Deezmaker 3D PRINTERS

Steps for assembly of a Bukito.

Beta version 3.0, February 7, 2014

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Definitions and conventions.

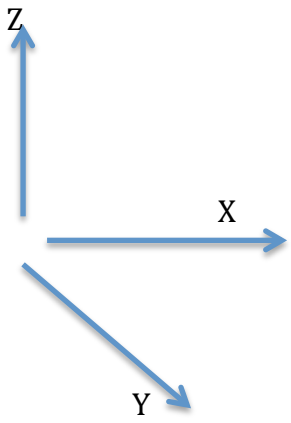
The parts are collected into kits (individual plastic bags.) Where possible, we will walk you through all the parts in a kit and highlight the kit name in yellow. In some cases we will have you use a few parts from different kits- we will point out where you open a kit for the first time.

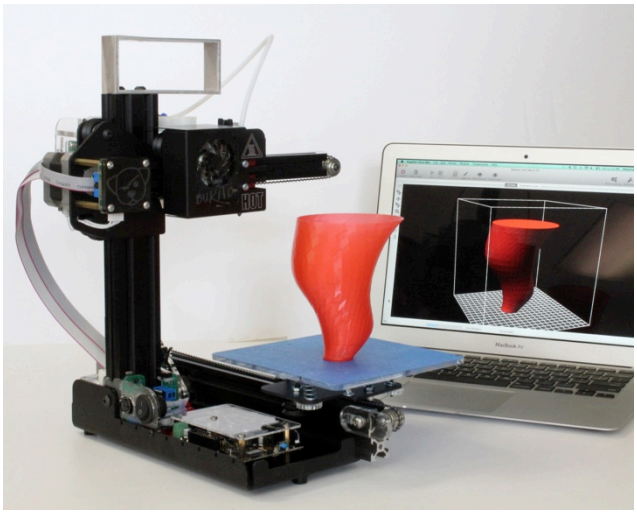
The X axis runs along the horizontal bar that runs from right to left in this photo. The extruder is carried on the X carriage..

The Y axis is the bar that runs underneath the platform (Y direction movement is done by the platform). Or, toward and away from you in this photo.

The Z axis is the vertical axis.

The "front" of the Bukito is the defined here as the end of of the Y axis closest from the Azteeg board mount. (Or to put it another way, the Azteeg and other electronics will be in the front, and the power switch will be on the left (See image below of assembled Bukitos– refer back to this if you get lost.) When we say "left" or right we mean from the point of view of an observer looking at the machine from the front.





Tools you will need, not included in kit

Phillips-head screwdriver (00 size)

A roll of 3M blue painter's tape ("ScotchBlue") for the platform, if you will be printing in PLA.

Metric allen wrenches (1.5, 2 and 3 mm)

Other items included in kit

We include a piece of nylon filament for cleanout if the nozzle clogs (see www.bukobot.com).

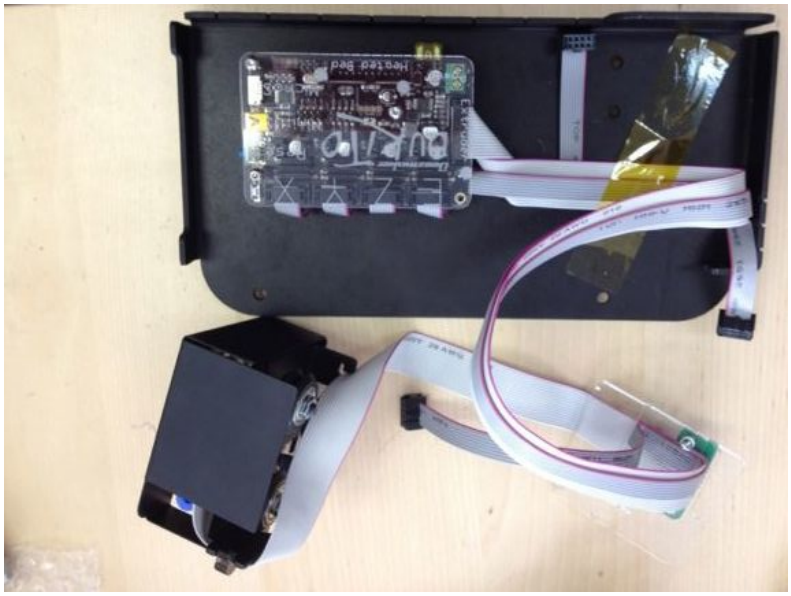
We include a test piece of PLA filament.

General observations

If you are an experienced assembler of electronics, you may find the following obvious. If not, some notes about assembly in general:

- Many pieces have rectangular and slide nuts. These nuts are designed to lock in the slots in the sides of the aluminum bars. You just need to get them started and they will self-align. The slide nuts should be installed with the protrusion toward the inside of the slot, with the exception of the ones connecting the idlers.
- By and large, it's a bad idea to cinch down nuts on the first pass. We will discuss this as we go.
- Each end stop gets a ribbon cable connection. The other end of these connectors are labeled on the board and also cut to a length that should make them tight connections when allocated correctly. If a ribbon cable has significant slack, it probably isn't the right one! Look at these carefully before beginning.
- Most of the screws are either M3 (3 mm) or M5 (5 mm) size.
- IMPORTANT: In some cases we have shown parts where they WILL go to make it clearer how to align them, but the actual connections may be made a few sentences farther down in the instructions. Where this happens we note it. In some cases the prototype parts we used for instructions look a little different or have connectors on a different side; we note that where it happens too and will have updated pictures soon.

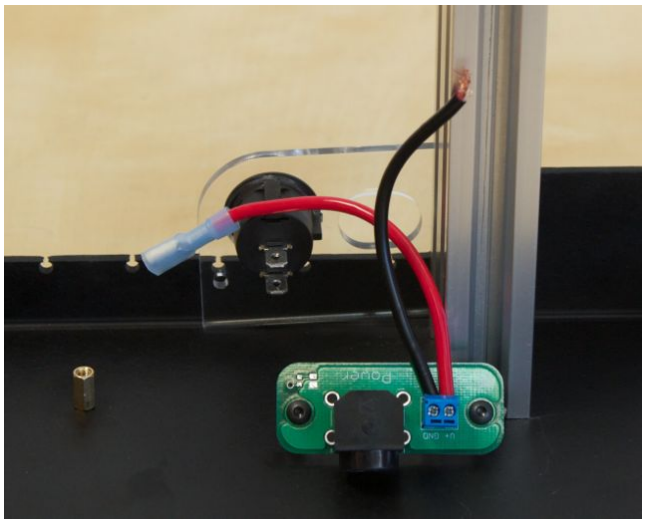
Power switch assembly.



Open the Power switch assembly kit.

Gather up the main assembly(baseplate, control board and extruder, with cables) and the two aluminum 11 inch extruded rods.

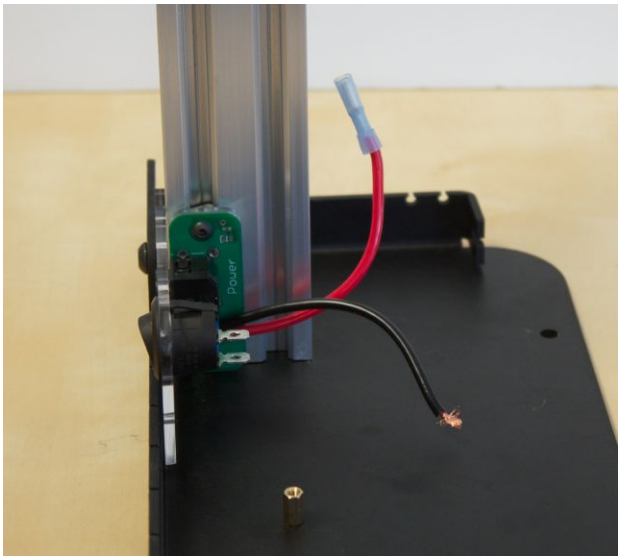
Attach the acrylic piece with the power switch to the baseplate assembly using the M5 (longer)screw and square nut and then the M3 (shorter) screw.



Attach the small acrylic piece to the back of the power connector board (small oval green circuit board) with the two slide nuts and M3 screws. Align it so that the cutouts are over the protruding connections on the board.

Pick up the aluminum bar marked "z axis."(Note: the aluminum bar is shown here attached to the base plate to allow you to anticipate – you should NOT have this bar attached yet.)

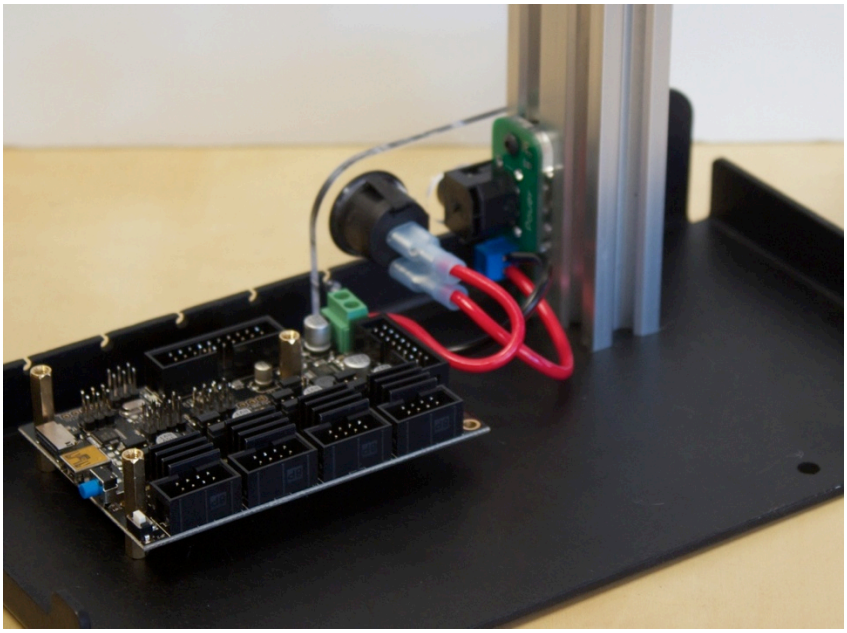
Slide the nuts into the wider side of the aluminum bar. Slide the piece to near the bottom of the bar.



