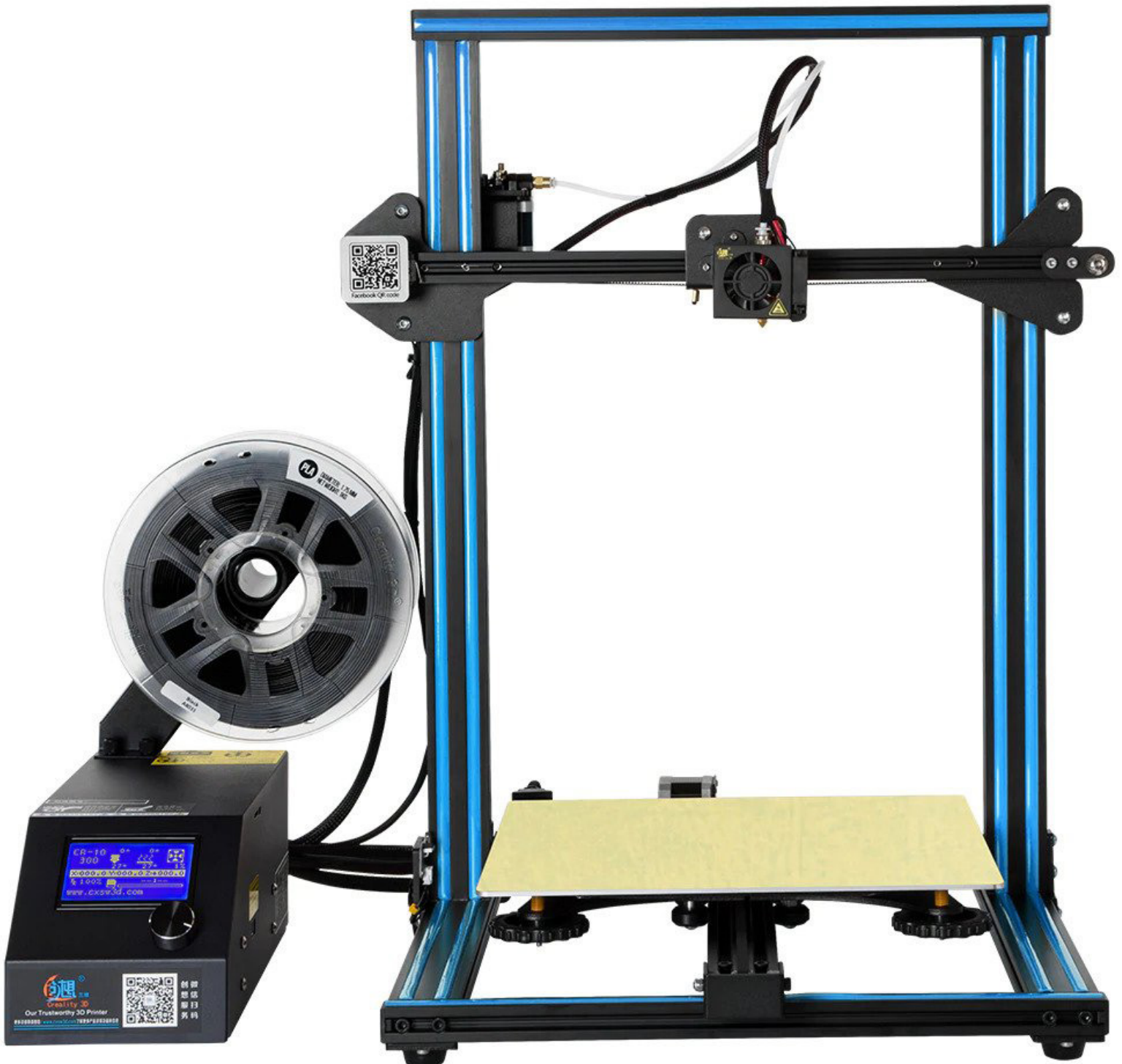


CAP FAB LAB

Creality CR-10



Definitions

<p style="text-align: center;"><u>Build-Plate or Bed</u></p> <p>Both of these are in reference to the metal sheet in which the machine lays plastic on.</p>	<p style="text-align: center;"><u>Extruder</u></p> <p>This is in reference to the part of the machine that extrudes plastic onto a build-plate. This system consists of a motor at the top which receives the filament, a hotend which melts the plastic, and a nozzle that extrudes the molten plastic.</p>
<p style="text-align: center;"><u>Gantry</u></p> <p>3D Printers typically have several Axis of movement. Such as X,Y,Z typically each will have a gantry or a system of components responsible for moving a portion of the machine in each direction. For example the extruder is attached to the X Gantry.</p>	<p style="text-align: center;"><u>Hot End</u></p> <p>This is a piece of metal within the Extruder that is responsible for melting the plastic for extrusion. It also connects to the nozzle in a straight line from where you feed the filament in to where it comes out at the nozzle.</p>
<p style="text-align: center;"><u>PLA</u></p> <p>PLA is the type of plastic in which we feed into our 3D Printers. Its full name is Polylactic Acid and consists of organic sources such as corn starch or sugar cane. It is the easiest and most versatile material used in 3D Printing.</p>	<p style="text-align: center;"><u>PETG</u></p> <p>Polyethylene terephthalate glycol, known as PETG or PET-G, is a thermoplastic polyester that delivers significant chemical resistance, durability, and formability for manufacturing. It requires hotter temperatures for it to print, but is significantly stronger than PLA. Its considered the middle ground between PLA - ABS.</p>
