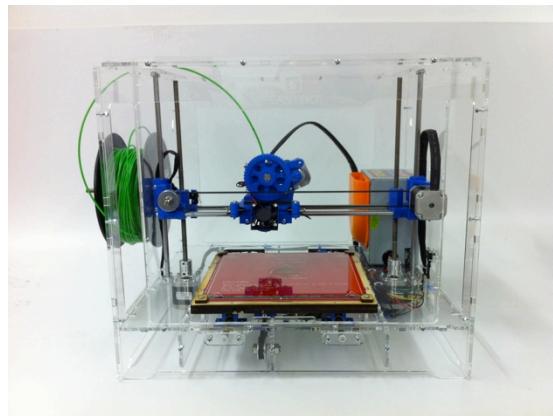




## Mendel 3D Printer Assembly



### Section 2

### X-Carriage Assembly

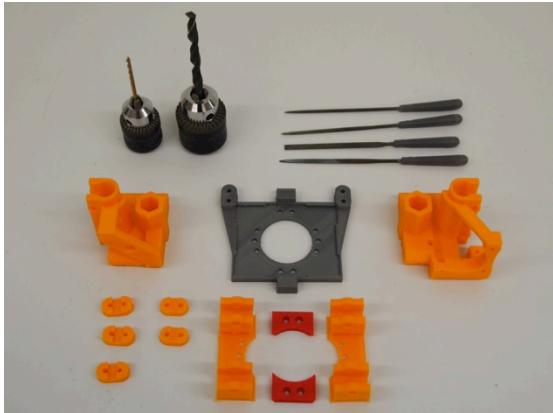
## Step 1: Cleaning X-Carriage plastic parts

### Parts Needed

- X-End-Idler
- X-End-Motor
- X-Carriage
- X-Carriage-Clamp (2 pcs)
- X-Carriage-Wedge (2 pcs)
- X-belt-channel (3 pcs)
- X-belt-clamp (2 pcs)

### Tools Needed

- Chuck with 1/8" drill bit
- Chuck with 5/16" drill bit
- Wire clippers
- Round File
- Flat File
- Triangular File
- Half Round File



Locate the plastic parts shown above. From left to right: X-end-idler, X-carriage with X-belt-clamps and X-belt-channel below it, and X-end-motor



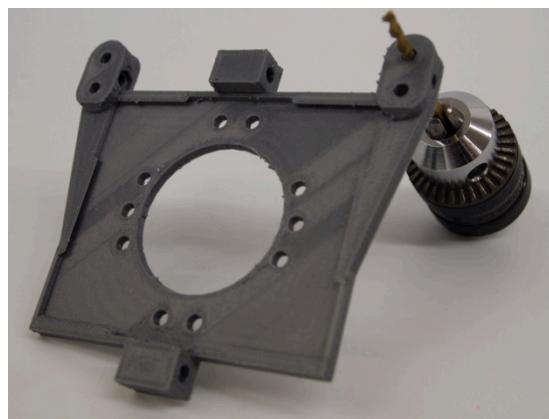
Use the chuck with the 1/8" drill bit to clean the holes for the X-belt-channels and X-belt-clamps (10 holes total)



Note the strings of plastic around the hole. Use the round file to file them away.



This is how the holes should look after cleaning them with the round file



Use the chuck with the 1/8" drill bit to clean the holes on the X-carriage-clamps. 14 holes on the top as shown on this picture,



Use the chuck with the 1/8" drill bit to clean 2 holes on the side (clamp socket holes) as shown in this picture.

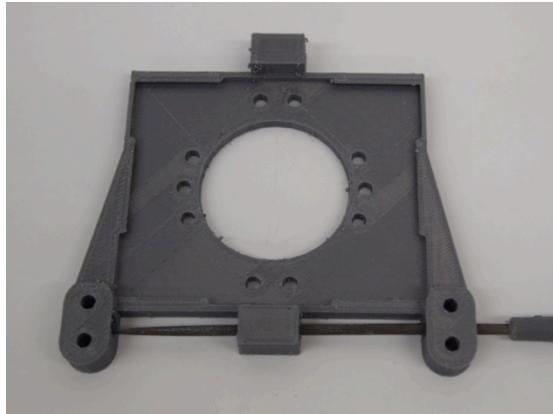
## Step 2: Cleaning X-Carriage plastic parts (Cont.)

### Parts Needed

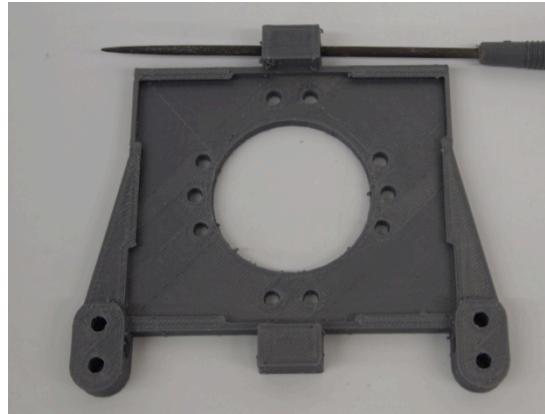
- X-Carriage

### Tools Needed

- Chuck with 1/8" drill bit
- Wire clippers
- Round File
- Flat File
- Triangular File
- Half Round File



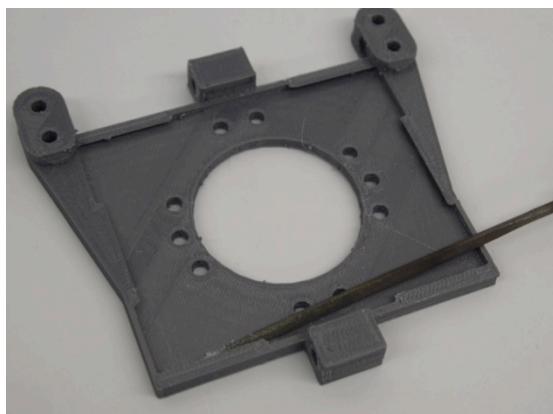
Use the round file to cleanup the hole for the fan mount. Insert the round file thru the clamp hole to reach the fan mount hole.



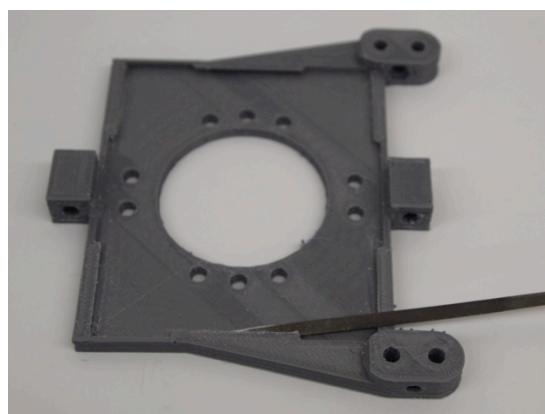
Clean the other fan mount hole as well.



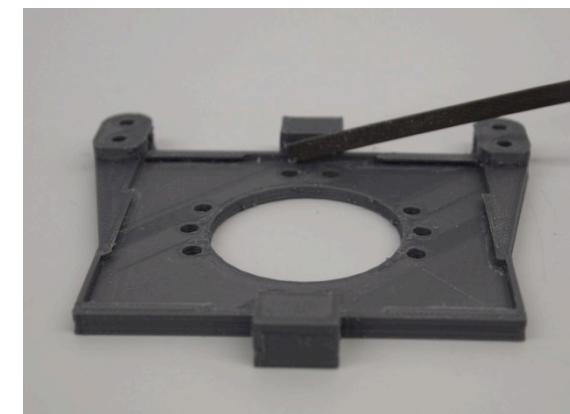
Use the flat file to clean the faces of the fan mounts. 4 faces total, 2 on each fan mount.



Use the triangular file to clean the dovetails from any grubs or imperfections. You need to clean 4 of them, one on each corner.



With the same triangular file clean the lateral dovetails as well (2 of them, one on each side)



Clean the walls on the middle sections using a flat file.

