



# Installing the Dual Extruder Upgrade for Printrbot Plus 1504/1412

Written By: Printrbot Support

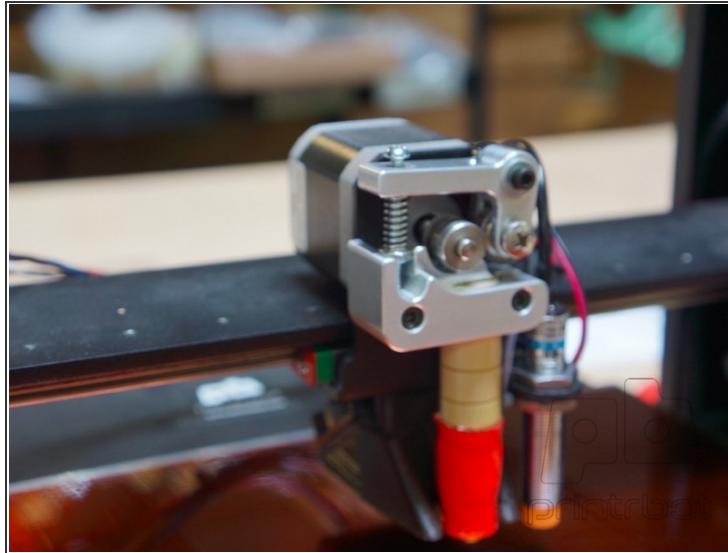
## TOOLS:

- 2.5mm allen wrench or drill bit (1)
- 3mm allen wrench or drill bit (1)
- 1.5mm allen wrench (included) (1)
- 2.0mm allen wrench (1)
- Needle nosed pliers (1)
- Micro Cutters (1)
- Phillips Screwdriver #2 (1)

## PARTS:

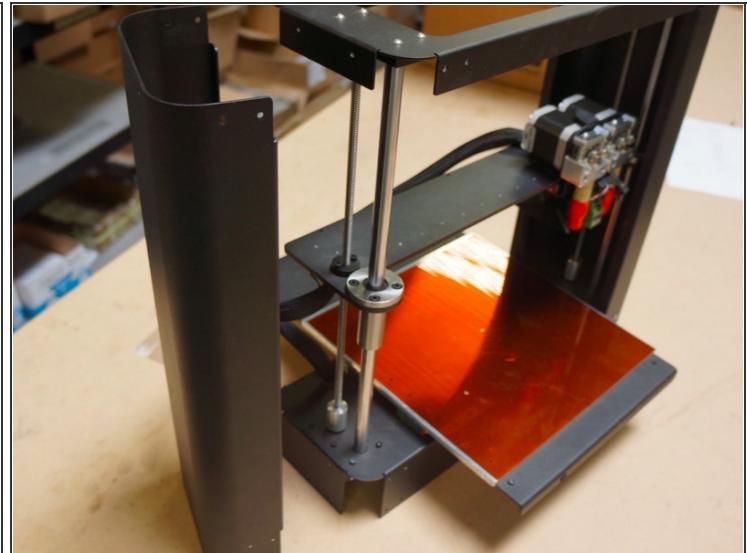
- Metal Plus Dual Extruder Upgrade Kit (1)

## Step 1 — Gather your tools and unbox your kit!



- Get a clean large work space ready, there are lots of small screws, wires, and little parts that could easily get lost. It is recommended that you place all the parts you remove in a small box or bin as you remove them so that you can find them later.

## Step 2 — Opening up the case



- Using a 2mm Hex, remove the left cover and the bottom cover.

## Step 3 — Disconnecting the Extruder



- Unplug the X-Endstop
- Unplug the Extruder Heater
- Unplug the Extruder Thermistor

## Step 4 — Disconnect the Extruder (cont.)



- Unplug Extruder Motor
- Unplug the Fan
- Cut the Zip-ties holding the wiring back.

 Be extremely careful to not cut wires when cutting the zip ties. Wires were harmed in the making of these instructions.

## Step 5 — Disassemble single extruder



- Using a 2.5mm Hex unbolt the fan shroud.
- Unbolt the fan from the shroud.

## Step 6



- Unbolt the extruder tensioner and body. Set aside.
- Unscrew the Z-sensor. Set it aside too.
- Now clip the the left zip tie holding the belt.

## Step 7



- Unbolt the remaining 6 bolts underneath the X-carriage.
- Remove the x-carriage and belt.

## Step 8



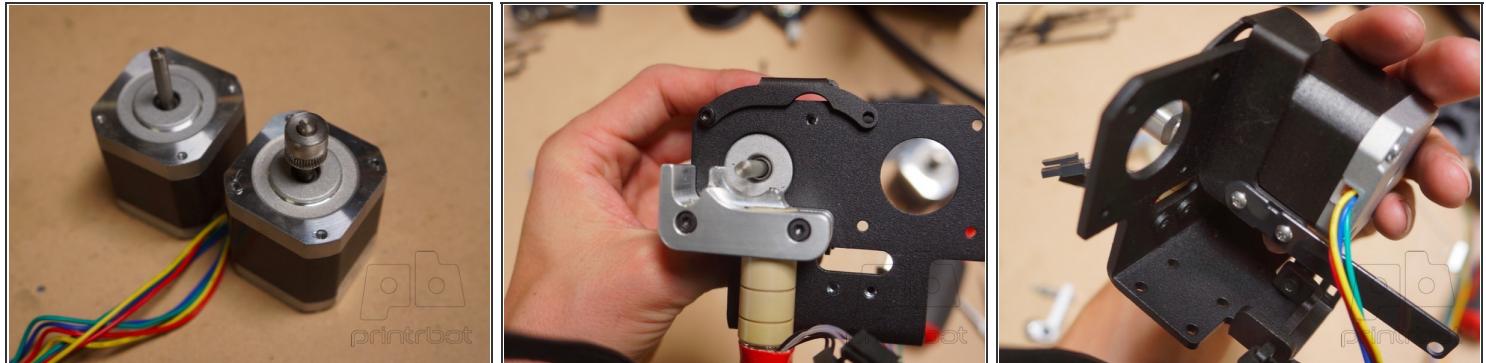
- Unbolt the X belt pulley.
- Clip the Zip ties in the base and pull out the bundle of wires.