<p style="text-align: center;"><u>ABS</u></p> <p>ABS or Acrylonitrile butadiene styrene is a common thermoplastic polymer typically used for injection molding applications. It is the strongest plastic used in 3D Printing. However it is extremely difficult to print with as it is sensitive to temperature shifts and releases harmful chemicals into the air when melted.</p>	<p style="text-align: center;"><u>TPU</u></p> <p>TPU or Thermoplastic Polyurethane are a category of plastic created when a polyaddition reaction occurs between diisocyanate and one or more diols. They can be used as a soft engineering plastic or as a replacement for hard rubber. Must be printed at slow speeds to ensure adhesion.</p>

Basic Printer Information

Miscellaneous Cartesian

This style of printer is distinguished by its linear moving Y Axis Bed. It is capable of fast print speeds with short wide objects and is the most common type of 3D Printer.

Bed Size

11.8" x11.8" x 15.73"

Typical operations use 1.75 diameter filament PLA is standard but PETG or ABS is possible with considerable changes to print settings and an enclosure.

PLA (Hot End 215 °C)(Build Plate 60 °C)
PETG (Hot End 230 °C)(Build Plate 70 °C)
*ABS (Hot End 250 °C)(Build Plate 75 °C)
*TPU (Hot End 205 °C)(Build Plate 50 °C)

(* Untested Settings)

Bowden Extruder

This stlye of extruder is distinguished by having the motor attached to the frame, away from the extruder with a bowden tube connecting the two entities. The pros of this extruder setup include faster print times and higher accuracy. Cons include potential stringiness and oozing.

