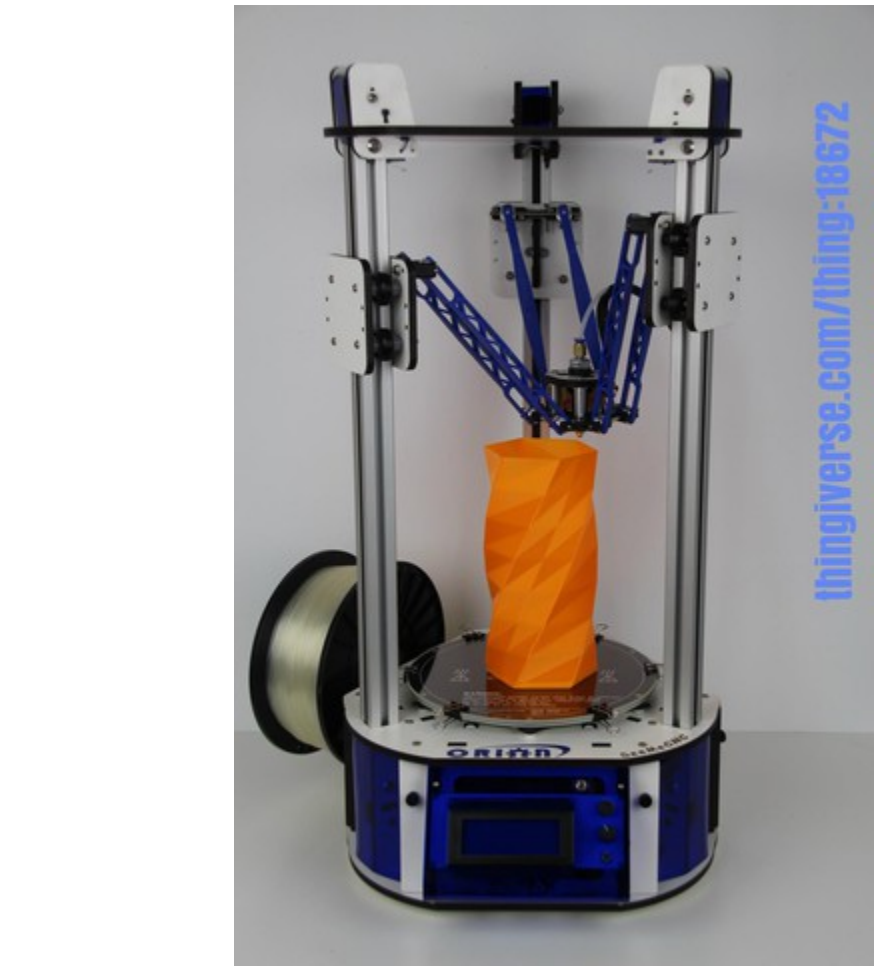

Orion Delta™ 3D Printer Manual
v1.10, November 15th, 2013

This guide will take you through the steps to set up and operate your new 3D printer from SeeMeCNC. You'll find instructions on calibration, software, maintenance and more all in this manual. As a new SeeMeCNC™ owner, you'll also find a ton of great resources on the forums at www.forum.seemecnc.com

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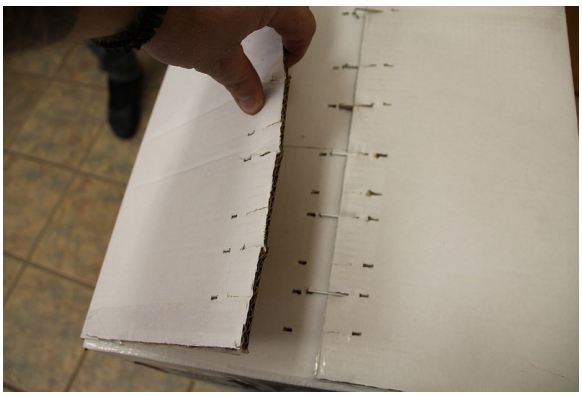
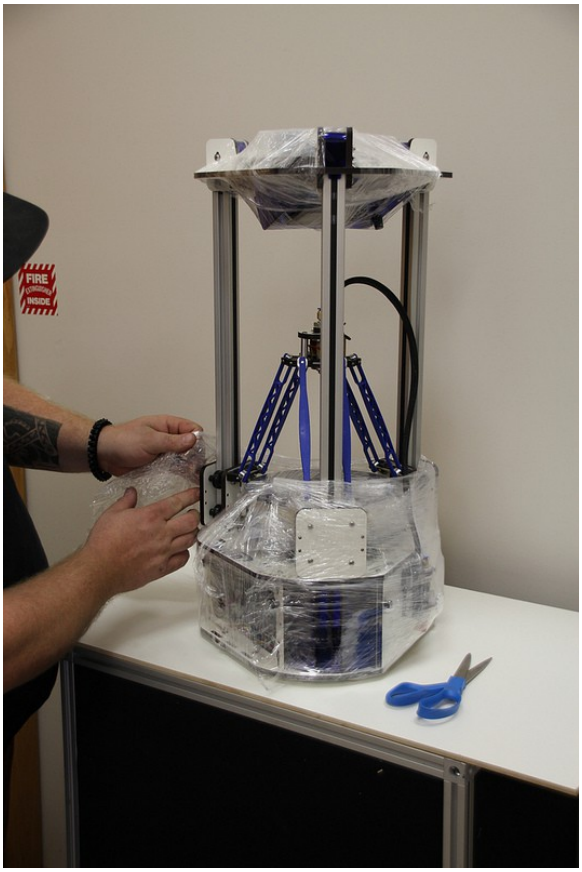
Un-Boxing your new Orion Delta™ 3D Printer

With your box standing in the upright position, carefully cut the packing tape along the top edges and across the taped seam in the box.

After you've cut the tape, open the top of the box being careful of any packaging staples. You'll find the machine tucked inside and wrapped in a protective expanding foam shell. Remove the machine and foam all as one by pulling straight up out of the box. Be careful not to drop the machine once it's out of the box and the foam is still around it.

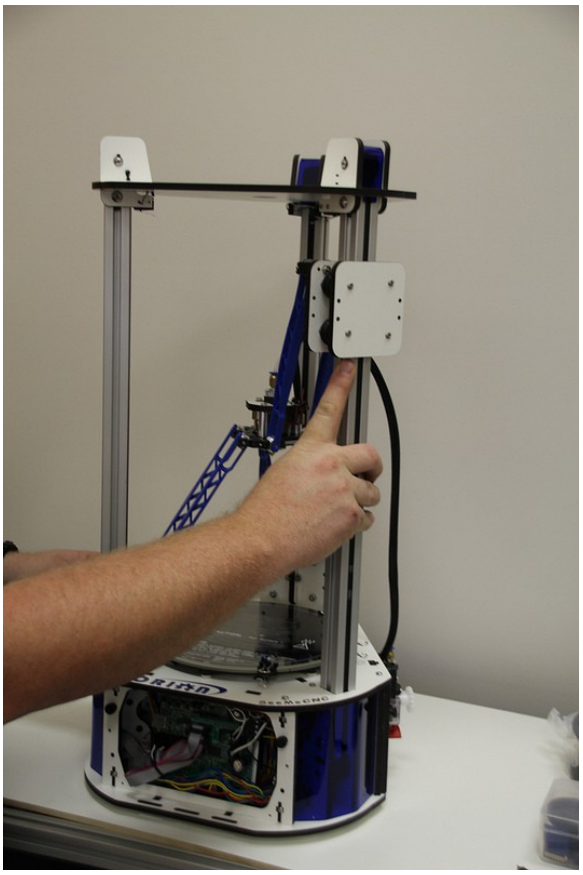


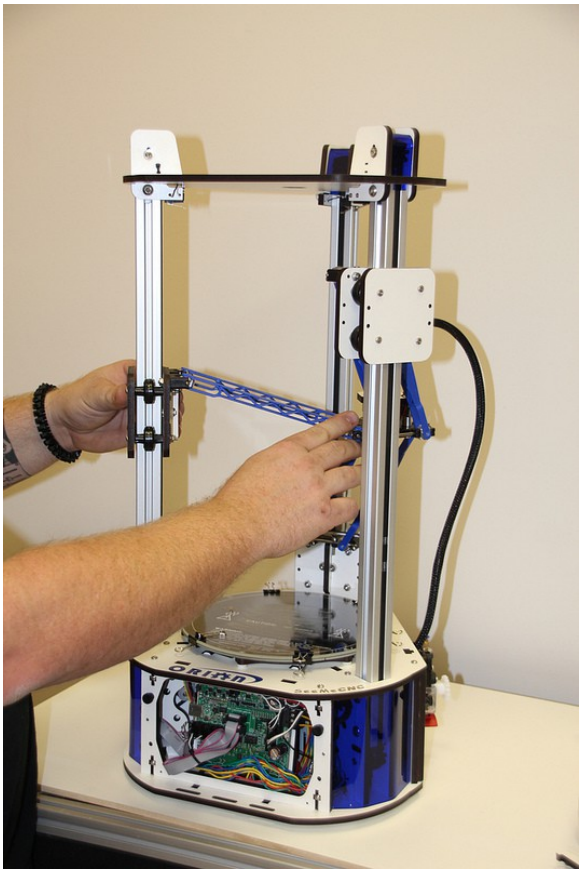
Carefully cut and remove the stretch wrap film that is holding the power/USB cables, Orion control panel and accessories on the top plate, as well as the stretch wrap holding your filament to the table top and glass build surface.

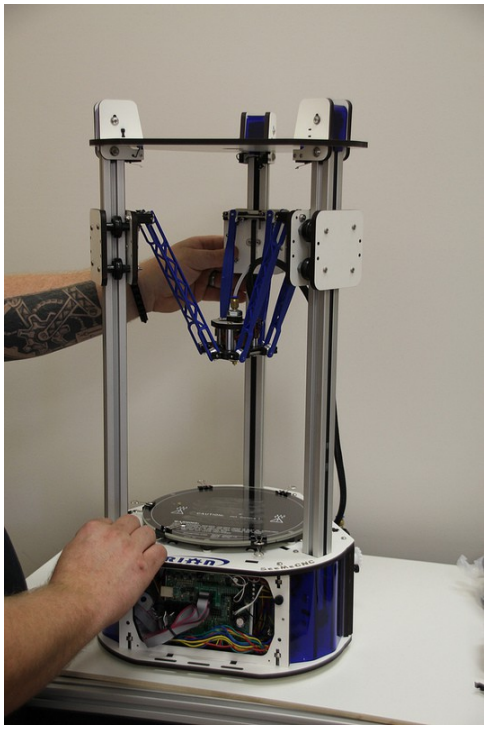


In order to prevent damage during shipping, the hot end on the Orion Delta™ is locked in place over the bed by lowering the delta arms as low as they'll go on each tower. These arms need to be raised in order for the Orion Delta™ to be used.

The process is very simple – just grasp the Cheapskate bearing for each arm and raise them one at a time to the top of the Orion as shown in the photos below.