Connect the red and black wires into the holes at 90 degrees to the small screws. Tighten the small Phillips screws. Be sure there are no stray strands hanging out as this can cause shorts. Twisting the ends a bit before inserting them may help. Red wire goes into the V+slot and black wire to GND.

Note that in this picture the acrylic cover is behind the green board, and the nuts are on the far side slotted into the aluminum bar. It can be a little tricky to handle all the pieces (here, the assembled main electronics board which you will have on your system at delivery is not shown; you should not have attached the z axis to the baseplate.) At the end of this process the Z axis should have the power connector board loosely attached.

Take the power connector board and loosen the small screws in the blue connector box on the green power board with a Phillips head screwdriver just enough so that you can insert the stripped wire ends into the holes at 90 degrees to the small screws.



Put the rectangular nut on the side of the baseplate into the narrow side of the aluminum bar. Turn the nut sideways so the nut can get into the slot and insert M5 screw into the side of the baseplate (thus attaching the side of the Z axis). Carefully slide down the Z axis over these nuts and attach it to the baseplate. Tighten down all sliding nuts and M5 screws. Attach the bottom of the Z axis with the remaining M5 screws.

Take the other **red wire** (not currently attached to anything) and insert it into the **+ terminal** of the main electronics board (you will need to take off the acrylic cover to do this, which involves taking off three screws with an allen wrench.)

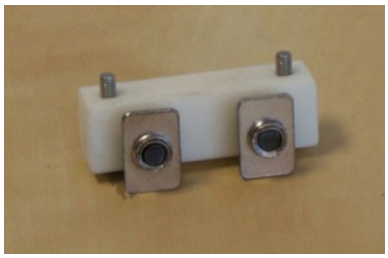
Tighten down the small Phillips screws. Take the **black wire** from the power plug connector board and attach it to the **- terminal** on the main board.

Attach the red wire from the main electronics board into the top of the switch.

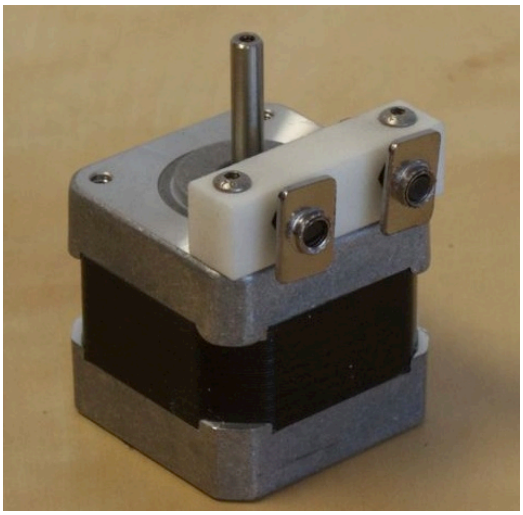
Attach the red wire from the power plug board into the bottom of the switch.

Z motor mount.

Open the Z motor mount kit.



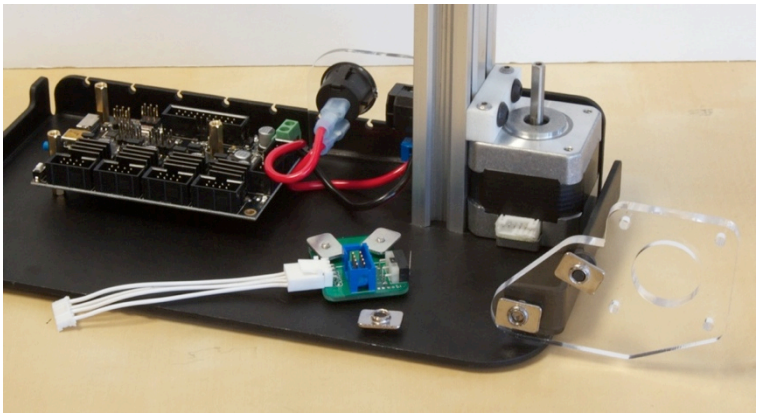
Put in screws from each side into the white block such that the screw tips are closest to the black mark. Put the big black (M5) screws in and out a few times to loosen up the holes a bit. Put the thinner (M3) screws in so they are just flush with the surface of the white block. This picture was taken before we added the black marks- the black mark would be on the top and front of this piece.



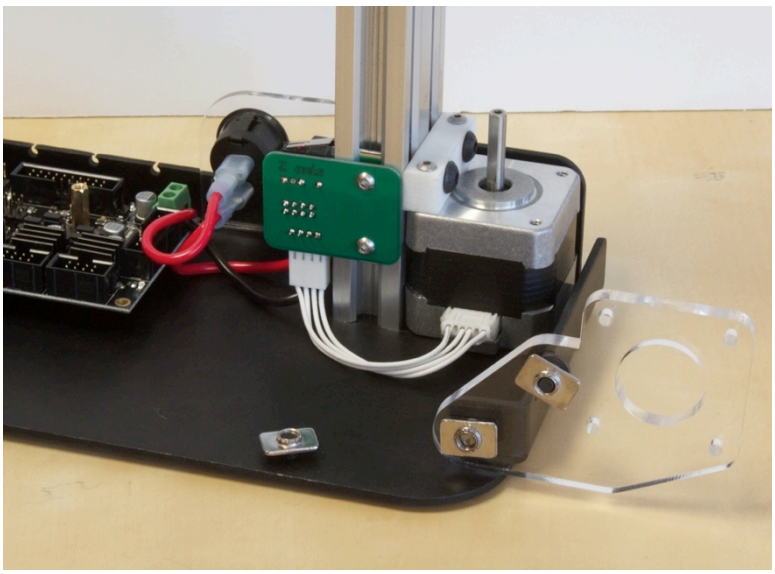
Put the piece on top of one motor such that if the motor connector is toward you, the white piece is on the left with the black line facing out (the M5 black screw heads should face toward the motor center). The black line will then disappear when it is attached to the aluminum bar. The nuts should be loose. Set aside for now.

Z axis kit.

Open the Z axis endstop kit and assemble the screws and acrylic cover such that the acrylic cover cutouts are over the protruding parts of the circuit board. Add the motor cable (thinner cables, not a ribbon cable.) Slide the nuts into the Z (vertical) axis aluminum bar such that the white connector is down. Attach the Z axis insulation displacement connector (ribbon cable- should be appropriate length so that it just fits) into the blue socket. Then press the part until the bottom of the acrylic touches the bottom plate and tighten the screws.



Note: these pictures show the Z motor installed. Do not install it just yet – this is just to allow you to anticipate where the part you just put in will be attached later. (It gets hard to see when the other pieces that we are about to put in are installed!)

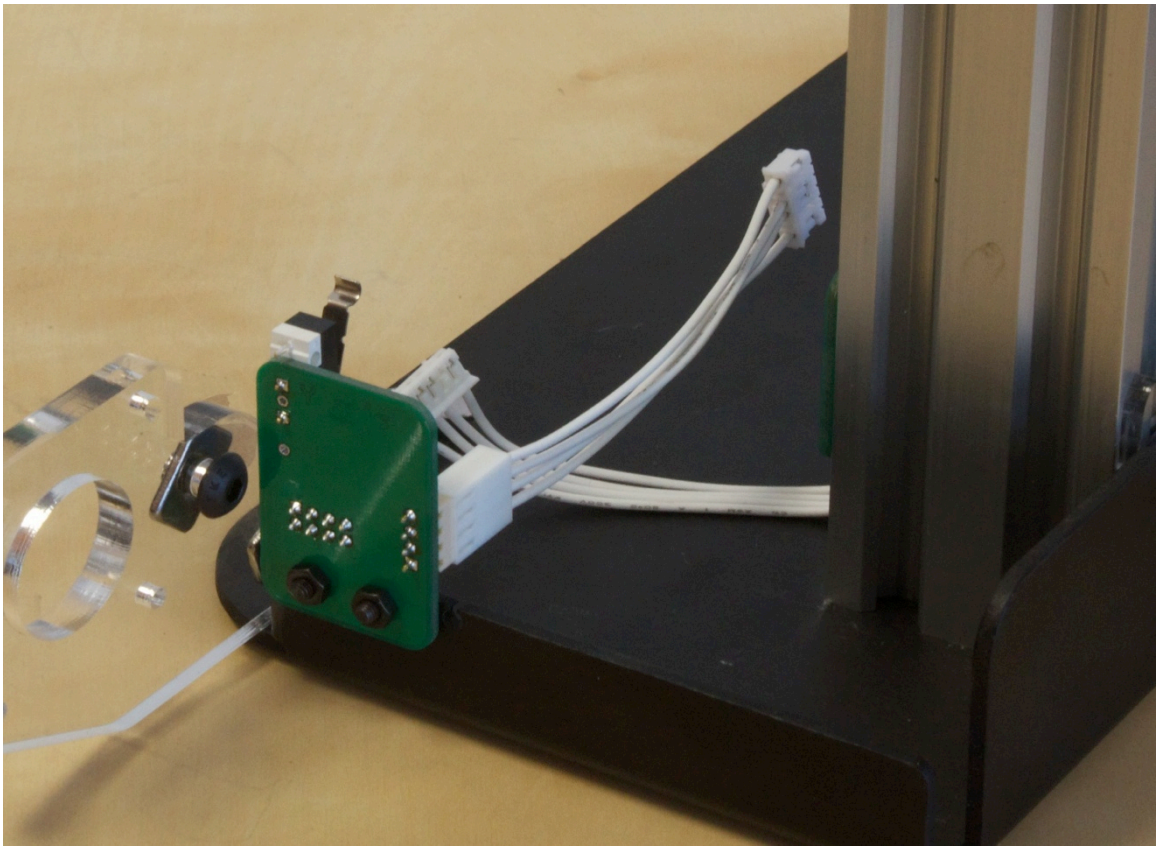


Y axis kit.