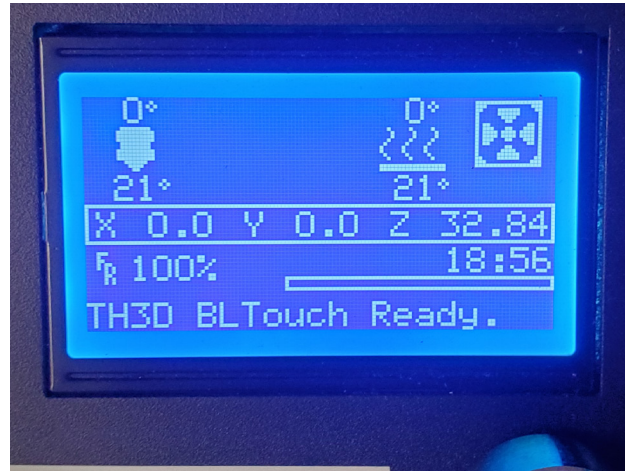
Product Page for More Information

<https://forums.creality3dofficial.com/tutorial/3d-troubleshooting/>

Procedure

1. Printer is ON
LCD Screen should be ON

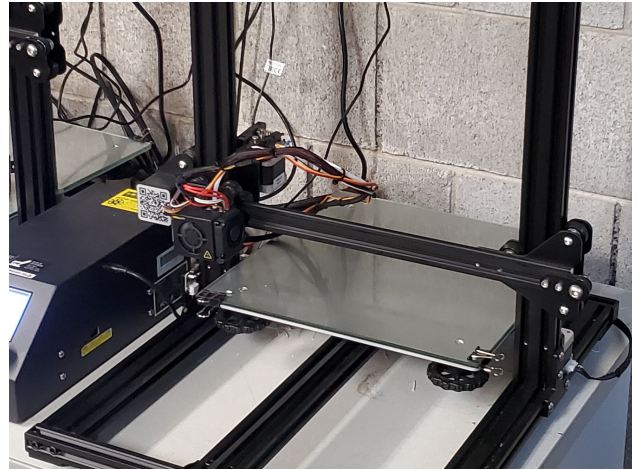
Key point: The Power Switch is located on the Power-supply on the back right of the machine. Press switch to the ON position.



2. Build Plate is Clear

Remove Existing Finished Prints as well as any extra filament that may be on the Build Plate.

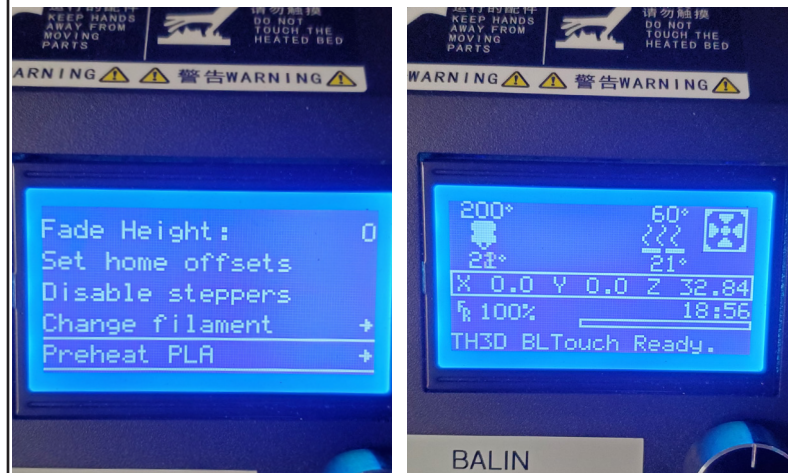
Clean with Isopropyl Alcohol if bed appears dusty or if there are small pieces of filament that are difficult to remove by hand. (Located underneath the sink in the far corner of the Lab)



3. Prepare for Loading

From the home screen, use the knob to go to **Prepare** → **Preheat PLA**. Once you press the knob to select, it will go back to the home screen. Ensure the hotend is heating to 200°C and the bed is heating to 60 °C

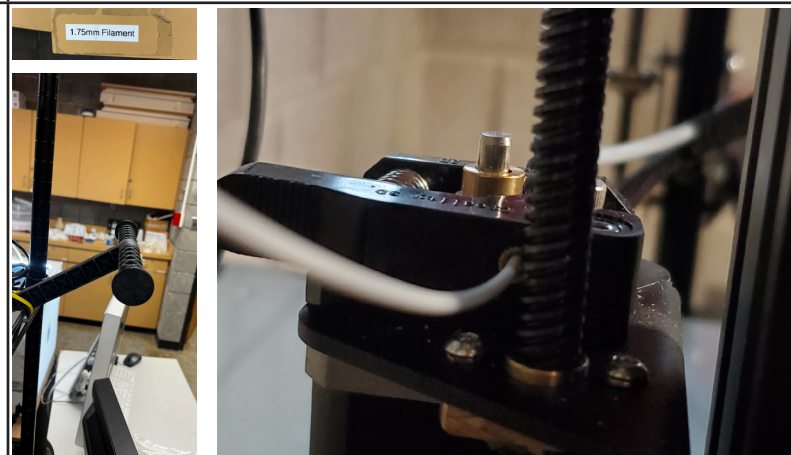
Key point: This printer only uses 1.75 filament.



4. Loading Filament

After the printer has heated to material temperature, Place on Roll Holder then feed it through the gears by pinching and holding the lever on the extruder motor.

Key point: Do NOT let go of filament end at any point before loading or it will tangle.