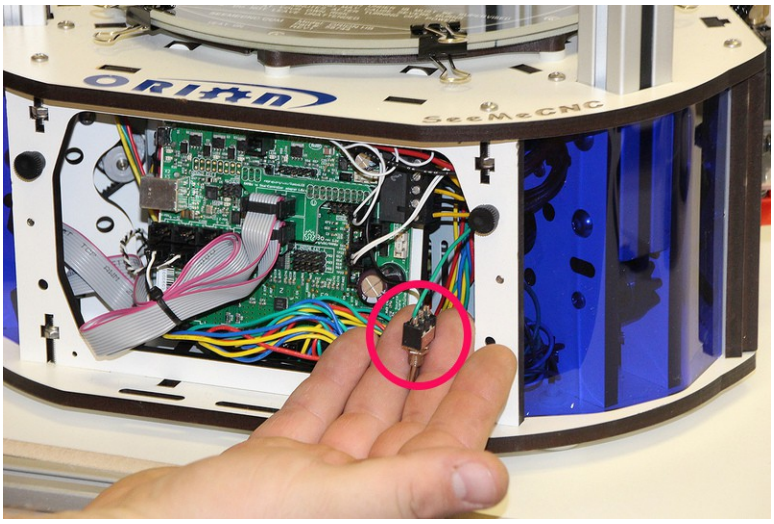




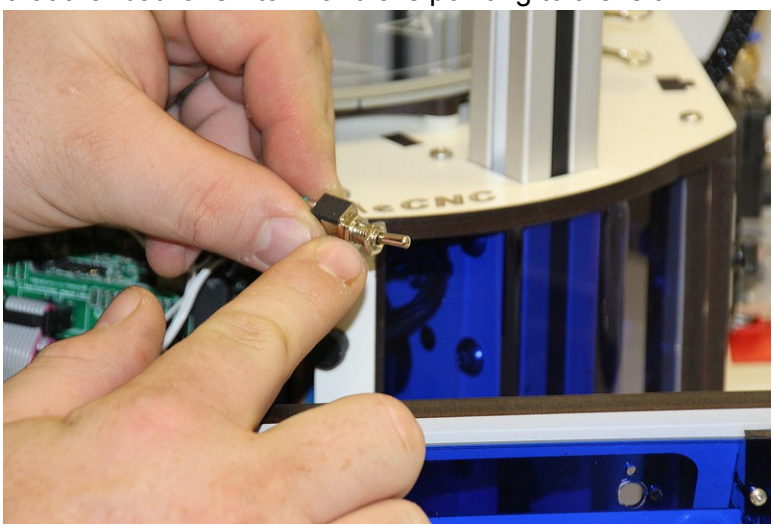


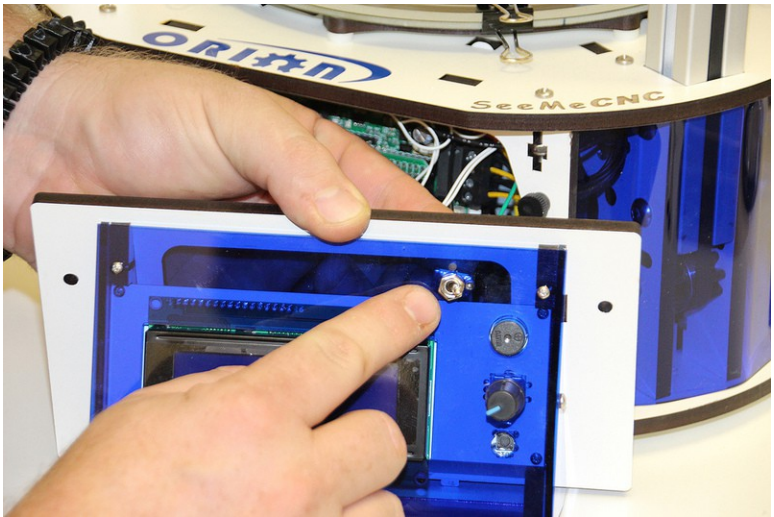
Installing the LCD Control Panel

The first step is to install the power switch into the blue acrylic face of the LCD as shown.

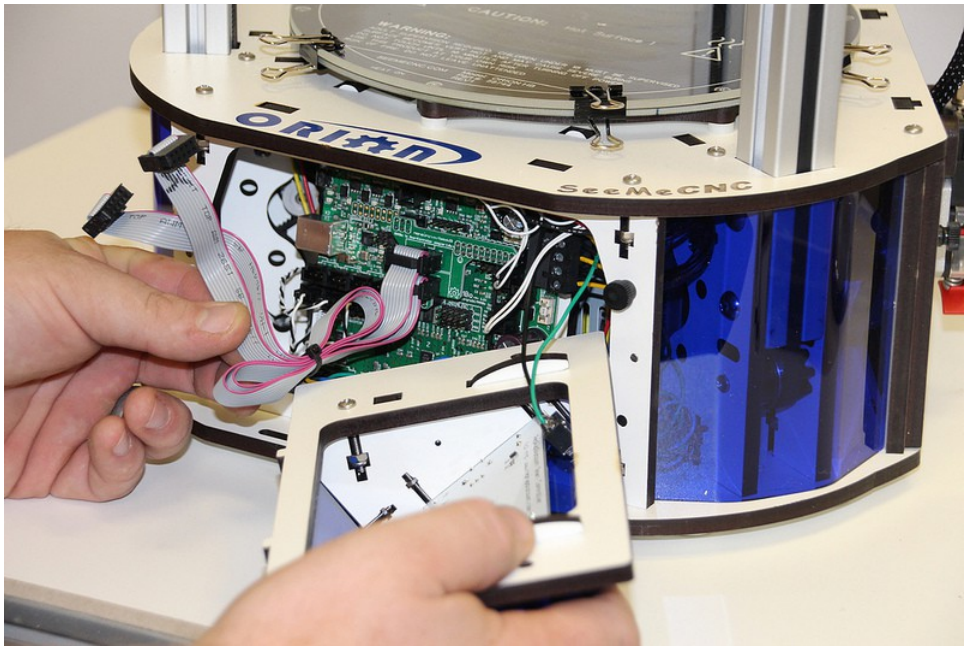


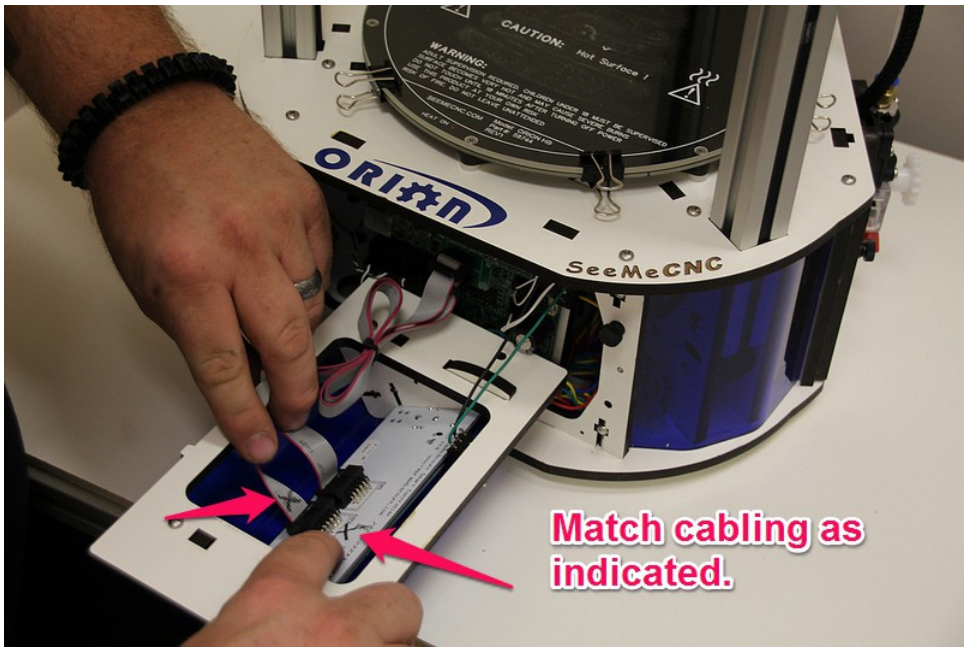
Remove the nut from the switch and insert it into the hole in the blue acrylic LCD control face. Note that the power switch has been shipped in the “Off” position. When you install the switch, make sure that the “bat” or switch handle is pointing to the left.



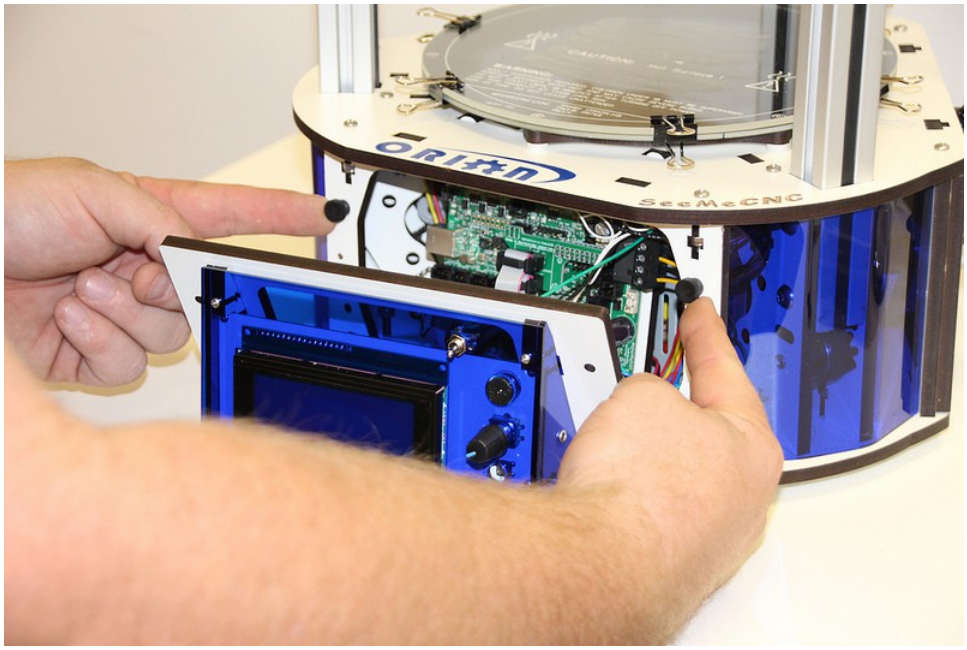


Gently pull the pair of flat ribbon cables out a bit from the Orion Delta™ and install them as shown. The “first” cable is marked by an “X” and has a matching “X” on the back of the LCD controller.