## Step 9



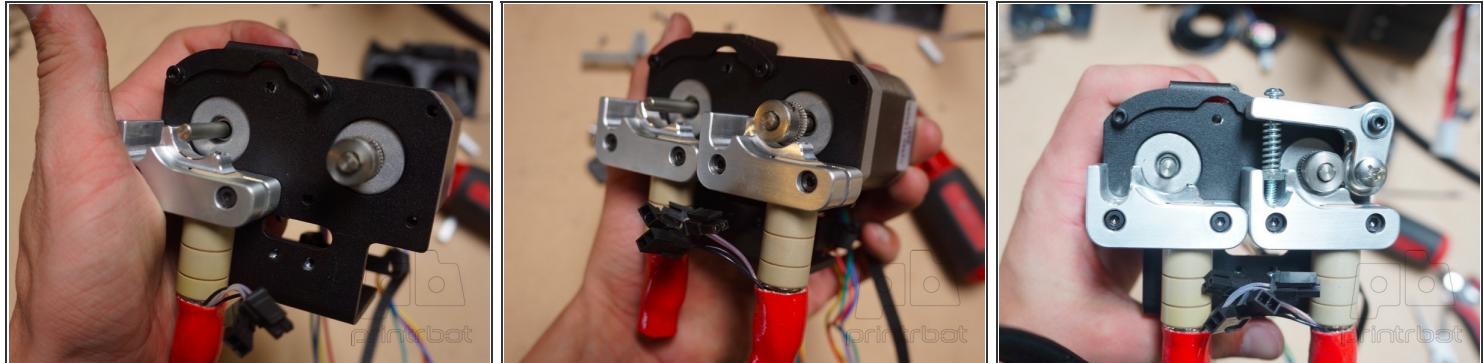
- Clip the zip tie holding the belt to the tensioner.
- Unbolt the tensioner from the single cart bolt it into the double cart.
- Zip tie the belt to the double cart tensioner.

## Step 10



- Take one Nema 17 and the old extruder base and bolt it on the left side of the cart. using the same bolts as before. M3 x 25mm with the two washers.
- Grab the Wire guide, and using a M3 x 8mm bolt in the left side.
- Take the black Delrin strip, and bolt it to the wire relief using using two M3 x 4mm button head.

## Step 11



- Take the other NEMA 17 and using an M3 x 8mm bolt, attach it to the cart and wire support.
- Now bolt the other extruder base and hotend in using 2 M3 x 25mm with the small washers under the heads.
- Take the old tensioner arm and bolt it in.

## Step 12



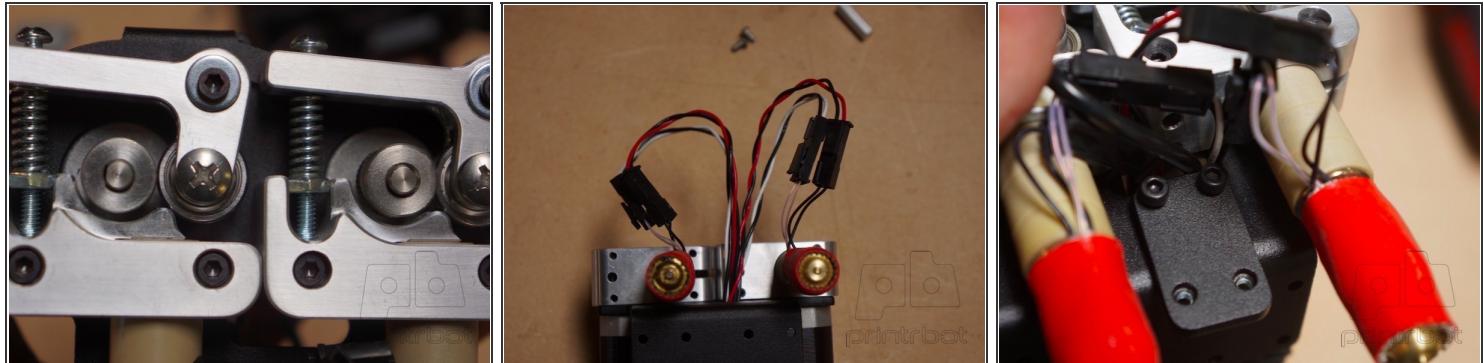
- Using the philips screw driver bolt in the 525 bearing into the new tensioner arm using the M5 x 16mm bolt.
- Add the #6 screw, spring and nut like in pic 2.
- Slide in the delrin sleeve and add the M3 x 25mm bolt with a washer.

## Step 13



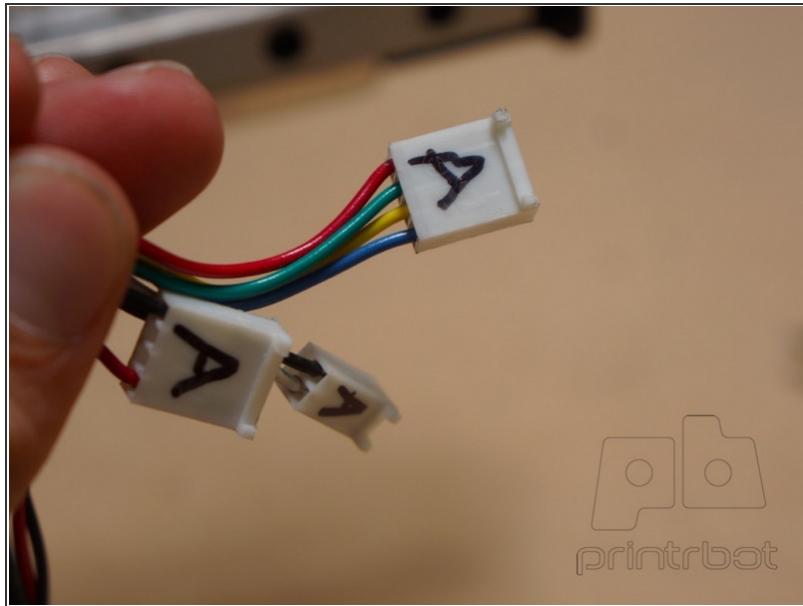
- Bolt in the new arm.
- Insert a set screw into the drive gear using a 1.5mm Hex driver.
- Slide the drive gear over the shaft until it lines up with the bearing. Tighten.