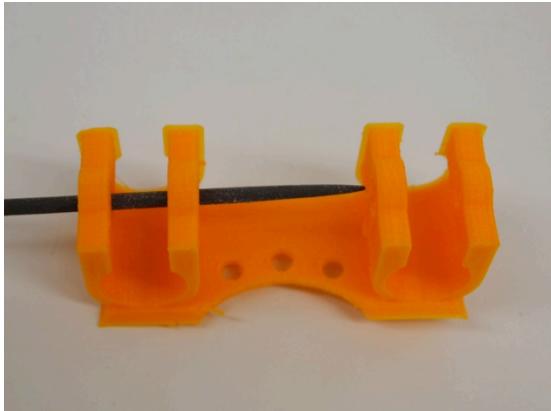
## Step 3: Cleaning X-Carriage plastic parts (Cont.)

### Parts Needed

- X-Carriage-Clamp (2 pcs)
- M3 Hex Nuts (4pcs)

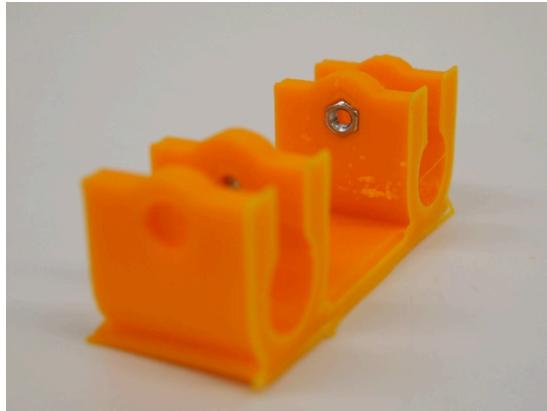
### Tools Needed

- Chuck with 1/8" drill bit
- Chuck with 5/16" drill bit
- Wire clippers
- Round File
- Flat File
- Triangular File
- Half Round File

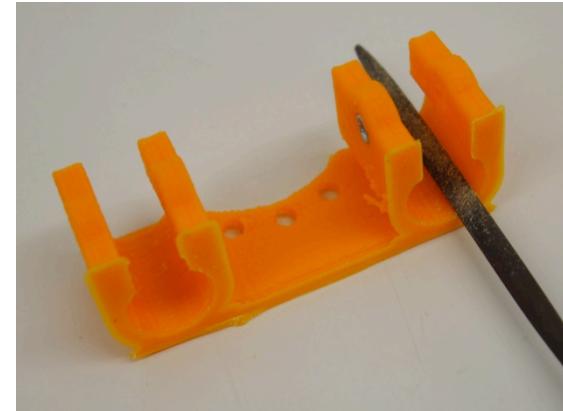


Use the round file to clean the clamp holes.  
Clean the screw head recessed holes as well.

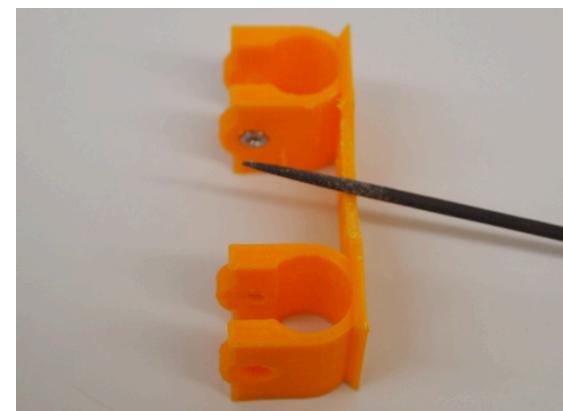
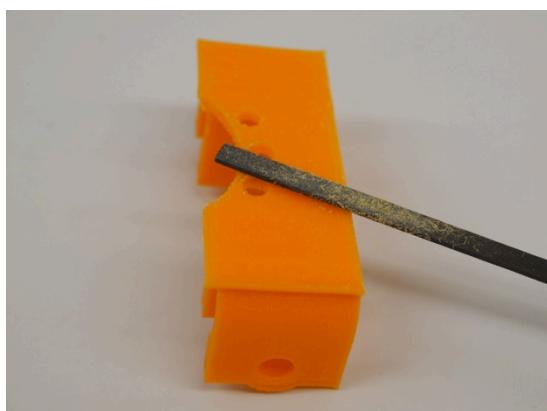
Note there are 2 of these pieces.



Insert M3 Hex nuts on clamps (one on each internal side for a total of 2 nuts). Note there are 2 plastic parts like this so repeat for the second one. (total 4 nuts).



Use the half round file to remove any imperfections on the clamp walls.



Use the flat file to clean any blobs or imperfections on the dovetails.

Use the flat file to remove any imperfections or blobs from the base.

Clean the 3 holes on the base using the round file. Clean the semicircle as well.

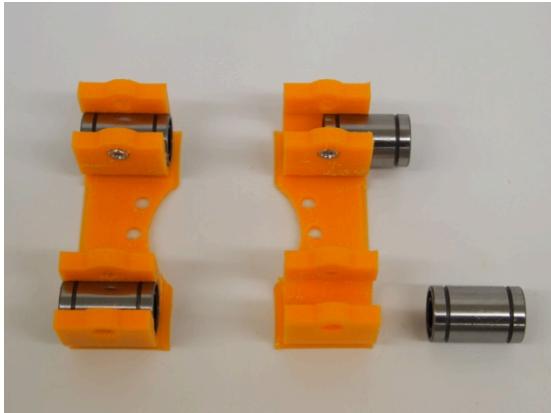
## Step 4: Assembling the X-Carriage plastic parts

### Parts Needed

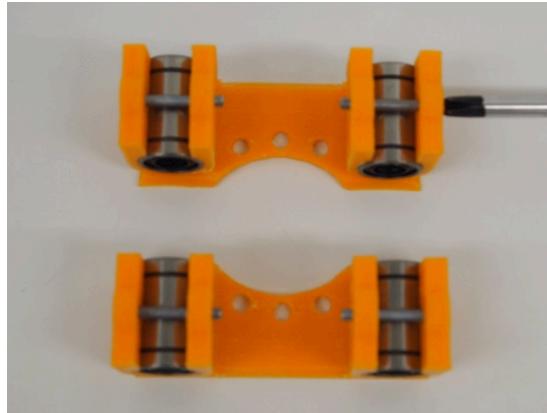
- X-Carriage
- X-Carriage-Clamp (2 pcs)
- X-Carriage-Wedge (2 pcs)
- Linear Bearings (4 pcs)
- M3 x 20mm screws (4pcs)

### Tools Needed

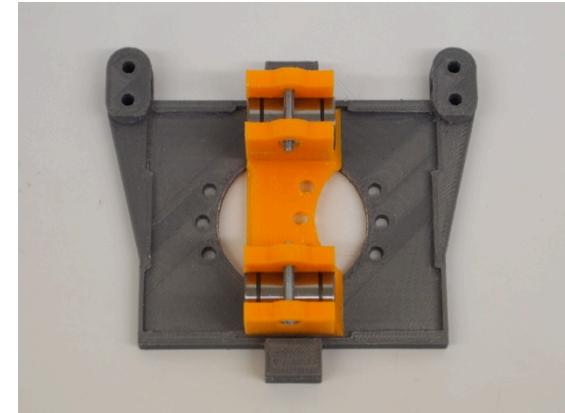
- Chuck with 1/8" drill bit
- Round File
- Philips screwdriver



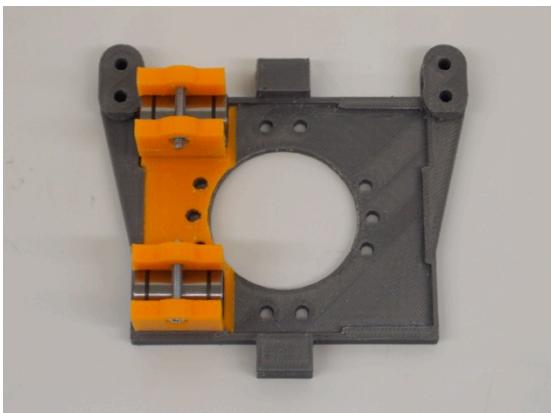
Insert linear bearings through side like so.



