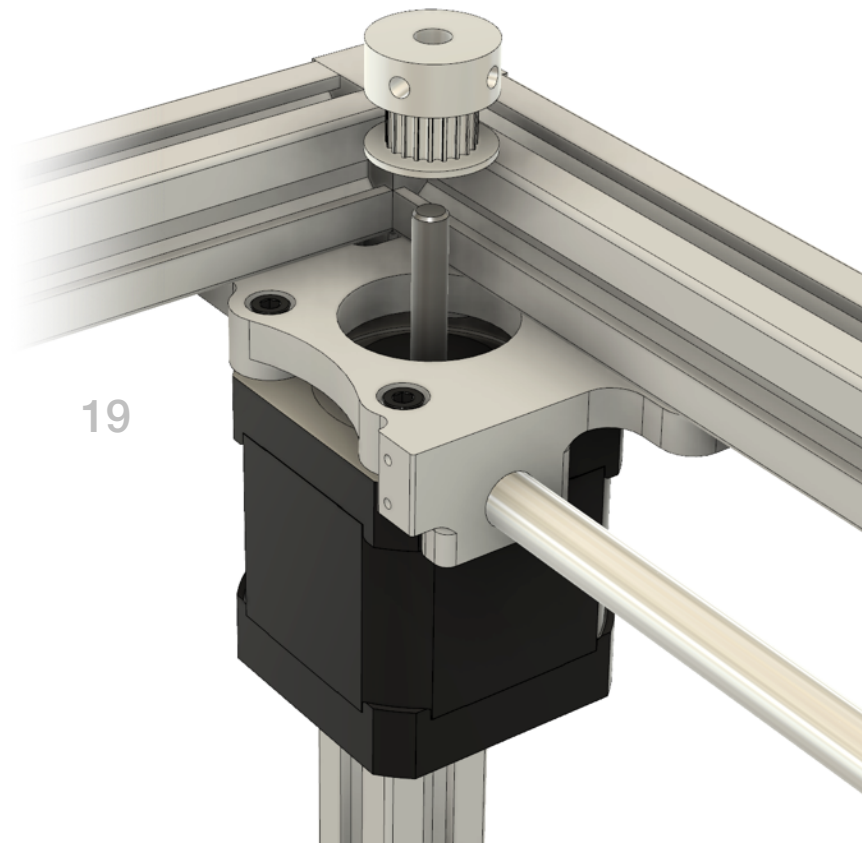
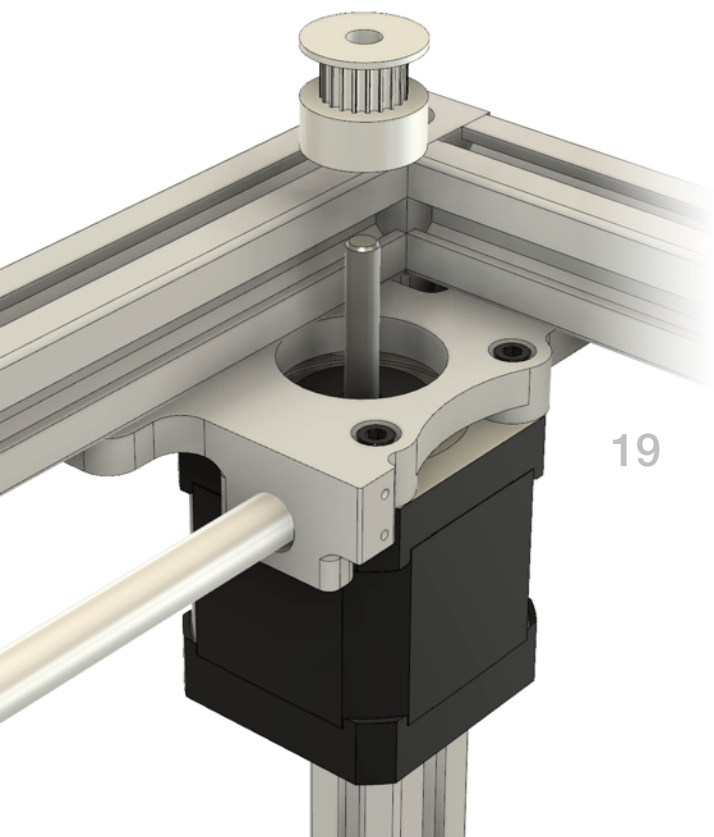


Step 18: Tighten the last 4 screws on the gantry. Take a break and enjoy your handiwork! You now have a working XY gantry.

The gantry should move smoothly and feel solid.

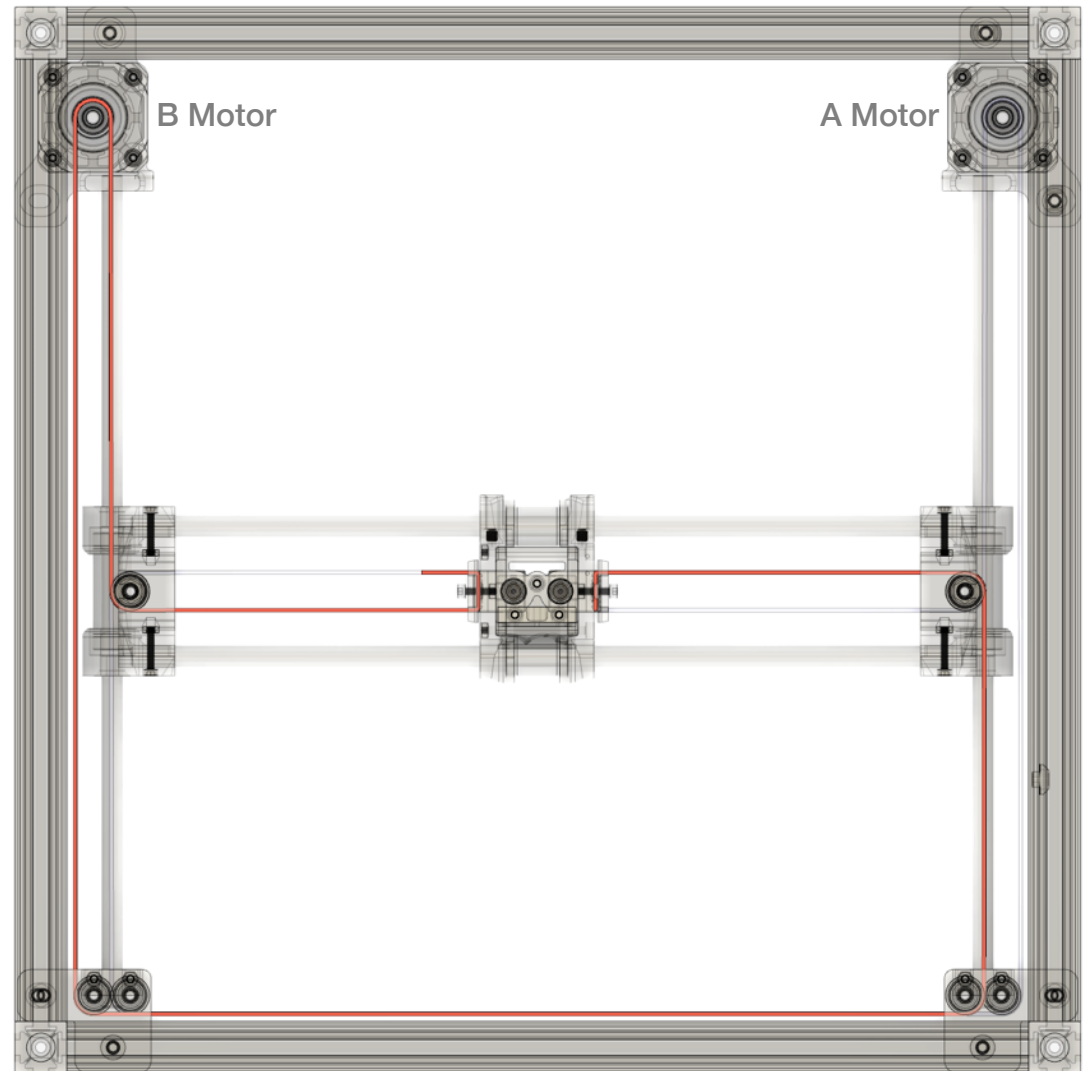


Step 19: Install the A and B motor drive pulleys as illustrated. The pulleys have 2 grub screws. Line up one of them with the flat portion of the motor shaft and tighten it. You can then tighten the other grub screw.



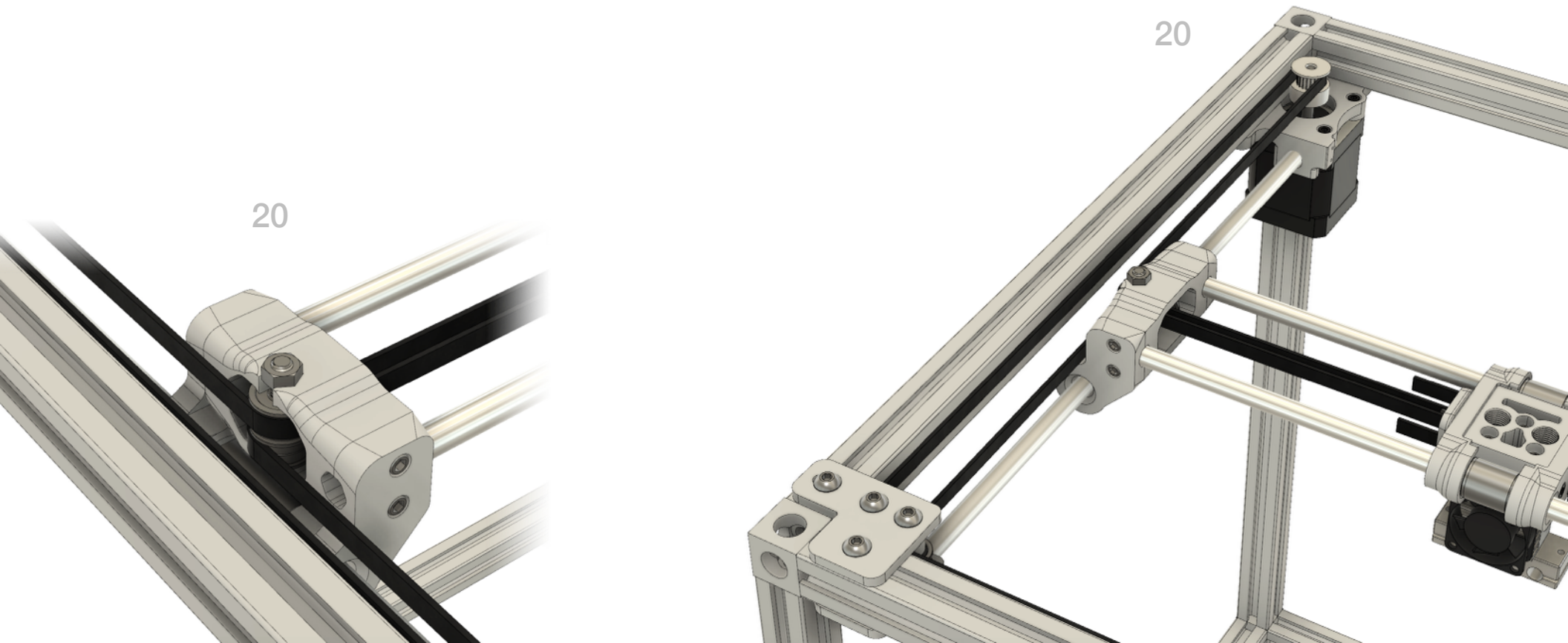
Here's the diagram of the B motor belt run. The A motor side is a mirror image of this setup. The belt starts at the X carriage, goes around the idler on the XY Joint, loops through both front idlers, around the B motor drive pulley, and connects back to the X carriage after passing over the other XJ Join idler.

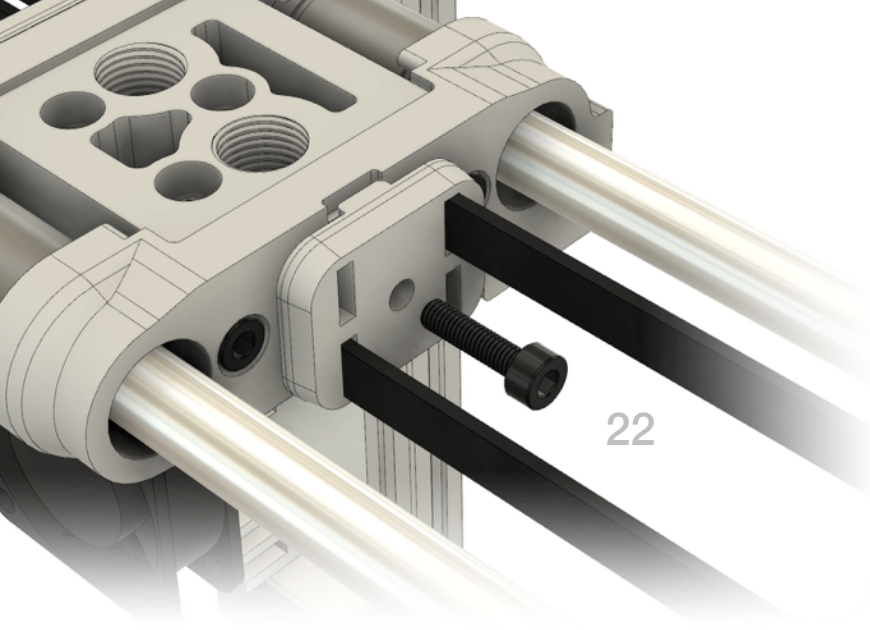
This is the magic of CoreXY. Because the 2 belt runs pull on the X from both sides, they balance each other out and prevent the gantry from racking itself.



Step 20: Loop the top belt hanging off the front idlers around the B motor and pass it through the XY Joint, looping it over the idler. Pass the other end of the belt on the opposite side through the other XY Joint.

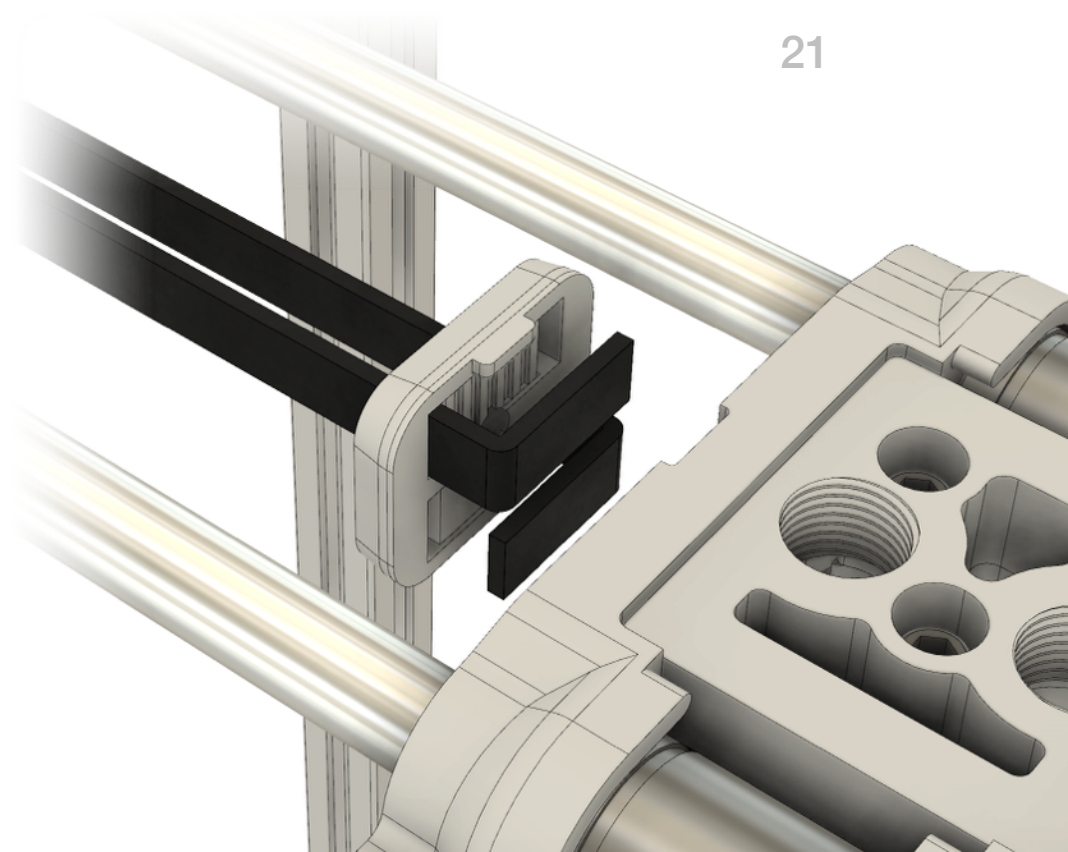
Do the same for the A motor belt loop.





Step 22: Secure the belt clip to the X Carriage. Tighten it fully.

Step 21: Take both ends of the belt on the right side of the X carriage, and loop them through the belt clip. Fold the belt ends over as illustrated. The belt teeth should line up with the teeth on the X carriage and the belt clip. If that's not the case, check your belts. They probably got flipped somewhere along the way.