## Step 14



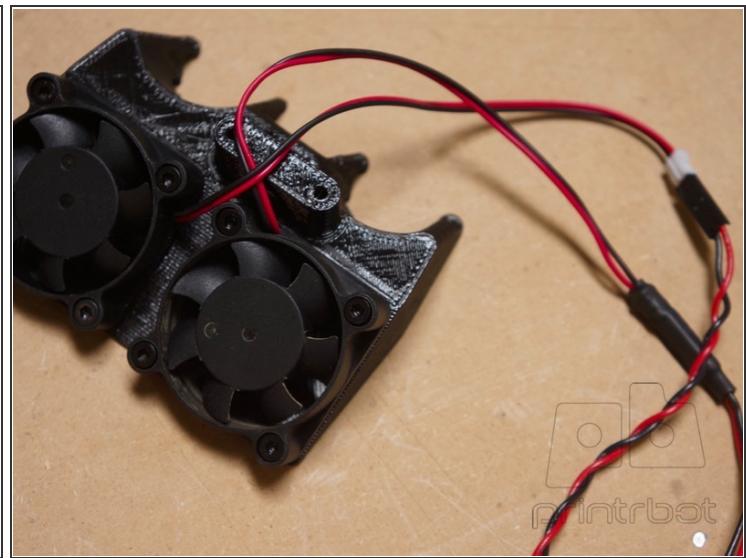
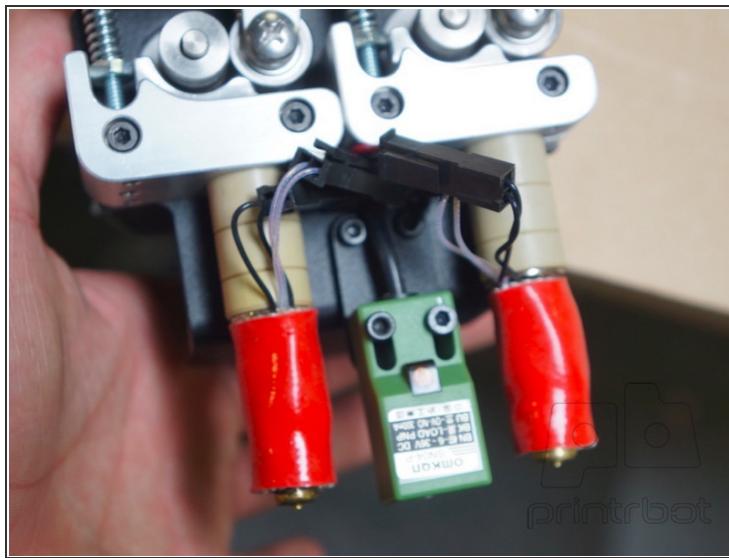
- Use the old hotend wires and new hotend wires supplied and feed them through the hole in the cart and plug in.
- Using 2 M3 x 8mm bolt on the Z sensor support.

## Step 15



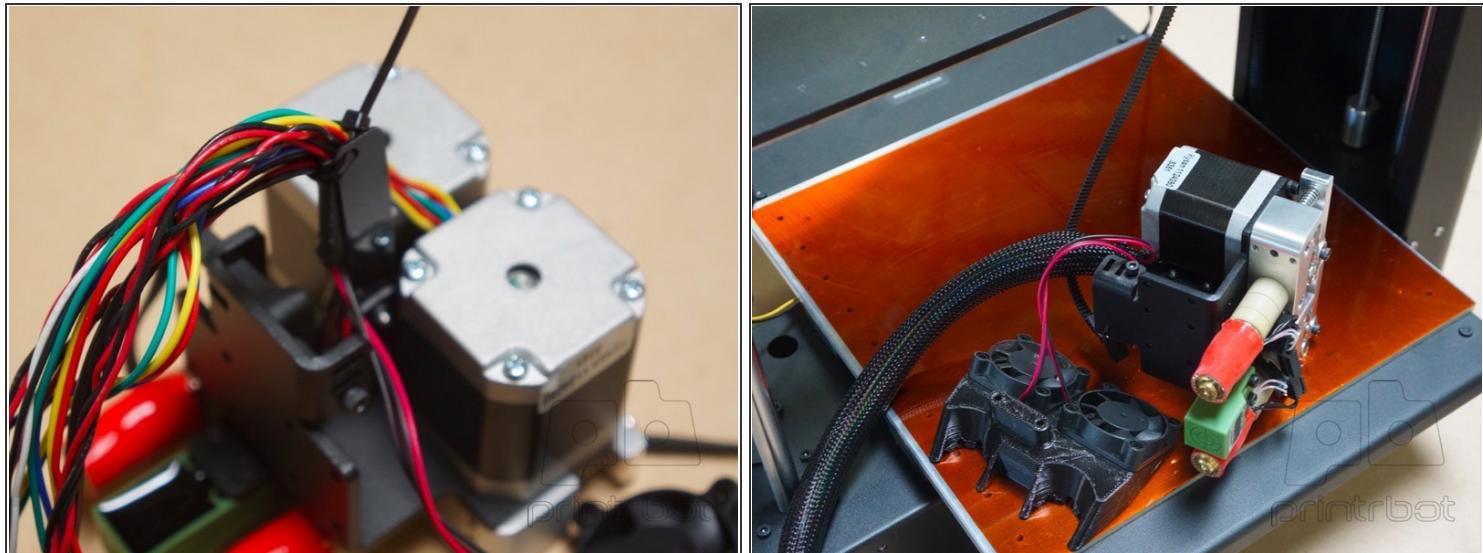
Now is a good time to label the plugs because, once we feed all the wires it will be difficult to impossible to tell them apart. Write an A on all of the plugs that go to the right extruder.

## Step 16



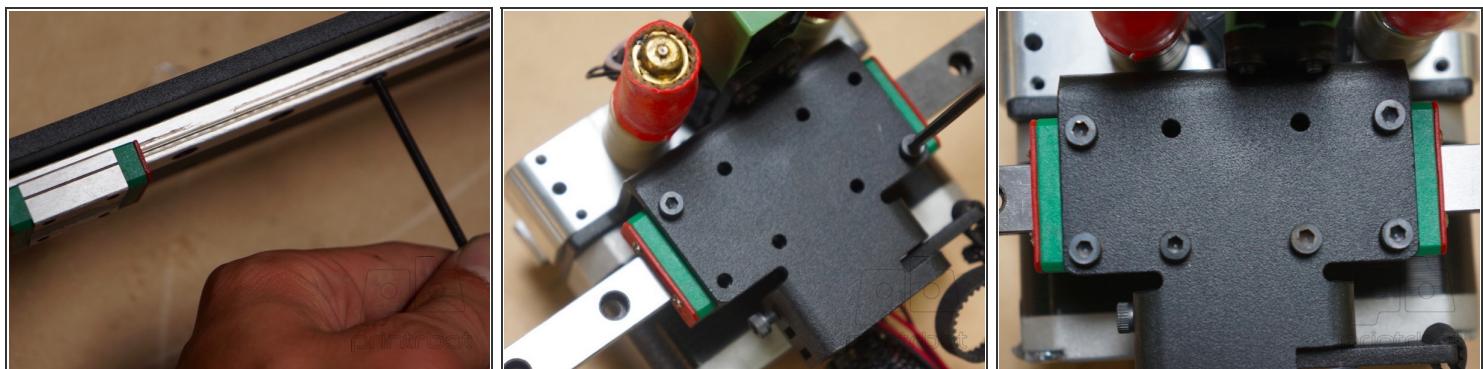
- Grab the new Z-Sensor and bolt it to the carriage using 2 M3 x 16mm bolts. Slide it all the way down for now. We will adjust it later.
- Take the fan shroud and bolt the two fans in using 8 M3 x 10mm bolts and a 2.5mm hex driver. Attach the supplied fan extension to the new fan.