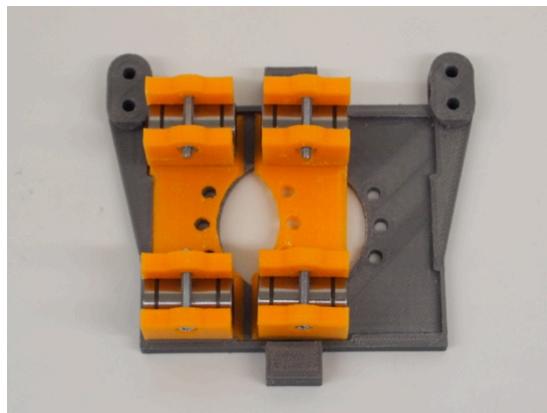
Use M3 x 20 mm screws to clamp the linear bearings into place. **Note:** you want the linear bearings to stay in place but don't over tighten.



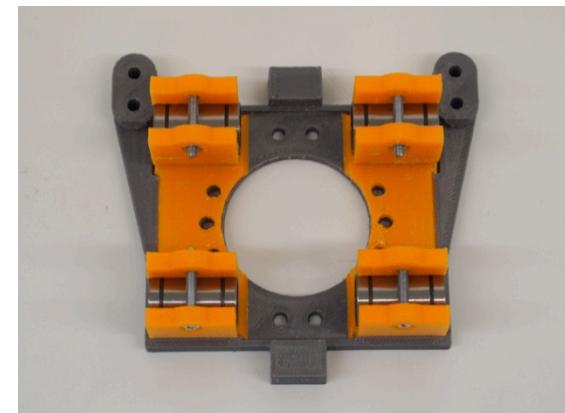
Insert one of the clamps into the x-carriage platform using the middle section where there is no dovetail.



Slide the clamp into the dovetails. If you have problems getting it in, you might want to re-check the dovetails for imperfections or blobs and file away.



Position the second clamp in the middle section.



Slide the second clamp into the dovetails.

## Step 5: Assembling the X-Carriage plastic parts (Cont.)

### Parts Needed

- X-Carriage-Wedge (2 pcs)
- M3 x 8 mm screws (2 pcs)
- M3 Hex Nuts (4pcs)

### Tools Needed

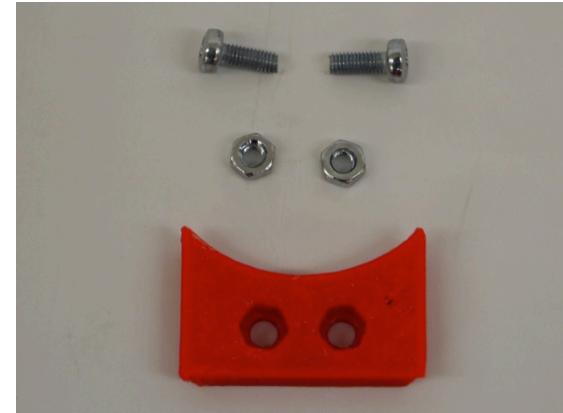
- Chuck with 1/8" drill bit
- Round File
- Half Round File
- Philips screwdriver



Take the wedges (2 pcs) and clean the walls of any blobs or imperfections using a round file.



This is how it should look once cleaned.  
Compare to previous picture.



Take a cleaned wedge, 2 M3 x 8mm screws and 2 M3 hex nuts



Insert the nuts into the nut traps using the screws to help pull them in.



This is how the wedge should look with the nuts inserted. Repeat for the second wedge.

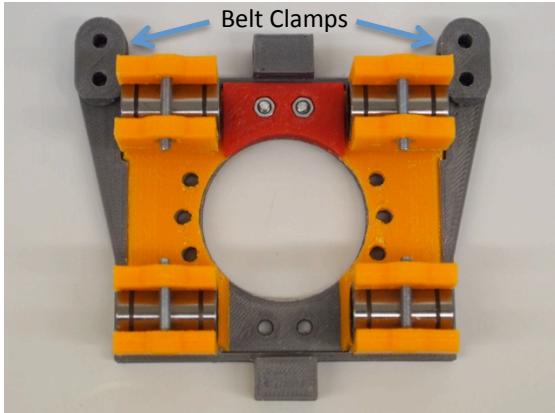
## Step 6: Assembling the X-Carriage plastic parts (Cont.)

### Parts Needed

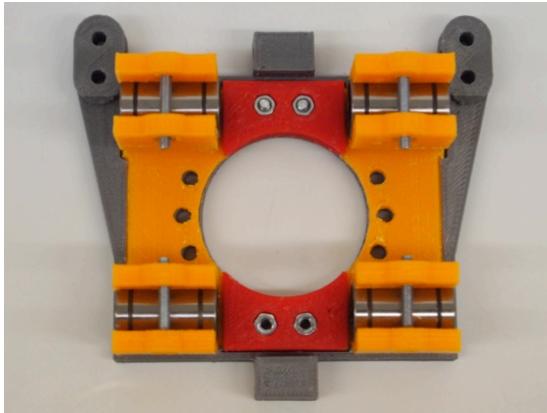
- X-Carriage Assembly
- X-Carriage-Wedge (2 pcs)
- M3 x 16 mm screws (2 pcs)
- M3 x 8 mm screws (2 pcs) from previous page

### Tools Needed

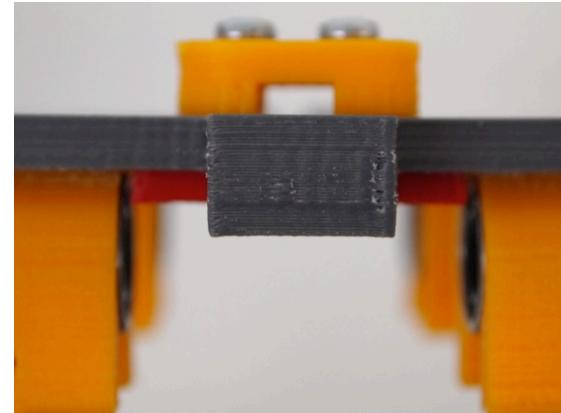
- Philips screwdriver



Install the first wedge using M3 x 8mm screws. This wedge is on the same side as the belt clamps on the X carriage assembly.



Place the second wedge on the side opposite to the belt clamps.



Flip the assembly over and position the wire clamp, insert 2 M3 x 16mm screws and tighten loosely (these screws will grind on the smooth rods if tightened all the way and will have wires in between to take up slack).

## Step 7: Installing Fan Holders

### Parts Needed

- X-Carriage Assembly
- Fan Holder (2 pcs)
- M3 Hex Nuts (2 pcs)
- M3 x 25 mm screws (2 pcs)

### Tools Needed

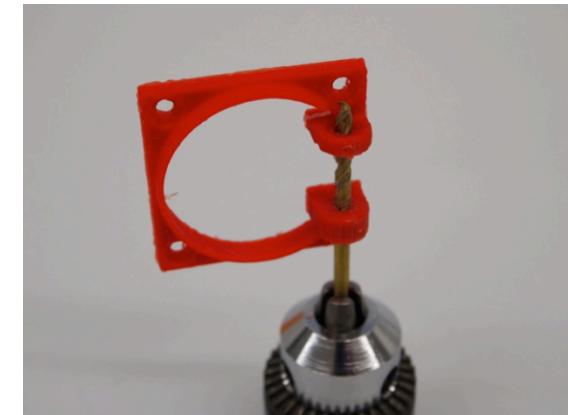
- Chuck with 1/8" drill bit
- Round File
- Flat File
- Triangular File
- Half Round File
- Philips screwdriver



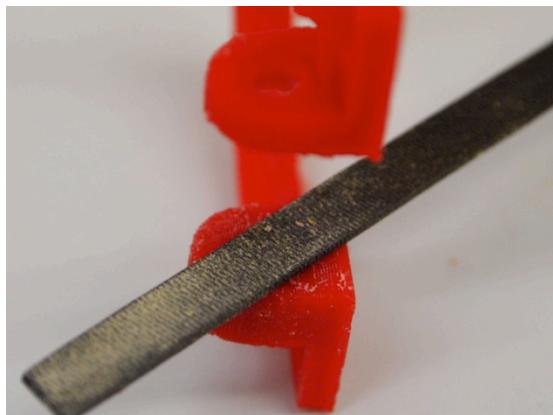
Find the Fan holders, m3 nuts, and M3 x 20 mm screws.



Use the chuck with the 1/8" drill bit to clean the 4 holes on each Fan holder.