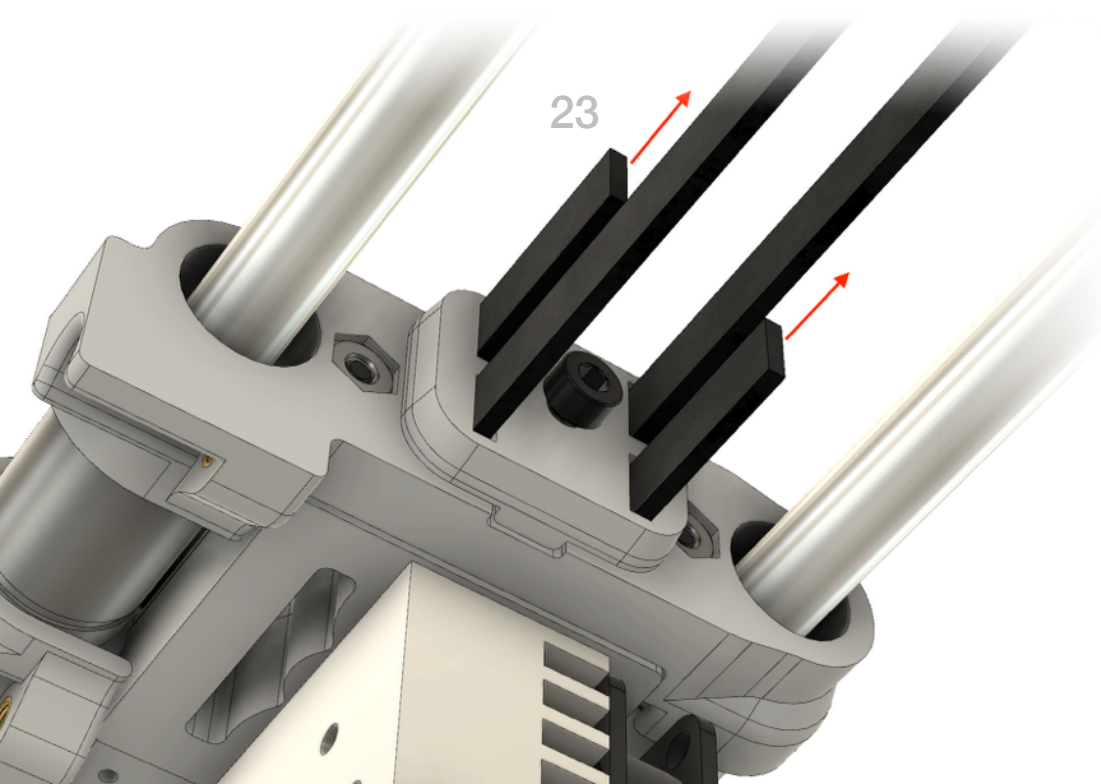


Step 23: Insert the other ends of the belt through the other belt clip, and loop the remaining belt length through the other 2 holes on the clip.

Put the M3 12mm screw back into the belt clip and screw it into the other side of the X carriage, leaving plenty of slack for the belt. Do not tighten it yet.

Walk the belts and make sure everything is seated properly. The 2 belt runs should not cross at any point, and they should be seated into their idlers.

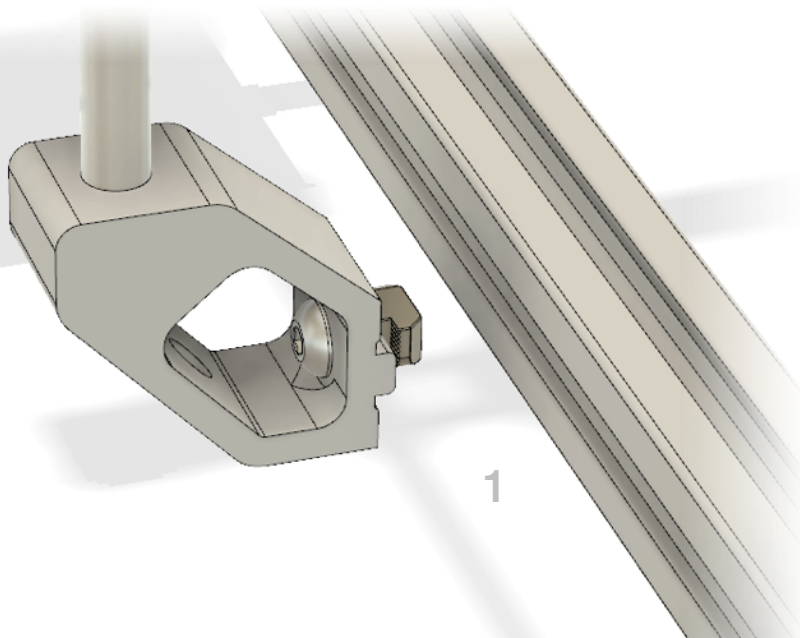
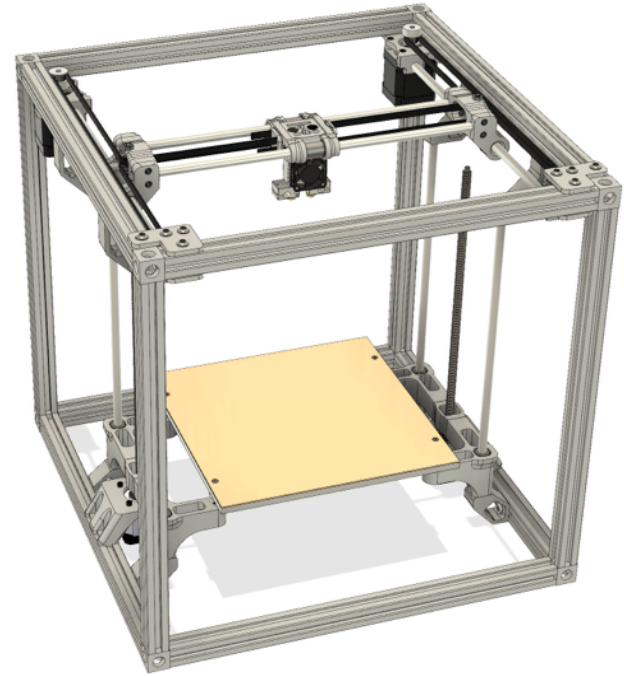
You can now start tensioning the belts by pushing the belt into the clip while pulling on it from the cut off end. Due to the tooth locks, it will move in discrete steps. When you feel the belt beginning to slip back after advancing, increase the tension on the belt clip in small increments. The belt tension you are looking for should be close to the G string on the guitar when strumming the run of the belt that goes between the 2 front idlers. Once you have the same tone from both belts, and are satisfied with the tension, tighten down the belt clip fully.



SECTION 5 : Z AXIS INSTALLATION

Items Required:

- Assembled Z towers
- Frame
- M5 10mm cap screws
- T-nuts
- Bed assembly
- M3 30mm screws
- Springs



Step 1: Prepare the Z shaft supports by inserting the M5 10mm screws into the holes, and adding a t-nut on the other side. Slide the bottom shaft supports into the inner slots on the bottom side extrusion.

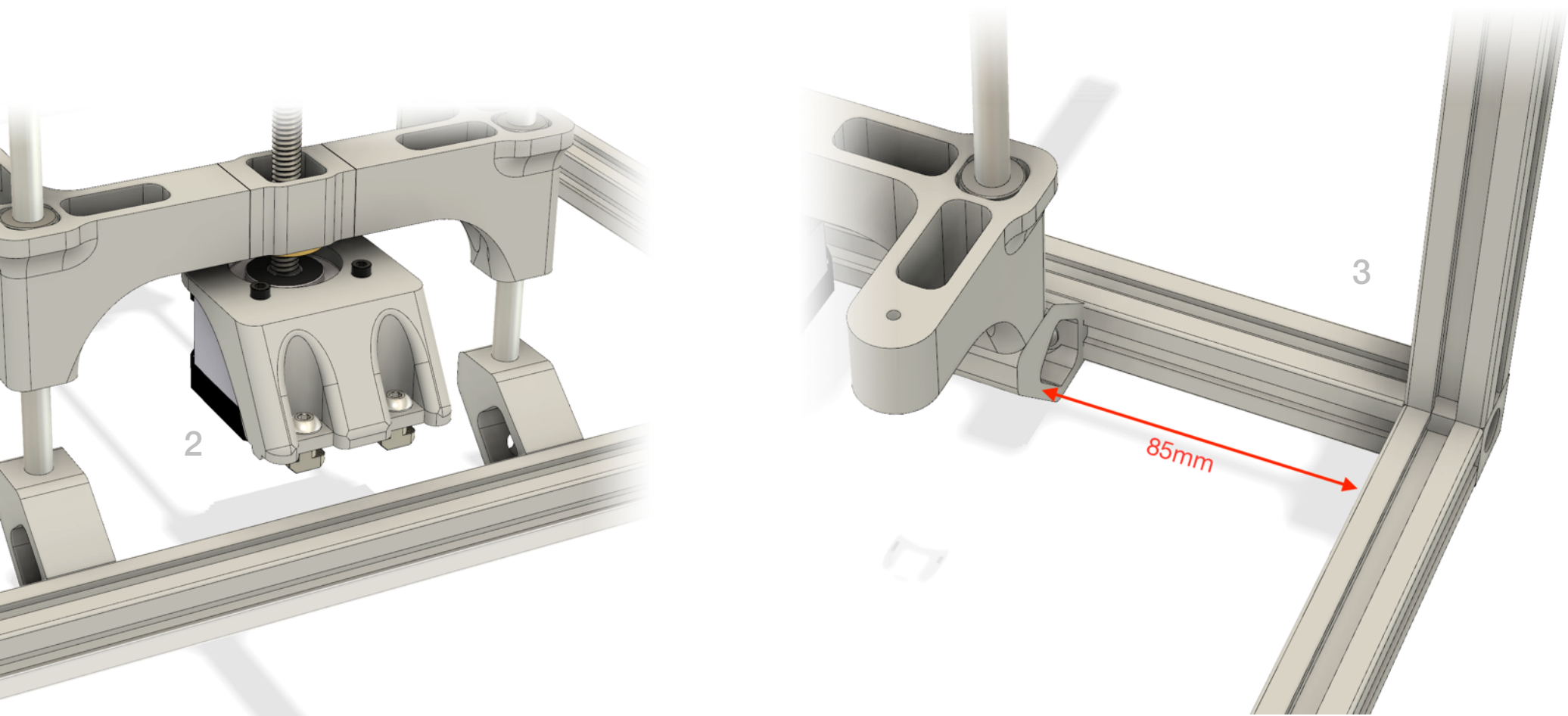
Don't tighten them down fully just yet.

Step 2: Insert the pre-attached Z motor mount t-nuts into the top of the lower side extrusions.

Step 3: While the bed carriage is in the lowest position, move the bottom of the Z tower until you can measure 85mm between the face of the Z shaft support, and inner face of the front extrusion.

Tighten the bottom screws on the shafts.

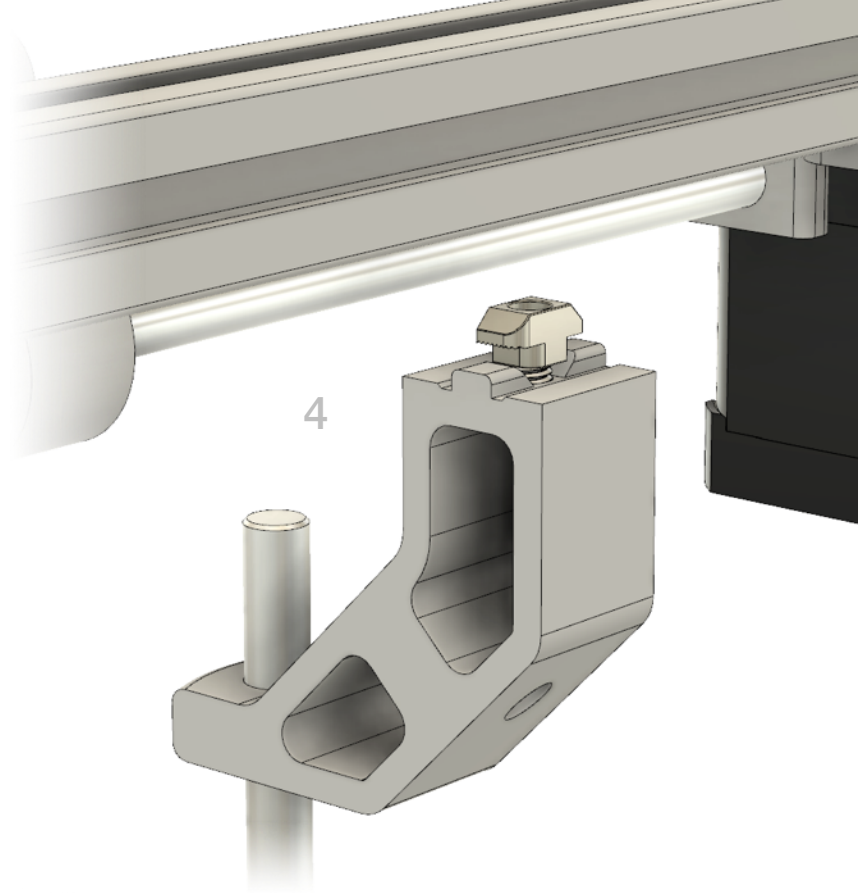
Check the Z lead screw alignment. It should be parallel to the shafts when looking down. A little wiggle will allow it to align itself properly. Now you can tighten the M5 Z motor mount screws.

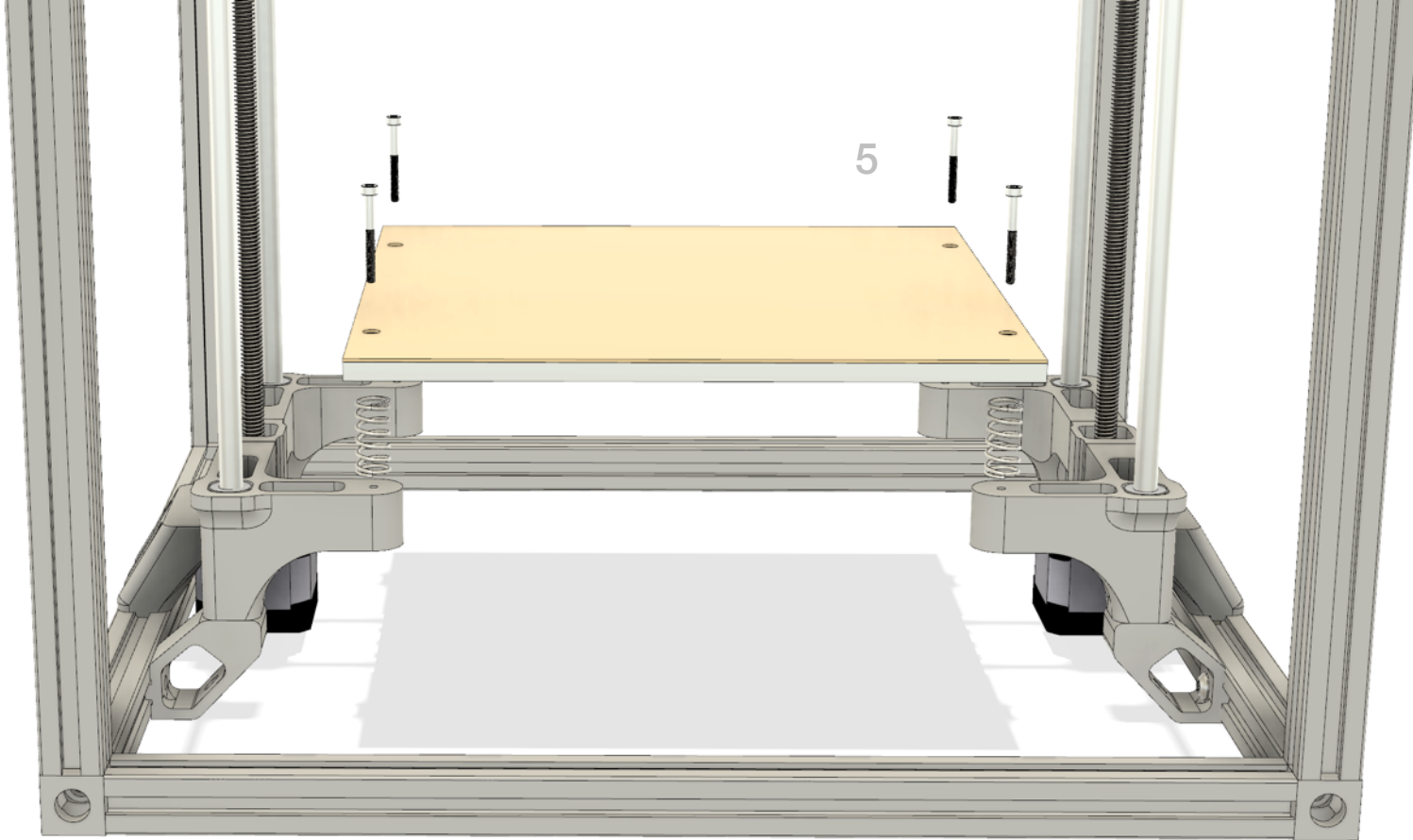


Step 4: Slide the upper Z shaft supports down slightly to allow them to clear the upper extrusion, and then slide them back up, seating the pre-attached t-nut into the bottom slot.

Twist the lead screw until the bed carriage is in the upper most position. We're essentially using the carriage as an alignment tool. Move the upper shaft supports until you can measure 85mm between the front-most support, and the inner face of the upper front extrusion, same as the bottom. Tighten the M5 cap screws.

Repeat these steps for the other Z tower.





Step 5: Move the bed carriages back down to the lowest position, and secure the bed to the bed carriages using springs and the M3 30mm screws. You'll need to compress the springs a bit to get the screws to bite into the holes.