## Step 17



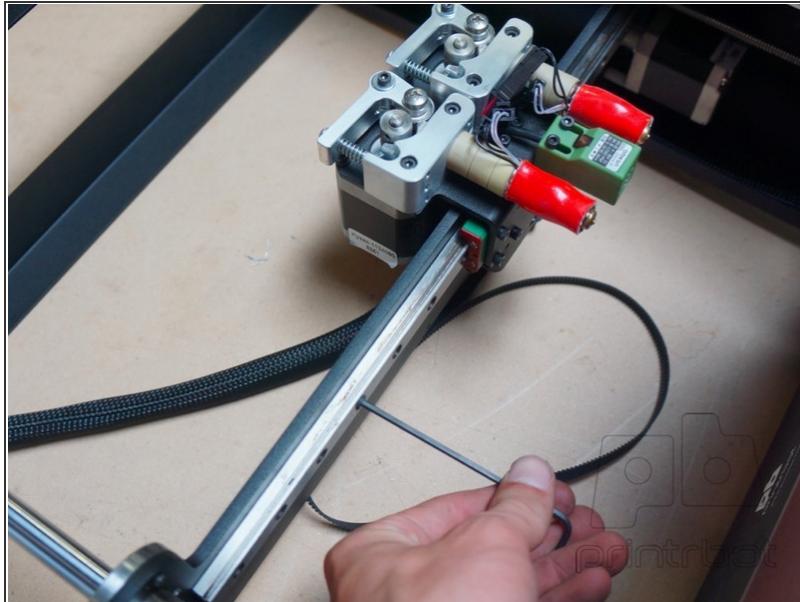
- Take the wires from the fan assembly, add them to the bundle coming from the extruders and zip tie it all to the wire relief.
- Be sure and leave about 4 inches of wire between the fan shroud and extruder. Slack is your friend here.
- Now feed the sleeving over the wire bundle with the slit in the sleeve closest to the extruder, this is where the X-endstop jumps in to the bundle.

## Step 18



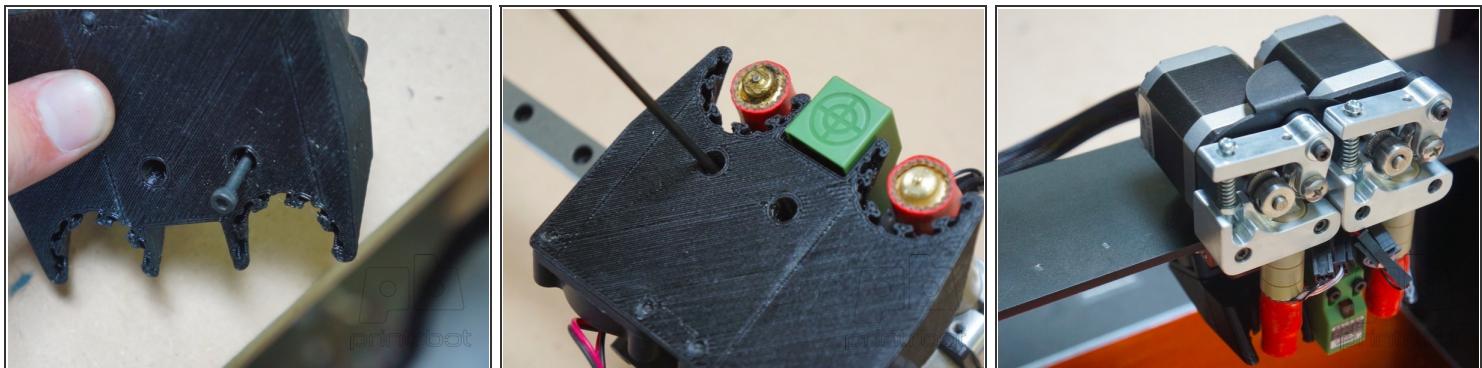
- Grab your 2.5mm hex and unbolt the linear rail from the X-Axis.
- Take the linear rail and slide it through the cart and line up the holes in the bearings with the cart and bolt on the carriage using 6 M3 x 8mm bolts.

## Step 19



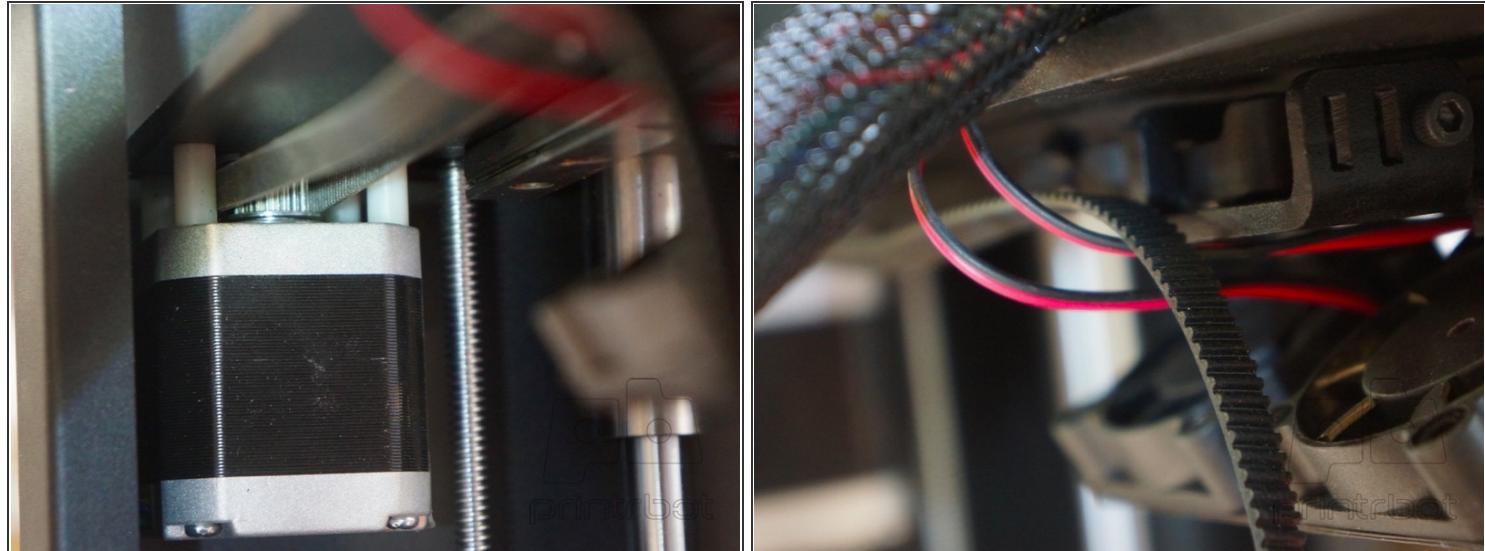
- Bolt the whole assembly back onto the X-Axis.