Open the Y axis kit and attach the acrylic piece to the board using the two longest (12mm) M5 screws and two nuts.

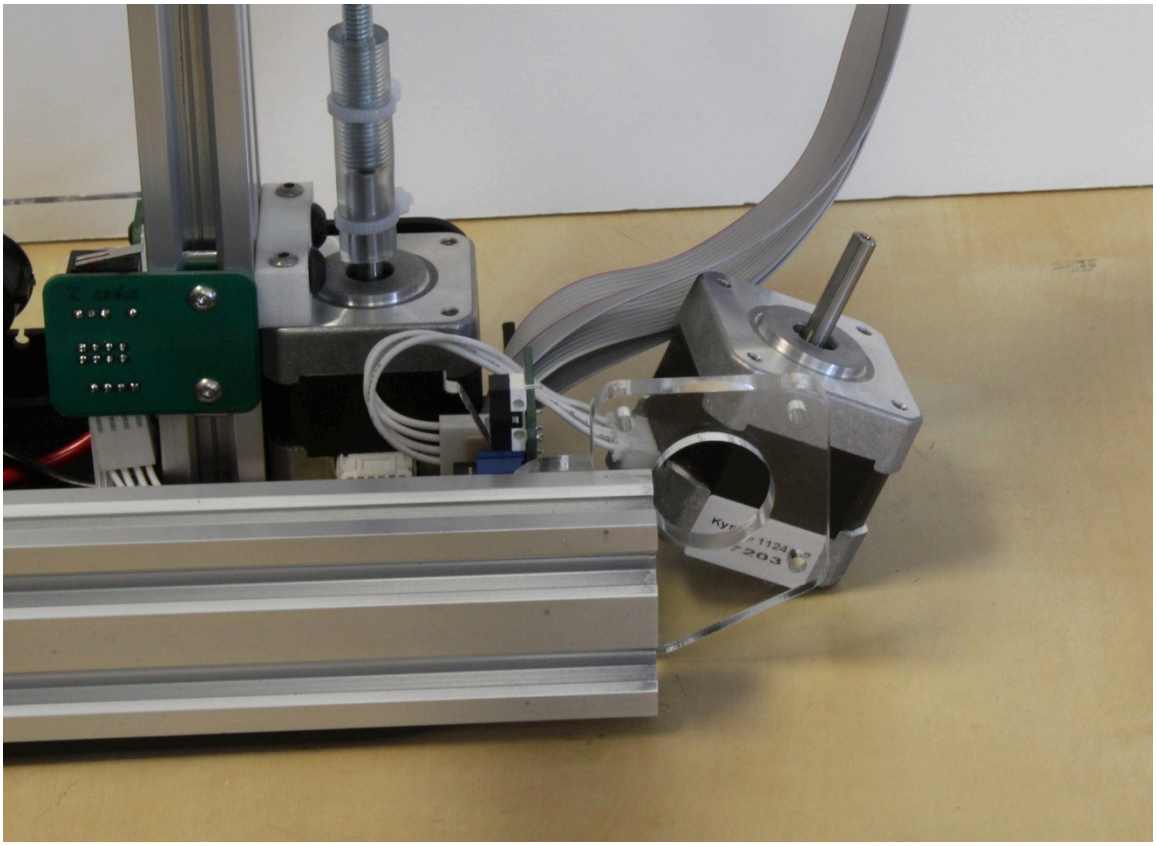
Put the two shorter M5 (10 mm) screws through the holes in the Bukito baseplate and put a rectangular nut loosely on each. The 12 mm will go through the longer hole (through the metal baseplate) and the 10 mm through the upper hole.

Take the y end stop and attach the motor cable(not a ribbon cable.)Attach it on the outside of the base plate next the acrylic piece with M3 screws. Use the two closest holes to the acrylic piece. Attach the ribbon cable and connector (trace back to the "y" on the main electronics board) to the y end stop.



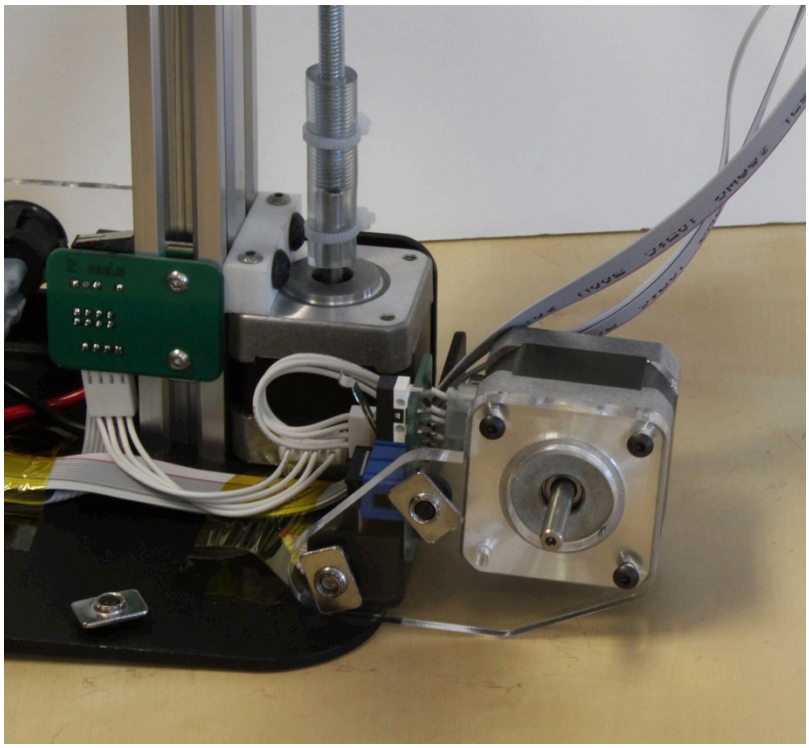
Take the other large aluminum bar and place it over the nuts; slide until it is just level with the big circular hole on the acrylic piece . Tighten down. Attach the white cable from the y motor power board to the y motor.

(Note: in this image the z motor and screw is already there to show placement but you should not place the motor yet).



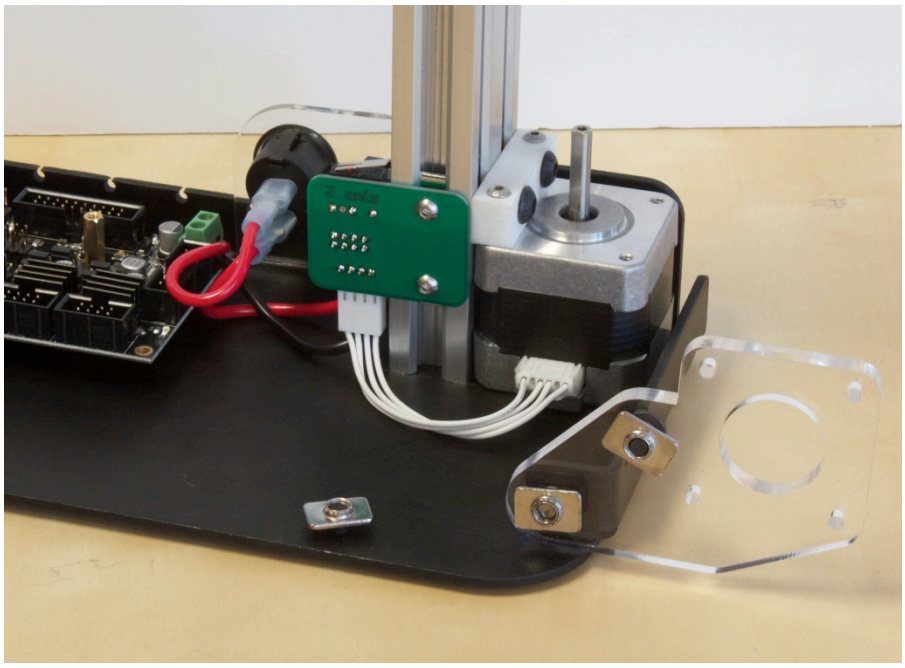
The y axis acrylic should be parallel to the y axis aluminum bar. Bottom of the acrylic should be flush with the aluminum bar.

Take a motor and attach the white connector to the board you just attached, and attach the motor with the three screws provided. We are talking about the motor with the shaft pointed toward us in this picture.

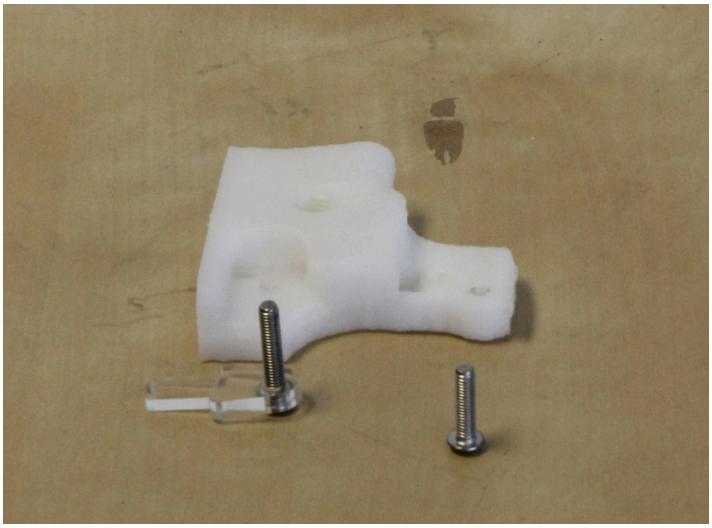


Z motor

Now attach the z motor by sliding it down the z axis. Attach the connector from the z motor board and tighten the motor down.