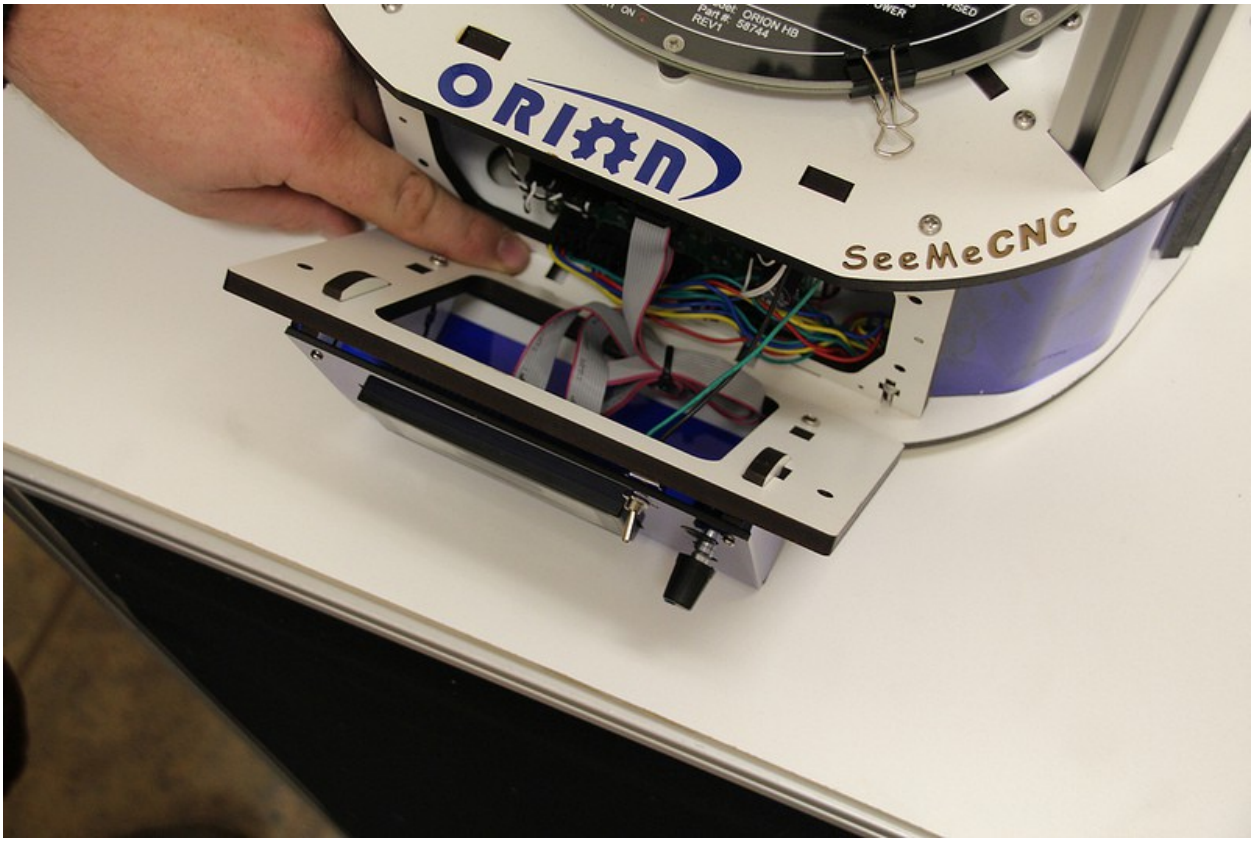




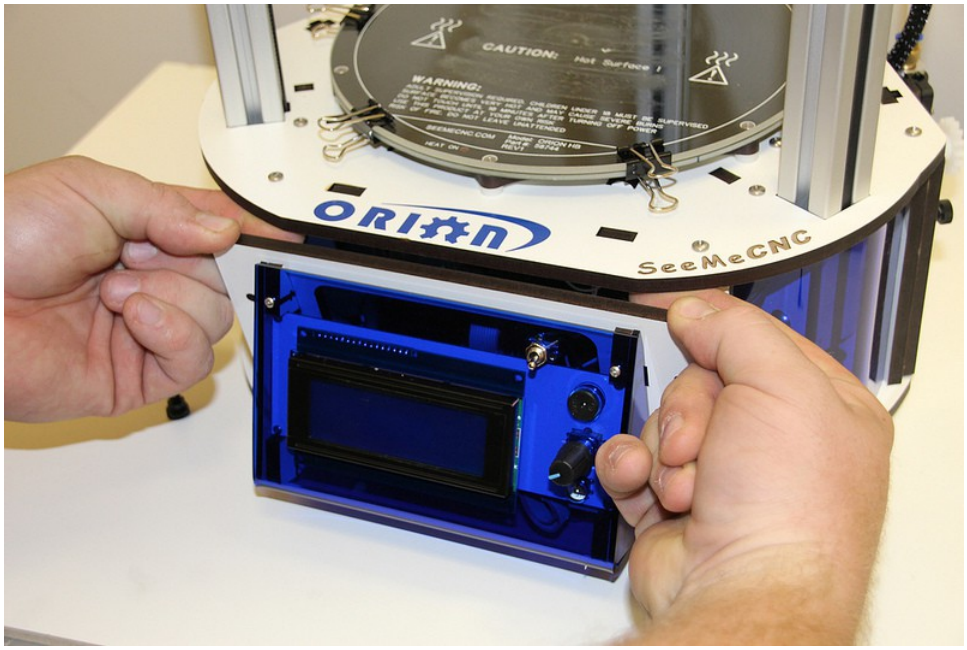
Remove the two black thumb screws as shown and set them aside.



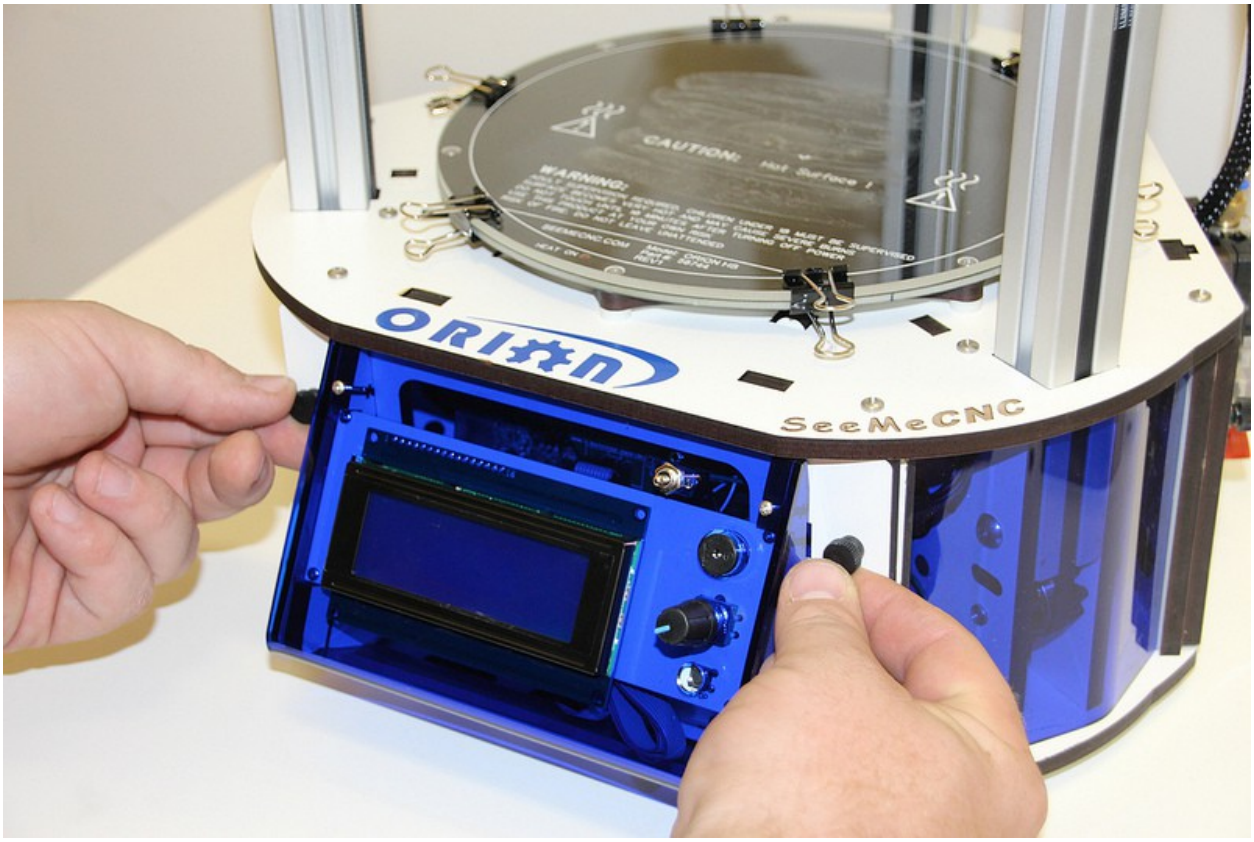
Now you'll install the LCD control panel into the Orion Delta™. Please take care as the parts are a tight fit. Align the LCD mounting plate as shown below – there's small locking tabs that fit into the slots shown.



Carefully raise the panel into place and fit it flush against the mating surface – this is a tight fit, so please take care.

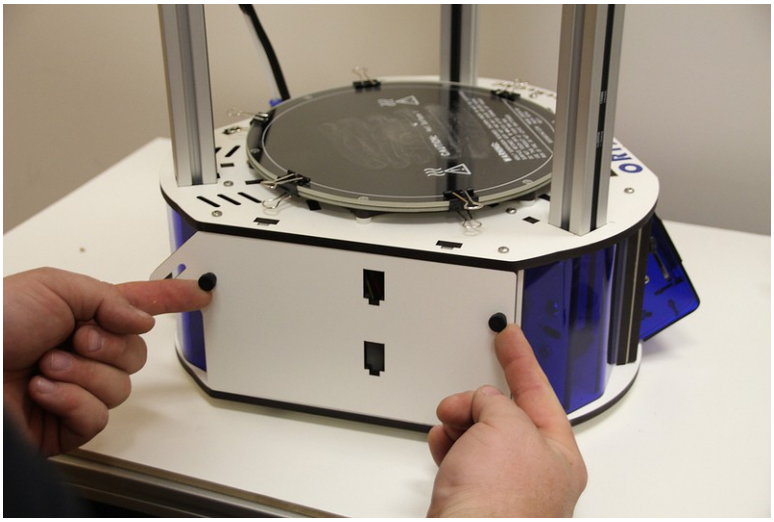


Insert the black thumbscrews you'd removed earlier in the mounting holes and tighten them using only your fingers.