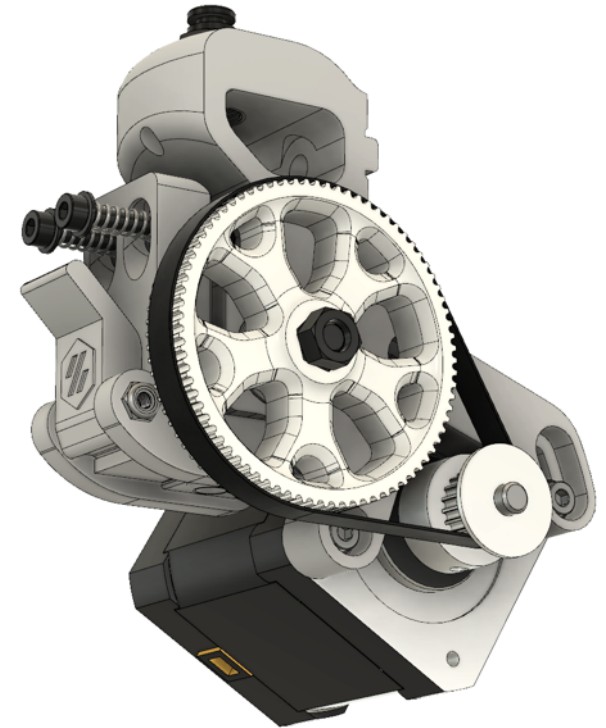
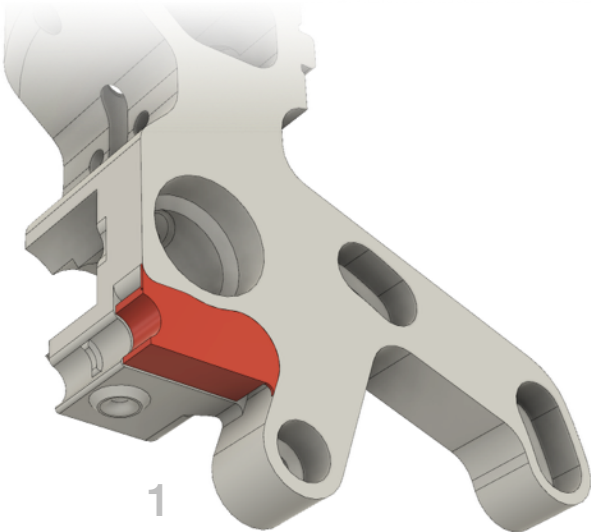
Make sure the bed is oriented with **wire harness coming out of the left side**

You don't need to level the bed at this time.

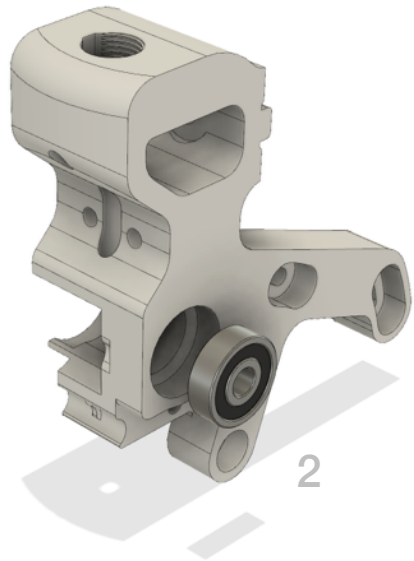
SECTION 6 : EXTRUDER

Items Required:

- Extruder printed parts
- Extruder hardware kit

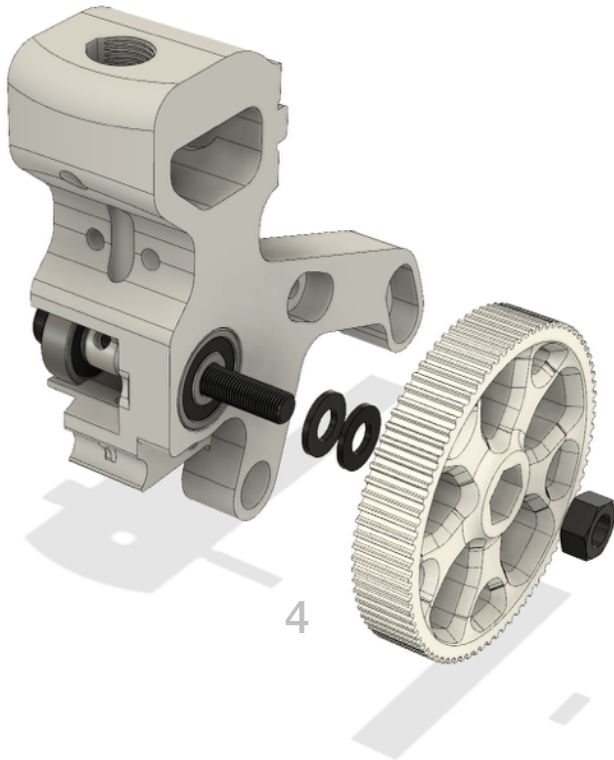


Step 1: Remove built-in support by prying off the piece with a screwdriver or a knife. Clean out all the holes as well.

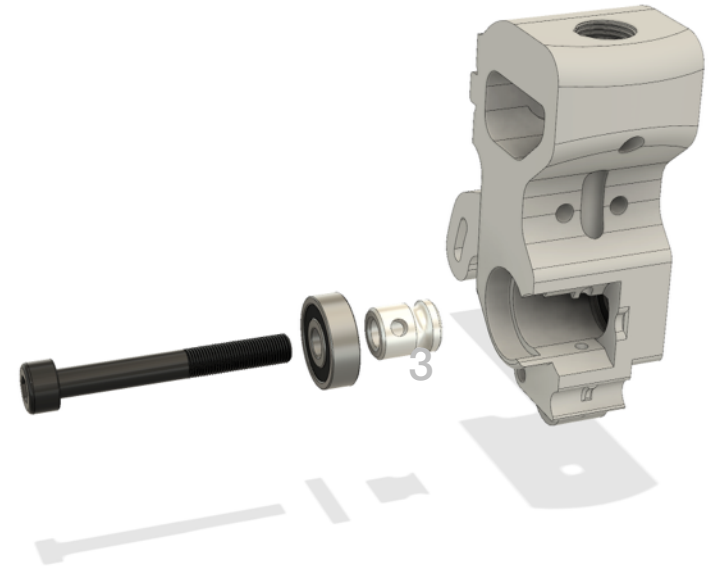


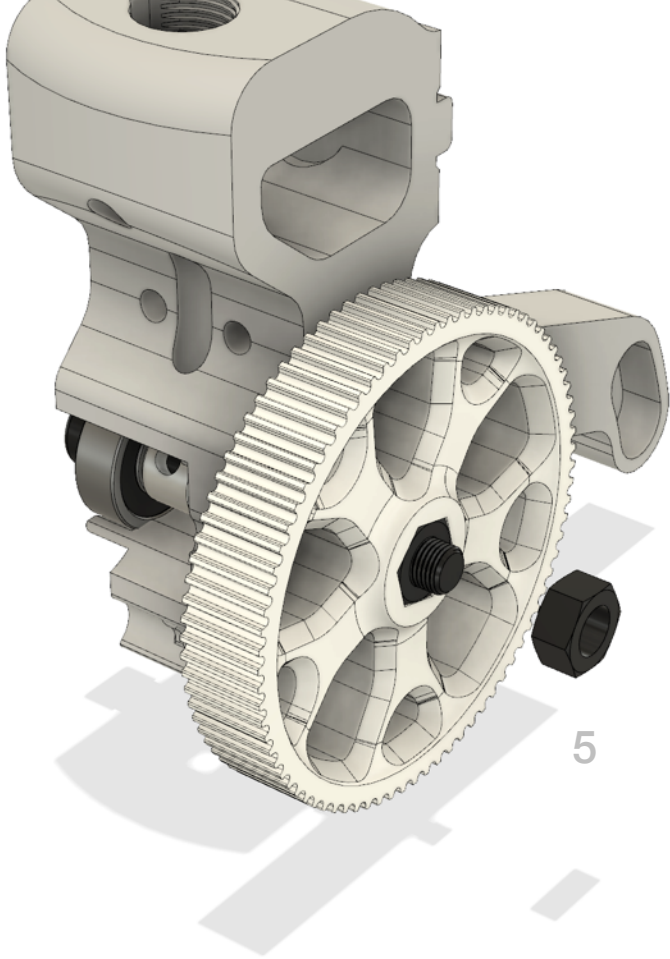
Step 2: Insert a 625 bearing into the retainer on the flat portion of the extruder body.

Step 3: Clean any transport oil off the drive shaft bolt. This is important. You want the drive gear to have a solid grip on the drive shaft. Insert the bolt into a 625 bearing, and insert the MK8 drive gear onto it as illustrated.



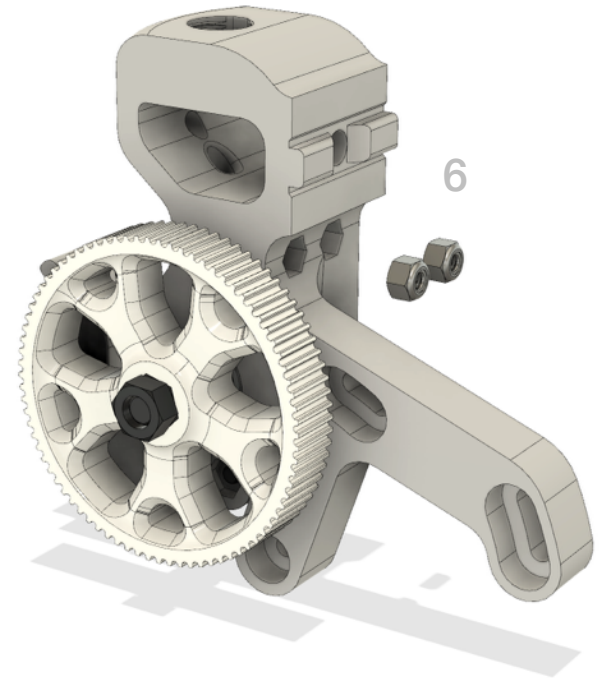
Step 4: Add the 2 M5 washers to the protruding shaft, and screw on the main drive gear and a M5 nut. Don't over-tighten it.

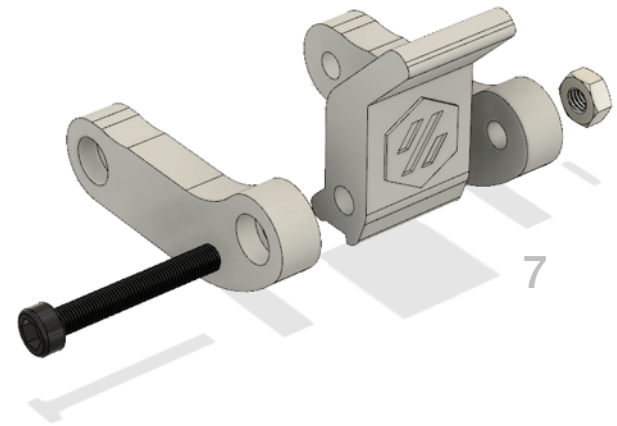
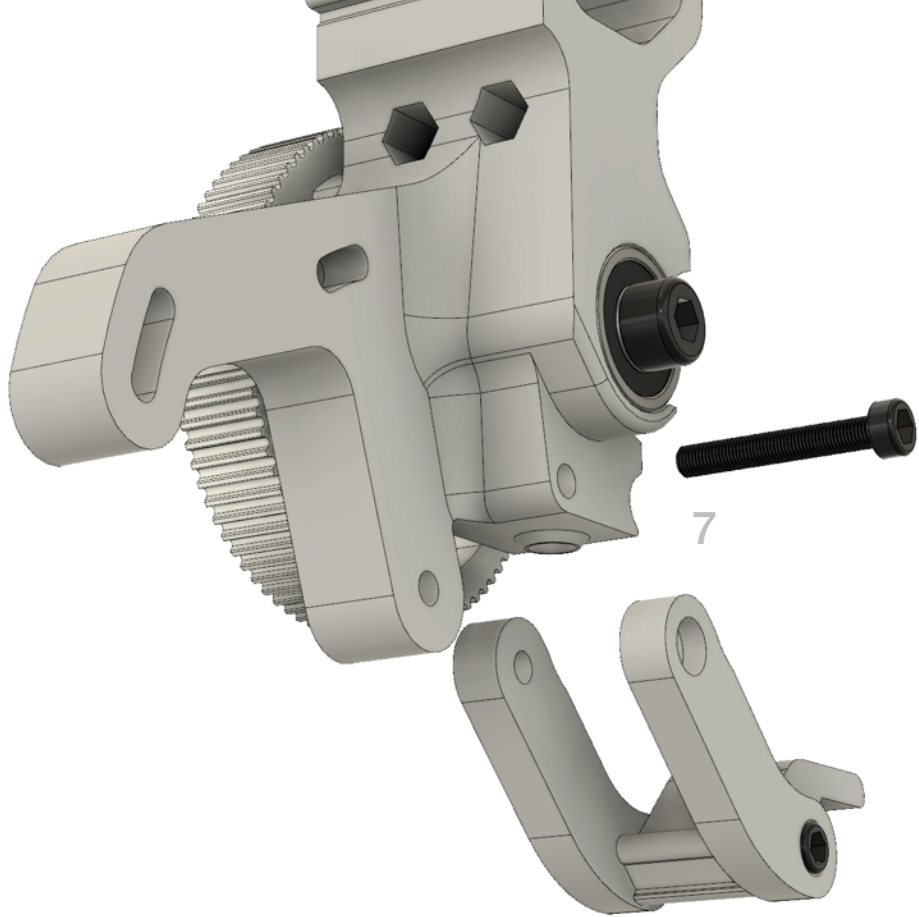




Step 5: Holding the drive gear, screw on the second M5 nut, using it to counterlock the first one in place. This locks the drive gear in place.

Step 6: Insert the M3 lock nuts into the retainers in the back of the extruder.



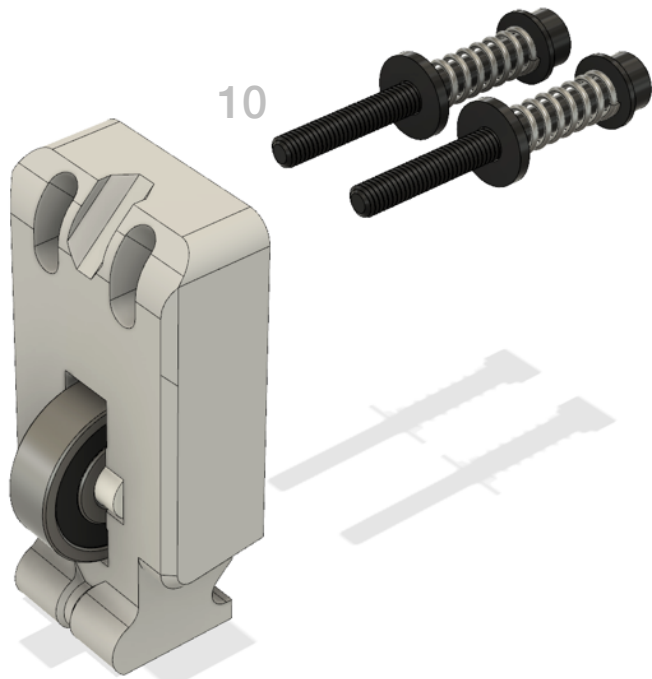
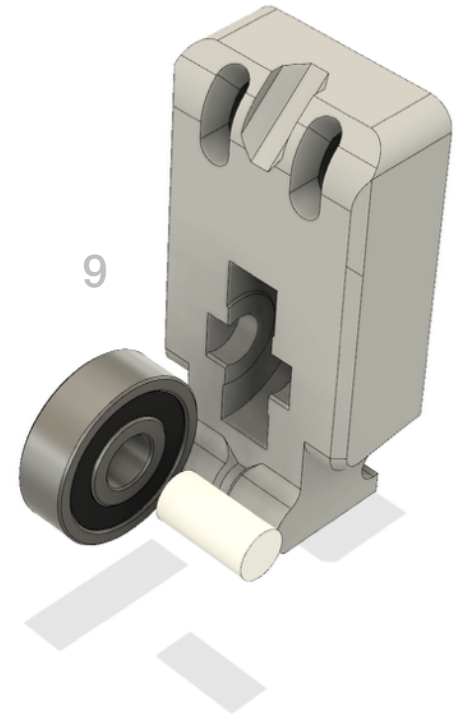


Step 7: Insert the M3 nuts into the retainers in the latch arm and attach both arms into the latch using an M3 22mm screw as illustrated. Attach the arm to the main body using another M3 22mm screw. Make sure you can still move the latch around after tightening it.



Step 8: Use a steel M3 washer, a spring, and a M3 nylon washer to assemble a tension bolt as illustrated. You'll need 2 of them.

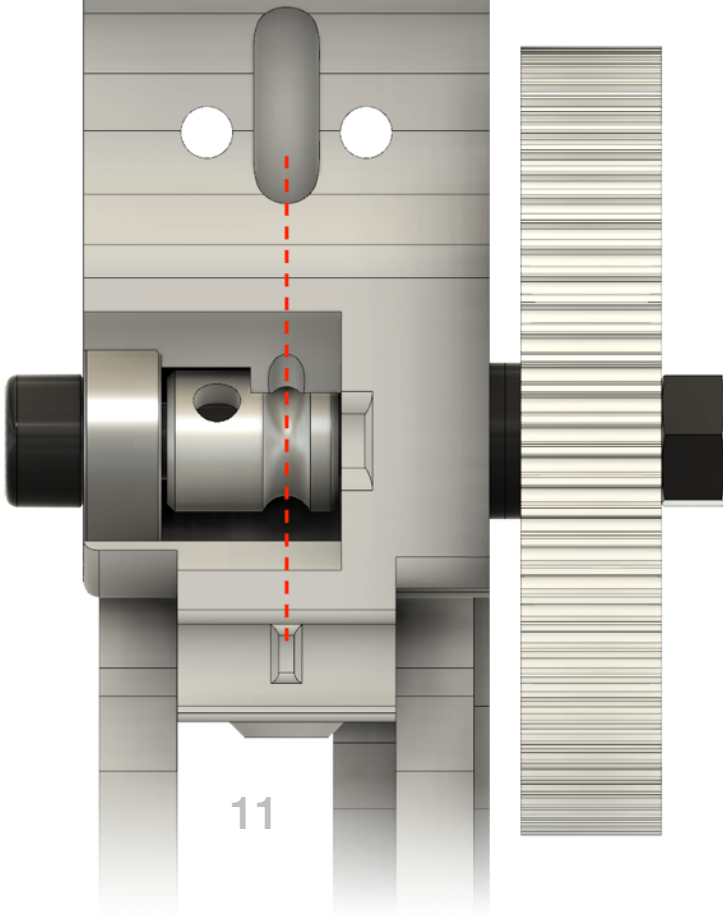
Step 9: Insert the acetal dowel into a 625 bearing and snap the idler bearing assembly into the retainer slot on the guidler body. This will take some force.