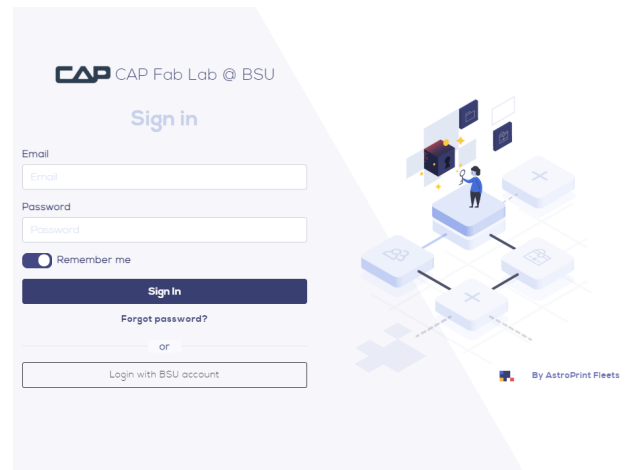
5. Loading (Continued)

These are the only machines that you have to manually push the filament through the bowden tube. Feed it through until you feel the filament reach the nozzle.

6. File Setup + Printing

Log into AstroPrint
Typically (Username BSU Email) +
(Password BSU Password)

Slice for CR-10
(For more details reference Astroprint SOP)

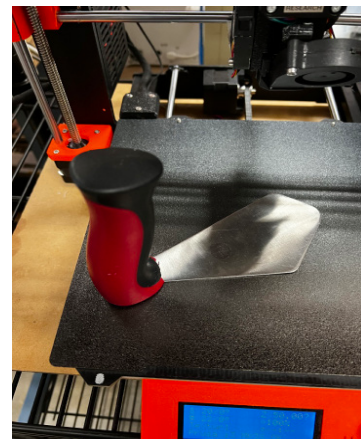


7. During Print

Once print has started, you **MUST** watch the first layer of that print (Most print failures start at the first level and build up into print failures or machine damages). UNDER NO CIRCUMSTANCES ARE YOU TO START A PRINT AND WALK AWAY. If you're on a tight time budget please wait to start a print until you have time to watch it.

8. After Printing

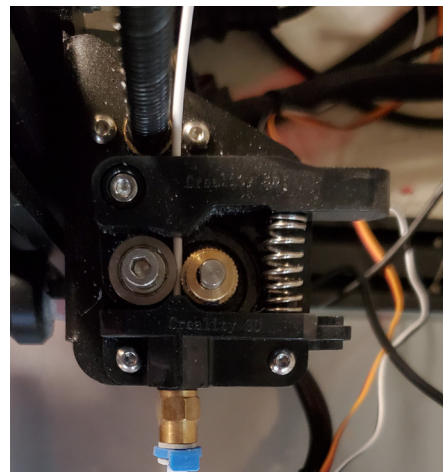
Once print has completed, clear the bed using a scraper to remove printed model. Clean bed with Isopropyl Alcohol if it appears dirty.



9. Unloading

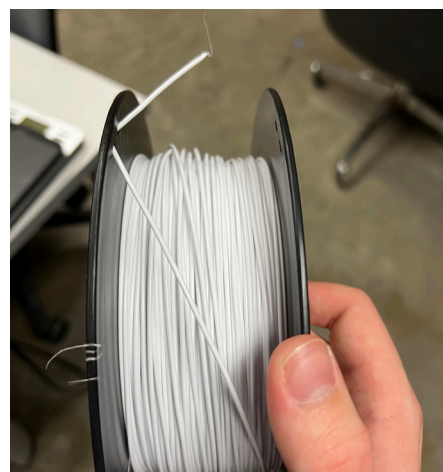
To unload the filament once a print has finished, follow the same steps as you did to load the filament.

Once the machine has heated up, pinch and hold the extruder lever and gently pull the filament all the way out of the extruder.



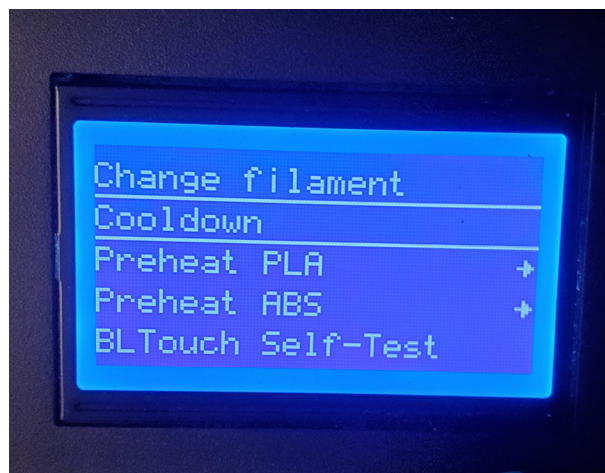
10. Unloading (Continued)

Remove filament from Roll Holder
Feed filament through holes on spool to prevent tangles and place back into bag and seal.