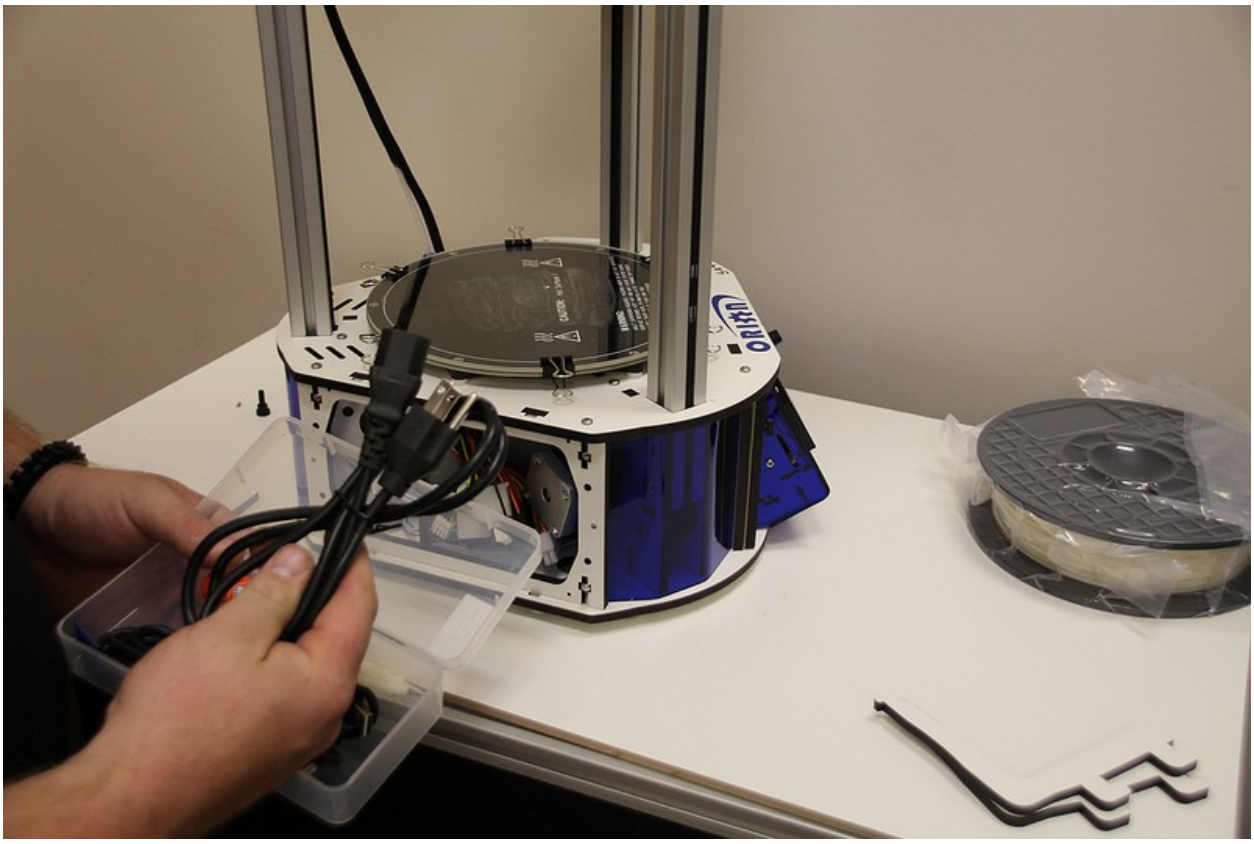


Installing the Power Cord and Spool Holder

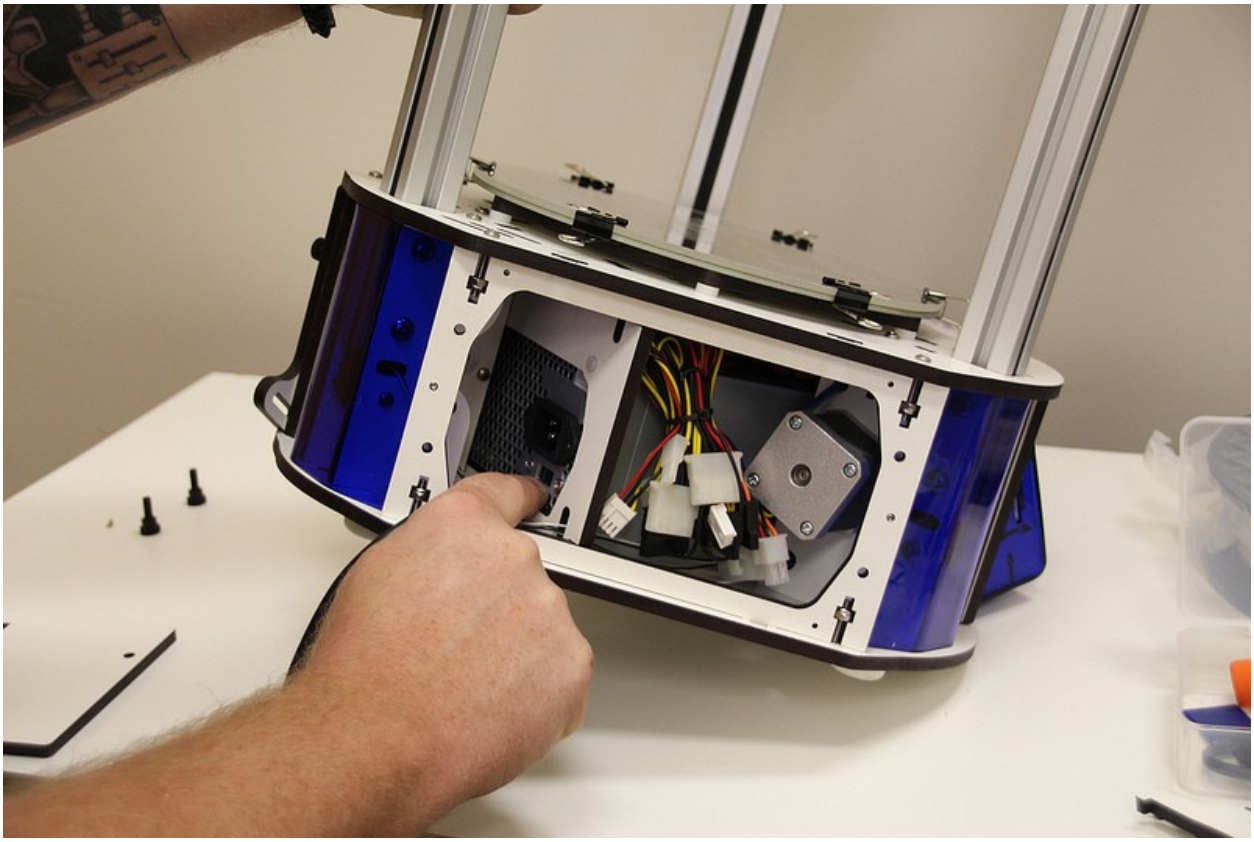
In order to reach the power supply, you'll need to remove the panel that covers it.



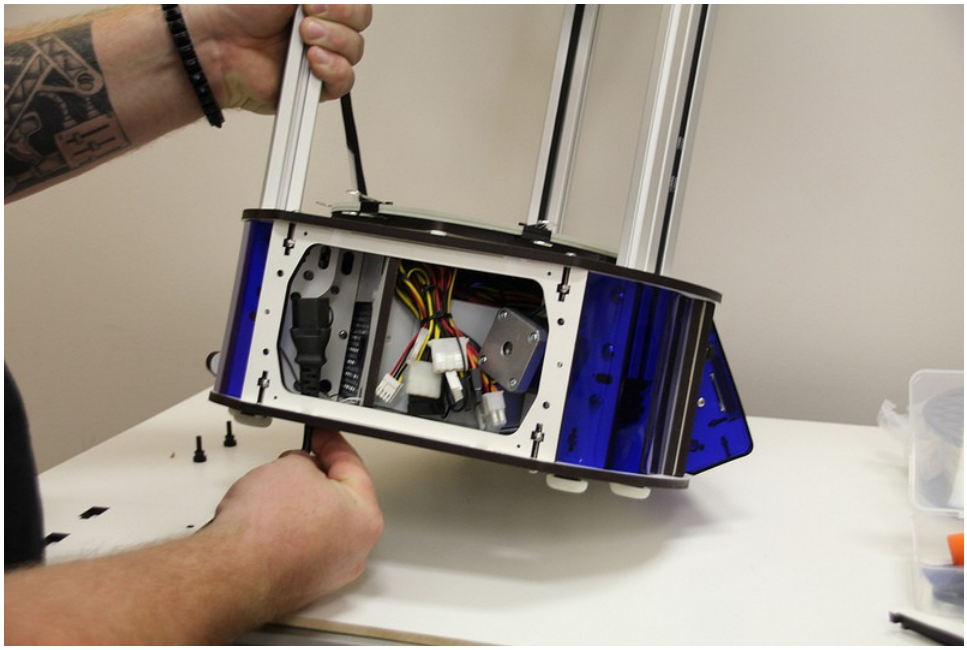
Remove the two black thumb screws and set them and the panel aside. Get the power cable from the box the accessories came in.



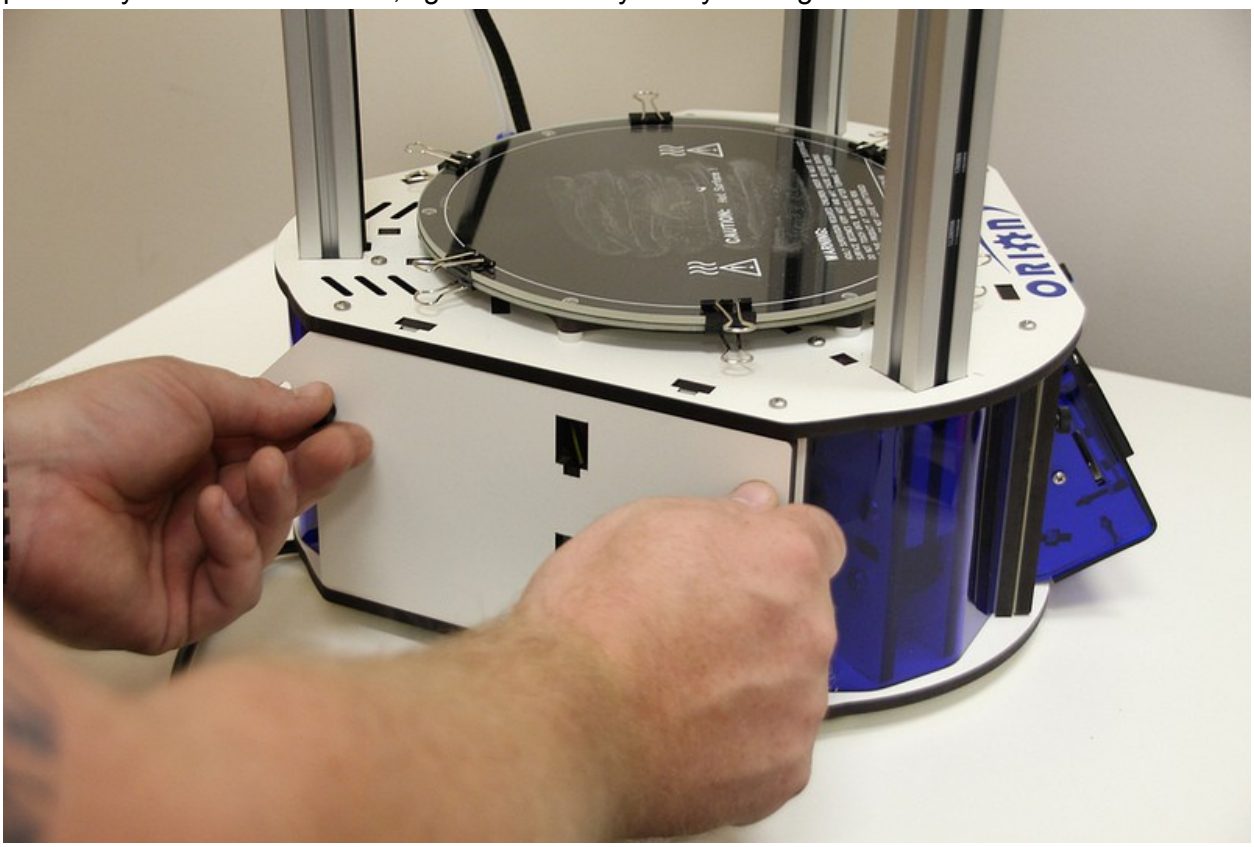
If you're outside the USA and live in a country where the A/C electrical power is 240V, you'll need to flip the switch on the power supply to its 240V setting. This switch is located right below the power socket as shown. You can use a flat tip screwdriver to change its position.



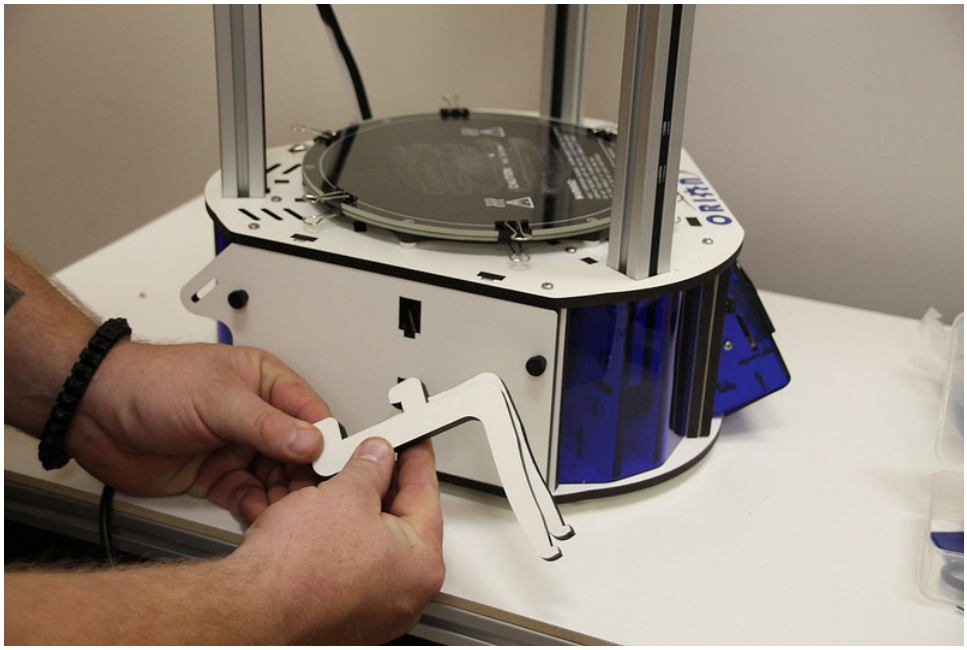
The power cable is installed by routing it through the hole in the base of the Orion Delta™ and plugging it into the socket on the power supply. It's a tight fit, so take your time.



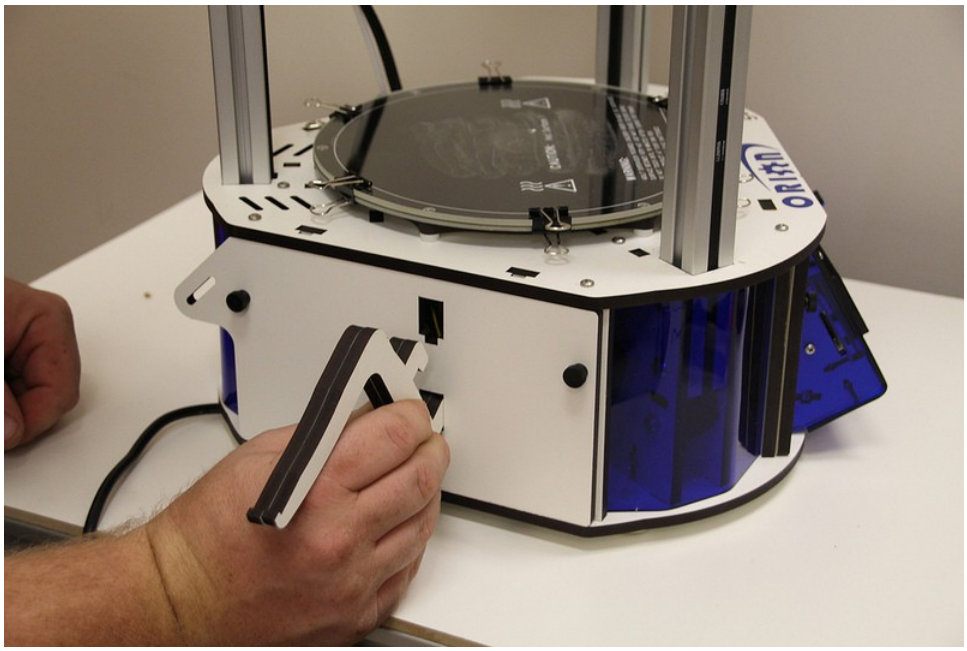
Now replace the door as shown, replacing the black thumbscrews you'd removed previously. As with the others, tighten them only with your fingers.