## Step 20



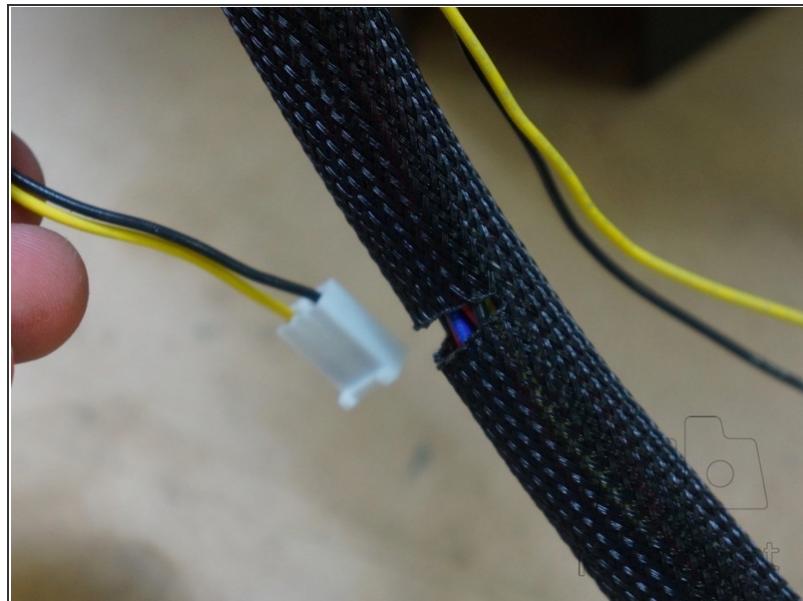
- Grab the 2 M3 x 16mm bolts from the old shroud and insert them into the dual shroud.
- Now run the wires behind the X-Axis and bolt the shroud on.

## Step 21



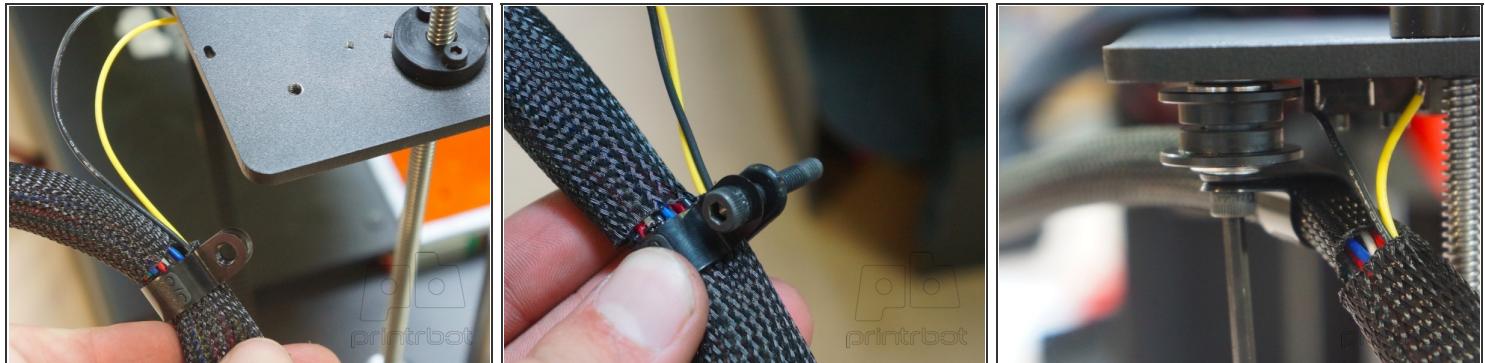
- Now feed the X-Belt around the motor pulley.
- Be sure when you run the belt past the X-Cart it goes between the wires and the cart.

## Step 22



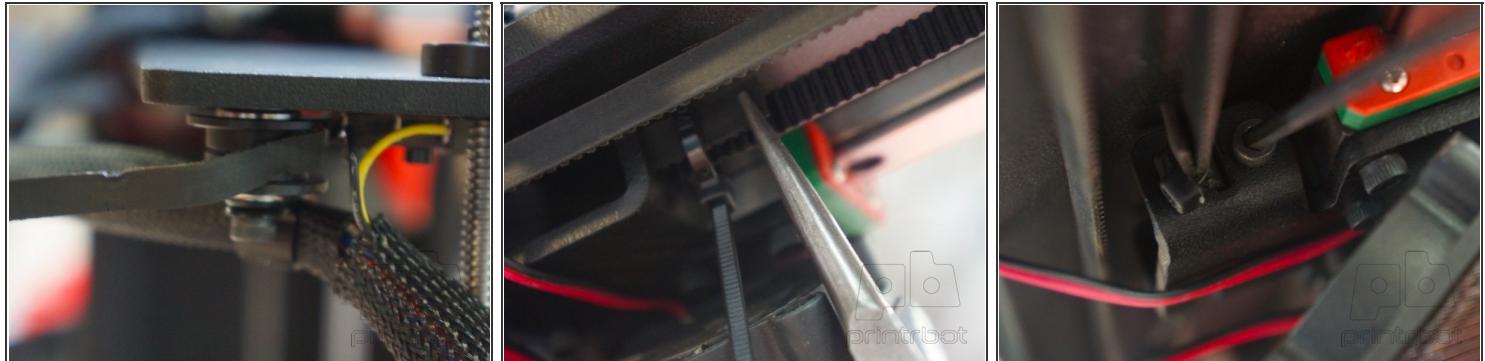
- Feed the endstop wires into the slit and pull it through the wire cover.

## Step 23



- Snap the 3/8" P-Clip around the bundle just behind the slit for the X-endstop.
- Now add the M4 bolt back on.
- Add the pulley assembly back on. It should go: Washer-Pulley-Spacer-Pulley-Washer.