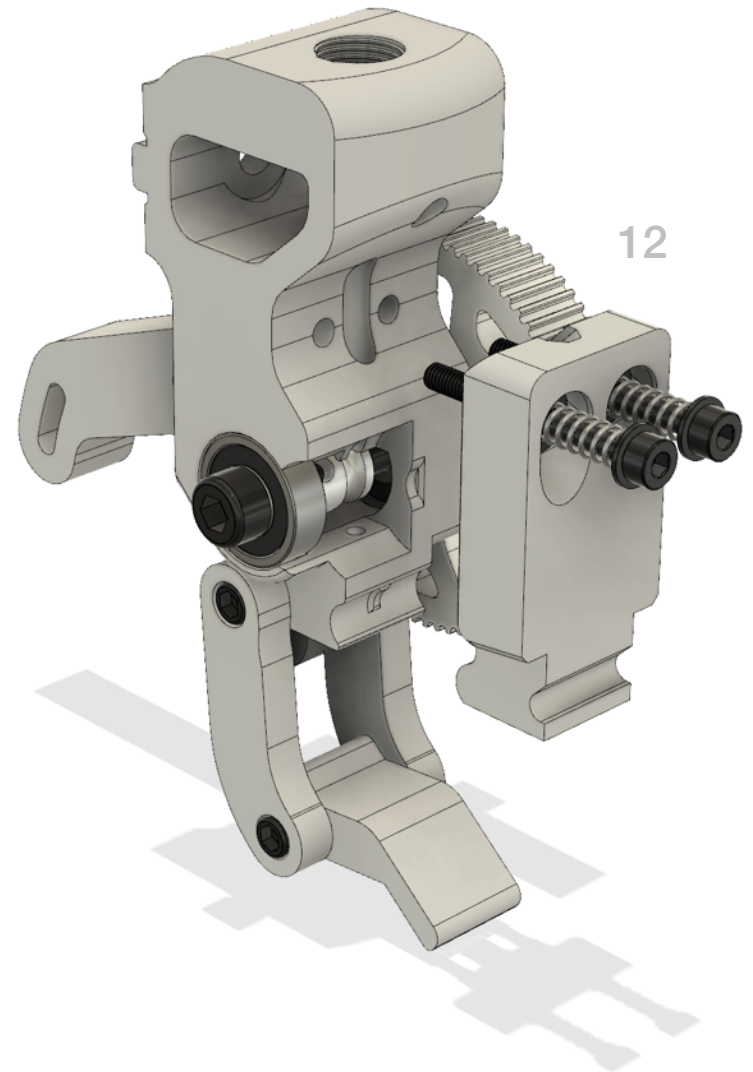
Step 10: Insert tension bolts into the guidler.

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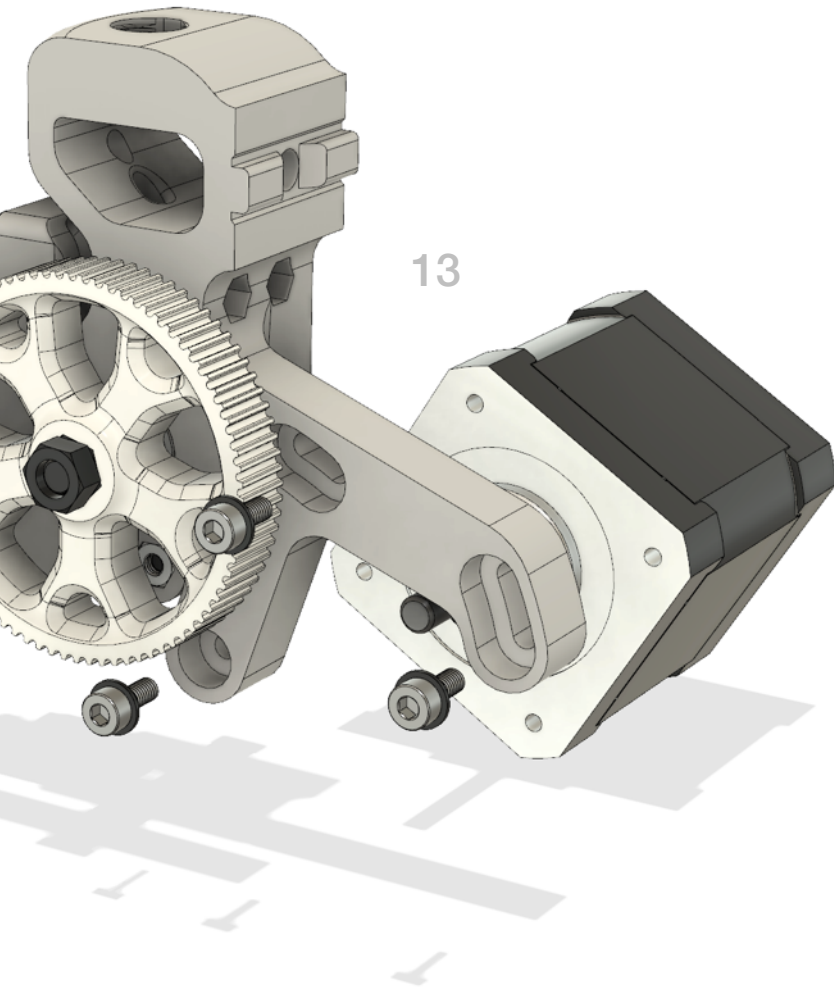
Step 11: Line up the teeth on the drive gear with the filament guide holes inside the extruder body, and tighten down the drive gear grub screw.



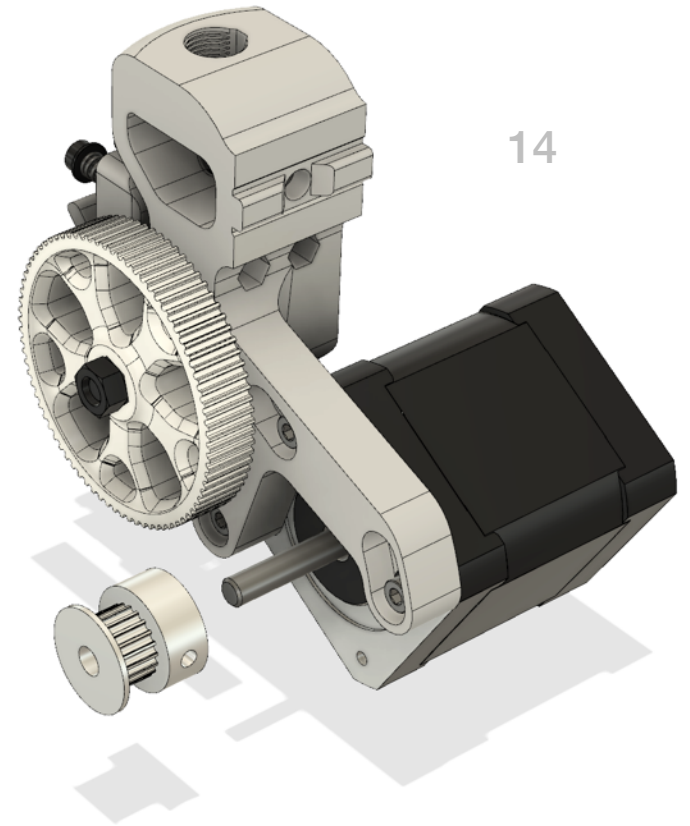
Step 12: Insert the tension arms into the main body and screw them into the lock nuts that are embedded into the body.



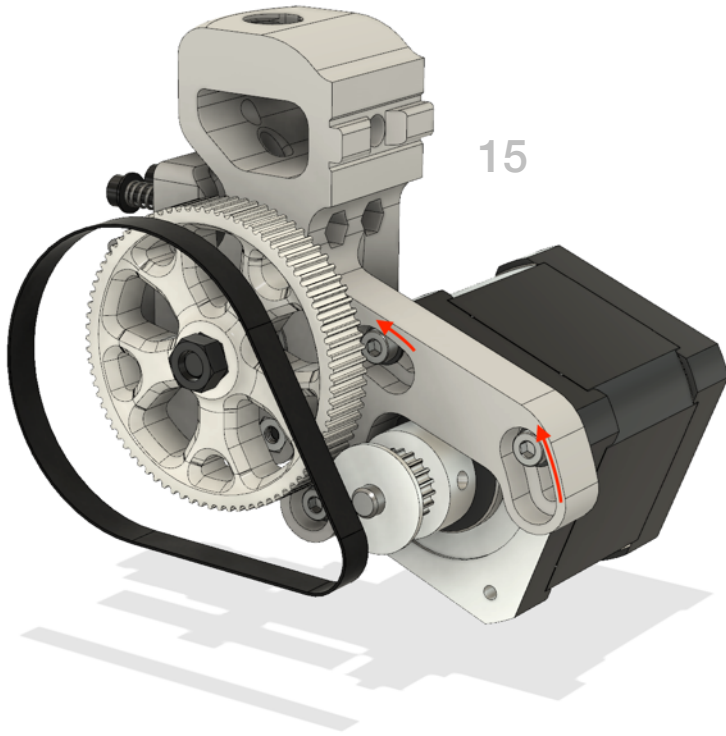
Step 13: Attach the NEMA17 motor to the motor mount points using M3 8mm screws and M3 washers. Don't tighten the screws all the way as we need them to move slightly. Make sure the motor wires are facing down.



Step 14: Attach the drive pulley using the same technique you used to attach the drive pulleys on the A and B motors.

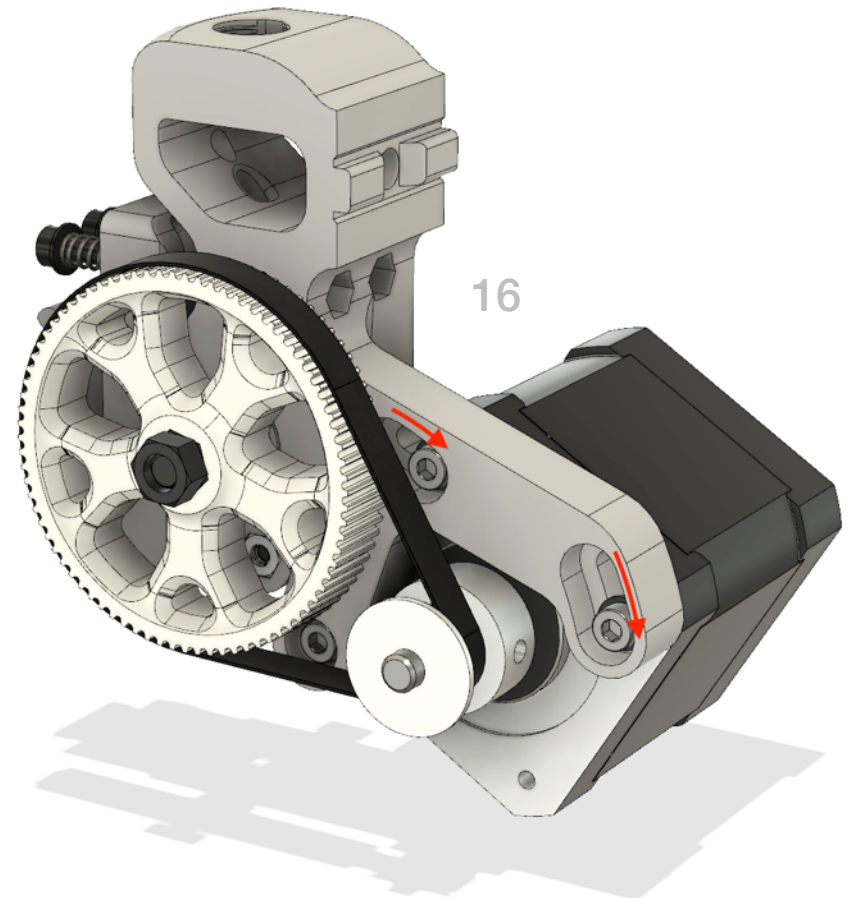


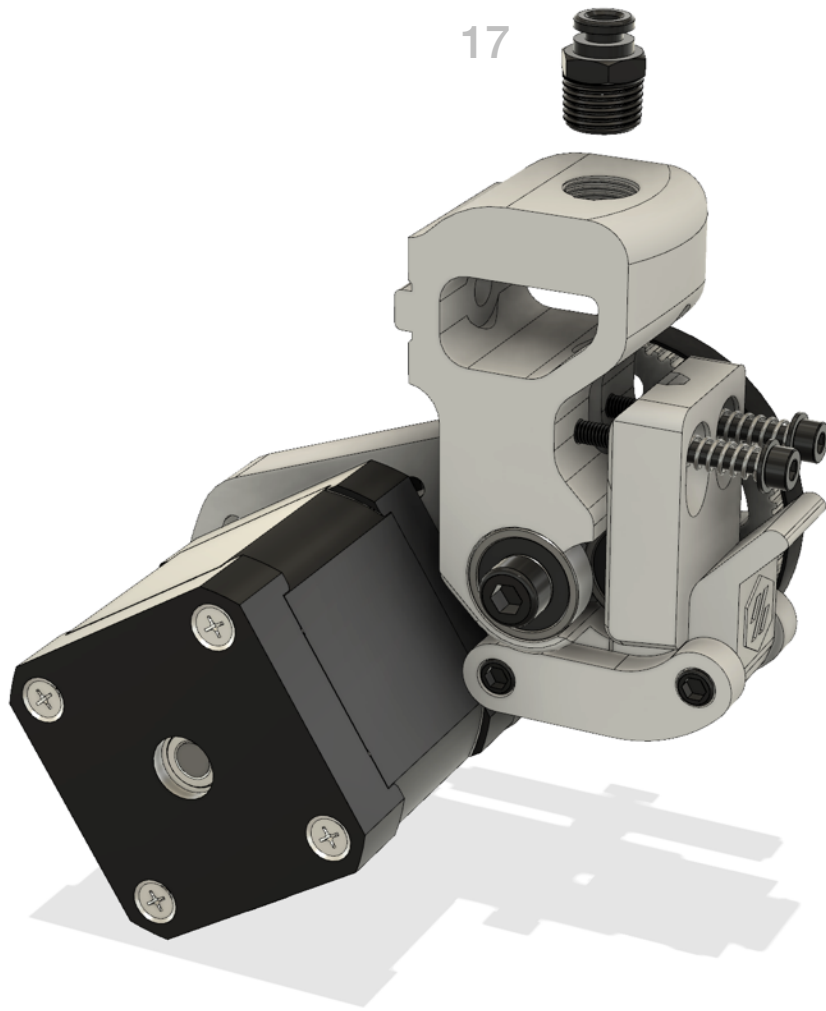
Step 15: Twist the motor towards the front of the extruder, and slip on the GT2 belt loop.



Step 16: Twist the motor away from the front of the extruder to put tension on the belt. Don't over-tighten the belt.

Now, tighten the motor screws.



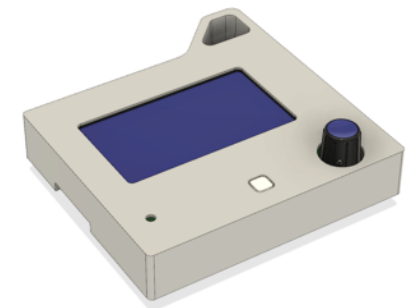


Step 17: Screw in the BSP bowden tube connector included in the E3D Chimera bag into the top of the extruder.