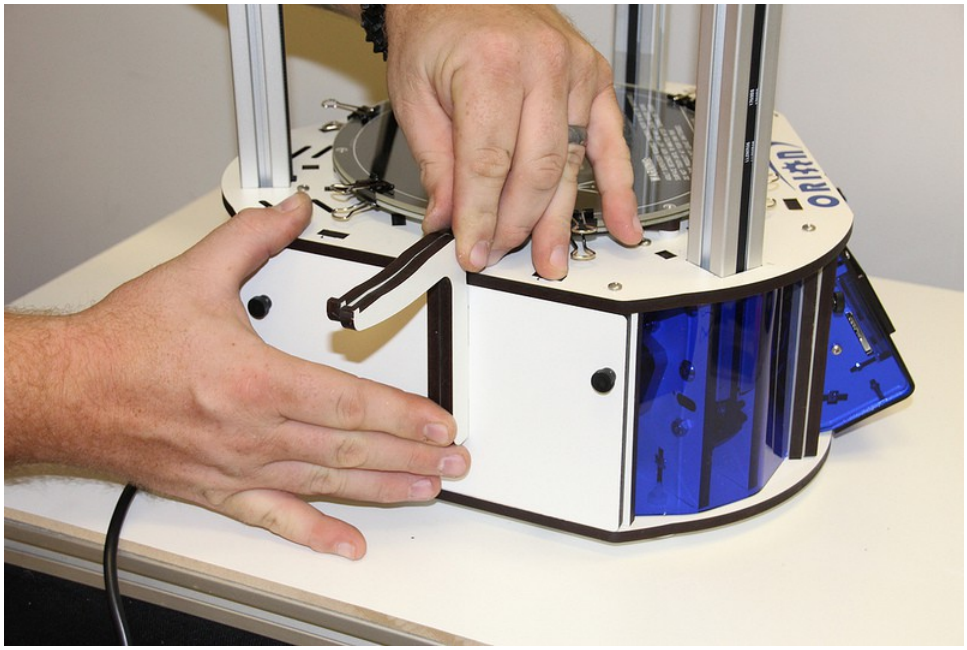
The spool holder is made from two identical laser cut parts.



Holding the spool holder parts together, install in the spool holder mount as shown.



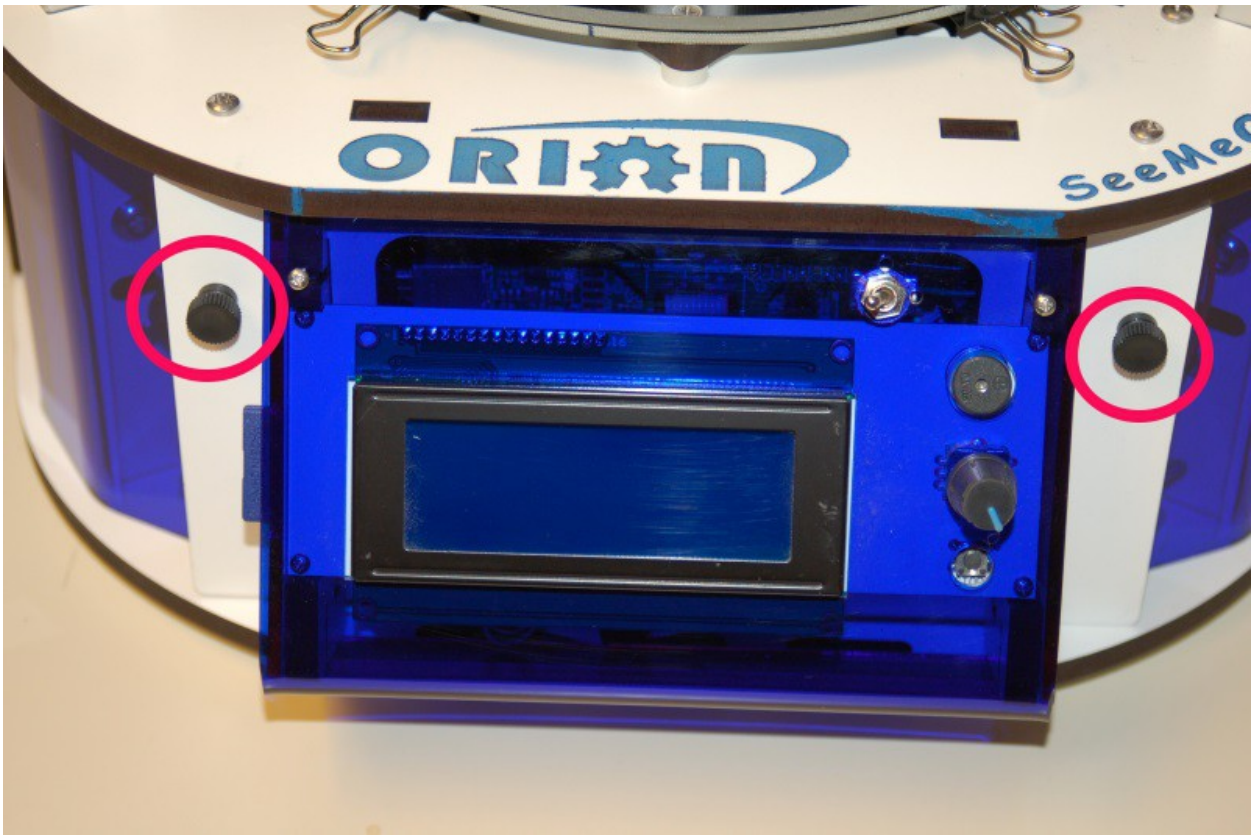
Press down firmly once the hooks on the spool holder are fully inserted into the mounting holes. This will lock the spool holder into place.



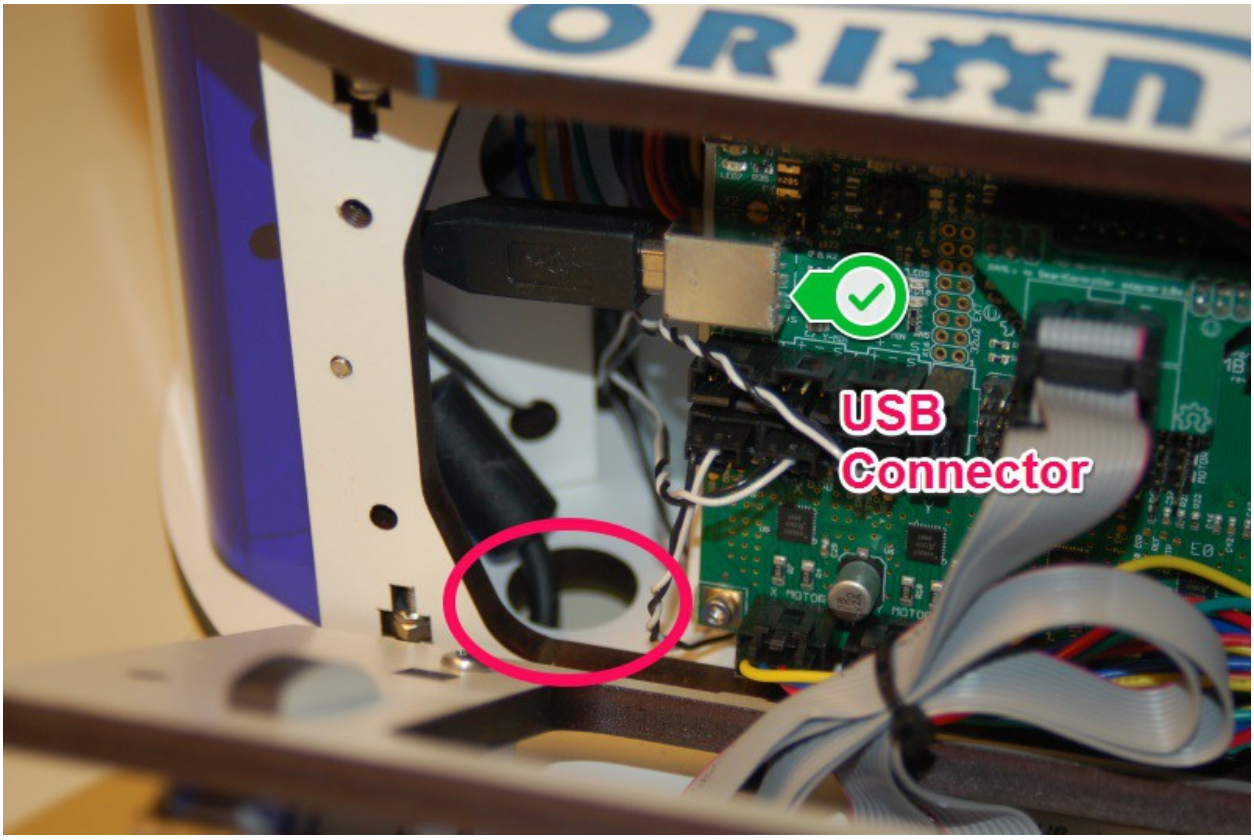
Installing the USB Cable and SD Card

The USB cable only needs to be used if you wish to manually control the machine from the software on your PC. you can print and do most calibration standalone, without the USB cable attached. We recommend hooking it up for starters, so if you need to connect it to your computer to make changes etc… the cable is already installed.

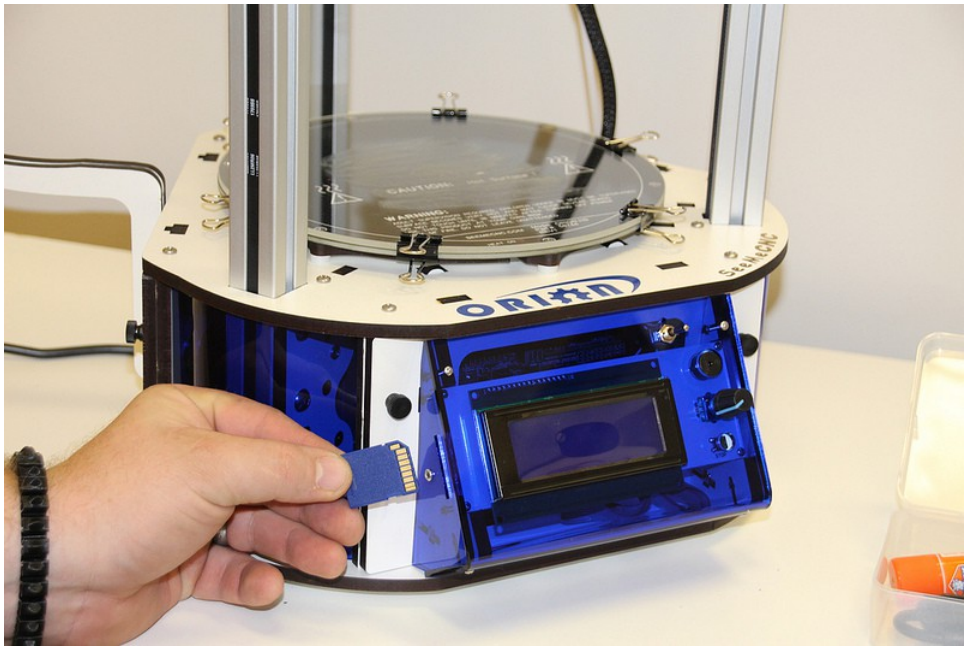
Facing the front of the machine, remove the two black thumb screws on each side of the control panel and set them aside. Carefully pull out on the top of the front panel until it is past the table of the machine, then lift up slightly and set it to the right making sure not to pull on any of the cables connected to the LCD screen.