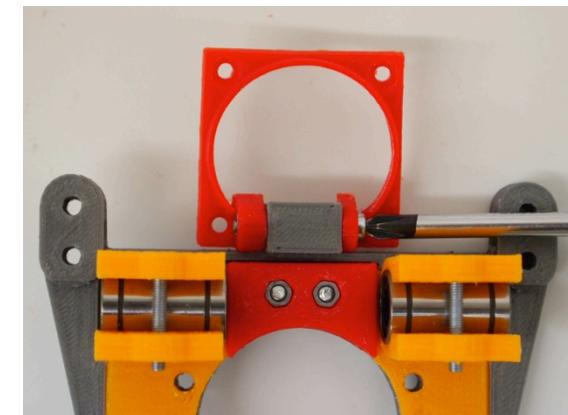


Using the same chuck drill out the last 2 holes.



File the inside of the fan holder on each side using a flat file as well as file the inside of the nut trap as it will most likely have a blob in it which could cause issues.

Place a nut in the trap. Again make sure there is no blob in trap this could cause the part to split/ brake.



Using a M3 x 25 mm screw attach the fan holder so that it can still move but will hold its position. Repeat for other side.

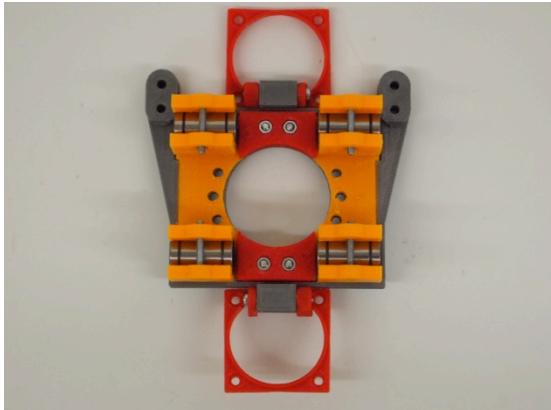
## Step 8: Assembling the X-Carriage plastic parts (Cont.)

### Parts Needed

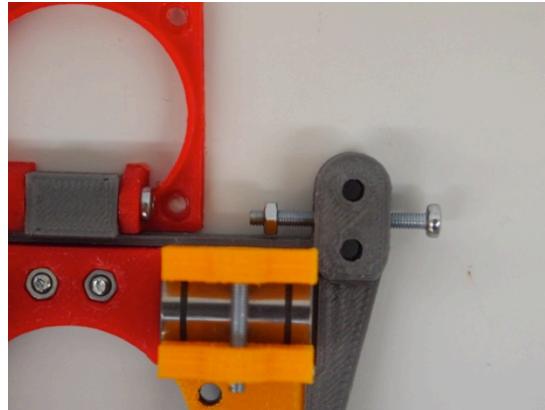
- X-Carriage Assembly
- M3 x 30 mm screws (2pcs)
- M3 Hex Nut (2 pcs)

### Tools Needed

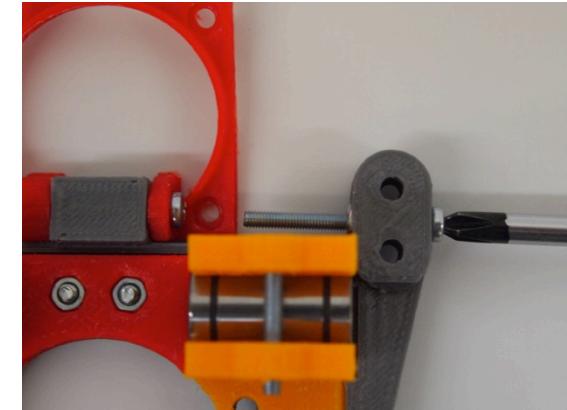
- Philips screwdriver



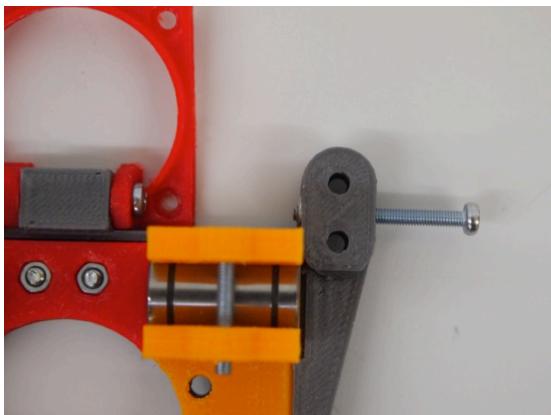
Your Carriage should now look like this.



Insert a screw thru the clamp socket and screw an M3 nut.



Align the M3 nut to the nut trap and use the screwdriver to screw-in to press fit the nut.  
Repeat for the other clamp socket.



Back the screw almost all the way out.

## Step 9: X-Belt-Clamp



Using a pair of visegrip pliers press a nut into the trap



Insert a screw through the clamp socket and screw into the nut, then using a screwdriver screw-in to press fit the nut into the nut trap.

### Parts Needed

- X-belt-clamp (2 pcs)
- M3 Hex Nuts (4 pcs)
- M3 x 12 mm screw (1 pcs) for alignment

### Tools Needed

- Visegrip pliers
- Philips screwdriver



This is how the nut should look once press fitted. Repeat process for second belt clamp

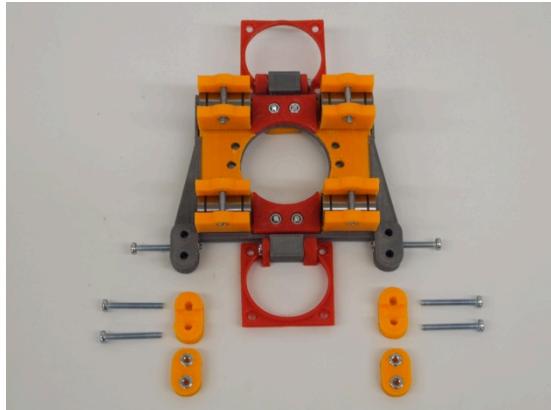
## Step 10: Assembling the X-Carriage plastic parts (Cont.)

### Parts Needed

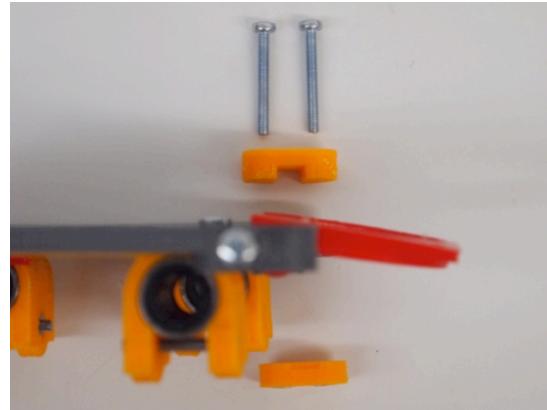
- X-Carriage Assembly
- X-belt-channel (2 pcs)
- X-belt-clamp (2 pcs)
- M3 x 25 mm screws (4 pcs)

### Tools Needed

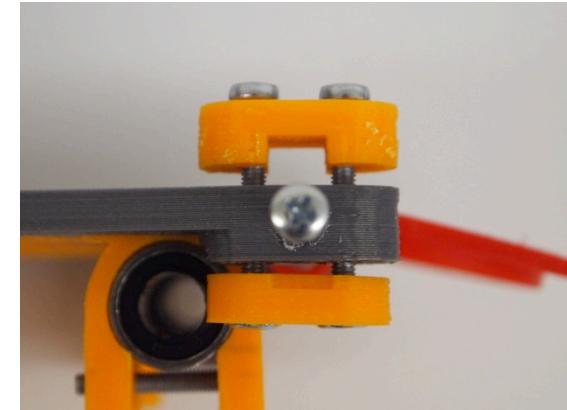
- Philips screwdriver



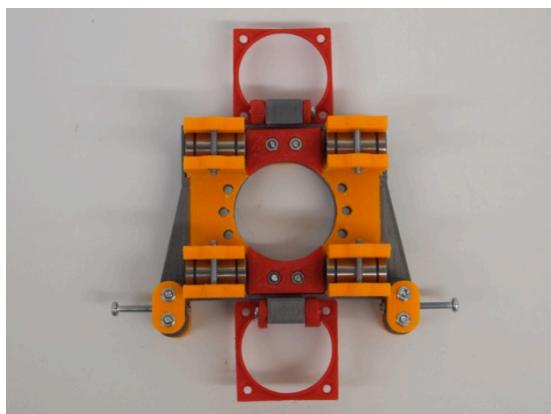
Locate the following parts. From top to bottom: X-Carriage Assembly, Belt Channels (2 pcs) with M3 x 25mm screws and Belt Clamps (2 pcs).