SECTION 7 : ELECTRONICS ENCLOSURES

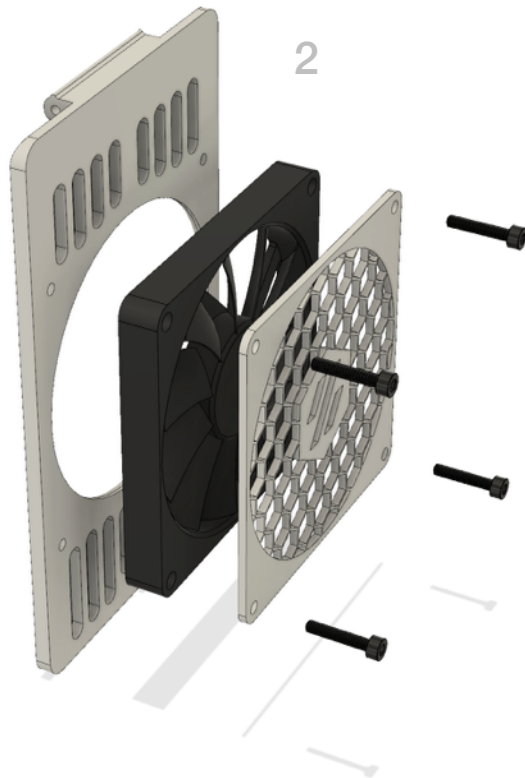
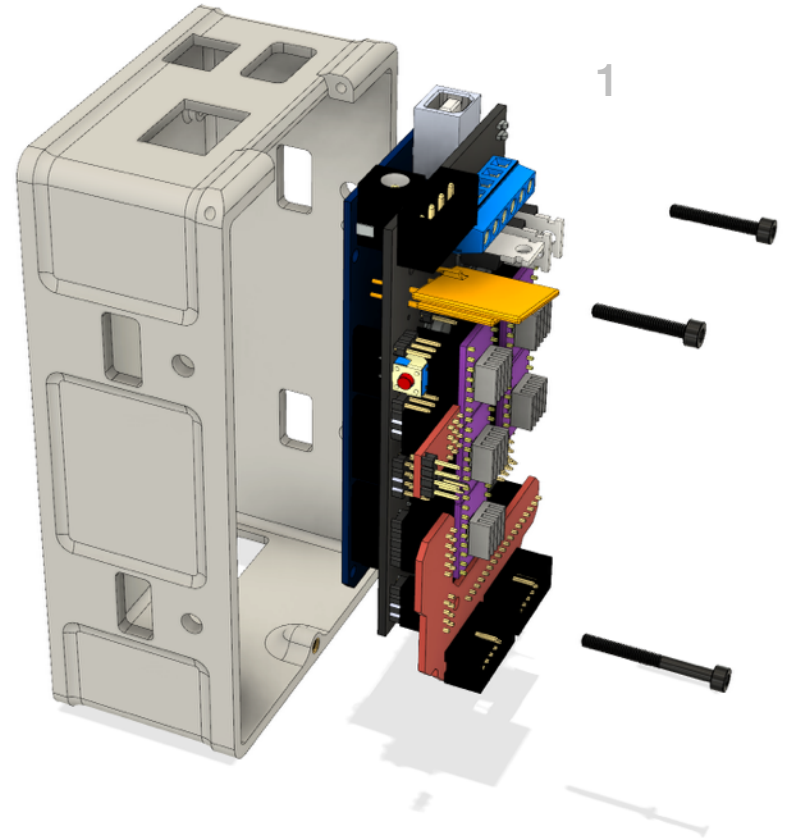
Items Required:

- RAMPs board assembly
- LCD board assembly
- RAMPs case printed parts
- Power box printed parts
- LCD case printed parts
- Power box wiring
- C14 receptacle with a switch
- Power supply
- 80mm fan
- M3 16mm screws
- M3 30mm screw
- M3 8mm screw
- M4 6mm screws



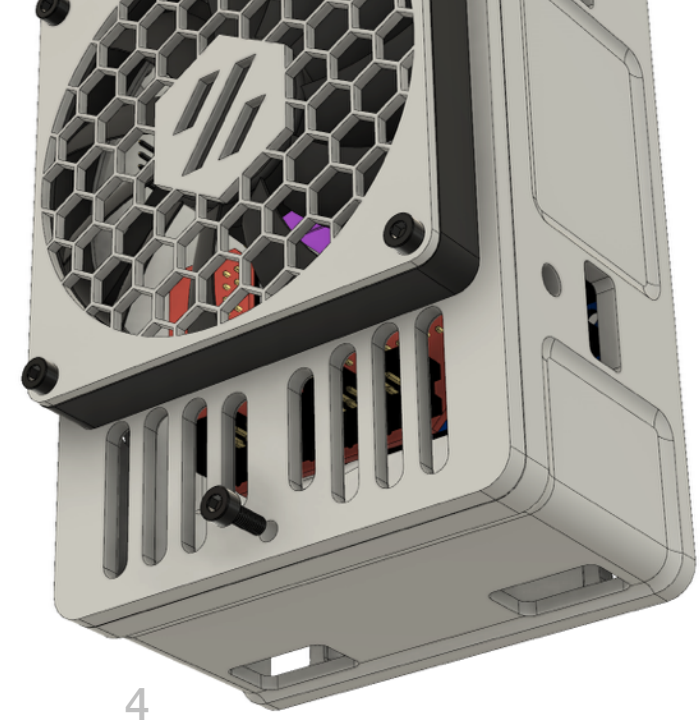
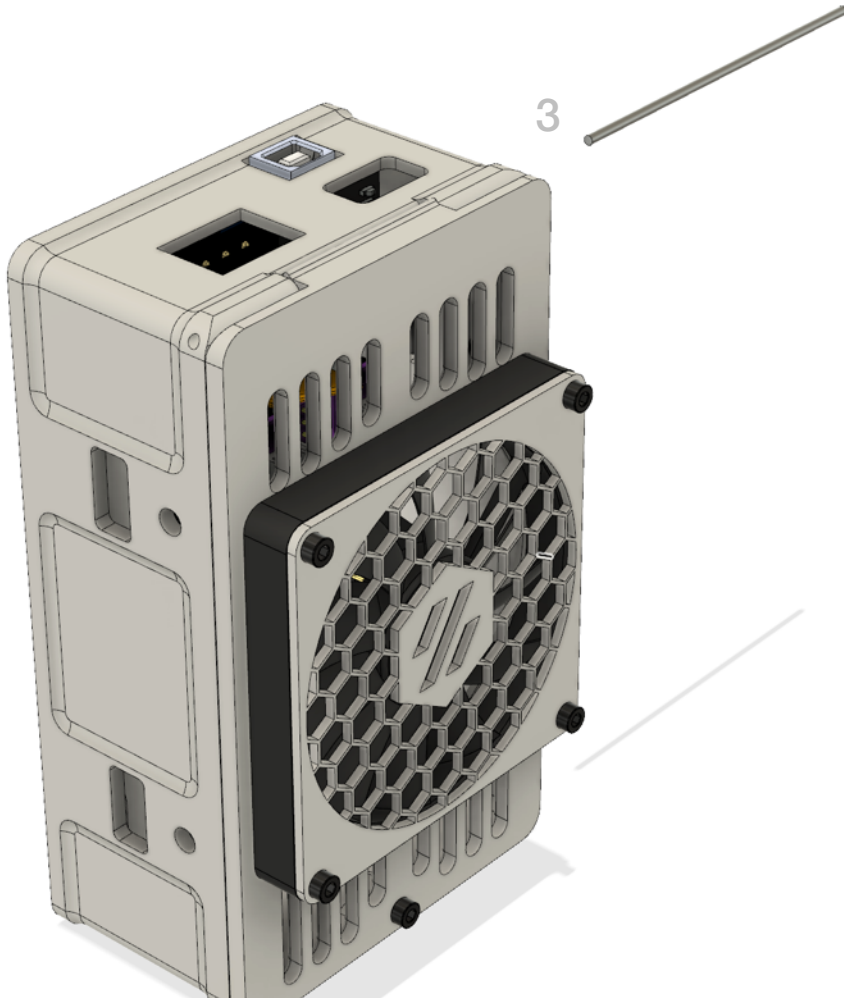
7.1 RAMPs Box

Step 1: Insert the RAMPs board assembly into the case and secure it using two M3 16mm screws and one M3 30mm screw.



Step 2: Use M3 16mm screws to secure the fan and the fan guard onto the case door.

Step 3: Use included piece of 1.75mm filament to attach the door to the case, creating a hinge. Trim the excess filament off with a knife.



Step 4: Screw in the M3 8mm screw through the door and into the brass insert at the bottom of the case. This is the lock for the RAMPs case and will keep the door closed during operation.

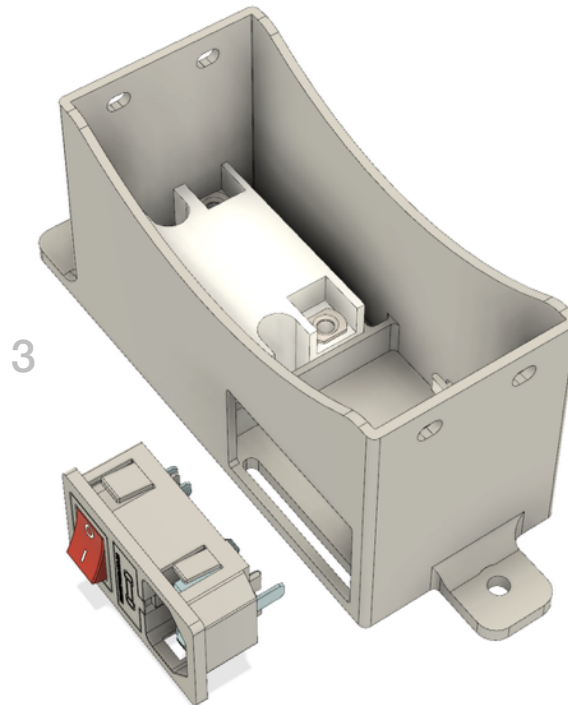
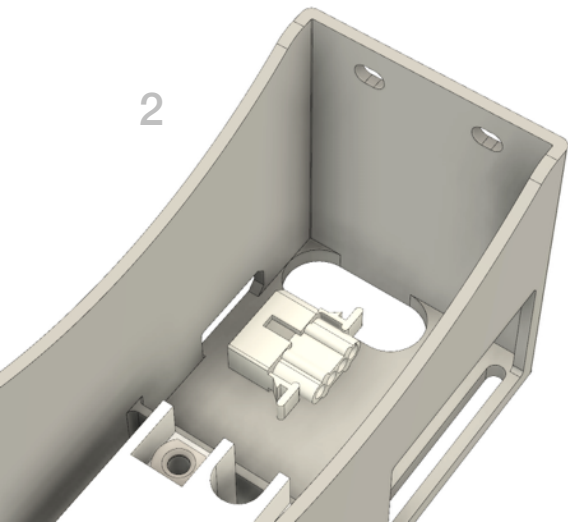
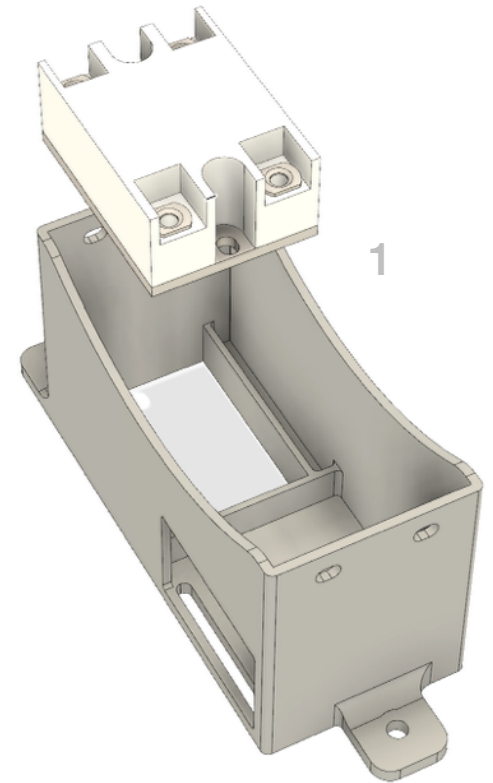
7.2 Power Box

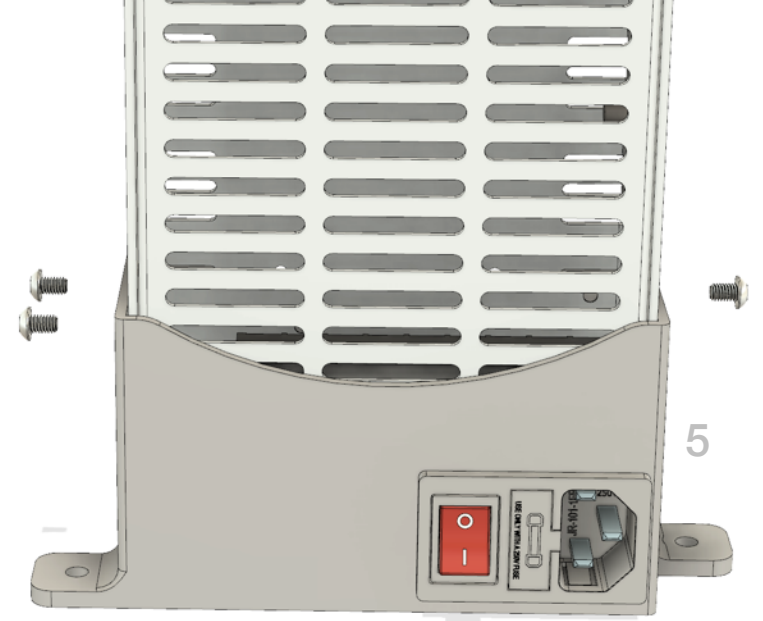
Refer to the wiring diagrams at the end for guidance on wiring up the Power Box.

Step 1: Attach the necessary wires to the SSR, and slot it into the retainer in the power box. Push it in until it's flush with the bottom of the box.

Step 2: Insert the bed harness connector into the slot on the front. You may need to shave some plastic off the edge of the hole to get the connector to engage fully.

Step 3: Plug the wires into the C14 receptacle, and push it into the opening in back of the box.



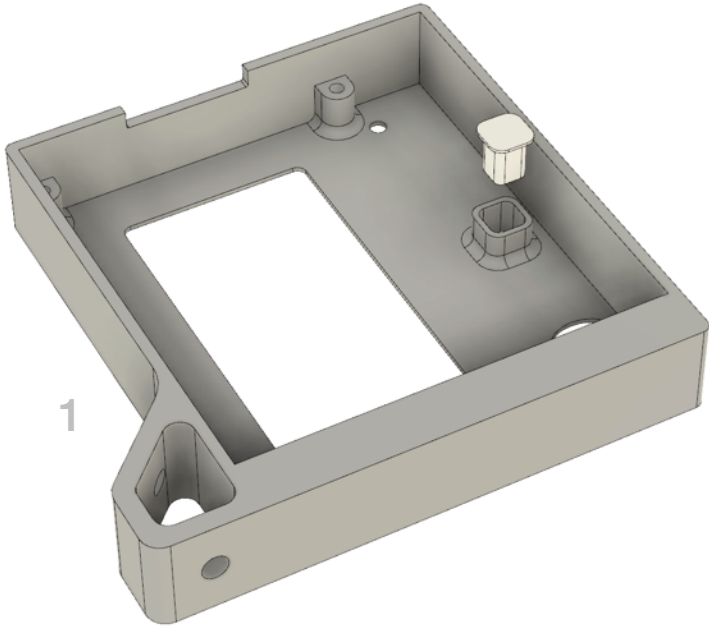


Step 4: Connect the wires to the PSU, route the outgoing wires through the oval hole in the bottom of the box, and slot the PSU into top of the box as illustrated.

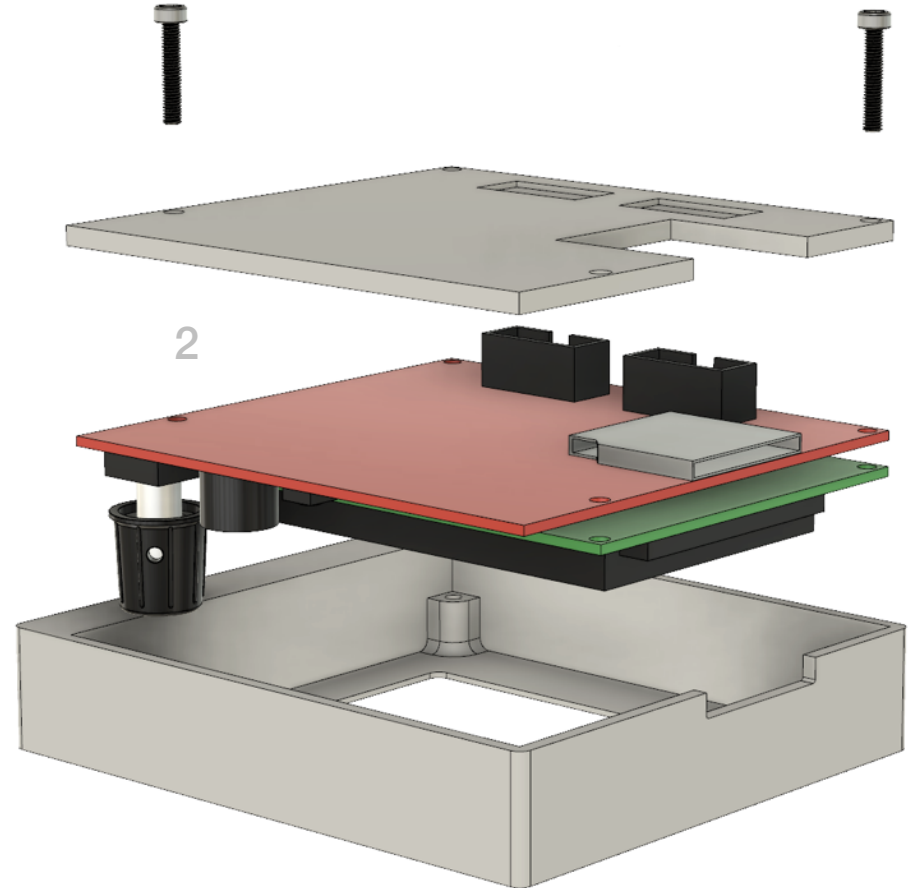
Step 5: Secure the PSU in the box with 4 M4 6mm screws.

7.2 LCD

Step 1: Drop the Kill button into the hole on the LCD case.