## Step 24



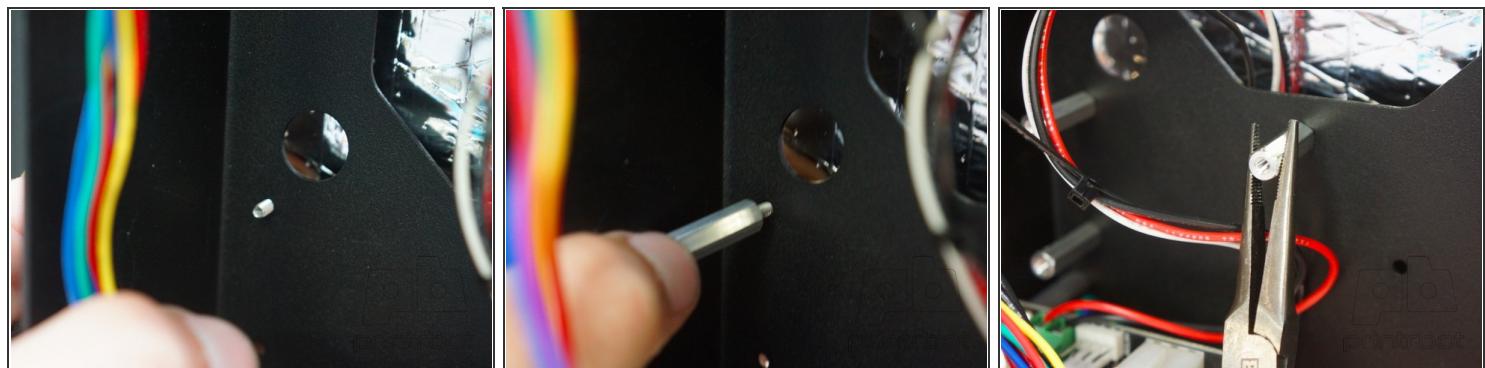
- Feed the belt around the pulley and through the holes in the X-Cart.
  - Pull the belt tight with a pair of pliers.
  - Add a zip tie.
  - Now tension the belt by using a 2.5mm Hex driver and tighten the Bolt on the cart.
- (i)** A good way to make sure the belt is tight enough is to feel the belt below your bed and compare it to the X-Belt.

## Step 25



- Grab the grommet from before and feed it over the wire wrap.
  - Insert the grommet in the base. This will be a bit tricky.
- i** If you are having a hard time, use a pair of pliers to help push the grommet in. Also, make sure there are no connectors in the grommet.
- !** Be sure that there is enough slack for the Z-Axis to reach the top.
- i** If you find it too difficult to insert the grommet, this step can be left out, it is non crucial to the function of the printer.

## Step 26 — Installing the Extruderboard



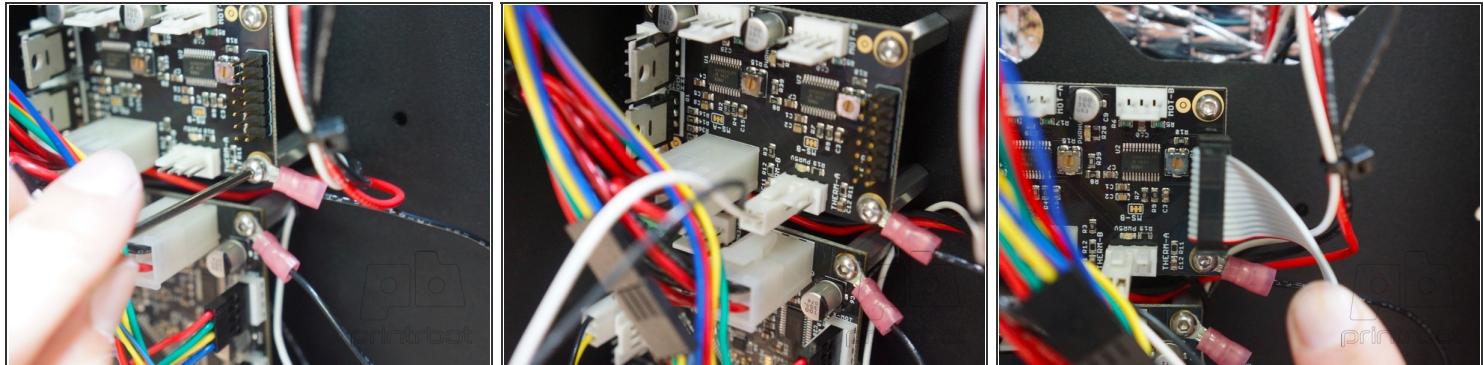
- Grab 4 of the M3 x 4mm button heads and the 4 threaded standoffs and insert them into the base using a pair of needle nose pliers.
- ★** If this does not work for you. Feel free to unbolt the aluminum bed in order to place the standoffs.

## Step 27



- Remove the grommet from the power cable. Discard it.
- Grab the second power cable included with the kit and plug it into the extruder board.
- Feed the power cables back through the port and add a Zip tie for strain relief.

## Step 28



- Using 4 more M3 x 4mm bolts mount the extruder board.
- Grab the ground cable and bolt it between the corners of the Printrboard and extruder board.
- Take the short thermistor cable included in the kit and plug it into the Therm-B port.
- Now take the ribbon cable and plug it in with the red stripe down like in the picture.

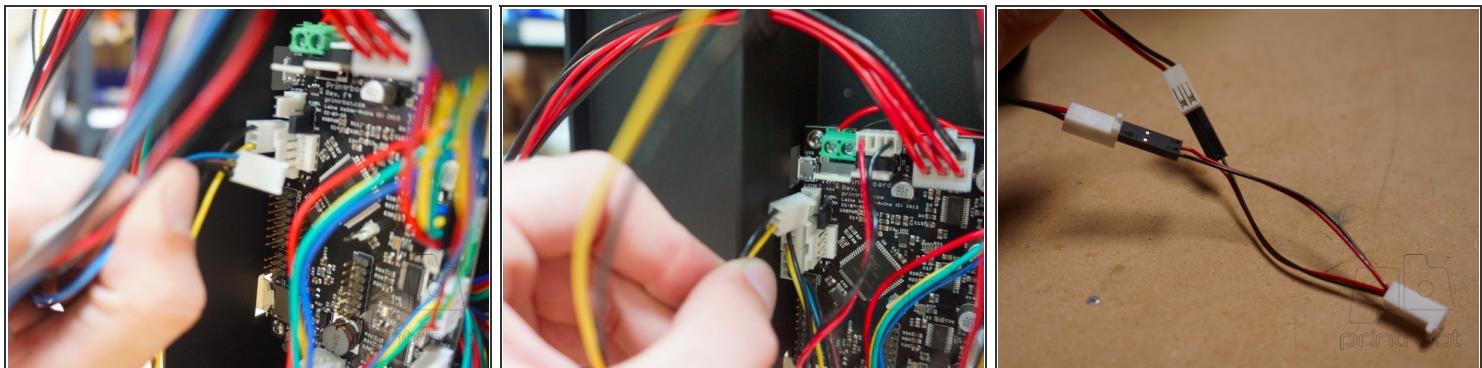
 **⚠ Plug orientation is crucial! Plugging it in backwards could damage your brand new hotend or the electronics.**

## Step 29



- Now plug the ribbon cable into the printrboard. Make sure the red stripe is towards the USB plug.