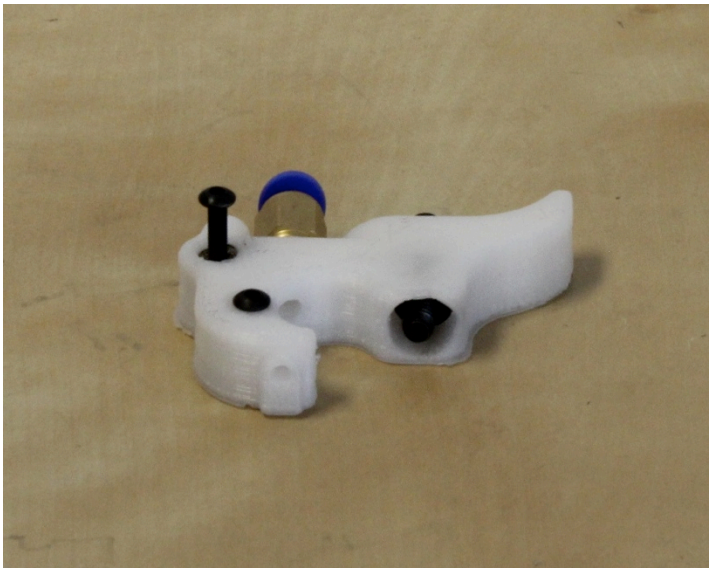


Extruder filament drive mechanism



Open the extruder drive mechanism kit. Be sure not to lose the small piece –the spring (a few steps down) hooks over the narrow part of this small acrylic piece. The 12 mm M3 screws go through the acrylic piece.

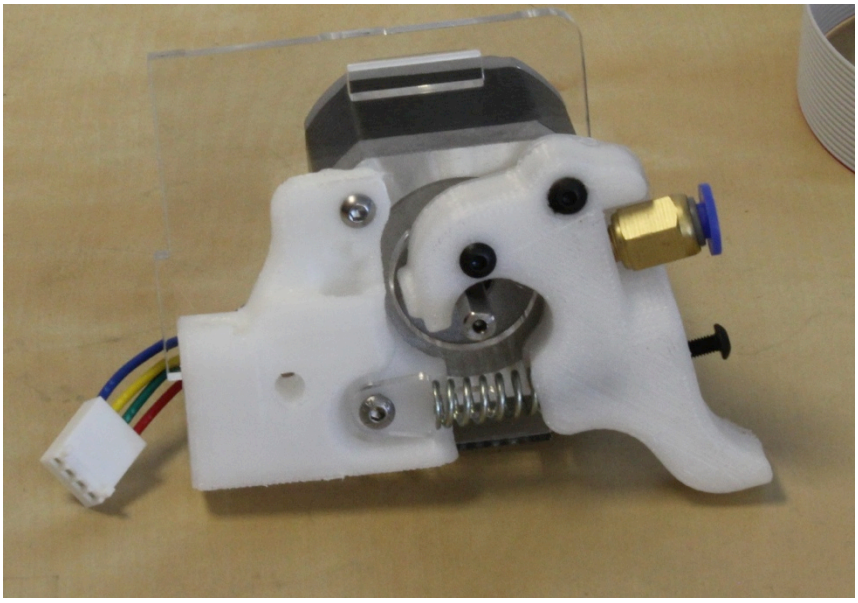
Take one motor and lay clear acrylic piece so that shaft pokes through on top with wider end toward the connector. Set the motor and acrylic aside for now. (This step not shown in a picture.)



Then, take the plastic piece shown here.

Drop M5 screw head in, tip out, into the hole in the part with the blue flange. Next drop in the spring over that screw tip. (Hole is in front of you – screw point is facing toward you. Spring will be over that tip.)

Assemble as shown below. HOWEVER in currently-shipping motors, the motor connector is on the other side.



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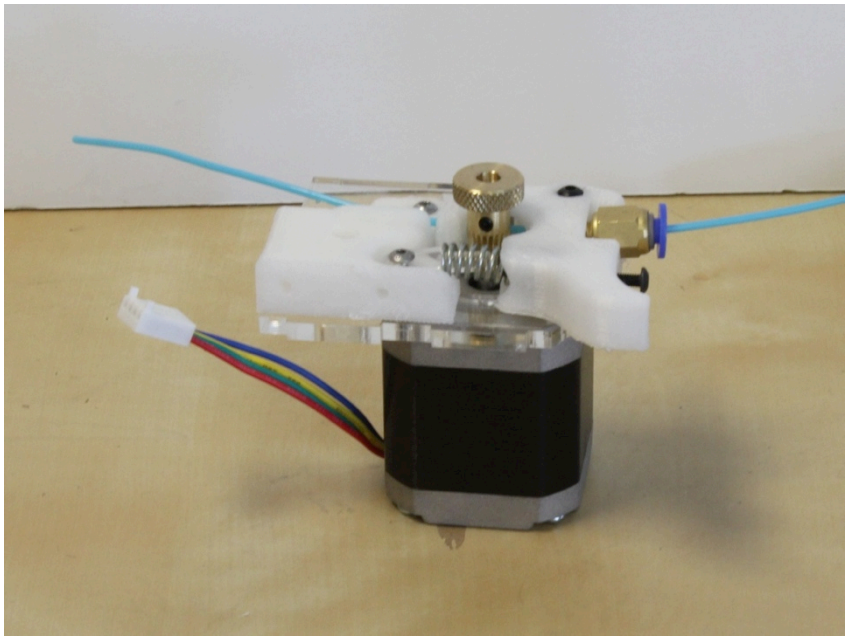
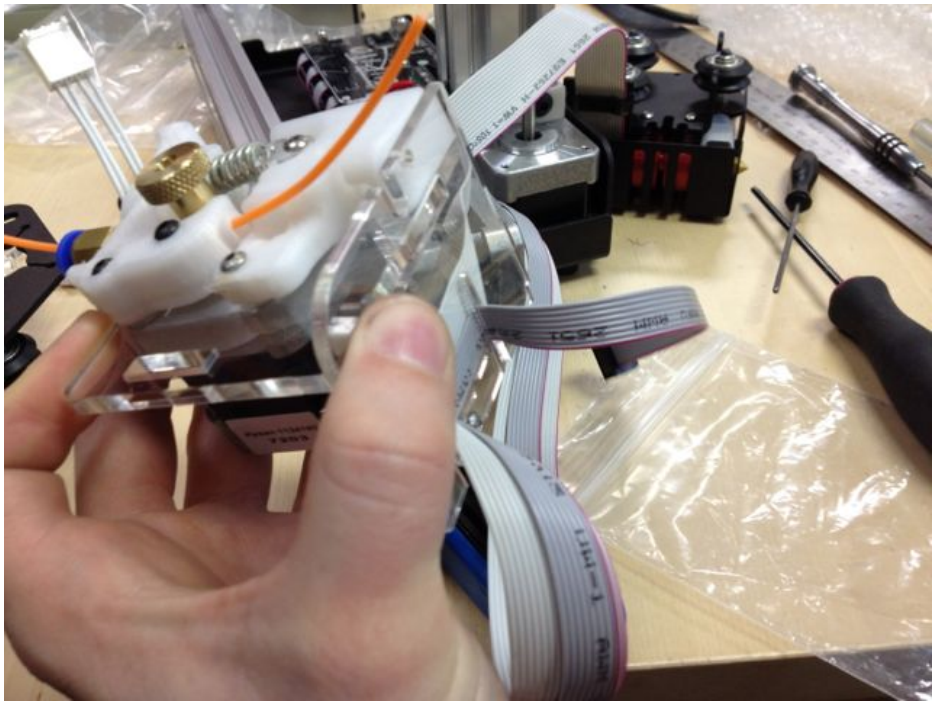


Put filament in to check drive gear alignment. **Motor connector should be on opposite side from blue flange in currently shipping motors- this is an older motor New images coming soon.**

Now straighten out wires and arrange things so that you can get at the wire clamp panel (acrylic piece and board on a ribbon cable, already attached to the main electronics board.)

Attach that panel to the extruder drive mechanism. It will become the left side of a 3-sided partial acrylic box around the extruder drive motor assembly.



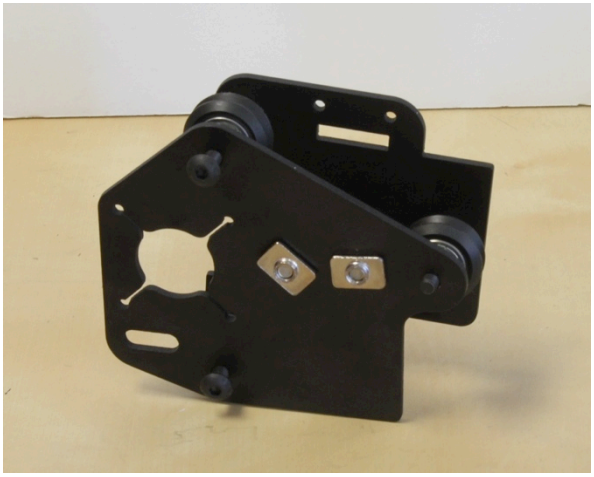
Plug motor into circuit board on assembly.

Add the fan – attach acrylic piece and press fit into place (far end first).