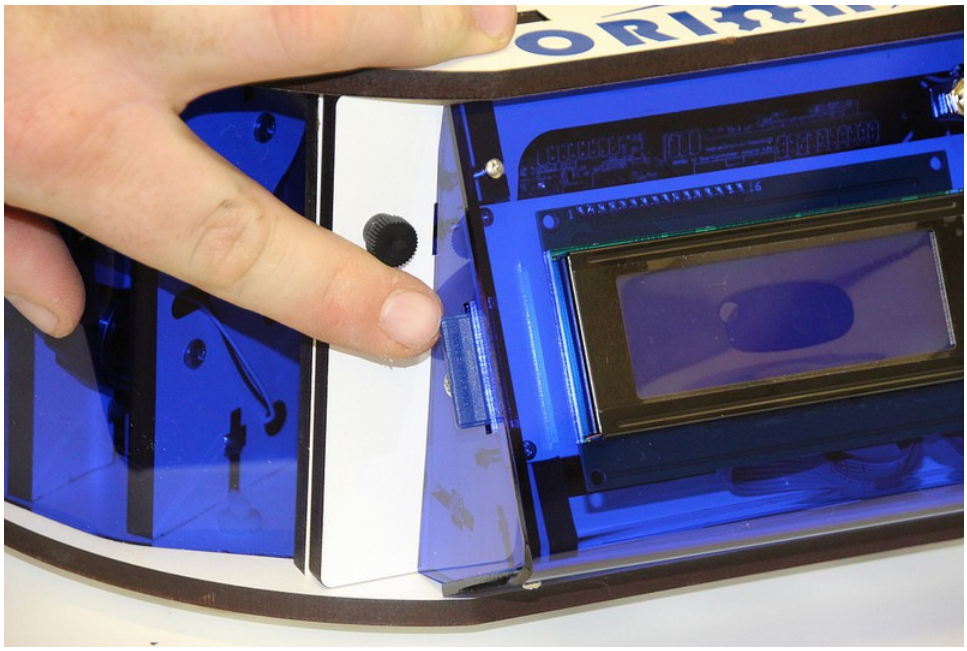


Now pass the end of the USB cable up through the hole in the bottom left of the base and plug it into the USB input on the electronics board. Next, replace the front panel by putting the bottom in first, then tilting the top in. Please be careful as it's a tight fit. Re-install the two black thumb screws and tighten them finger tight.



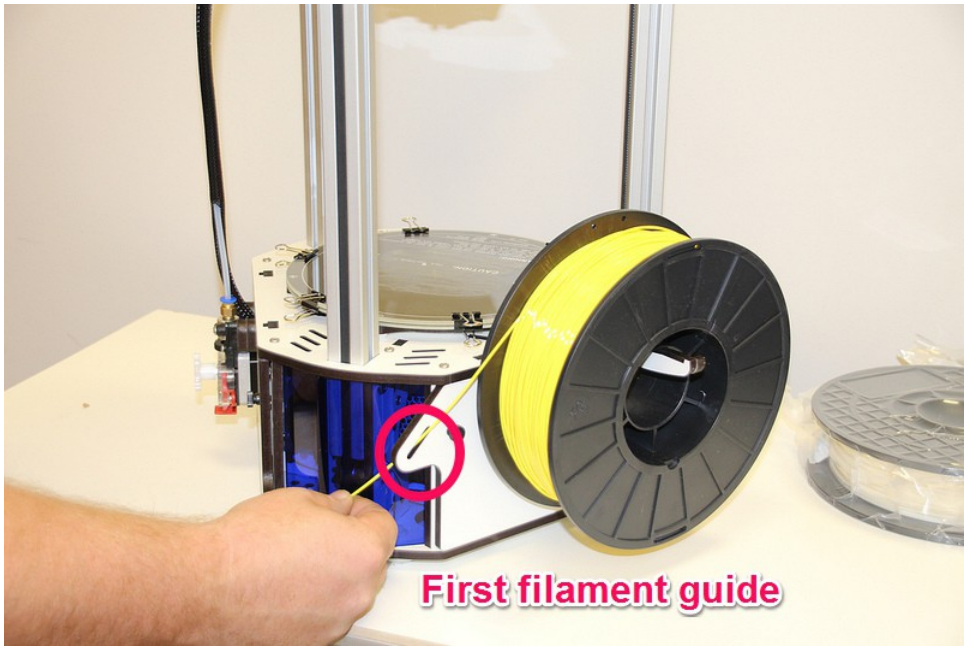
In the accessories box, you should find a small SD card. Insert the SD card into the side of the LCD enclosure as shown below.



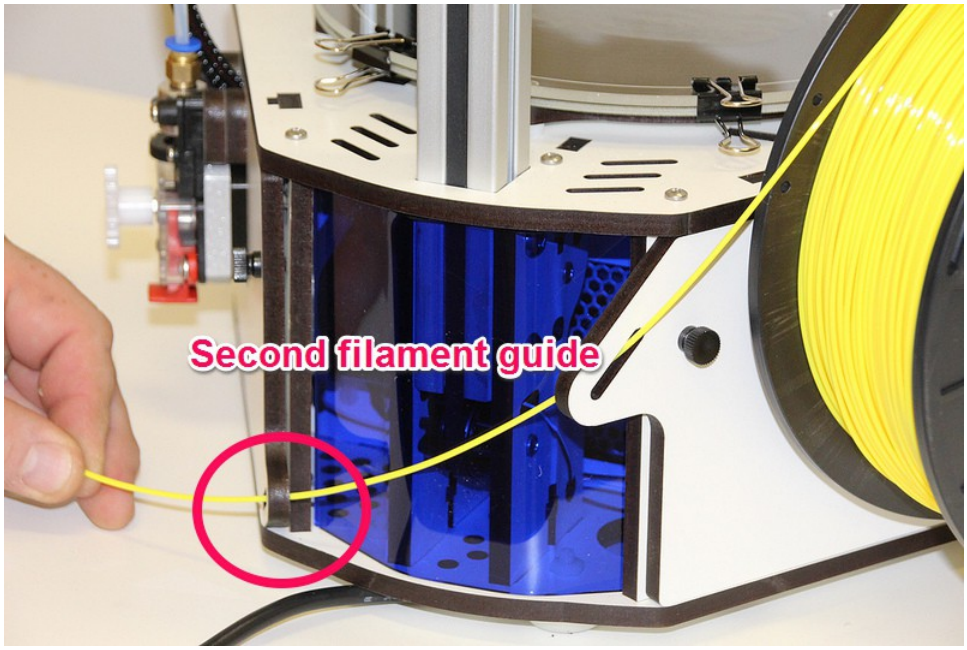


Loading Filament

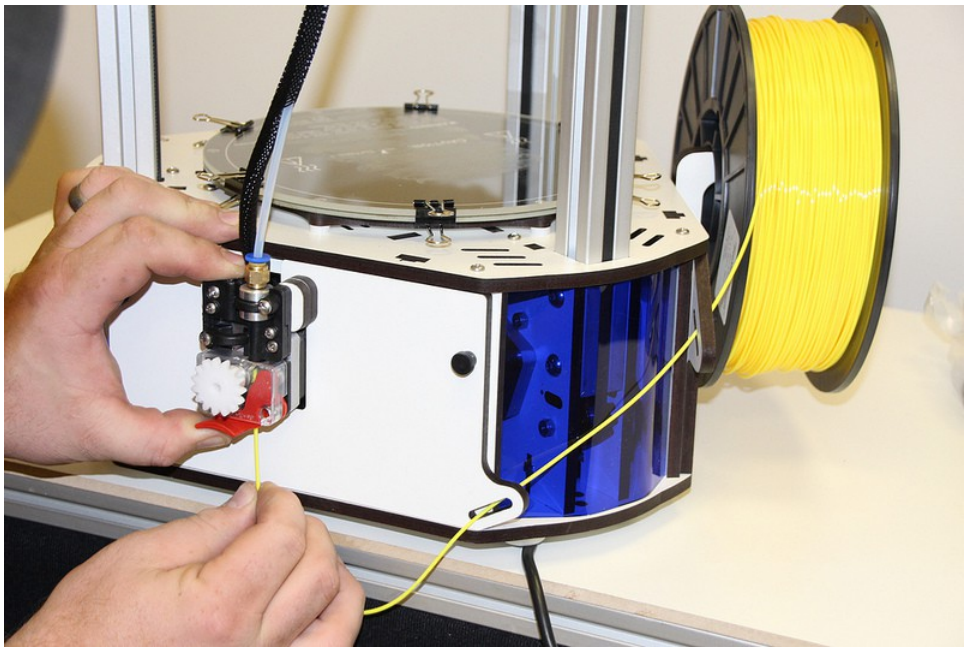
Hang your filament spool on the hanger as shown – you want to make sure that the filament is oriented such that the filament comes off the top of the spool, not the bottom.



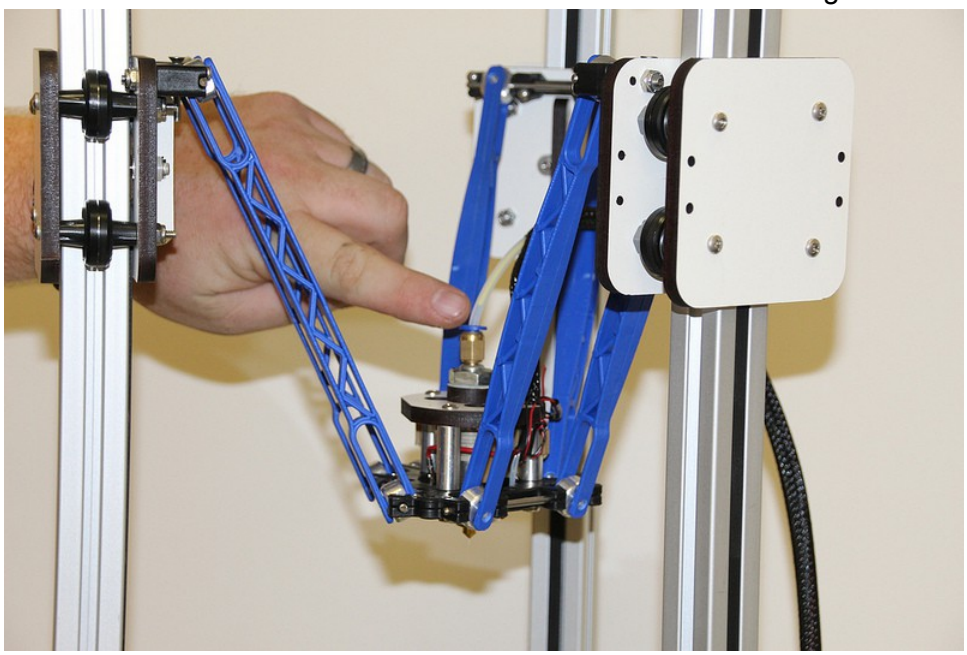
Route the filament through the first filament guide as shown and then route the filament through the second filament guide that's located on the other side of the rear tower.