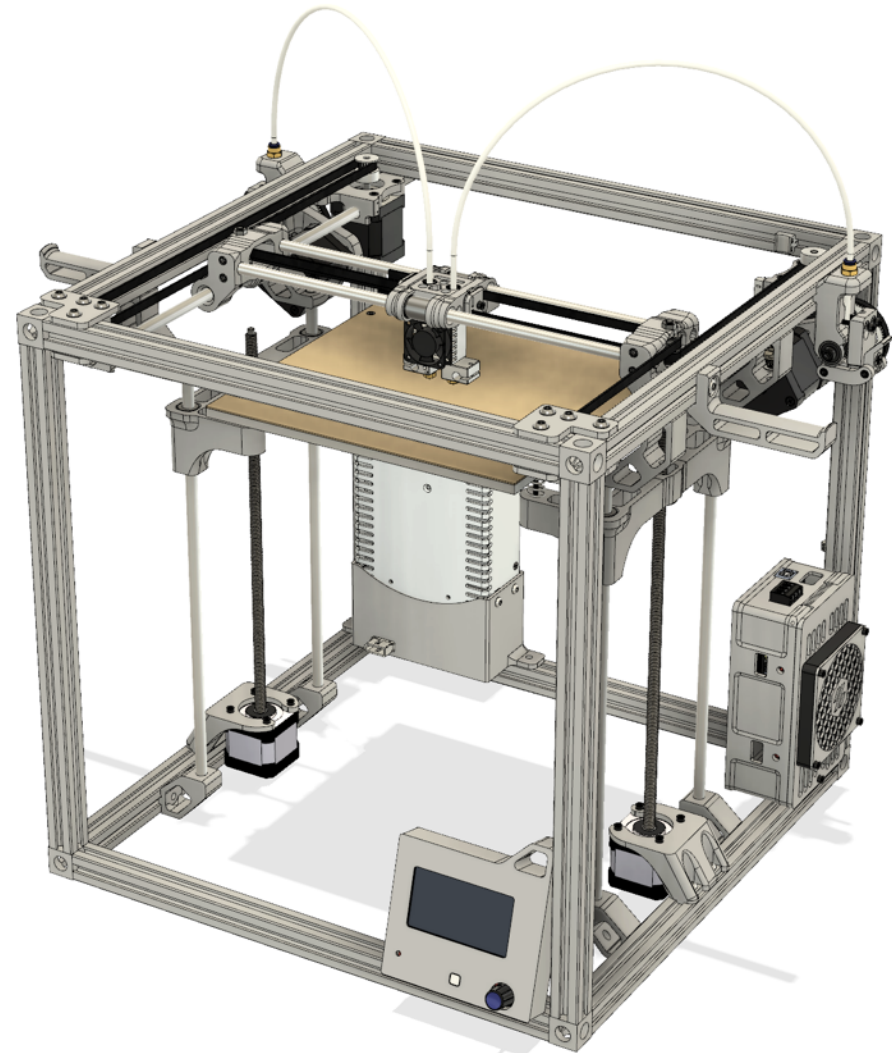


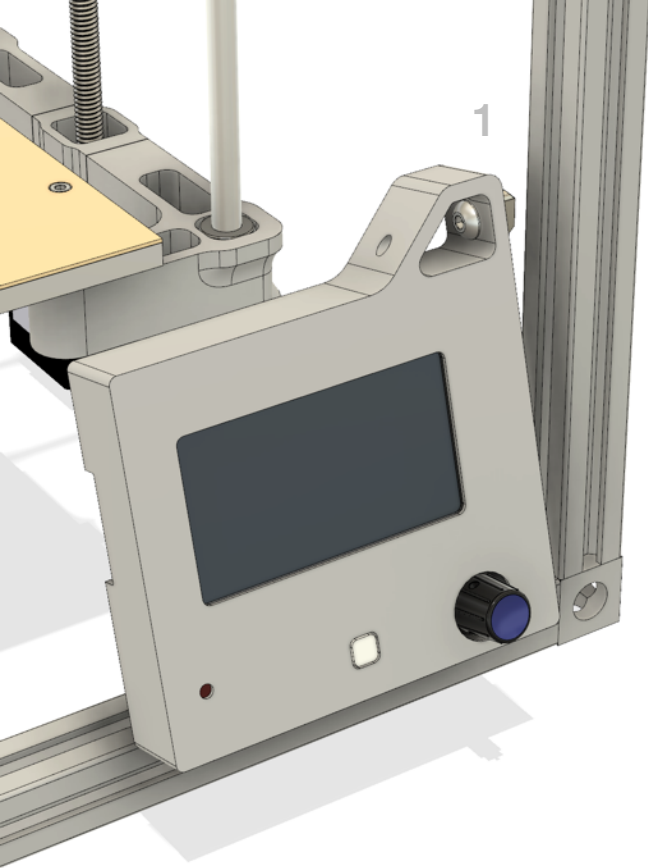
Step 2: Insert the LCD screen assembly into the case, add the back cover, and secure the whole assembly with two M3 16mm screws as illustrated. **Be careful not to damage the LCD.**



SECTION 8 : PUTTING IT ALL TOGETHER

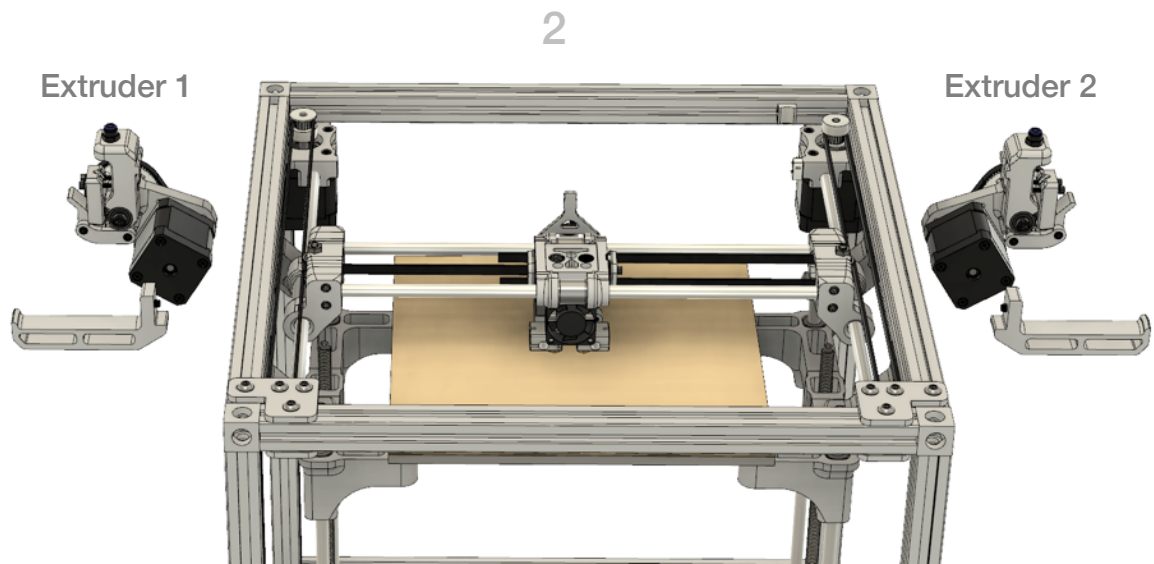
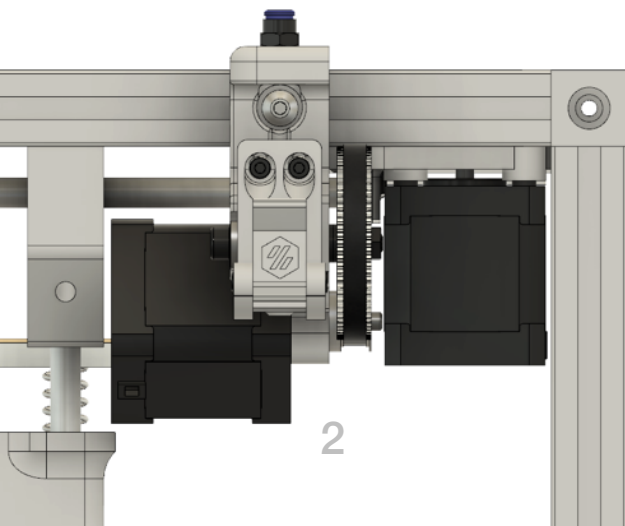
In this section we are going to mount the rest of the assemblies onto the frame, and wire the printer.



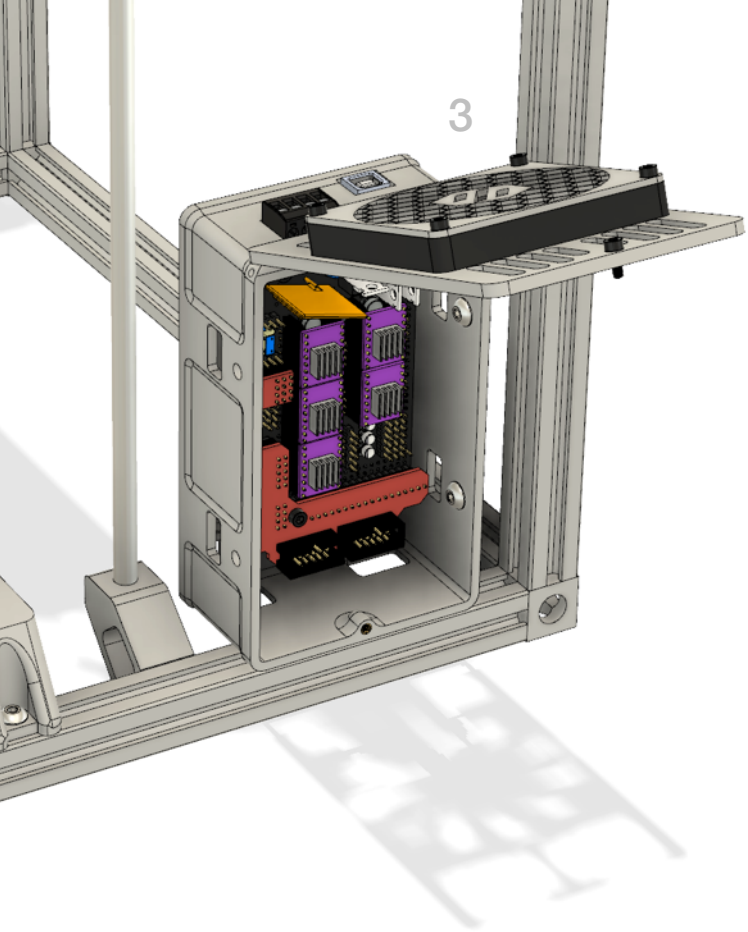


Step 1: Using the same M5 cap screw and t-nut method you've been using to attach components to the frame, install the LCD module on the front of the printer.

Step 2: Attach the extruders and spool holders to the sides. Extruders have just enough room to slide in between the A and B motors, and the rear Z shaft supports. Make sure no parts of the extruder are touching any other components. This is especially important for moving parts.



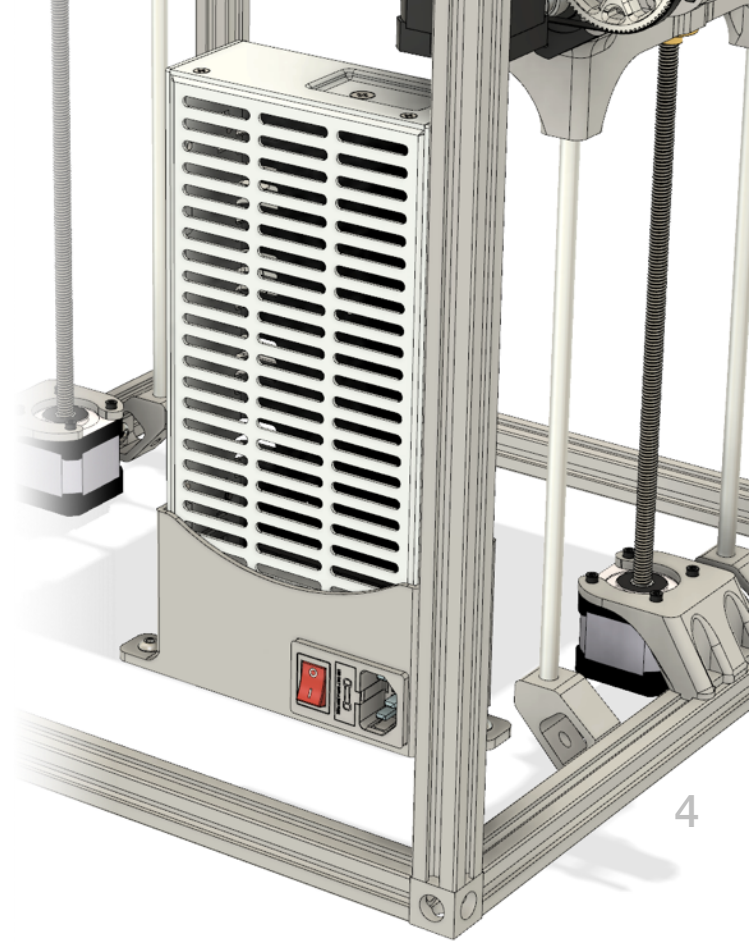
3



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Step 3: Attach the RAMPs box assembly onto the bottom of the rear right vertical extrusion.

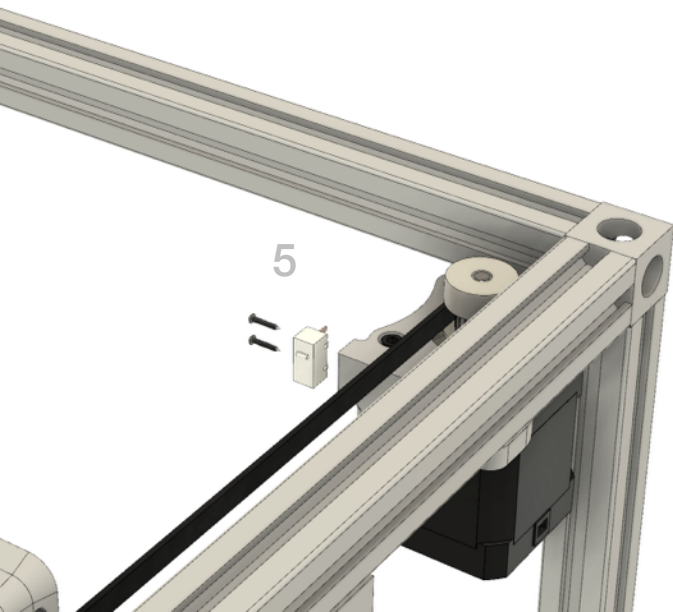
Step 4: Install the power box into left lower corner of the frame.



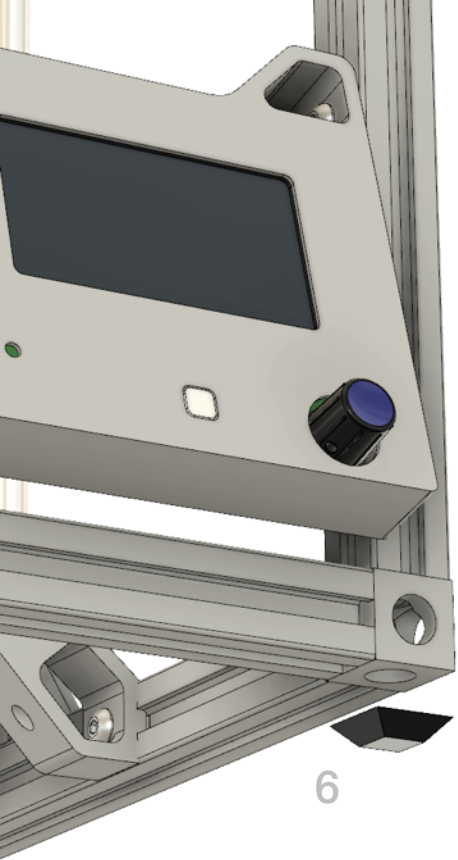
4

Step 5: Attach the Y end stop switch (the one with the longer wire) to the A motor mount.

5

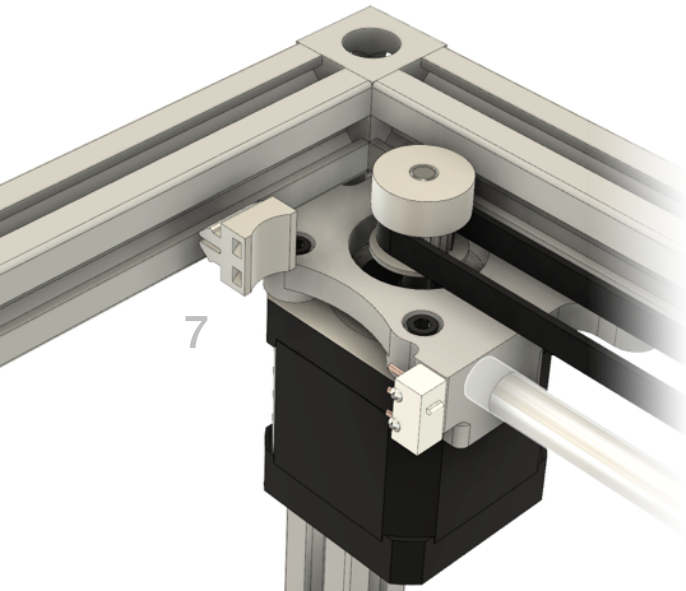


Step 6: Attach the peel-and-stick rubber feet to each lower corner cube of the frame.

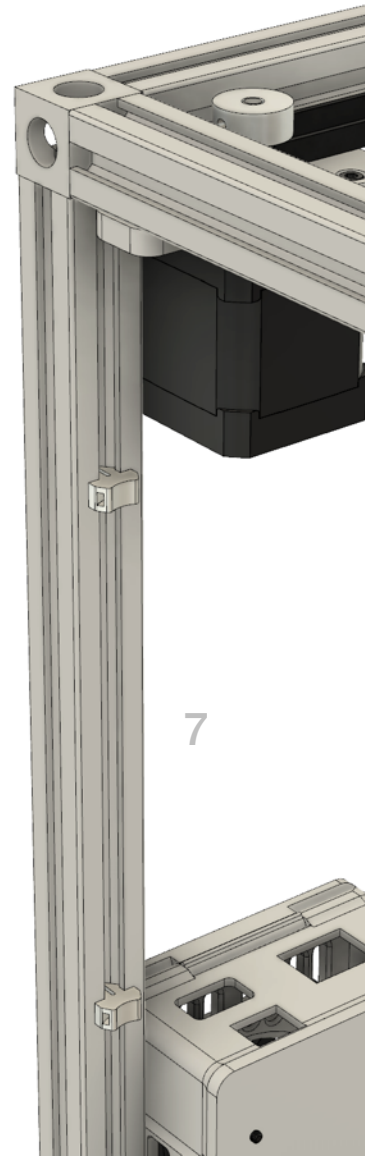


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Step 7: Snap in the X carriage harness attachment points into the frame. The 2 smaller ones go on the vertical extrusion between the A motor and the RAMPs box, and the larger anchor point snaps into the inner slot of the upper extrusion.