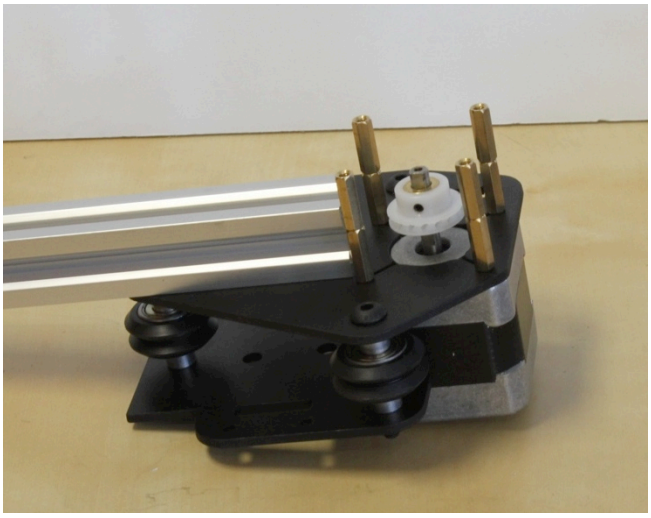
The fan will be the back of the three-sided acrylic box around the extruder drive mechanism left, front, and top sides. The filament drive gear will be on top. Use tabs/slots and M3 screws to assemble.

X axis assembly

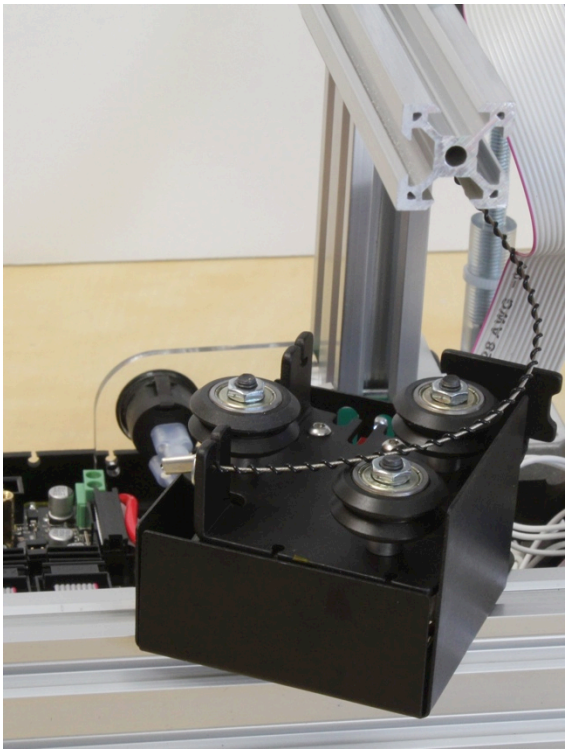
Open the x axis kit and set aside the X-axis carriage (prebuilt for you as shown.)



Mount the x motor onto it using the standoffs in the kit; be sure the connector faces down (away from the drive assembly).



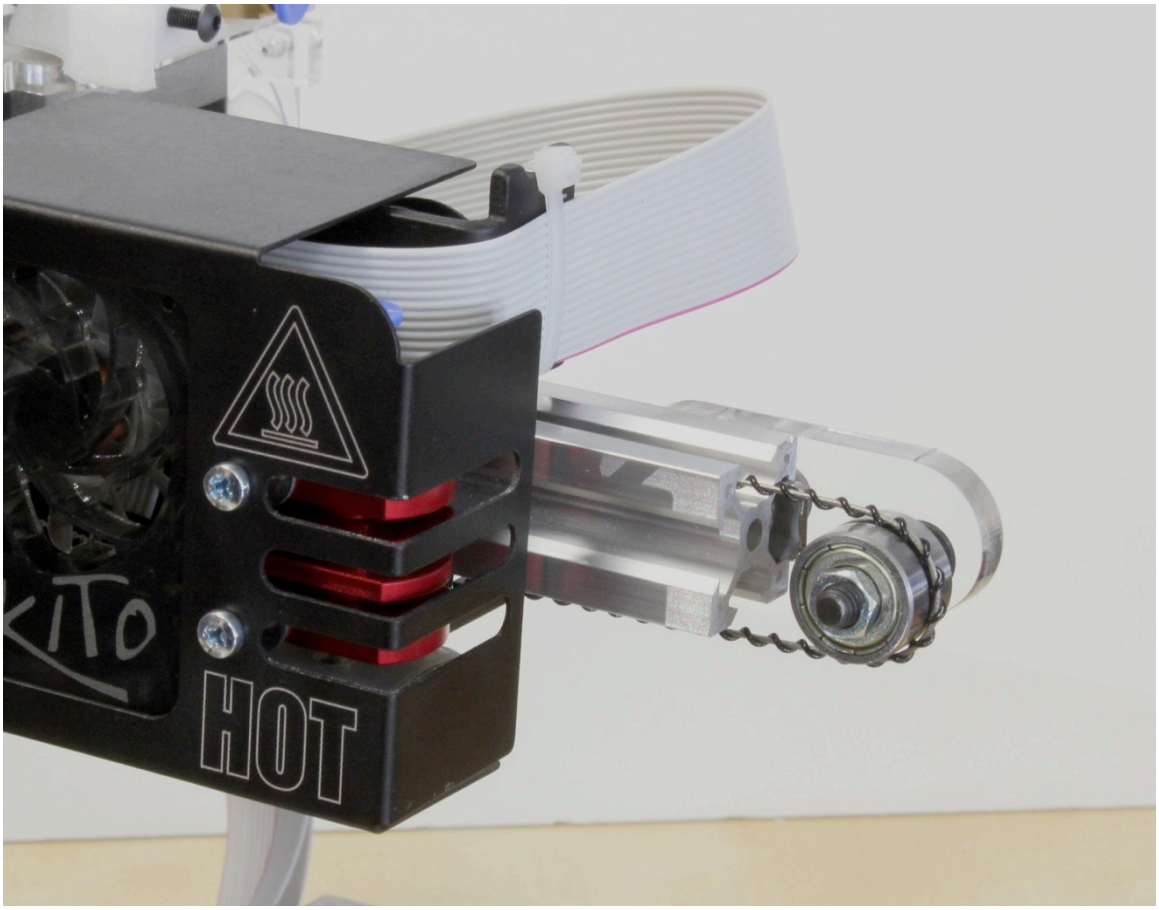
Align syncromesh pulley (white plastic part) with slot of the extruded aluminum rod. Once it is aligned, rotate the pulley so that the small screw on the side (dark spot on side in image) is on the flat part of the motor shaft so that it can be tightened down.

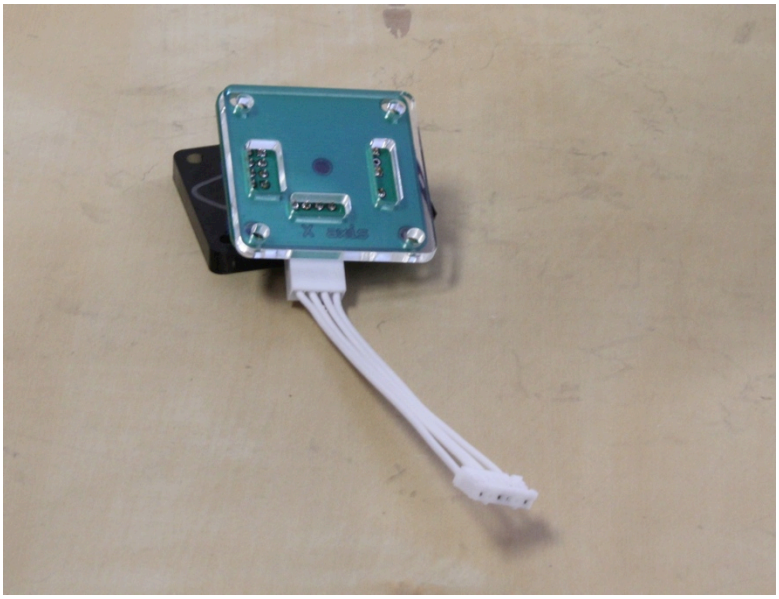


Take shorter of the two pieces of synchromesh cable and be sure there is a washer on either end. Put the cable in the slot of the top of the x carriage aluminum bar.

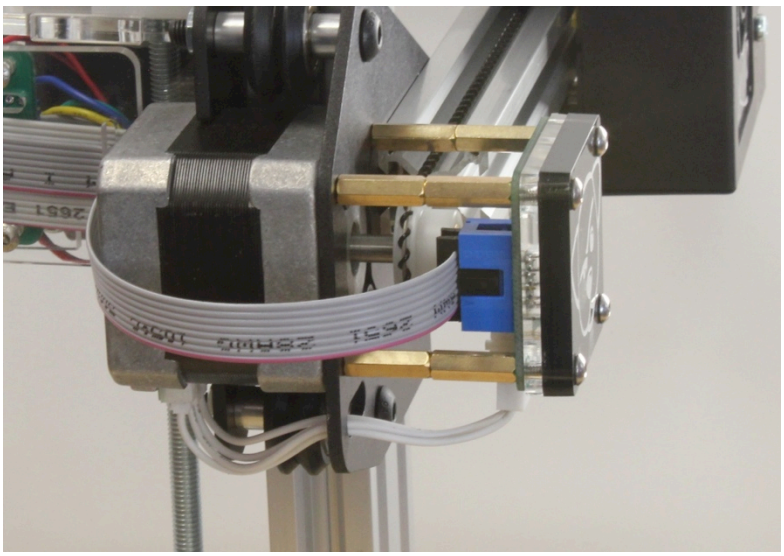
Take the extruder carriage and slide it onto the x axis by sliding it onto the back slot on the x axis aluminum bar. Be careful to place the wheels over the synchromesh before sliding fully onto the beam. Then hook the synchromesh into the tabs on the bottom of the X carriage.

Next take the synchromesh idler (piece of acrylic with a roller) and attach it to the back of the end of the x axis. Adjust the tension of the synchromesh by pulling the idler away from the end of the x axis. Adjust the synchromesh to be tight enough so that it takes some force to tighten down the idler into position. Be sure the synchromesh isn't binding or dragging anywhere. It should be tight enough that it does not lift off the idler or pulley on the other end – about the same tension as a steel-string guitar string.