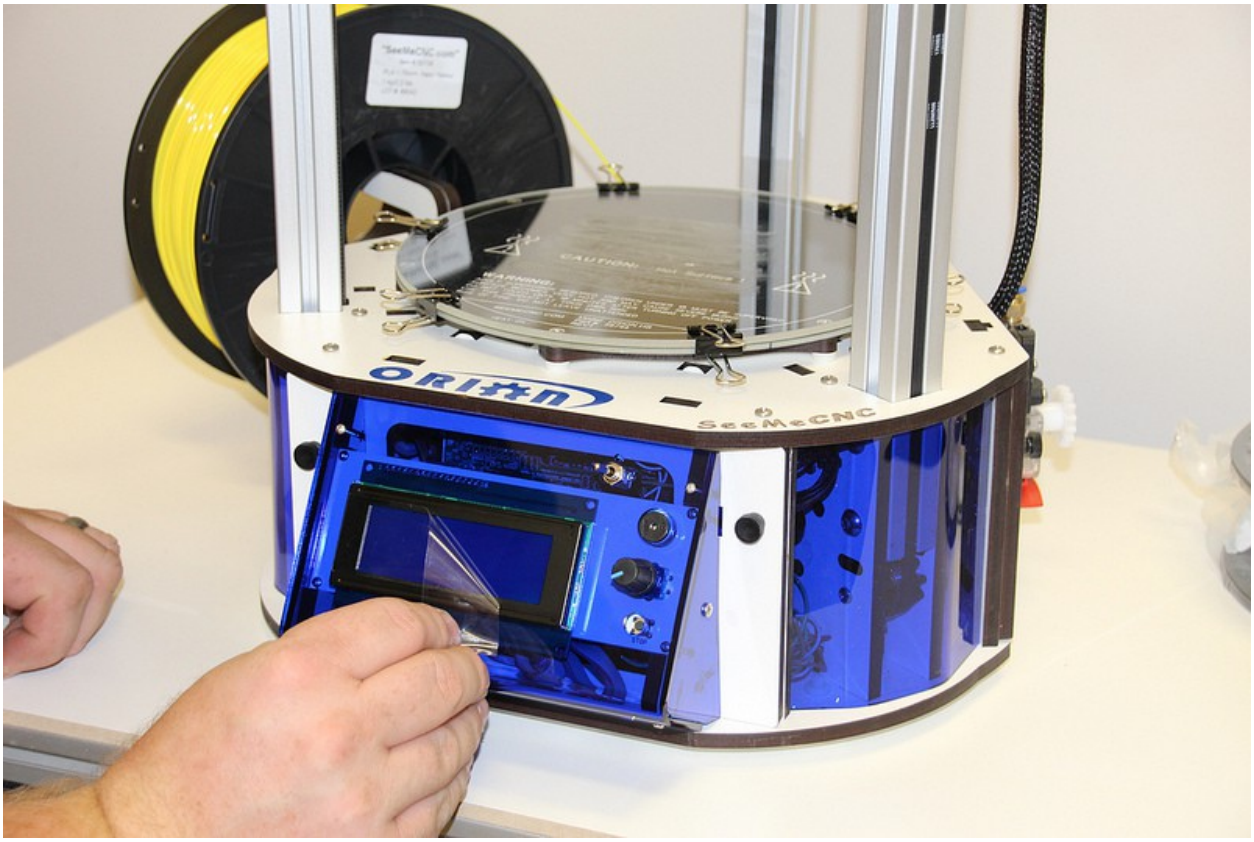
To load the filament through the EZStruder, you'll need to depress the red lever with your thumb (press up) and thread the filament in from the bottom as shown.



Continue to feed filament until the filament enters the hot end through the bowden tube.



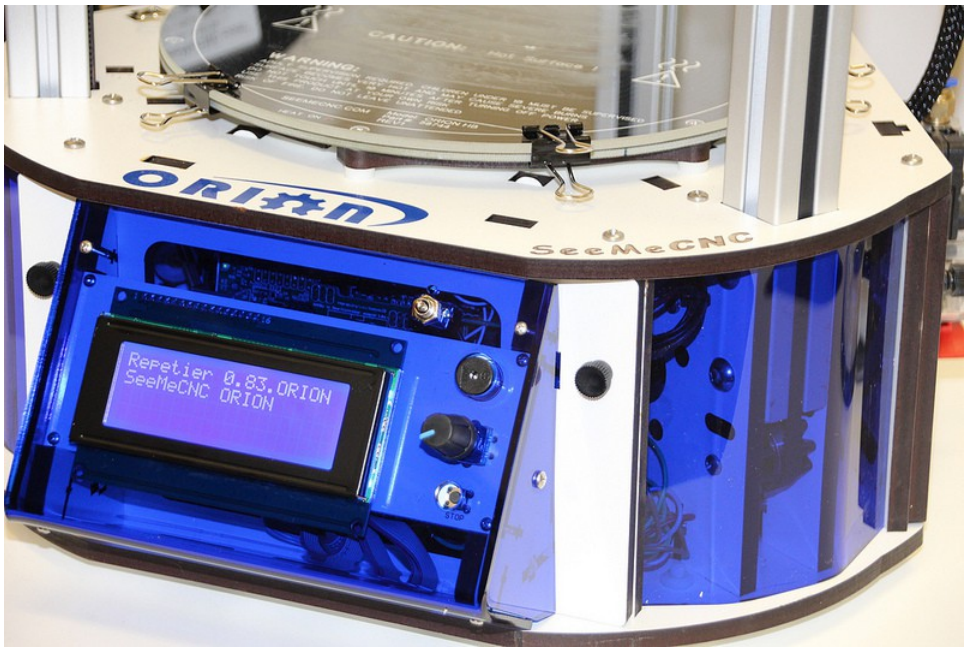
Finally, you'll want to remove the protective plastic sheet that covers the LCD.



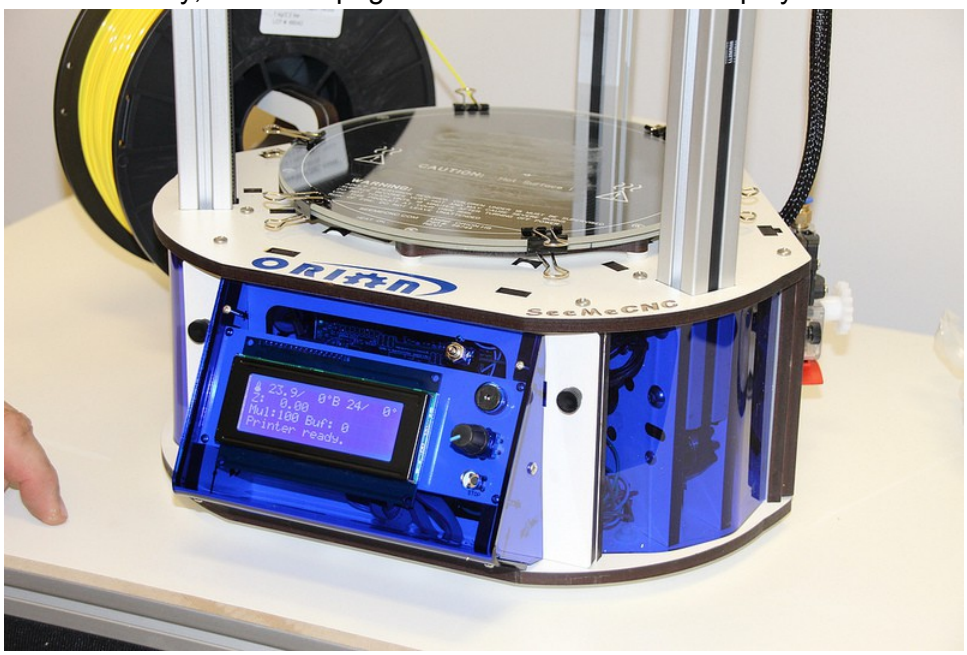
Powering Up your new Orion Delta™ 3D Printer for the First Time

Plug the power cord into a grounded, three prong outlet. Orient the Orion Delta™ to face you and flip the power switch to the right.

You should be briefly greeted by a power on message similar to the one shown below.



After a short delay, the “front page” of the LCD should be displayed.



Now that you've got your Orion powered up, let's learn what it's all about!

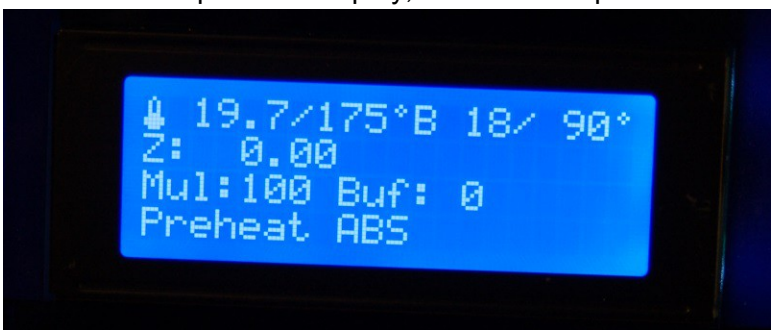
The LCD Control Panel

Before we get into doing final configuration and printing with your new Orion Delta™ 3D printer, let's take a moment to go over the LCD “home” screen so you'll understand what information is being presented to you.

1. Actual Hot End Temperature / Temperature Set Point
2. Actual Bed Temperature / Temperature Set Point
3. Current Nozzle Height
4. Current Speed Multiplier
5. Amount of Buffer Space Consume

The current hot end and bed temperatures may differ from what you see above – it's entirely dependent on the temperature of the room that your Orion Delta™ is currently in.

When you specify a hot end and/or bed temperature you'll see those set points reflected in the second portion of each temperature display, like the example below.



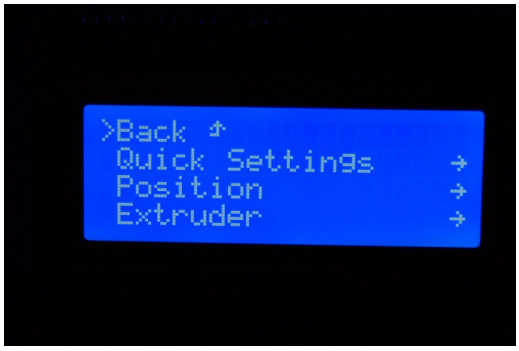
In the image above, the hot end temperature has been set to 175 degrees Celcius and the bed has been set to 90C. Note that just about all aspects of 3D printing is expressed in metric or “SI” units.

You'll notice an additional line at the bottom of the LCD display – this is a “message line” and the firmware in your Orion Delta™ will display information relevant to what it's currently doing on that line.

All control of your Orion Delta™ when not connected to a host computer is done via the LCD panel and the rotary knob to the right of it. The knob will allow you to navigate the various menus and make selections when you press the knob in.

Let's navigate to the “Quick Settings” menu and move the hot end to its home position.

To do this, press the knob in. The interface will beep once and you'll be presented with the following menu:



Rotate the knob to the left and move the selection mark to “Quick Settings” as below:

Press the knob in to select the “Quick Settings” menu. Your LCD should now show the following menu:

Rotate the knob to the left and select the “Home All” option. Pressing the button should result in your Orion Delta™ homing all three axes.

Note that if you leave the LCD in “menu mode” for too long, it will automatically revert to the home screen.

Your LCD should now reflect the current nozzle height above the bed. It should be somewhere around 241mm. Your value may vary due to any number of factors, but it won't vary much.

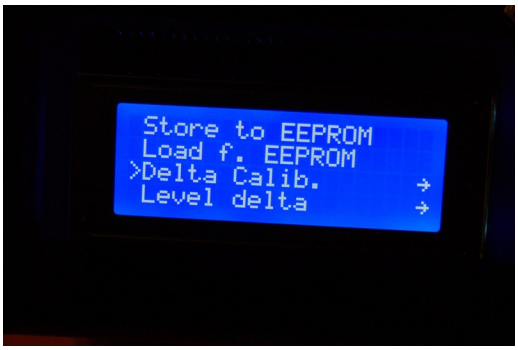
Setting the Z height

Congrats! Your new Orion Delta™ 3D printer is alive! But before we get to printing lets take a minute to set the Z height of the machine as it could have been bumped during shipping and it needs to be super accurate to get the best first-layer adhesion of your prints.

Using the control panel on the machine to set the Z height is really easy. You'll find you may need to do this from time to time or after changing to a new build plate or nozzle etc. Pretty much anything that could change the height as measured from the tip of the nozzle to the built plate.

To set the Z height you want to warm the bed and hotend to close to printing temperature to let any heat expansion take place. To do so, click on the knob and scroll to "Quick Settings" then "Preheat ABS" and press the knob. This will set the heated bed to 90c and the hotend to 175c. This is less than the melt temp for ABS, but a good holding temperature that will make sure that any ABS filament doesn't burn as it sits in the hotend waiting for the bed to heat up. It may take up to 15 minutes to heat the bed to 90c depending on the room temperature, but it's important to let it heat up before setting the Z height.