7



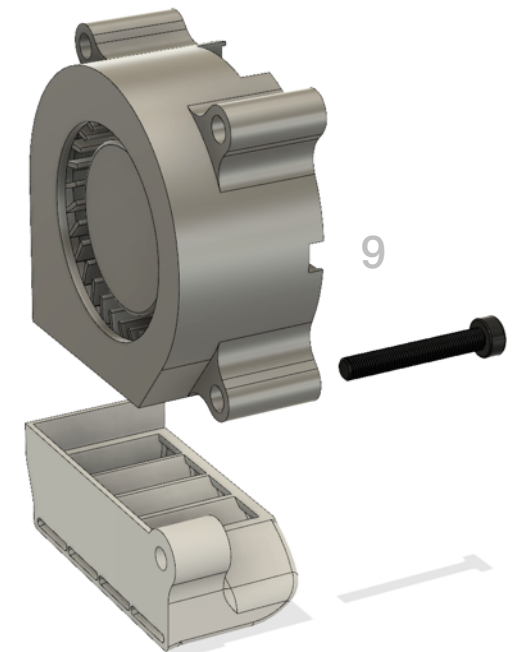
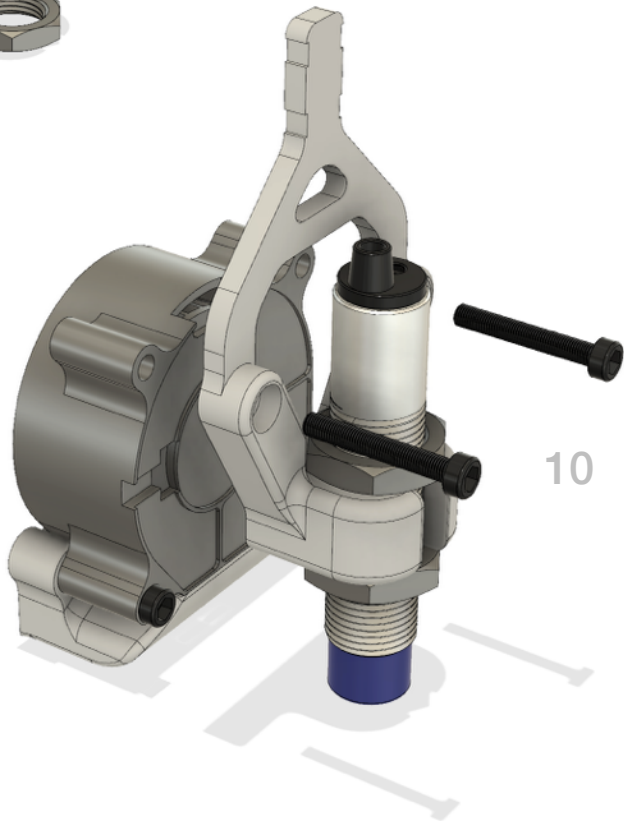
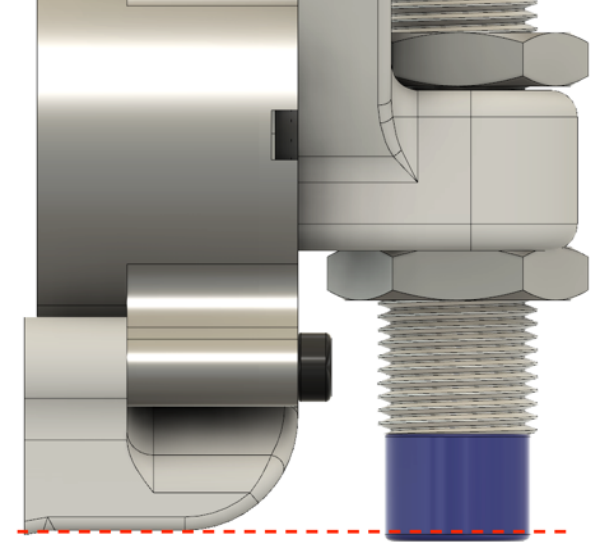
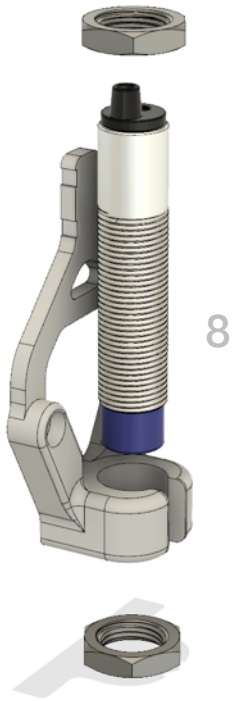
7

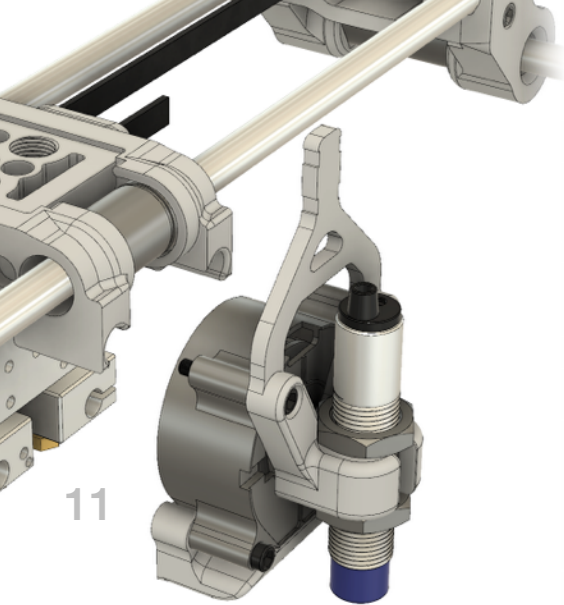
Step 8: Insert the inductive Z probe into the retainer and secure it with two nuts.

Step 9: Install the part cooling fan duct onto the blower fan using an M3 20mm screw. **Be careful.** Do not over-tighten this screw, or you run a risk of damaging the fan.

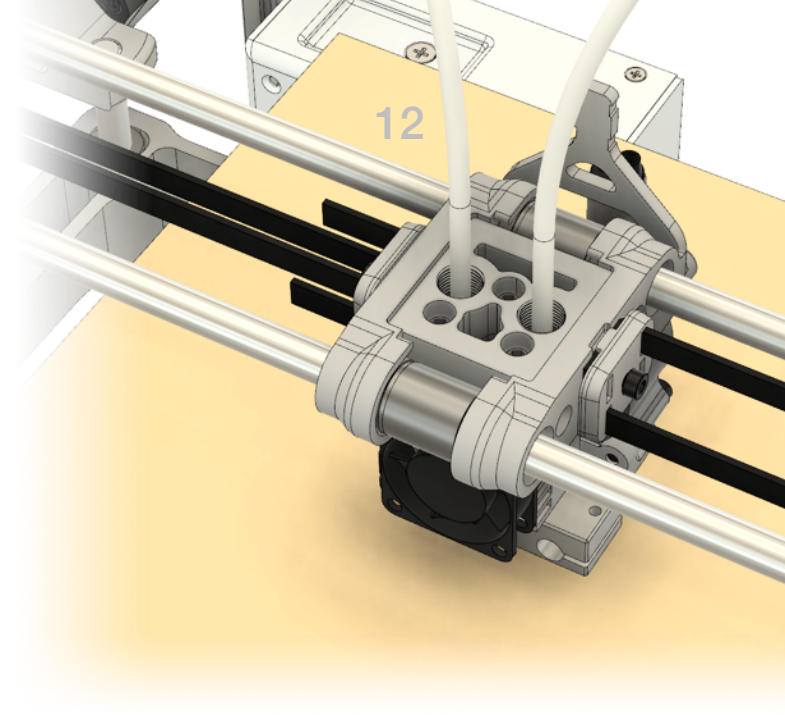
Step 10: Insert two M3 20mm screws through the Z probe mount and the fan mounting points.

Check the Z probe level. It should protrude no more than 2mm past the fan duct. If the probe is too high, you can fix this later.

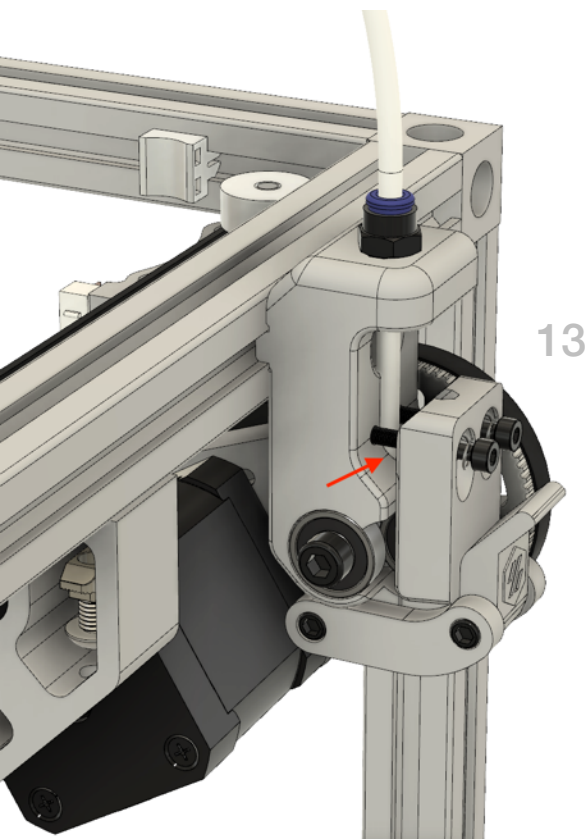




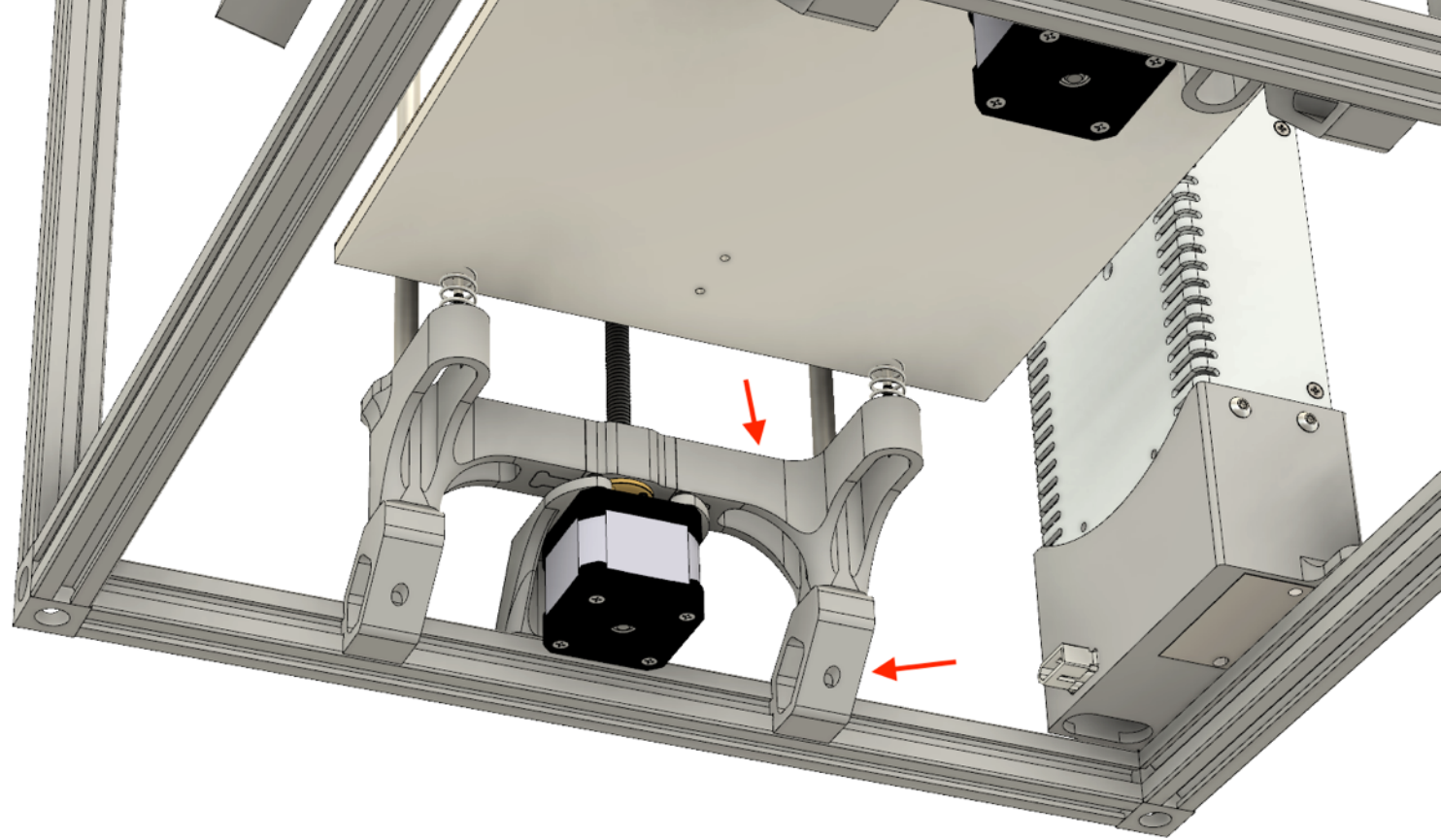
Step 11: Attach the rear X carriage components to the X carriage. Do not over-tighten this assembly.



Step 12: Insert one end of the bowden PTFE tubes into each of the holes in the hot end. Make sure you push the tubes all the way down to the heat break.



Step 13: Insert the other ends of the tubes into the extruders. Make sure to push the tubes all the way into the retainers on the main body.



Plug in the bed harness into the connector on the power box. Also connect the grounding wire to the grounding connector pigtail hanging out the power box.

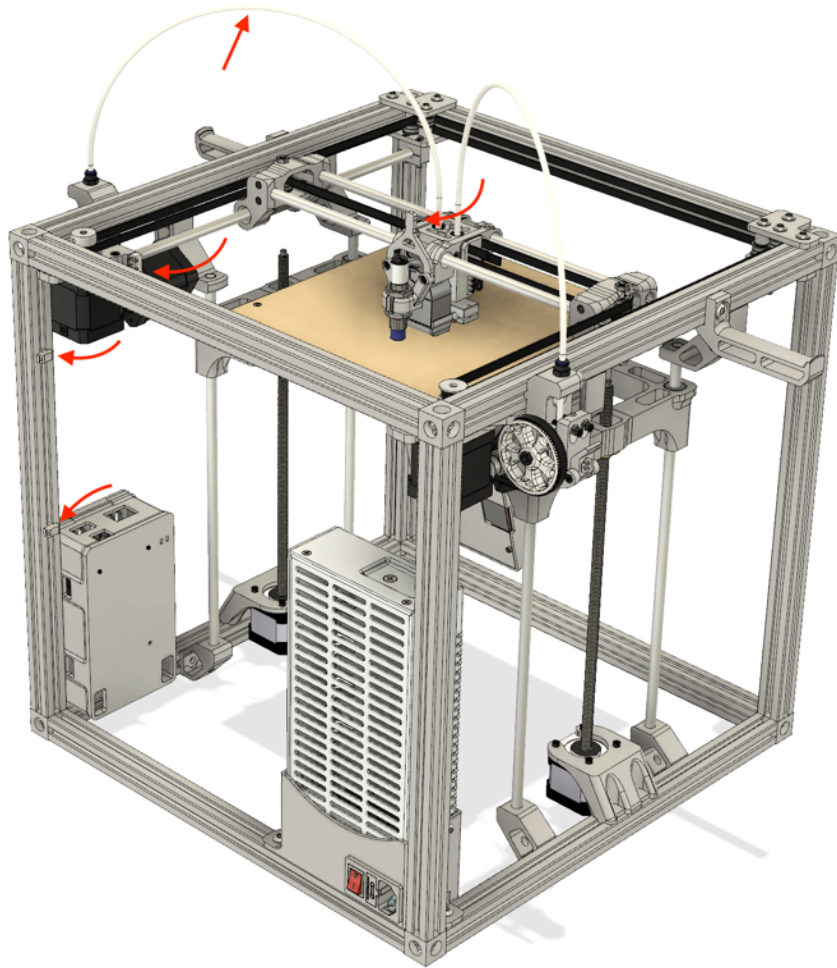
The bed harness needs to be attached at two points to relieve any wire strain. The bed carriage provides a great spot to zip tie the bed harness to.

The other side, closest to the connector, can be zip tied to the lower Z shaft support.

Make sure the wires have plenty of slack on them before tightening up the zip ties.

Route the X Carriage wire harness into the top opening in the RAMPs box. Use the indicated attachment points to secure the harness. Use one zip tie at the top of the right bowden tube to keep the cable from sagging down.

Route the rest of the wires through extrusion slots on their way to the RAMPs box, plugging the connectors in as you go. Use the RAMPs Box wiring diagram at the end to guide you.



You can use included extrusion slot covers to contain the wires inside the slots. Trim them with the knife to fit. Extra wire can be tucked into the bottom portion of the RAMPs box.

The LCD cables can be contained inside the lower slot of the bottom right extrusion. The extrusion will provide some EMI protection for those cables. It's a tight fit and won't require a slot cover. LCD cables are keyed with a red dot. Use the LCD panel diagram to figure out what plug goes on what side.

Plug the X carriage components into the harness according to the X Carriage Harness labels. Use zip ties to keep the rat's nest of cables in the rear of the X carriage contained.