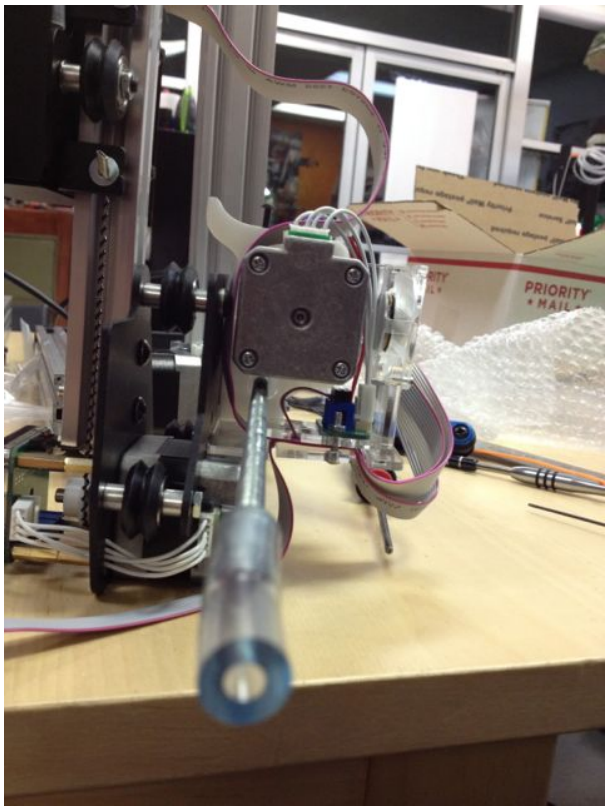
Take the x end stop kit and put the acrylic cover over the circuit board, aligning so that the protruding parts of the board are in the cutouts. Attach the part with the Bukito logo to the other side (facing away from you in this photo.)



Plug in end stop ribbon cable (should trace to “x” on main board); the motor cable goes through oblong hole black metal plate (near center of image below) Plug in motor cable (ribbon cable) into blue connector.

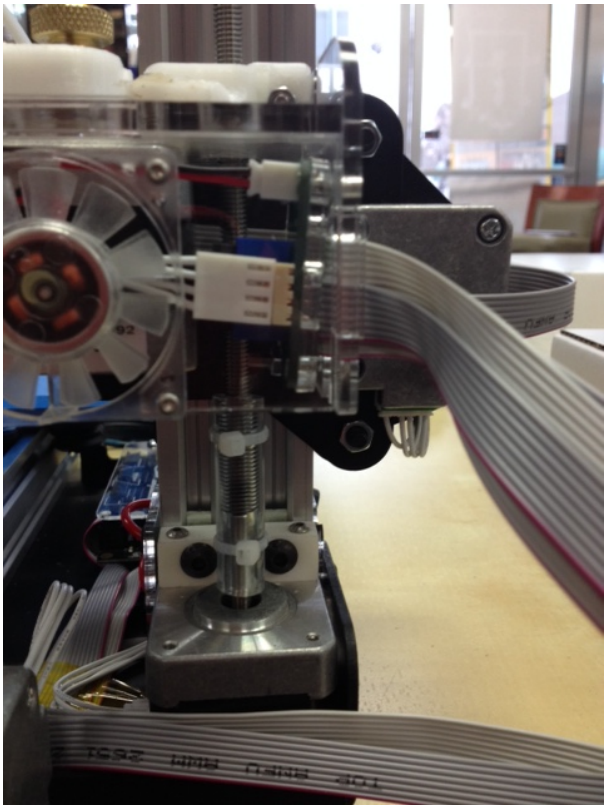
Attach extruder drive gear assembly to x axis assembly (process not shown- look at picture of completed Bukito on last page of instructions for overall alignment).

Z Screw



Put z screw into white plastic of extruder screw assembly. (You are looking up from what will be the bottom of the screw.) Screw into plastic piece until it starts to come out other side.

Slide x carriage onto front of z axis and extruder assembly onto back and be sure that all wheels and z screw align. You might want a friend to help you hold pieces as you do this part.



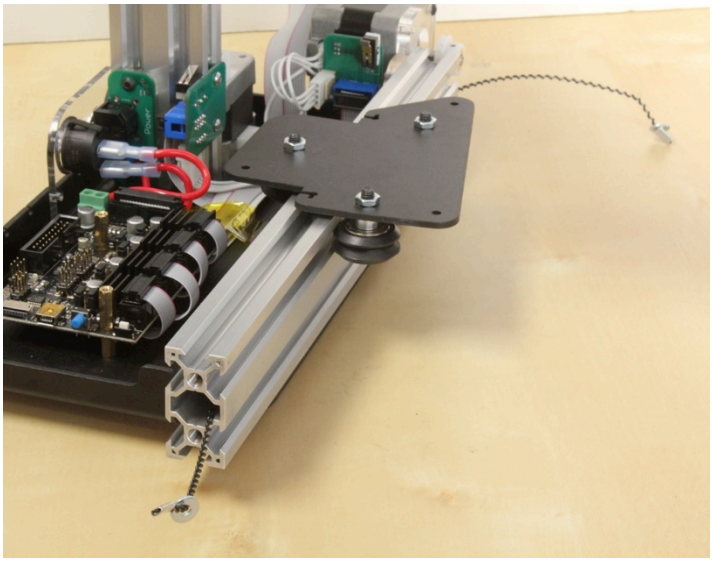
Squeeze plastic tube onto z axis and push down. Squeeze while pushing down so that tube will widen a bit while being forced along.

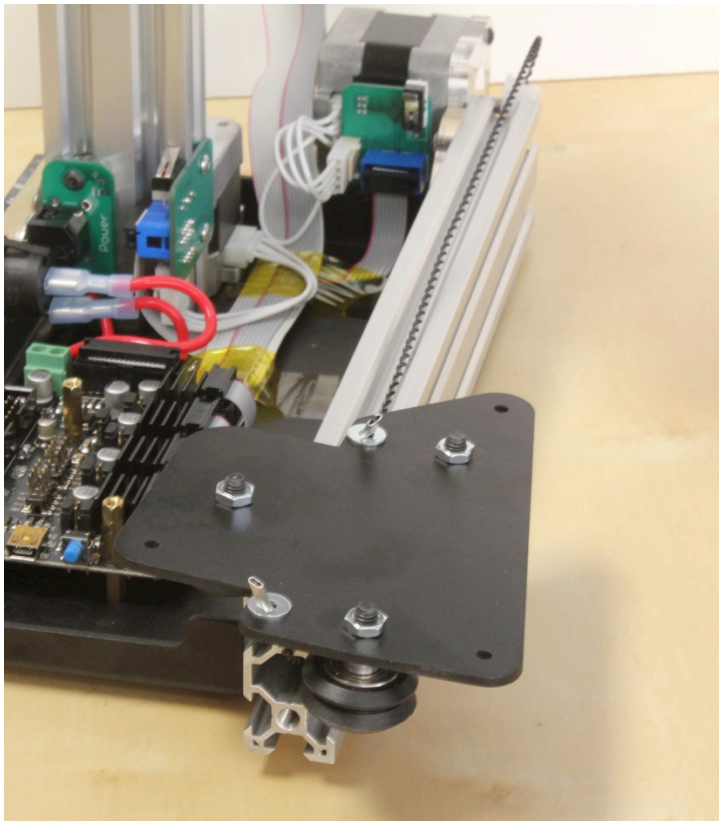
Put a cable tie on the plastic tube just above the z motor mount white piece and another near the top of the screw cover. Make these as tight as possible to prevent shafts from turning in tube.

Y platform

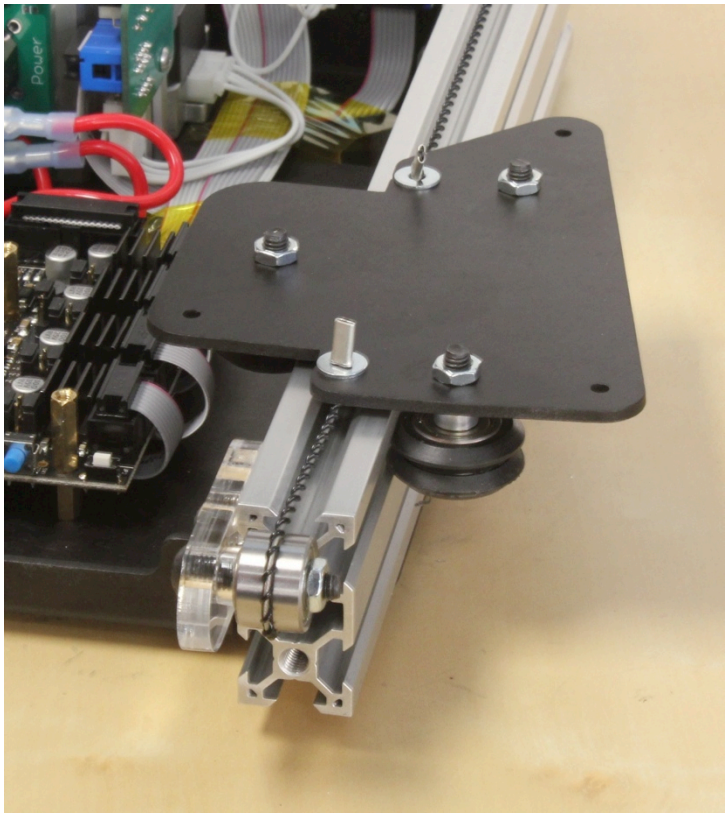
Slide the y platform carriage onto the y carriage aluminum bar.

Run the remaining piece of synchromesh through the channel in the MIDDLE of the aluminum rail. Be sure that you have a washer on either end.