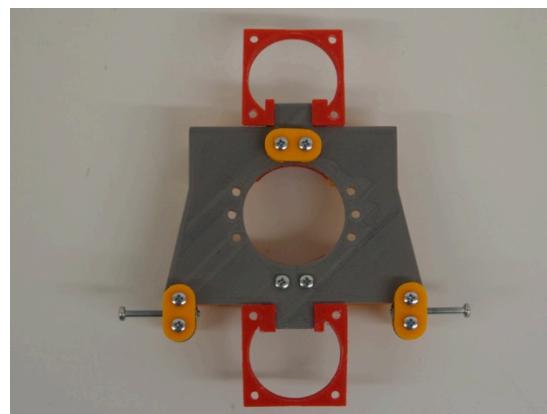
Insert M3 x 25mm screws into Belt Channel, then X-Carriage belt socket and into Belt Clamp as shown on this picture and next one.



This is how it should look. As you can see the screws are very loose. Repeat for second clamp.



This is the bottom view of the finished assembly.



This is the top view of the finished assembly.

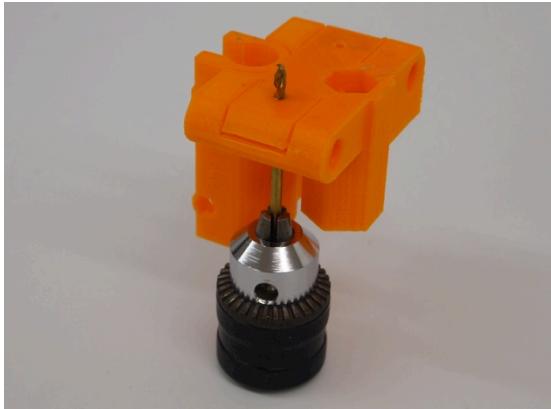
## Step 11: Cleaning X-End-Idler plastic part

### Parts Needed

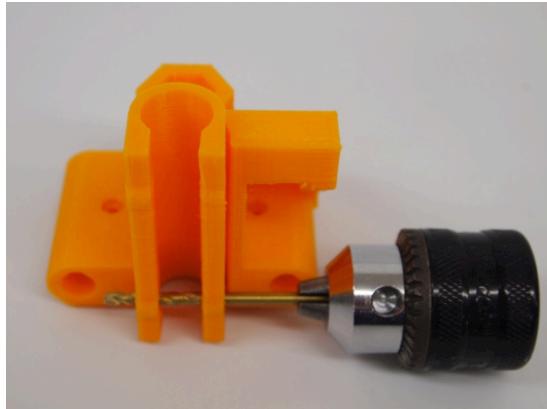
- X-End-Idler

### Tools Needed

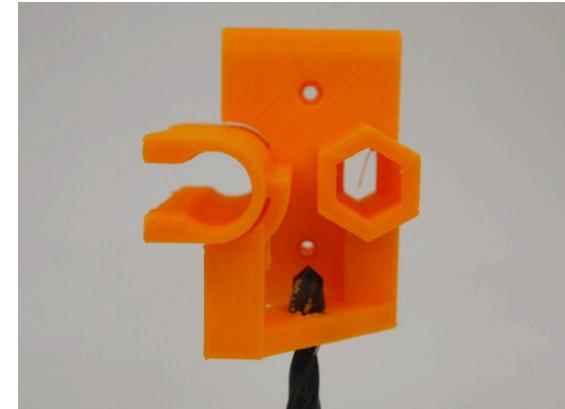
- Chuck with 1/8" drill bit
- Chuck with 5/16" drill bit
- Round File
- Flat File
- Triangular File
- Half Round File



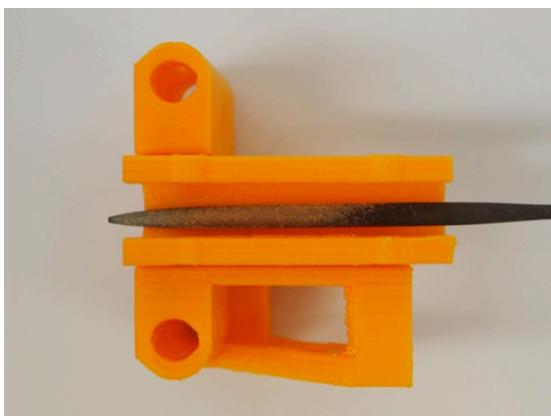
Use the chuck with the 1/8" drill bit to clean out the rod clamp holes on the X-end-motor. (2 holes)



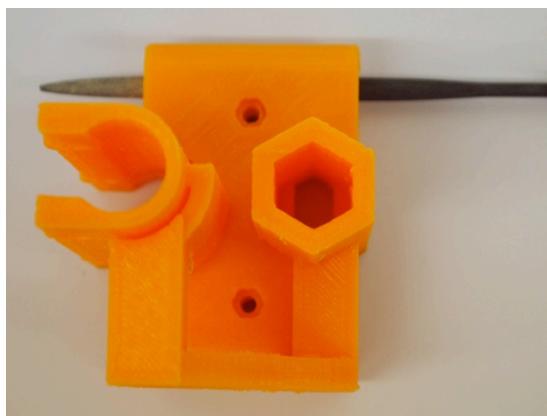
Use the chuck with the 1/8" drill bit to clean the bearing clamp holes as shown. (2 holes)



Use the chuck with the 5/16" drill bit to clean the idler hole.



Use the half round file to clean the holes for the linear bearings. Make sure there are no bumps or blobs that may push the bearing out of alignment.



Use the half round file to clean up any blobs or imperfections from the rod holes. (2 holes)

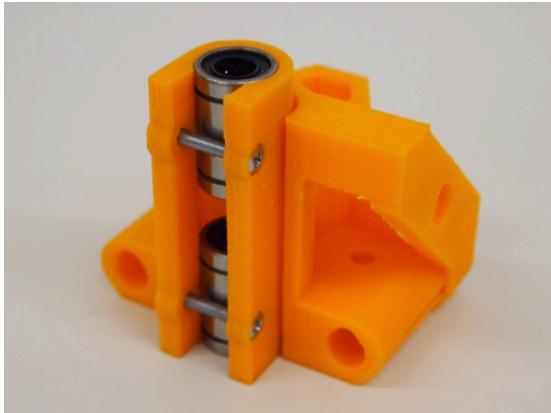
## Step 12: X-End-Idler Assembly

### Parts Needed

- X-End-Idler
- M8 x 30mm Hex Bolt (1 pcs)
- 5/16" Fender washers (2 pcs)
- 5/16"x 0.022" shims (2 pcs)
- 608 ball bearing
- Linear bearings (2 pcs)
- M3 x 16mm screws (2 pcs)
- M3 x 20mm screws (2 pcs)
- M3 nuts (4 pcs)

### Tools Needed

- Philips screwdriver
- Visegrip Pliers (2 pcs)



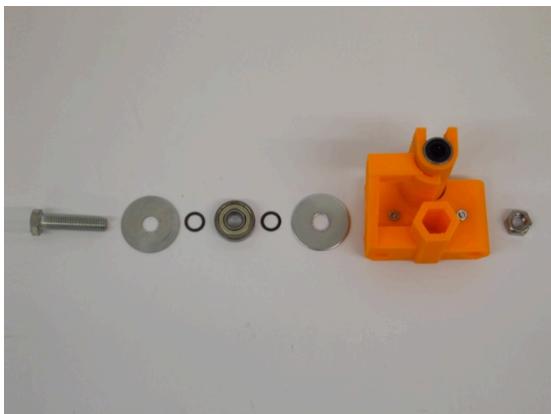
Insert Linear bearings and clamp in position using M3 x 20mm screws and nuts



Take 2 M3 x 16mm screws and insert them on the bottom as shown.