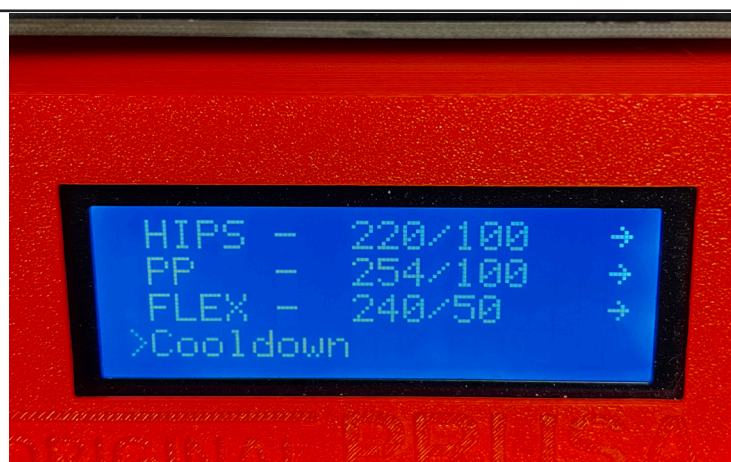
11. Cooling Down the Machine

The Machine at this point is still at working temperature. If left in this state it will cause wear and tear on the equipment. With the knob go to **Prepare** → **Cooldown**



11. Cooling Down the Machine (Continued)

Then scroll all the way to the bottom and select Cool Down. This will spin up the fans and cool off the bed and hot end bringing it back down to Idle temperatures.



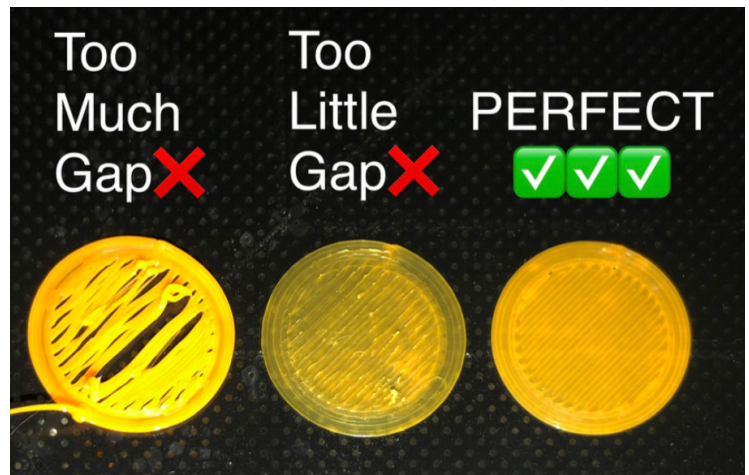
Basic Maintenance + Repairs

Build-Plate Adhesion Issues

If you're experiencing build-plate adhesion issues try cleaning the build-plate with Isopropyl Alcohol, It may be dusty or covered with oils from our hands.

Build-Plate Adhesion Issues (Continued)

Next try re-leveling the printer. In most circumstances it is useful to start a print then adjust the leveling wheel on the fly based on which corner is causing issues. Too much gap means that the bed should be moved closer to the nozzle while too little gap means that the nozzle is too close to the bed.



Clogged Nozzle Issues

If you're experiencing thin or no filament extrusion from the nozzle then you may have a clogged nozzle.

First try heating up the nozzle to PLA temperatures, then take a nozzle cleaner from the 3D Printing Tools Drawer and sticking it into the nozzle from below. This will help clear any stuck filament inside the hot-end.



Clogged Nozzle Issues (Continued)

Next try heating up the nozzle to ABS temperatures. This may help to heat up any hardened filament stuck within the hotend. Then take a scrap piece of 1.75 filament and push it through the extruder from the top in order to force out any clogs that remain. If the issue persists then reference (Intensive Maintenance)

Intensive Maintenance + Repairs