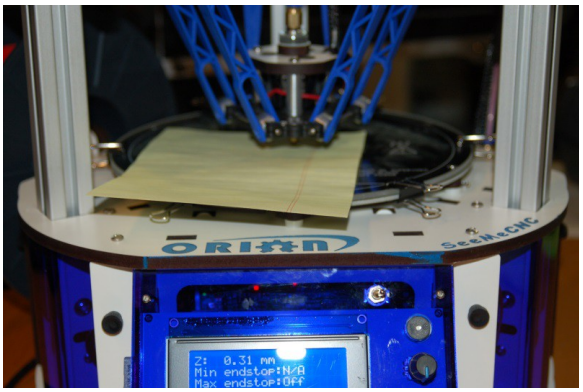
Once the bed and hotend are up to temp, click on the knob and from the main menu scroll down to "Calibration" then down to "Delta Calib." then down to "HOME ALL" and press to home the machine first.



After the machine is homed, scroll to “Z Pos. Fast” and click. Now, make sure you turn the knob to the right to lower the head. If you accidentally raise the head into the limit switches, it will stop moving but keep updating the Z position on the display. If that happens, go back to “Home All” and home again first, then move down. Using the “Z Pos. Fast” screen, jog the hotend down to about a half-inch or so above the table.

Make sure the nozzle is clean and there is no filament hanging from the nozzle (Be careful, it’s hot now!). Take a single sheet of notebook paper and place it under the nozzle.

Click back and choose “Z Position” which puts the jogging into “fine” mode, and jog down until the nozzle just begins to “snag” on the paper. Now click back and scroll up a few to “Set meas. origin” to store the new Z height to memory. That’s it! You’ve now set the Z height to the table and you're now ready to prime the hot end and begin your first print!

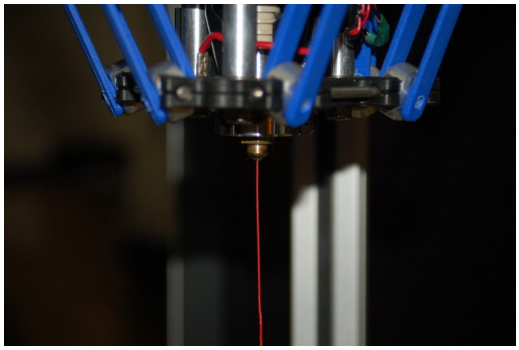


A Simple Guide to Hot End Priming

Before you can print with your new Orion Delta™ for the first time (or any time you load new filament), you'll need to prime the hotend with the new material. Fortunately, this is a very simple task!

Now on the LCD screen, click and go to “Quick Settings” and scroll down to “Disable Stepper” and click. This will unlock the motors allowing you to turn the extruder by hand to purge the hotend. Now go to the main menu and click on “Extruder” then scroll down to “Extruder” and click, then set the temp to 215 and click to set the new temp. You can wait for the screen to go back automagically to the main screen or scroll up and click “Back” and get to the home screen.

Once the hotend is up to temperature, reach around the right side and rotate the knob on the extruder counter clockwise to feed filament slowly into the hotend and you will see it start to flow out the nozzle. Let it flow out about 4” or so, then stop and remove the hanging filament.



That's all there is to it! You're ready to print!

Printing from the SD Card

The SD card included with your new Orion Delta™ 3D Printer has folders already on it with some sample prints as well as the firmware that was used to calibrate your machine.

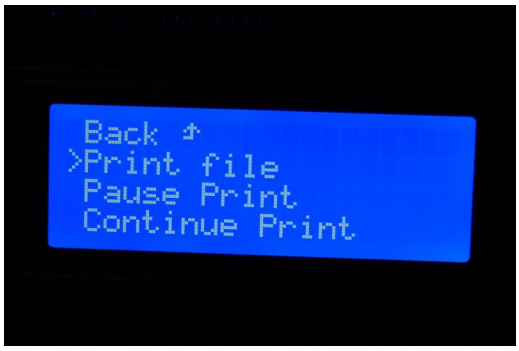
The SD card goes in the left side of the control panel, label facing inwards, through a slot in the blue acrylic side panel as shown below.

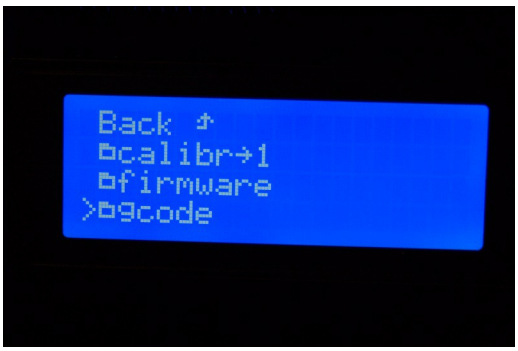
If you've got an SD card reader on your computer, you can easily save files to the SD card in order to print with your Orion Delta™ in “stand-alone” mode. You don't need to connect the printer to your computer in order to print!

Let's take a look at the demo files that were included on the SD card that was shipped with your Orion Delta™.

Click the control knob to enter the LCD menu and scroll down to the entry mark “SD Card” and click.

Scroll to the “Print file” menu item and click. This will get you into the top level directory of the SD card.





The odd little symbol you see to the left of the directory names are actually little folder icons. This simply helps separate the directories from gcode and other files on the SD card.

Click the “gcode” directory to see a list of the files included.

For this first print, go ahead and click on the file, “blinky.gco”.

When you select the filename, the LCD controller will make a “chirping” sound and the heated bed will begin to pre-heat. Once the bed has reached its target temperature, the printer will home all three axes and then the hot end will begin its pre-heat process. Once that has completed, the printer should begin the print.

Note – before you run a print job on your Orion Delta™, you need to apply a thin layer of adhesive using the included glue stick. This will allow the ABS plastic to stick to the glass. All you need to do is swipe it around on the area you think the part will occupy and you're done.

If you need to cancel a print job for any reason, navigate to the “SD card” menu and select “Pause Print” and then go back to “Quick Settings” and select “Home All”.

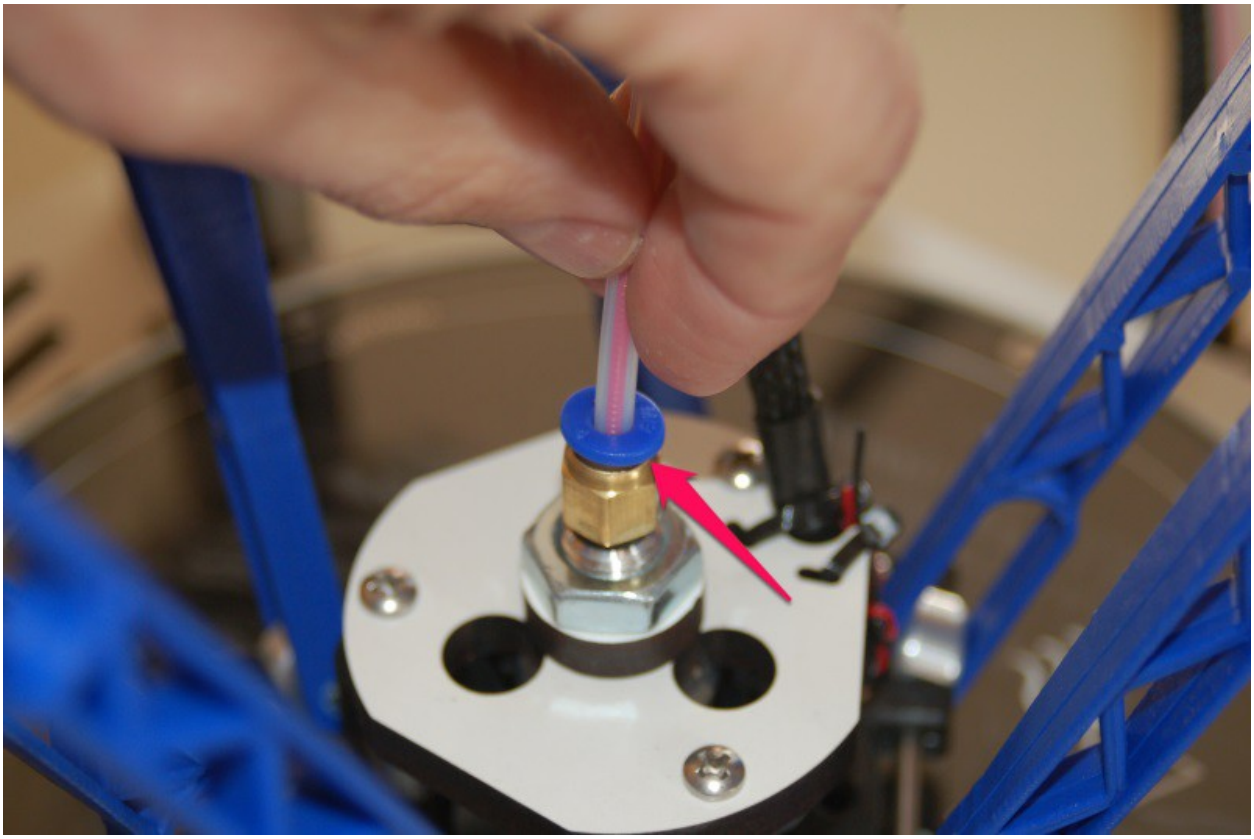
Changing Filament

Changing the filament on your Orion is a very simple process.

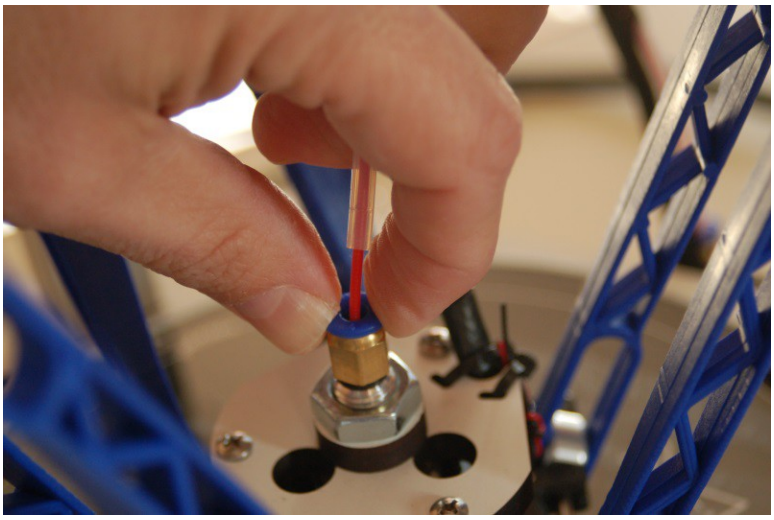
First, you'll want to bring the hotend up to the temperature you normally set it at when you're printing.

Once the hotend is at operating temperature, pop the bowden tube off the hot end as shown in the following steps.

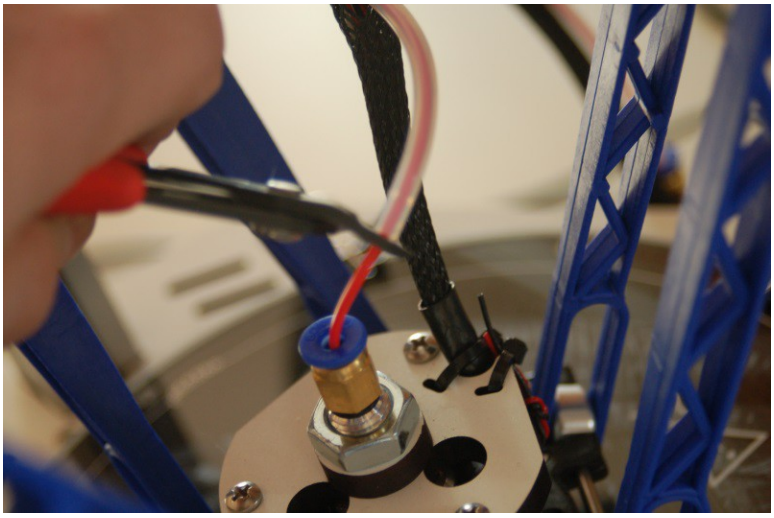
1. Grip the bowden tube with one hand and press down the blue ring and pull up on the bowden tube. You may need to depress the red release lever on the extruder in order to get enough slack to pull the bowden tube free of the hotend fitting.



When the filament pulls free, it should look something like the photo below.



2. Cut off the filament flush with the end of the bowden tube.



3. Pull the filament stub from the hotend and then re-insert the bowden tube into the hotend, making sure it seats fully.