## Step 30



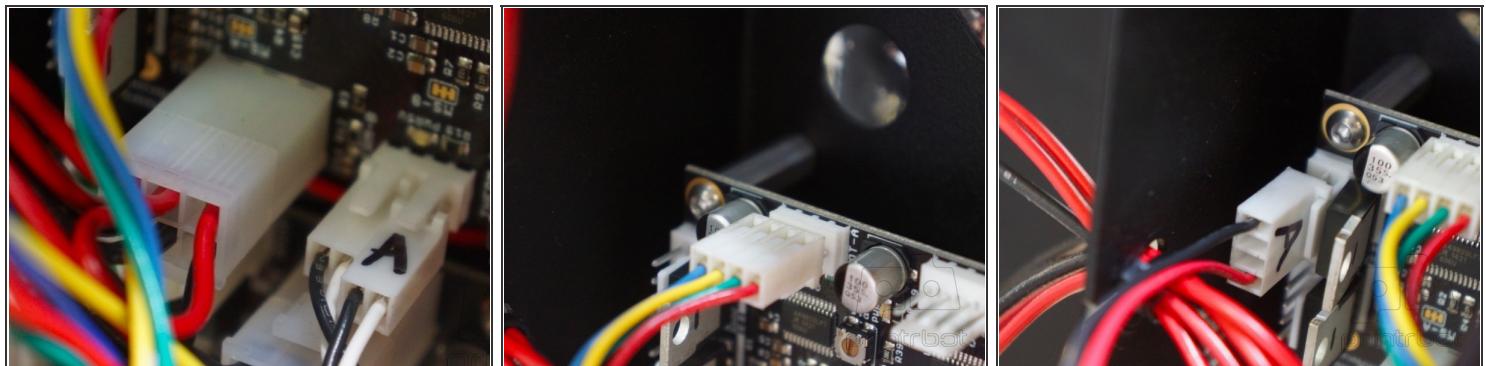
- Now plug the Z-Sensor Cable (Blue Brown and Black) and plug it into the Z-Stop port.
- Plug in the X endstop (Black and Yellow) into the X-Stop port.
- Grab the fan splitter cable and plug it into the two fan cables.

## Step 31



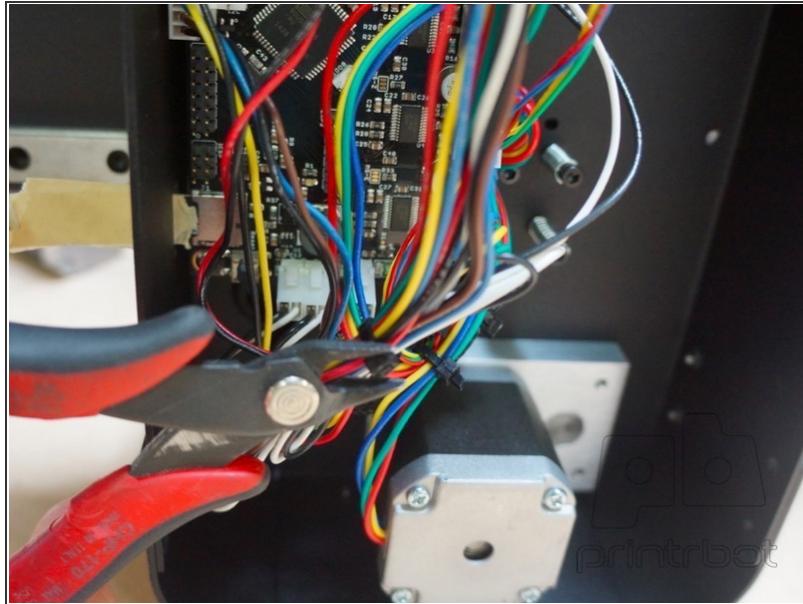
- Plug in the black and white thermistor cable (do not plug in the labeled one).
- Also plug in the fan splitter we just attached.
- Plug in the extruder motor (use the blank plug here).
- Now plug in the blank hotend power cable.

## Step 32



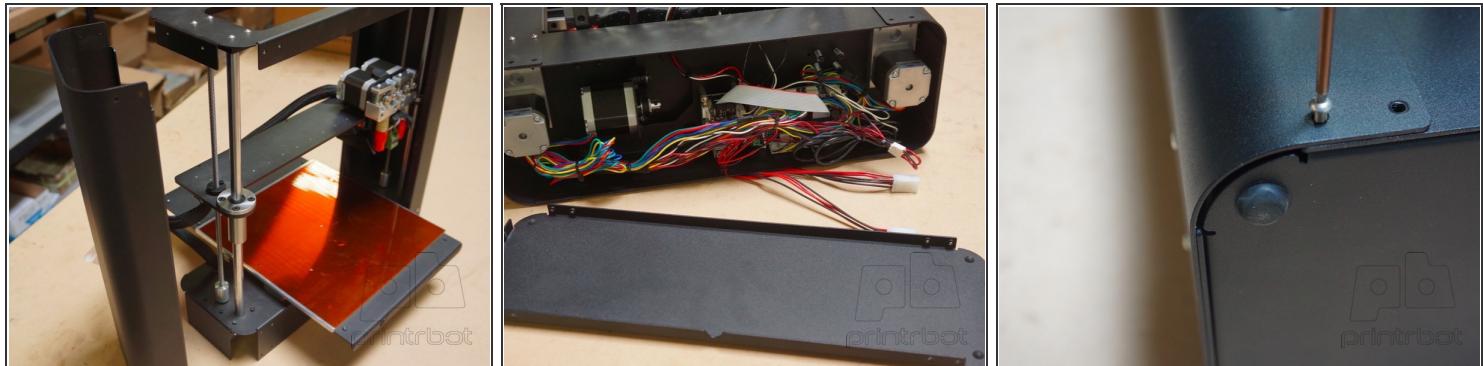
- Now plug in all of the plugs we labeled "A" into the Extruderboard.
- Plug in the A thermistor into Therm-A.
- Plug in the A motor into Mot-A.
- Plug in the A hotend into Hotend-A.

## Step 33



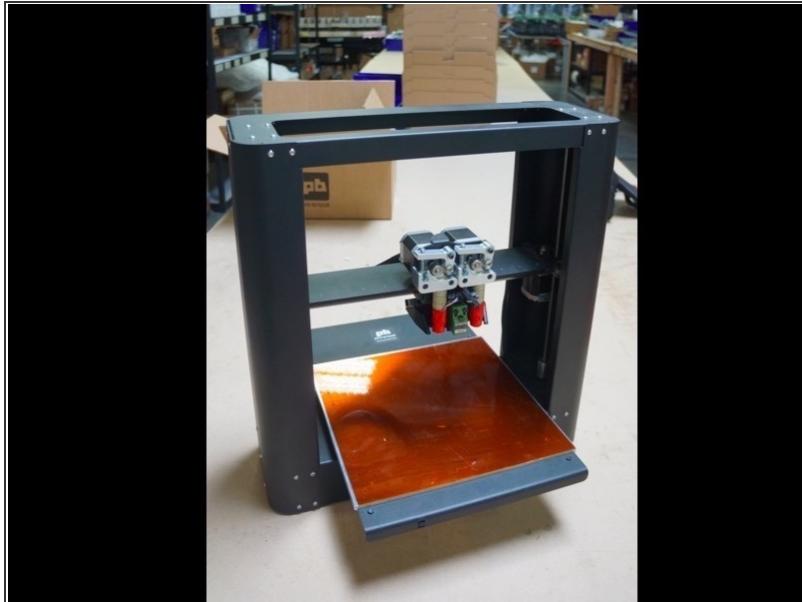
- Now use some Zip ties to clean up all the wiring.