Hook the synchromesh on the back side of the Y carriage then slide onto rail. Hook front end before sliding all the way.

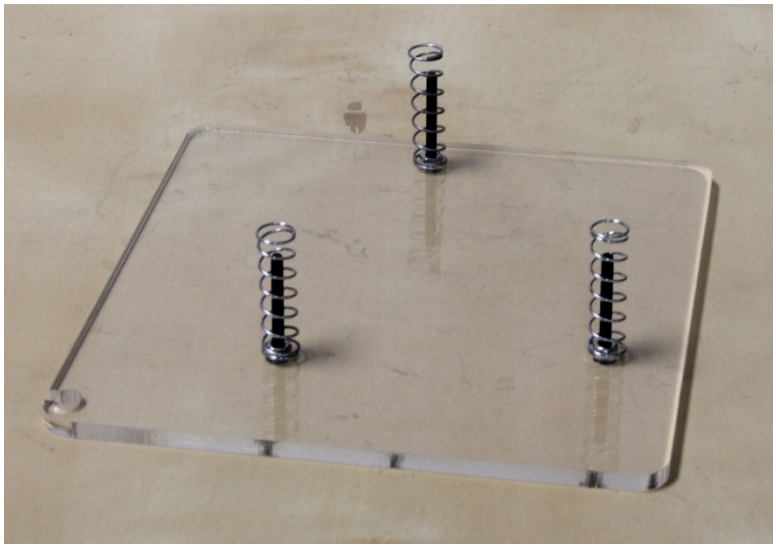


Attach ends of syncromesh to bottom of platform and put on and adjust idler as you did on the x carriage. Tighten similarly.

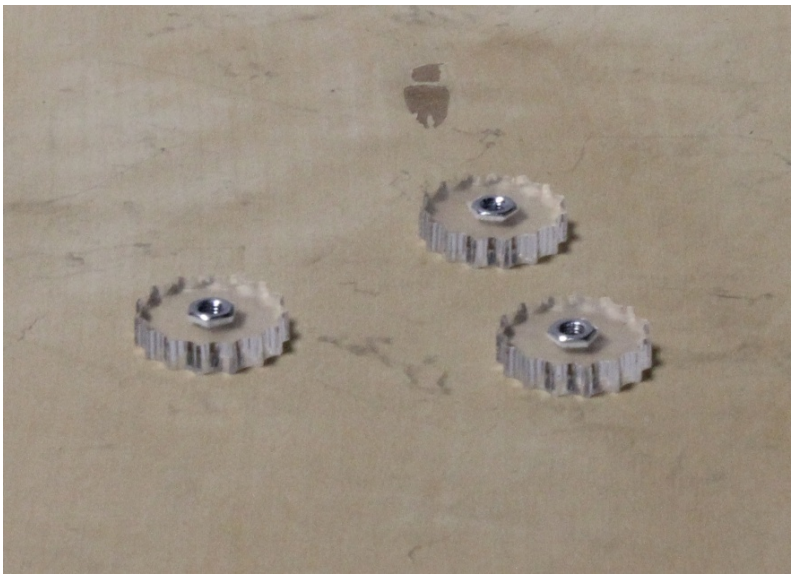
Attaching the platform

Open the platform attachment kit

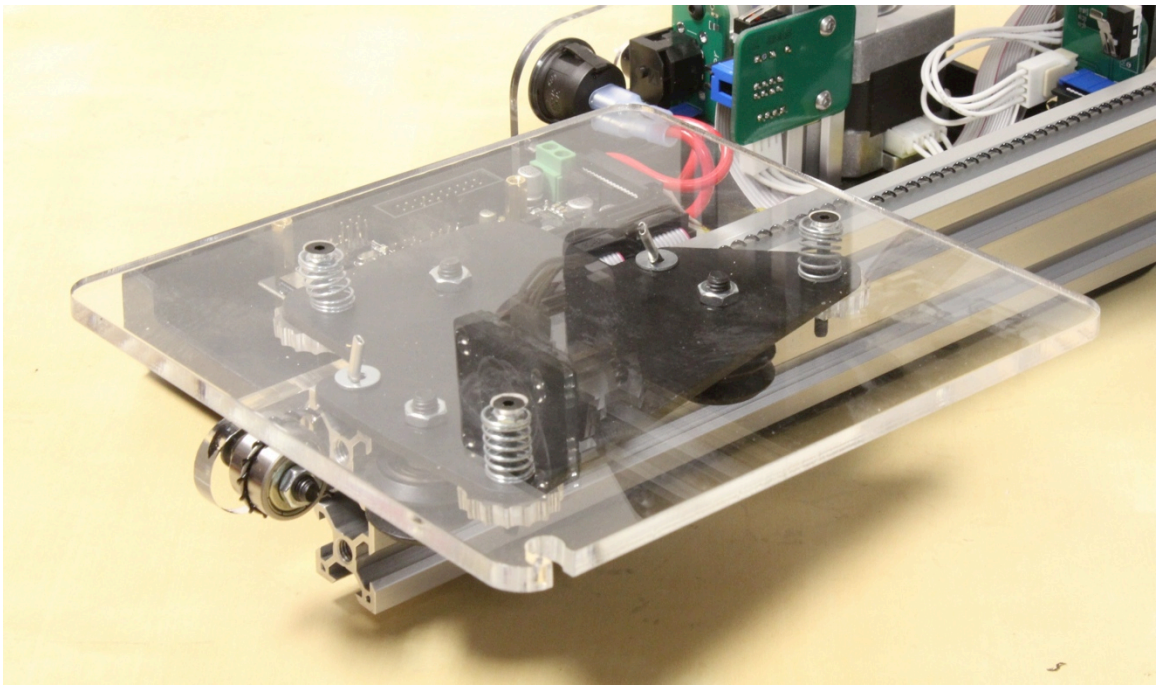
Take the platform (shown here as clear acrylic, but production kits will be made of garolite-LE, a tan linen-phenolic composite.) Put the three long screws and springs on as shown.

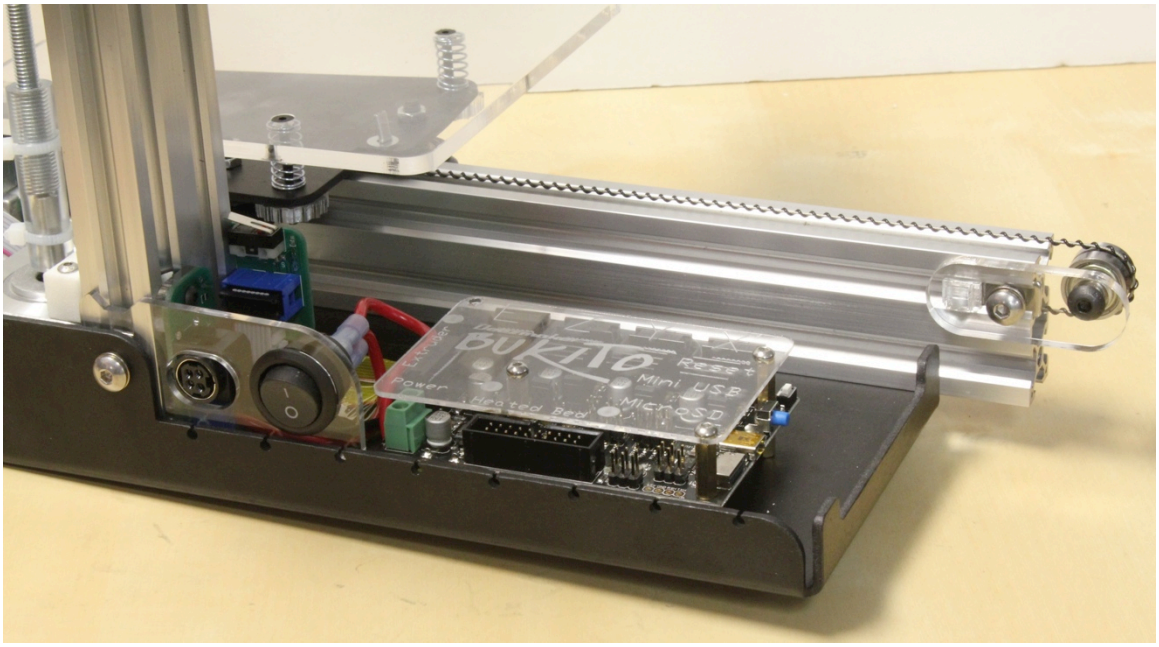


Take the flower-shaped adjuster wheels and small nuts and drop a washer into the indentation in each gear. Press into place.



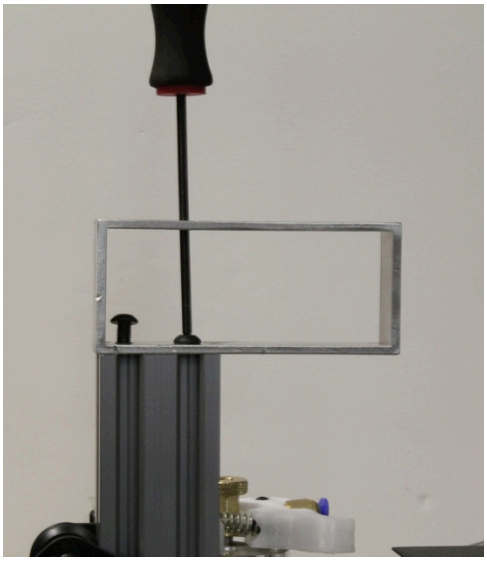
Take the platform and connect it to the carriage as shown. Hold the platform down with one hand and tighten the screws (using the "flowers") as much as you can. You will back it off later to adjust it.