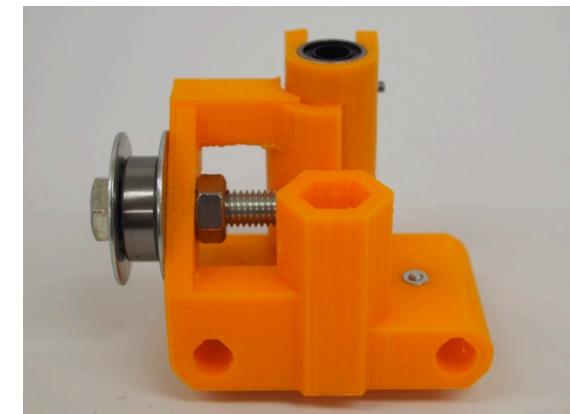
Insert M3 Hex nuts on the top and screw into the screws and nut traps. Loosen up the screws again.



Locate the following items. M8 Hex Bolt, fender washers, shims, ball bearing, and M8 hex nut.



Take the M8 Hex bolt and place parts on bolt in this order; fender washer, shim, ball bearing, shim, fender washer. Try to have the "round" side of the fender washers facing the ball bearing.



Finish by inserting the M8 hex bolt through the hole in the X-end-idler and tightening the M8 nut on with vicegrip pliers.

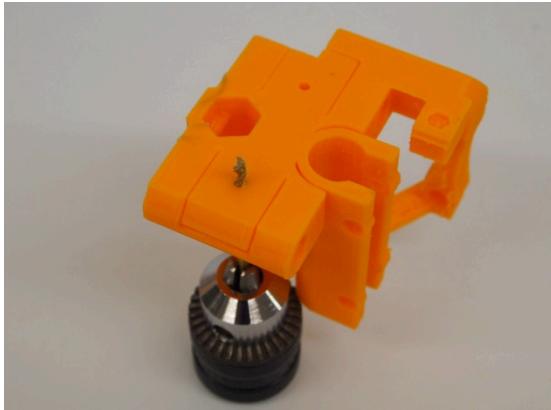
## Step 13: Cleaning X-End-Motor plastic part

### Parts Needed

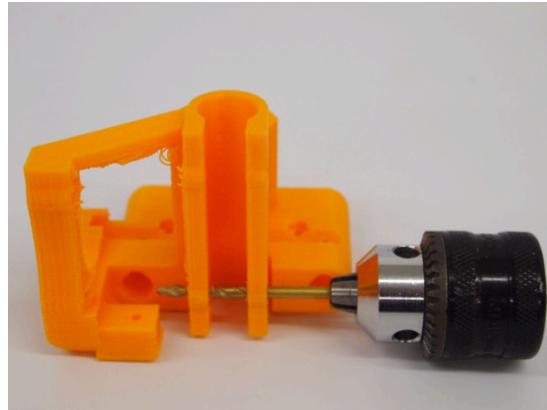
- X-End-Motor

### Tools Needed

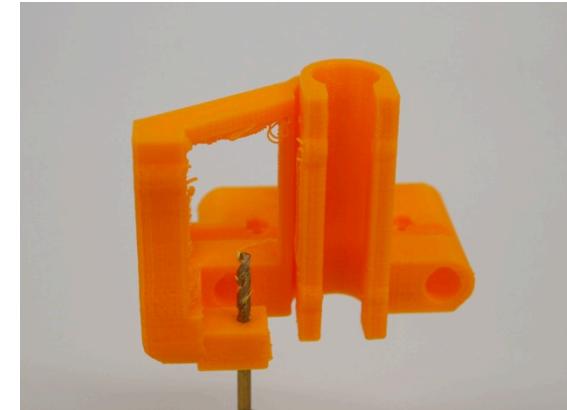
- Chuck with 1/8" drill bit
- Round File
- Flat File
- Triangular File
- Half Round File



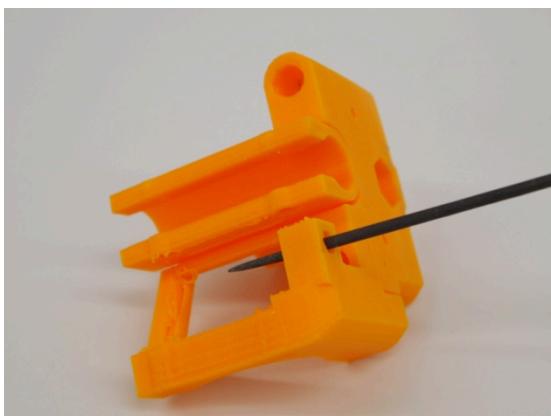
Use the chuck with the 1/8" drill bit to clean out the rod clamp holes on the X-end-motor.



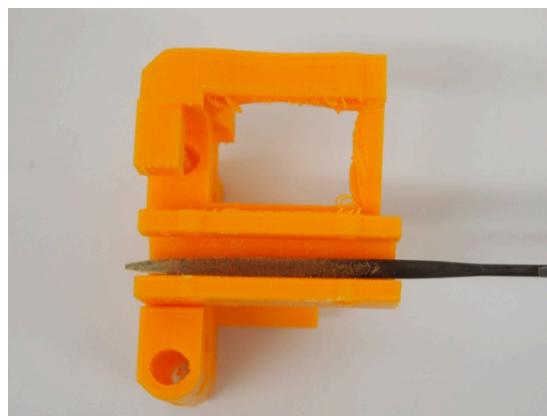
Use the chuck with 1/8" drill bit to clean the bearing clamp holes as shown.



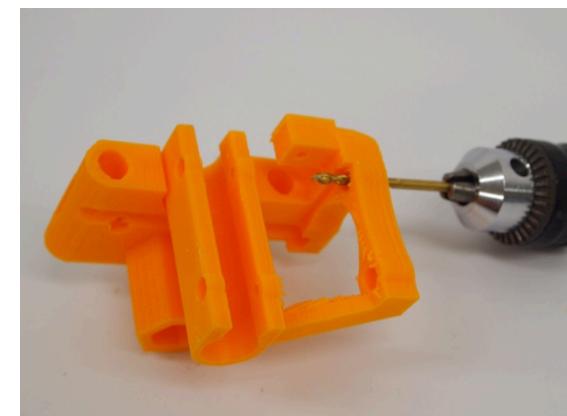
Use the chuck with the 1/8" drill bit to drill out the hole for the Z endstop adjust. Use the round file to clean the hole.



Then use the round file to clean out any blob on the nut trap hole.



Use the half round file to clean the holes for the linear bearings. Make sure there are no bumps or blobs that may push the bearing out of alignment.



Use the chuck with the 1/8" drill bit to drill put the motor mount holes. (3 holes)

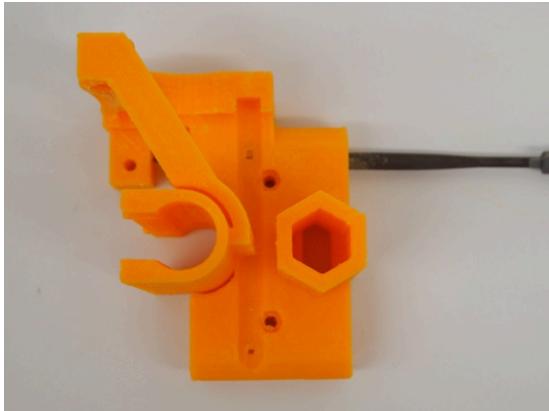
## Step 14: Cleaning X-End-Motor plastic part And Assembly

### Parts Needed

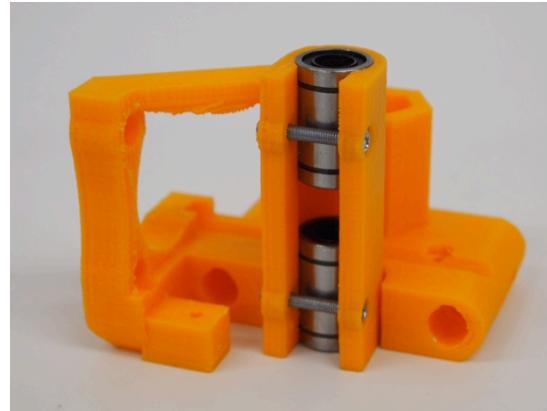
- X-End-Motor
- Linear bearings (2 pcs)
- M3 x 16mm screws (2 pcs)
- M3 x 20mm screws (2 pcs)
- M3 nuts (4 pcs)

### Tools Needed

- Half Round File
- Philips screwdriver



Use the half round file to clean up any blobs or imperfections from the rod holes. (2 holes)



Insert Linear bearings and clamp in position using M3 x 20mm screws and nuts



Take 2 M3 x 16mm screws and insert them on the bottom as shown.