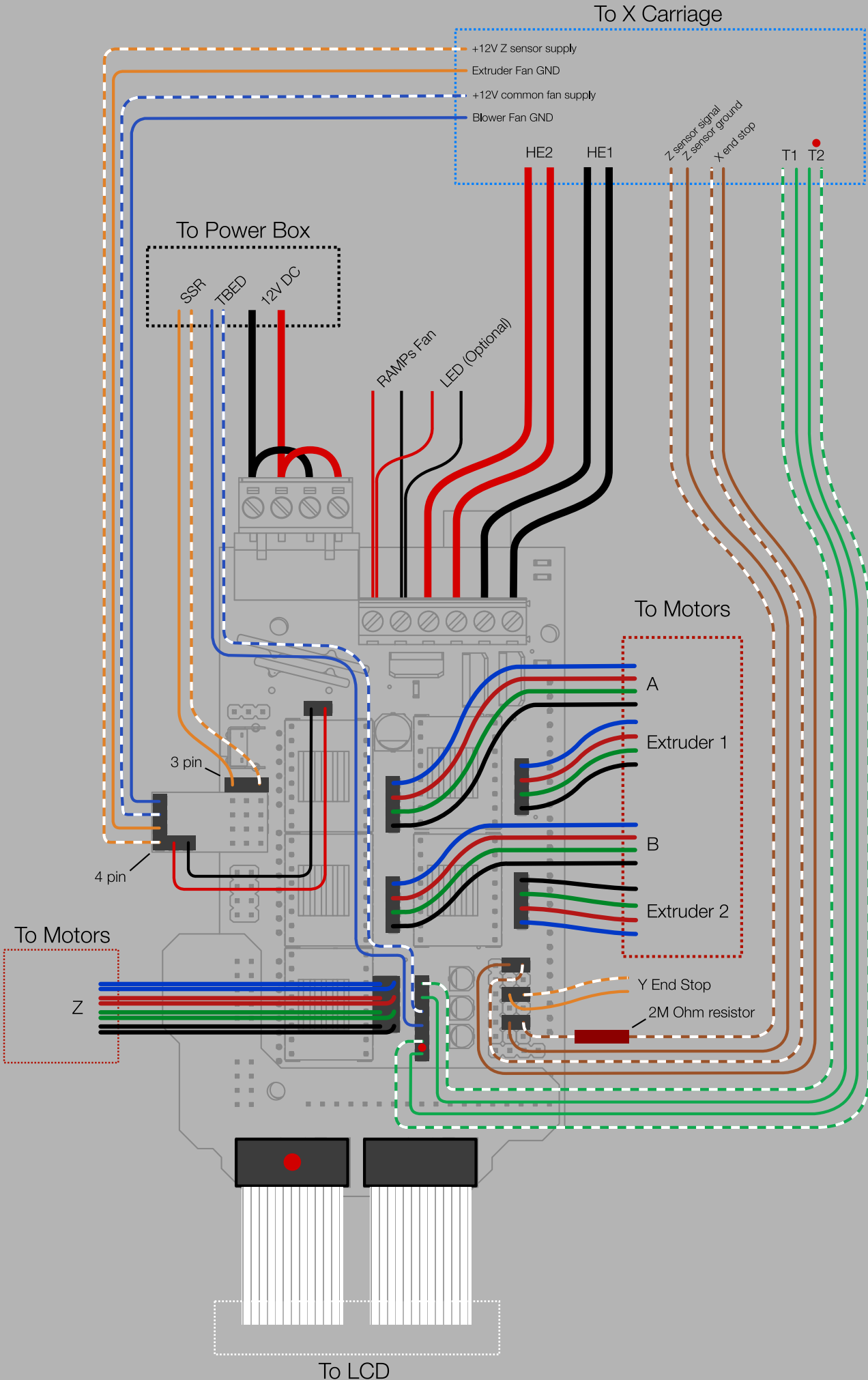
CONGRATULATIONS!

You have assembled a VORON printer. Well done! You can now plug in the power and attempt to power the machine on for the first time.

VORON

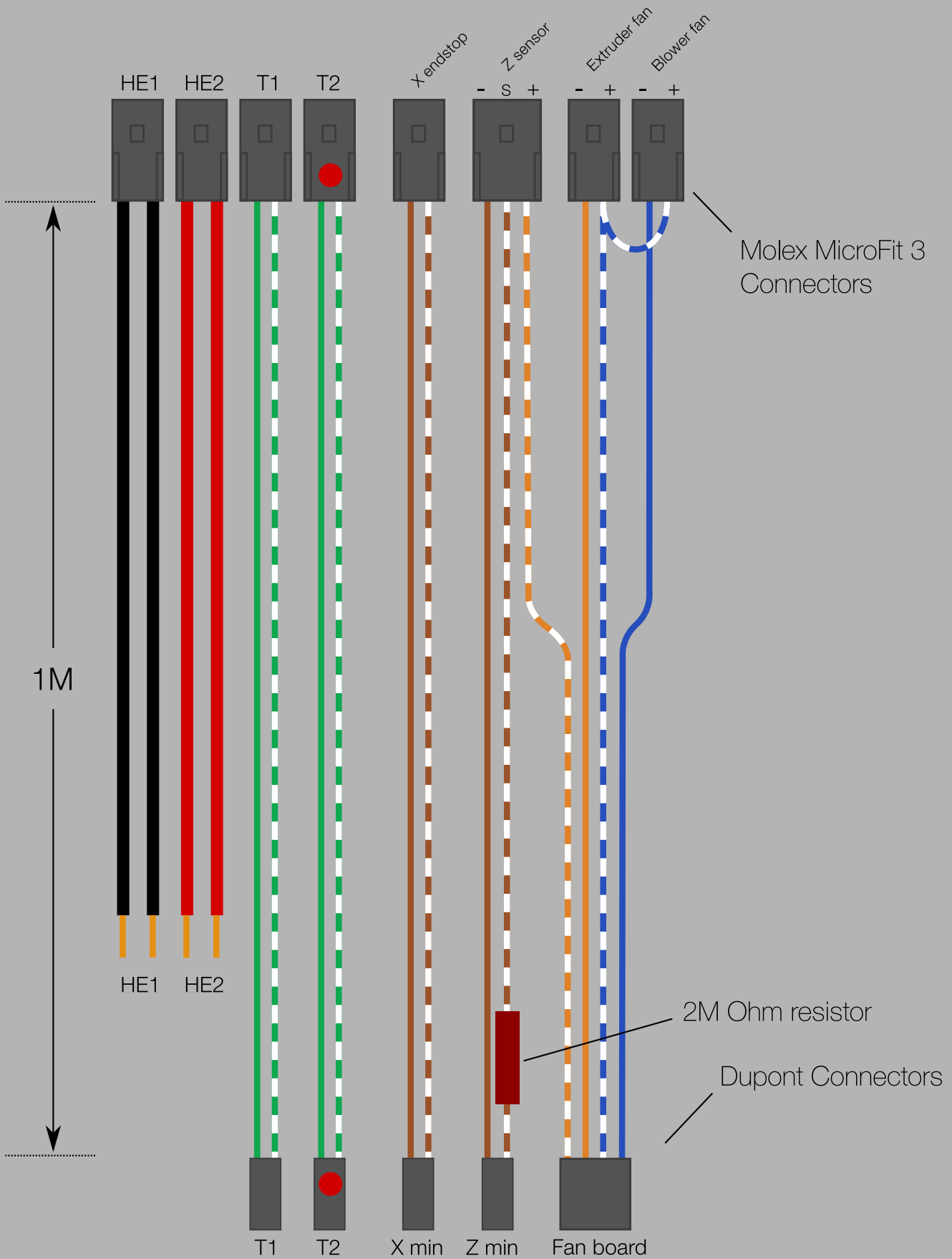
RAMPs 1.4 Wiring

+ CAT5E cable wire (26 AWG multi-stranded)
 GND CAT5E cable wire (26 AWG multi-stranded)
 20 AWG wire (multi-stranded)



VORON X Carriage Harness

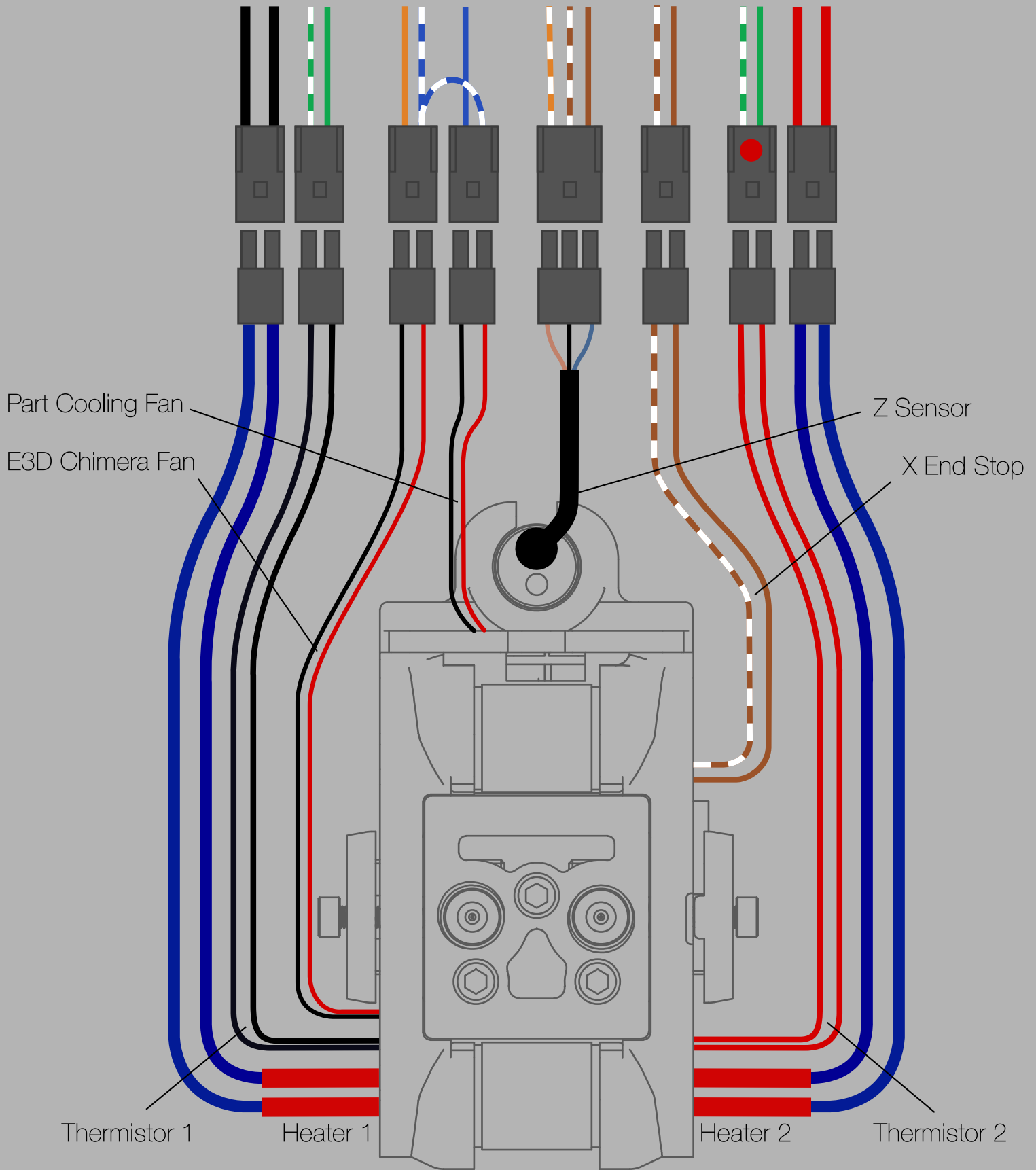
+ CAT5E cable wire (26 AWG multi-stranded)
GND
20 AWG wire (multi-stranded)



VORON

X Carriage Connections

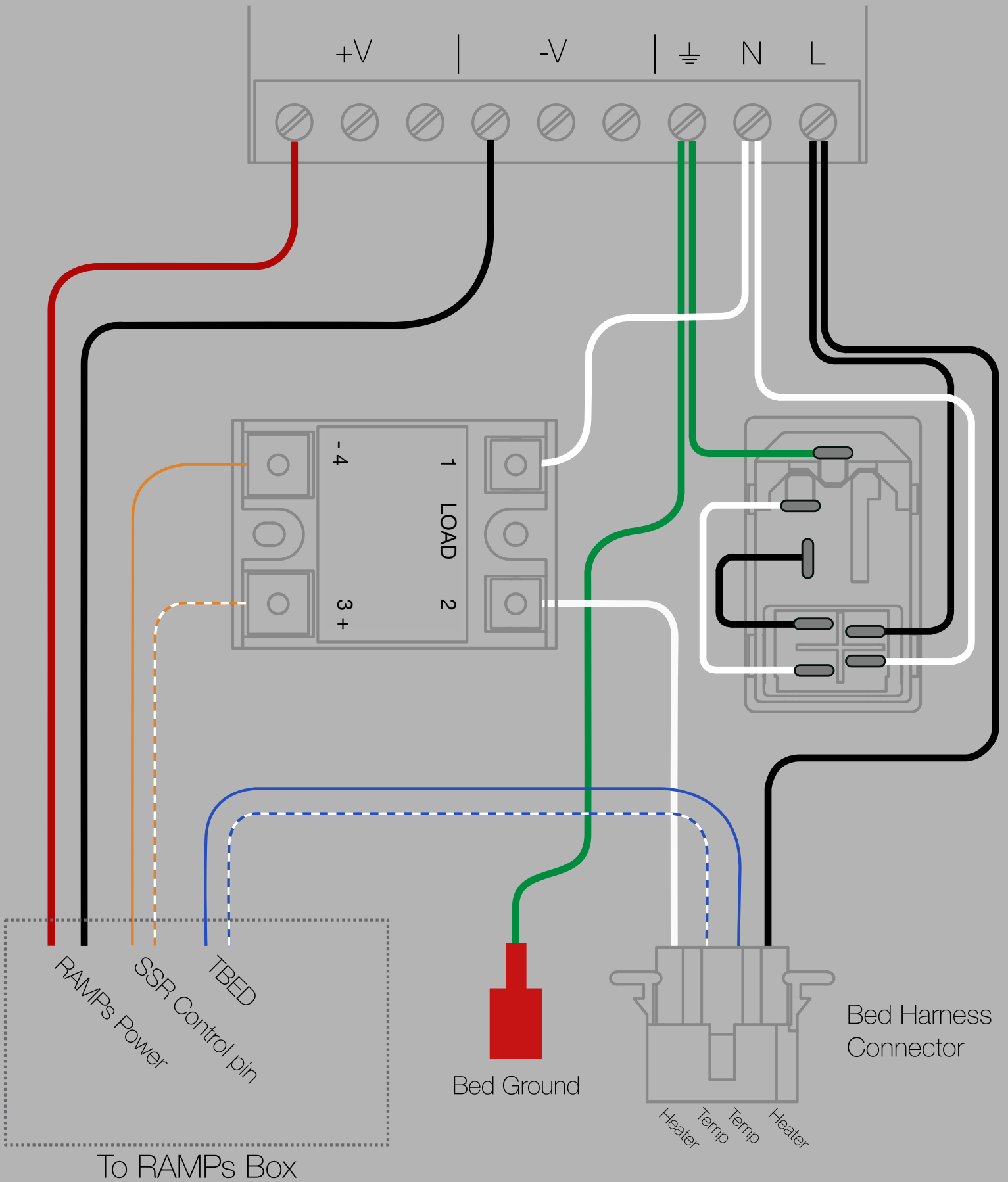
+ CAT5E cable wire (26 AWG multi-stranded)
GND 20 AWG wire (multi-stranded)



VORON

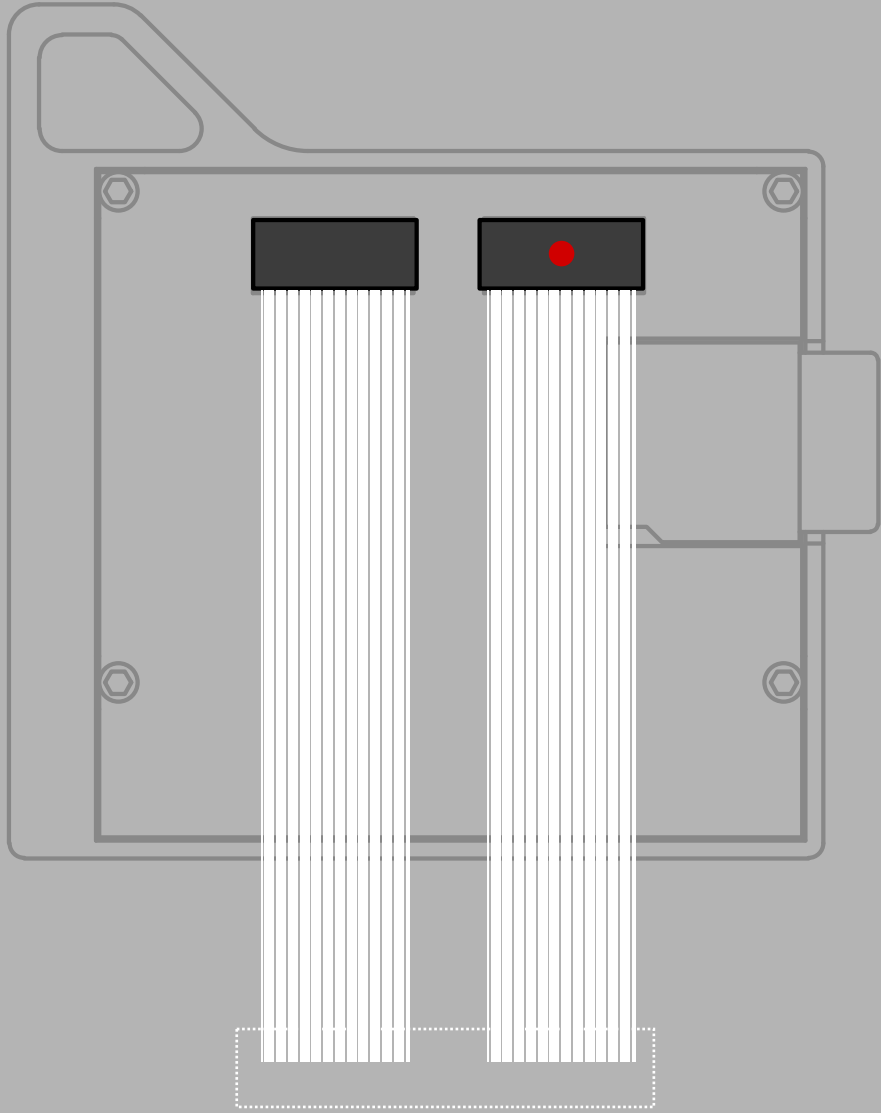
Power Box Wiring

+ CAT5E cable wire (26 AWG multi-stranded)
GND
20 AWG wire (multi-stranded)



VORON

LCD Panel



To RAMPs Box