## Step 34



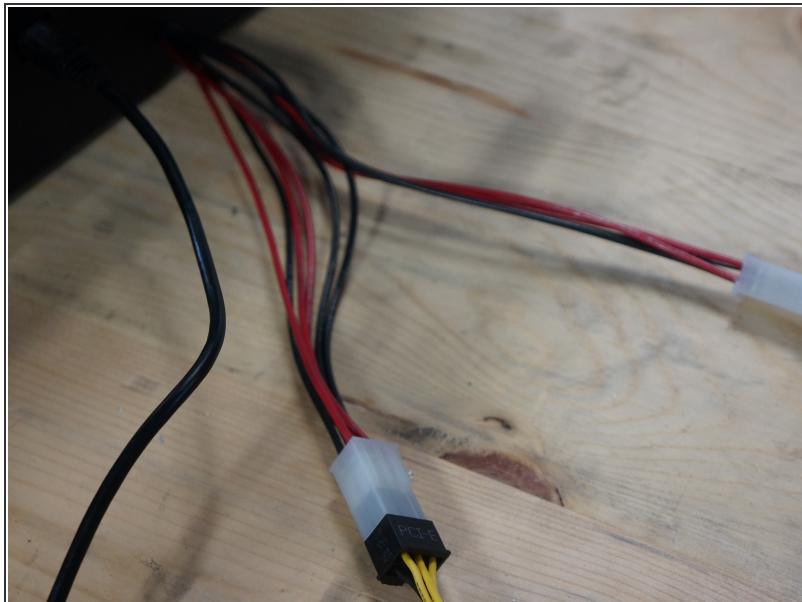
- Now with all of the wiring finished its time to bolt the covers back on.
- Start by placing the left cover back on. Use only short button heads for this.
- Now bolt the bottom on. Use the longer M3 button heads for the bottom.

## Step 35



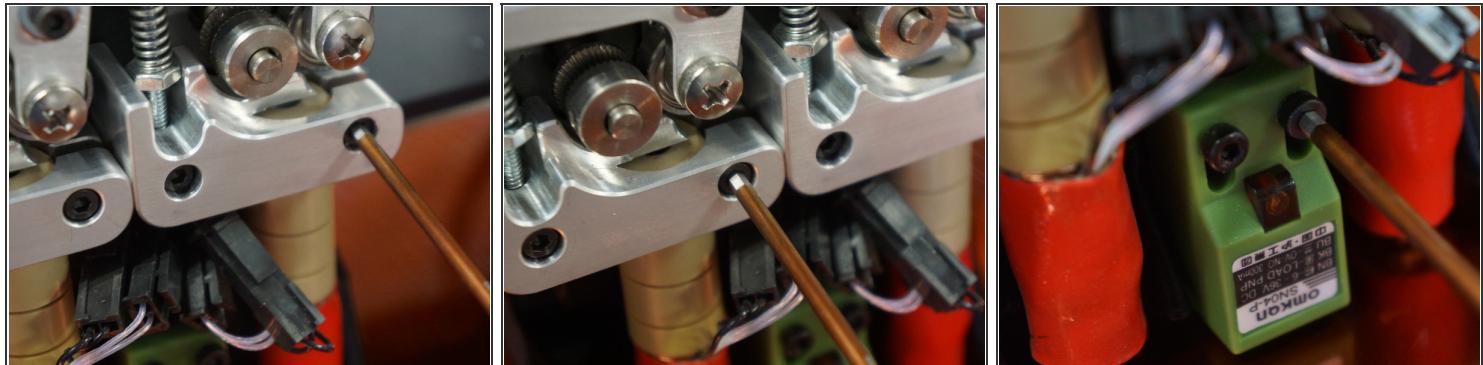
- Great! Now we have assembled the upgrade kit. We just have to align the hotends and the Z-Sensor.

## Step 36



- Start by plugging in the USB plug and power and turning it on.
- ⚠ If your right hotend starts heating up on its own shut the power off immediately and go back to step 29 to check your connections.
- If the right hotend stays cool, you're in good shape.

## Step 37



- Using a 2.5mm Allen Key loosen the 2 screws holding the hotends in and the the screws on the Z-Sensor.
- With the hotends loose, drop the Z axis till tips of each hotend are touching the print surface. This will ensure that you height of each hotend is the same.
- Once the height is the same, tighten the screws to secure each hotend in place.

## Step 38



- Now, manually lower the Z-axis until nozzles both touch the bed.
- Now tighten the nozzles and manually raise the Z-Axis a few millimeters.
- Place your delrin calibration square underneath. If you lost your square a credit card will work.

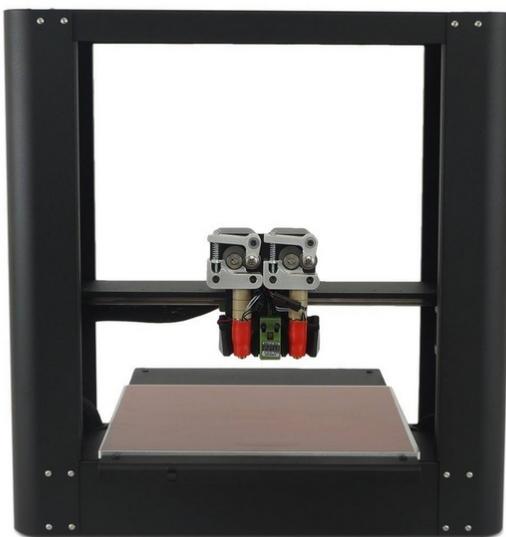
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## Step 39



- Now manually lower the hotends back down to the bed and tighten the Z-Sensor.

## Step 40



- Congratulations! You've completed the mechanical part of the upgrade!
- NEXT STEPS**
- [Click here](#) for instructions on flashing your Printrboard to ensure that you have the most current firmware.
- Review [Getting Started with Cura on Your Printrbot Plus](#).
- [Click here](#) to complete the [Dual Extrusion Getting Started Guide](#).

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