Insert M3 Hex nuts on the top and screw into the screws and nut traps. Loosen up the screws again.

## Step 15: X-End-Motor Assembly

### Parts Needed

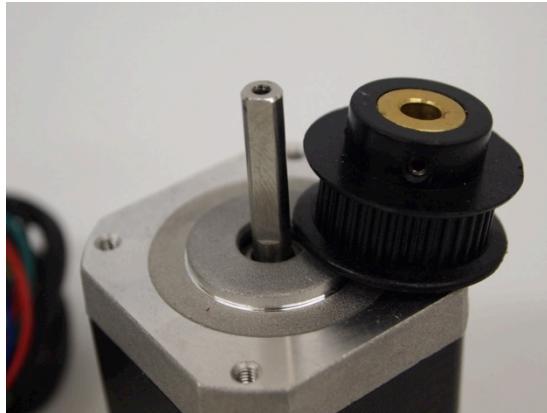
- X-End-Motor Assembly
- X Stepper Motor
- Large Pulley
- M3 x 10 mm screw (3pcs)

### Tools Needed

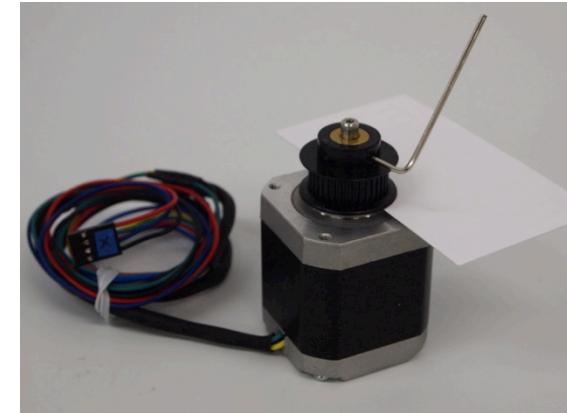
- Philips screwdriver
- Allen key #1.5 (Metric)
- A sheet of paper



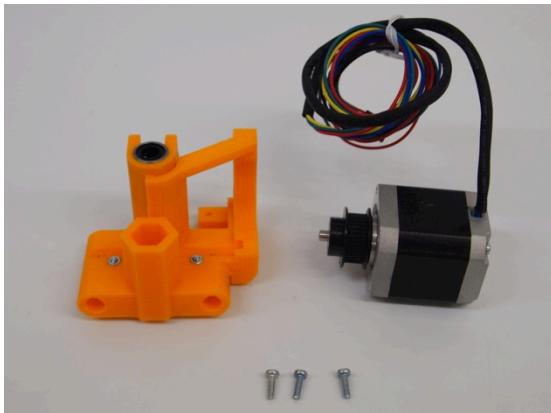
Locate the X-Motor and large timing pulley.



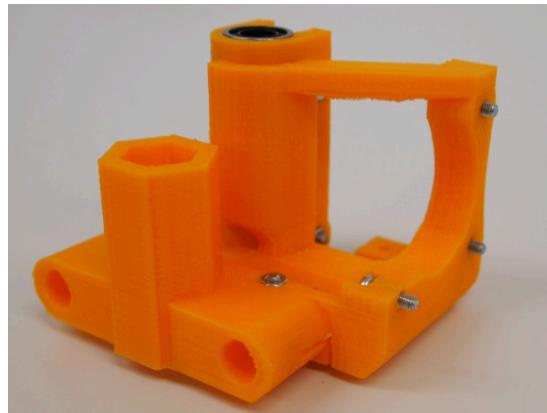
Align the Pulley setscrew with the flat on the motor shaft.



Insert the Pulley into the shaft. Use a piece of paper as a shim. Tighten the setscrew using Allen key.



Locate the X-motor assembly, 3 M3 x 10mm screws and the X-end-Motor plastic part. Position the motor so that the wires are facing up as shown.



Insert the M3 x 10mm screws on the plastic part as shown.



Attach the motor by screwing-in the M3 x 10mm screws.

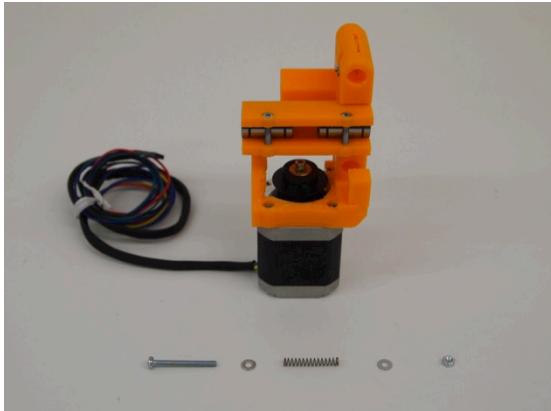
## Step 16: X-End-Motor Assembly

### Parts Needed

- X-End-Motor Assembly
- M3 x 30 mm screw (1pcs)
- M3 Hex Nut (1 pcs)
- M3 Washer (2 pcs)
- Spring .016 x 1"

### Tools Needed

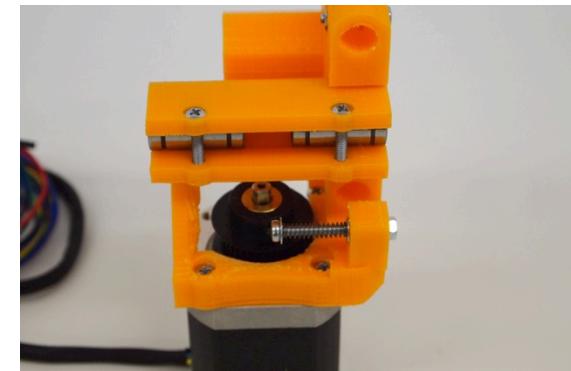
- Philips screwdriver



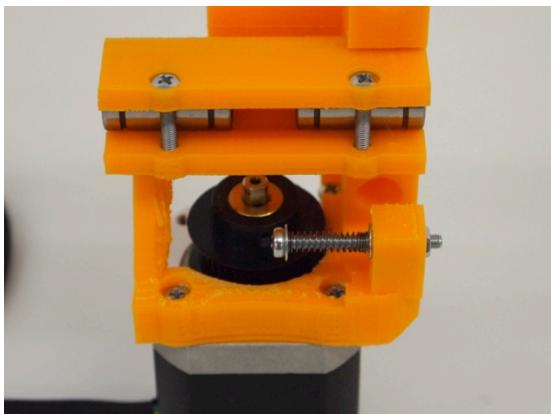
Locate the following: From left to right: M3 x 30mm screw, M3 washer, 0.047 x 1" spring, M3 washer, M3 nut.



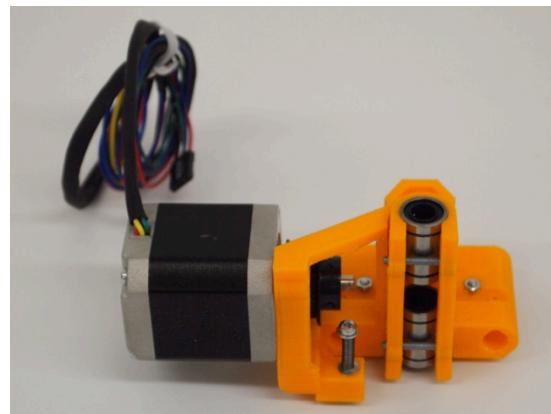
Insert all onto the screw except for the M3 nut.



Insert into the plastic part and screw on the nut.



Align the nut with the nut trap and press-fit into place. Then loosen the screw almost all the way out. **Note:** The nut will only go in slightly, so long as it holds in place its fine.



This is how the final X-end-motor should look.