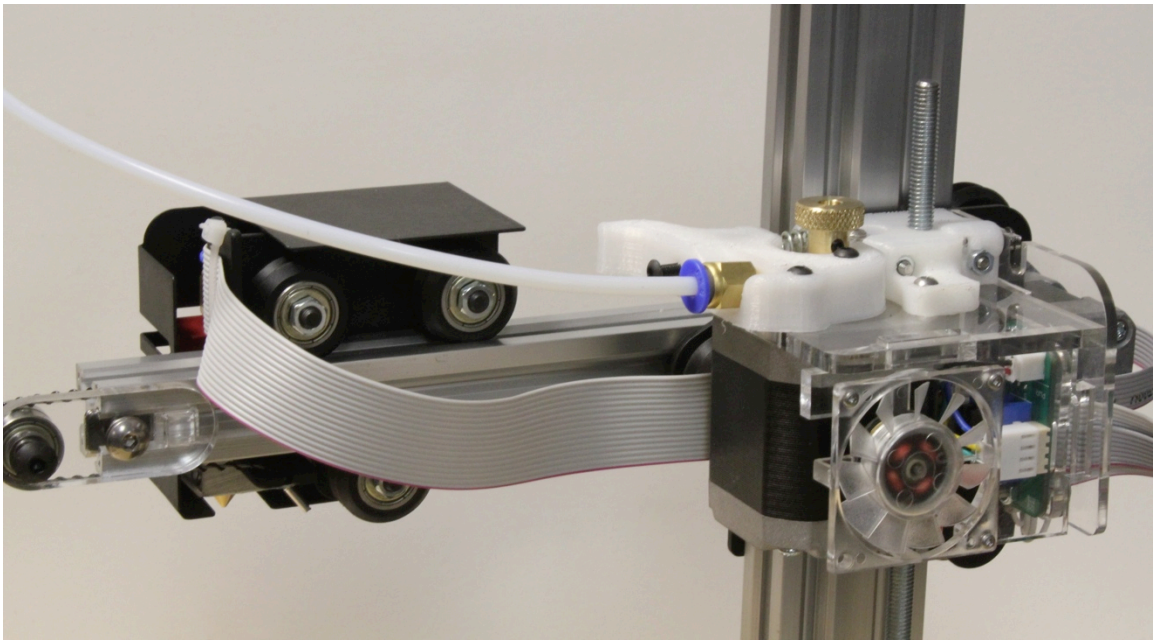
Handle

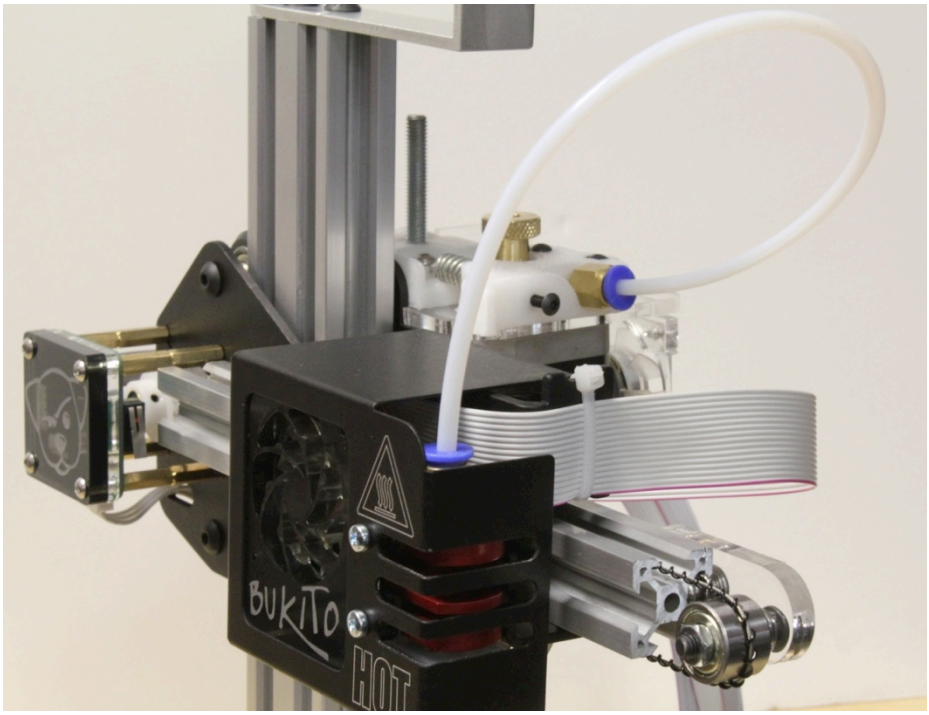
Put on the handle, using the two screws provided. The top holes are meant for clearance for the screwdriver and also for you to add your own 3D printed handle additions if you like.



Filament tube

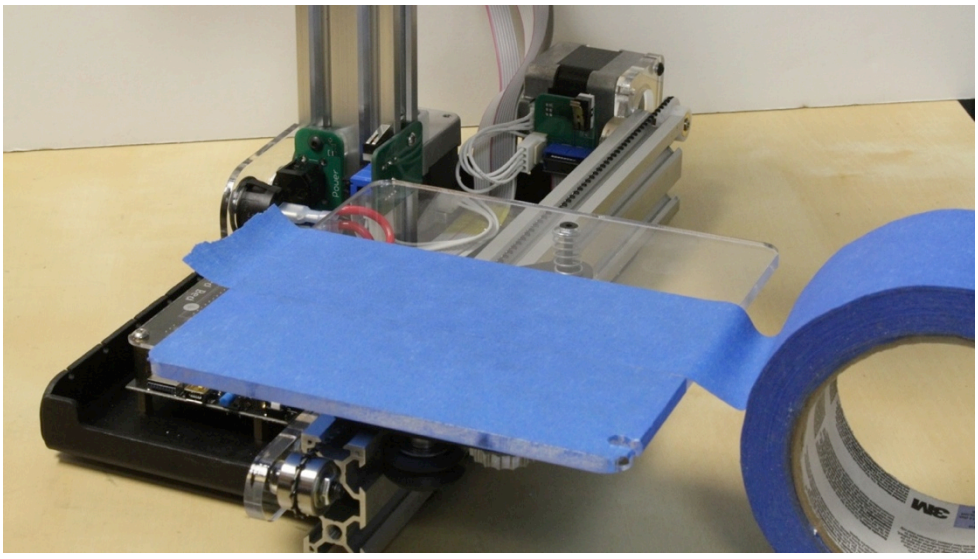
Attach the filament tube to the blue flanges on the extruder drive assembly and on the extruder block.





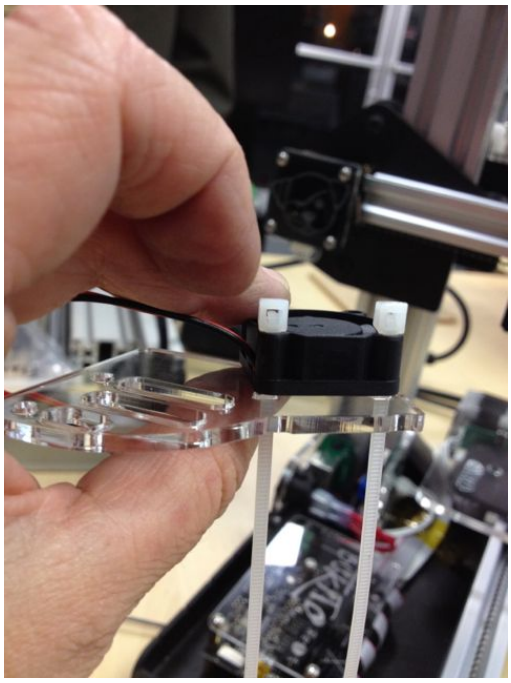
Applying blue tape

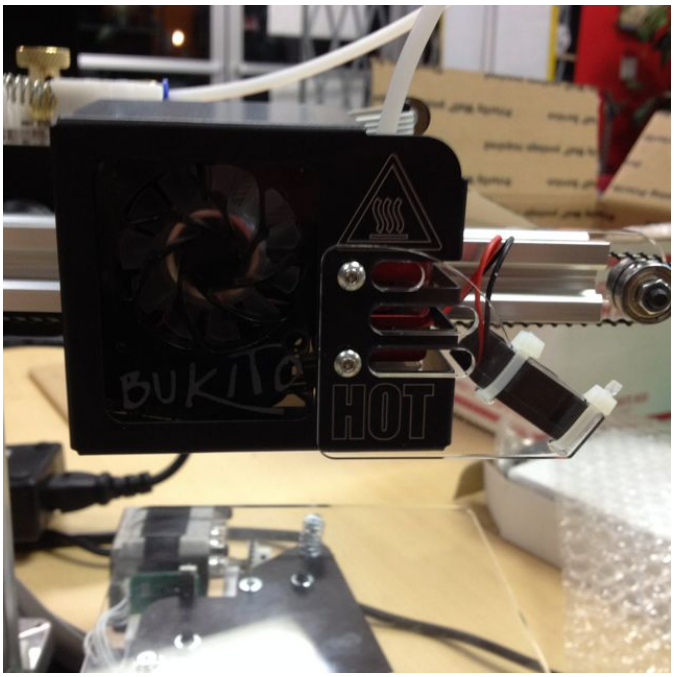
If you are going to print in PLA, now put on blue tape. (Garolite as-is works for nylon.) Purchase a roll of 3M "ScotchBlue" painter's tape. (Other brands do not seem to work as well.) This tape is used so that the PLA will stick to the platform. Cover the platform carefully (one layer thick, preferably without lapping or bubbles.) Be sure to punch a little hole for the extruder well.



Add-on PLA cooling fan

Take the PLA cooling fan kit and attach the small fan at 90 degrees to the end of the acrylic piece with two cable ties. Trim the cable ties. Remove the screws holding on the extruder head cover, add the fan holder acrylic, and replace the screws





Plug in the power supply.

Congratulations- you are done! Next, read the "first print" Bukito directions at bukobot.com.