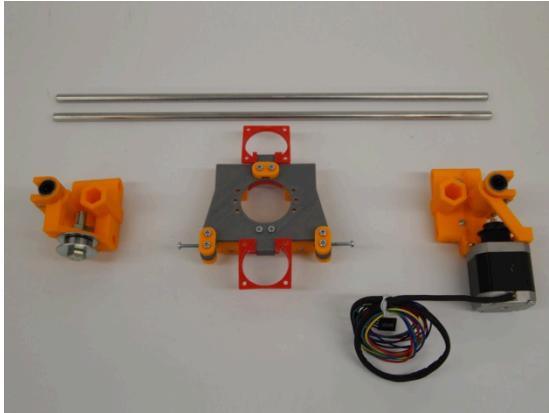
## Step 17: X-Carriage Assembly

### Parts Needed

- X-End-Idler Assembly
- X-End-Motor Assembly
- X-Carriage Assembly
- Smooth Rod – long (2 pcs)

### Tools Needed

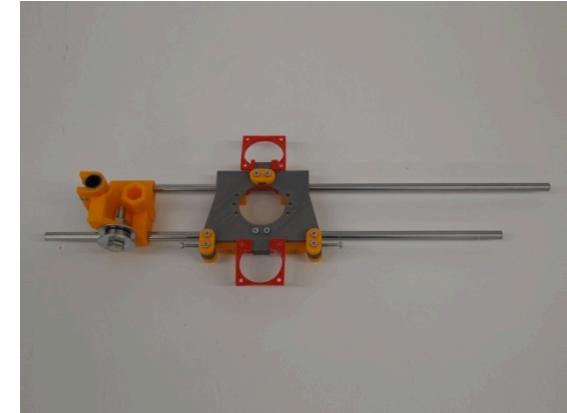
- Your hands



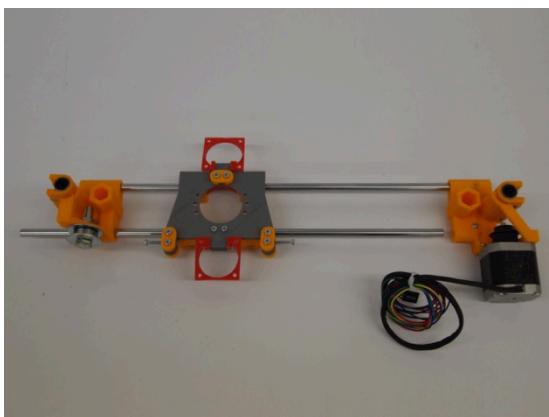
Locate the following parts: From top to bottom clockwise: Large smooth rods, X-motor assembly, X-Carriage Assembly, X-idler assembly



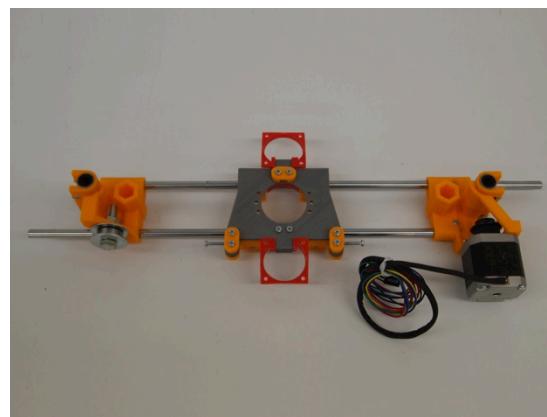
Insert both of the large smooth rods into the x-idler assembly. Let one of the smooth rods go through about 2".



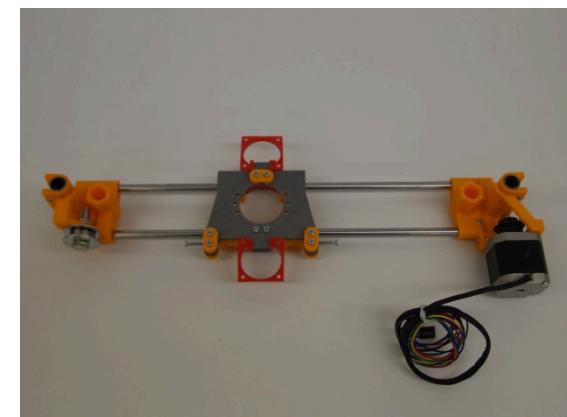
Insert the X-Carriage. Make sure the belt clamps are facing the same side as the belt idler on the x-idler assembly.



Take the X-motor assembly and insert the first smooth rod as shown in the picture

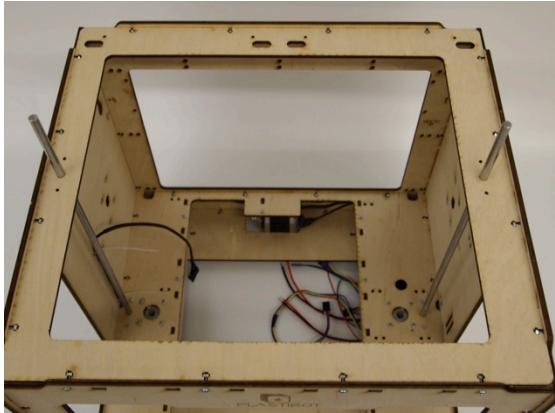


Insert the second smooth rod into the X-motor assembly as shown

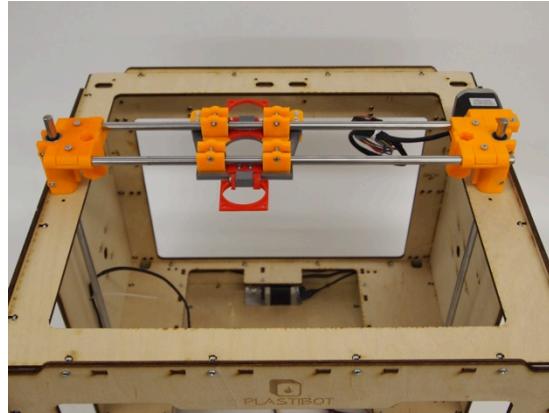


Even out the smooth rods.

## Step 18: X-Carriage Assembly (Cont.)



With the Frame Assembly facing right side up and the front facing you insert the second set of long smooth rods all the way to the bottom.



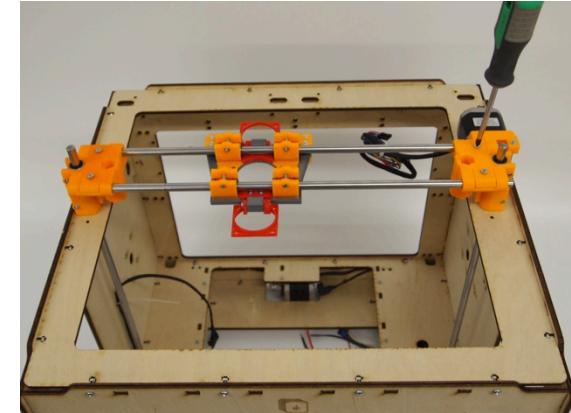
Align the bearings of the carriage with the holes in smooth rods and carefully slip the X-carriage upside down over the rods. **Note:** Do not force, bearings could be lost if done so.

### Parts Needed

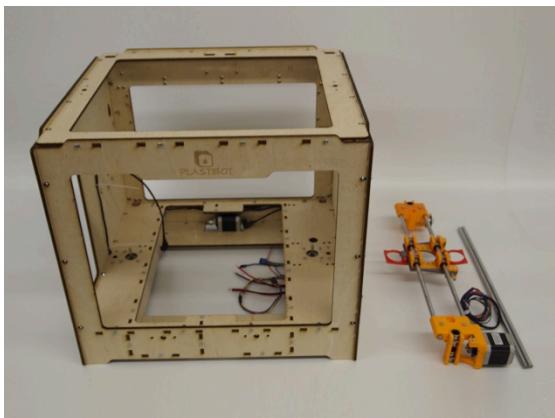
- Frame Assembly
- X-Carriage
- Smooth Rod – long (2 pcs)

### Tools Needed

- Philips screwdriver



Tighten the 4 screws (2 screws on each x-end) to clamp the rods in position.



Remove X-Carriage assembly from the rods and the smooth rods from the frame.