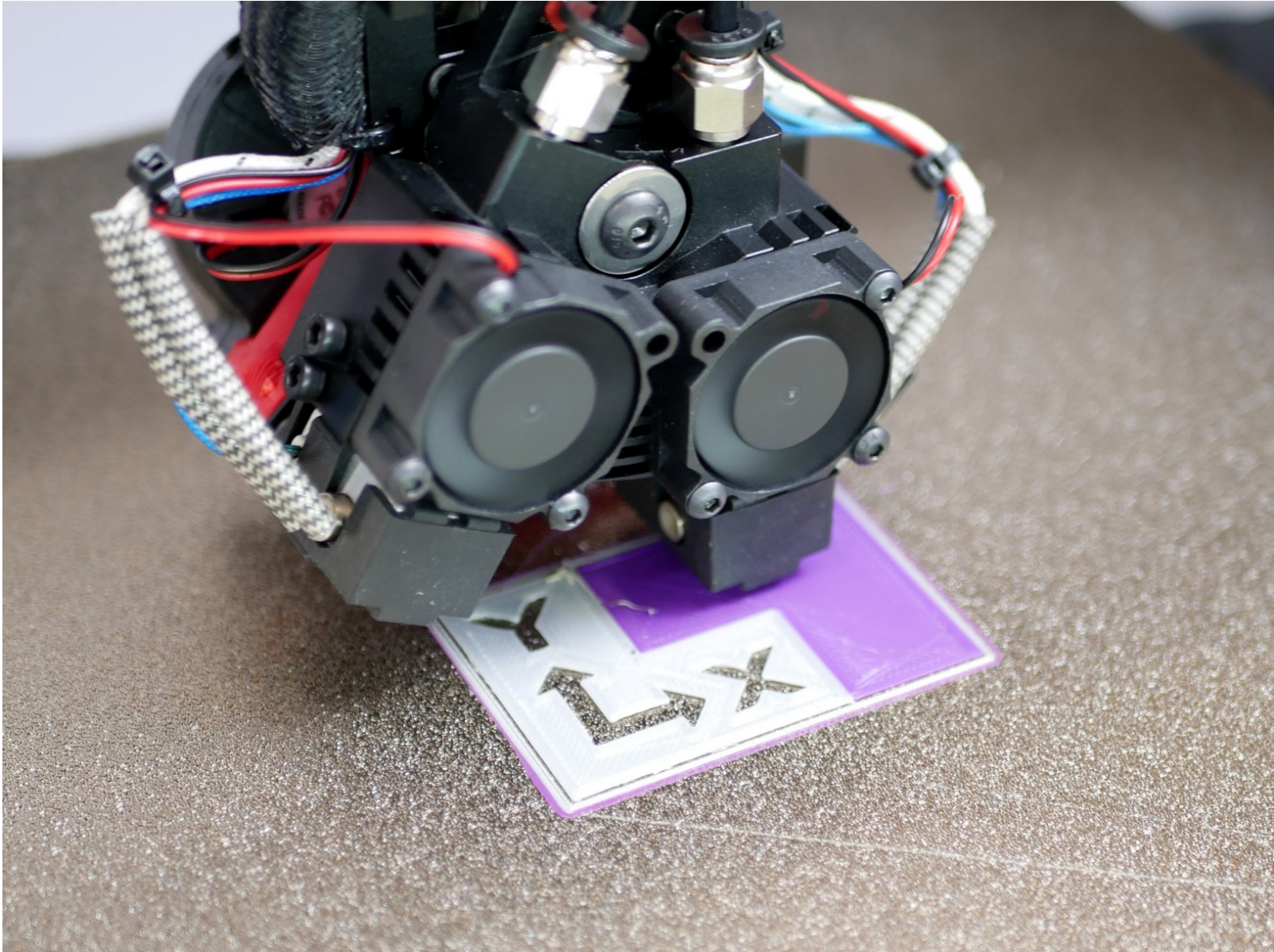


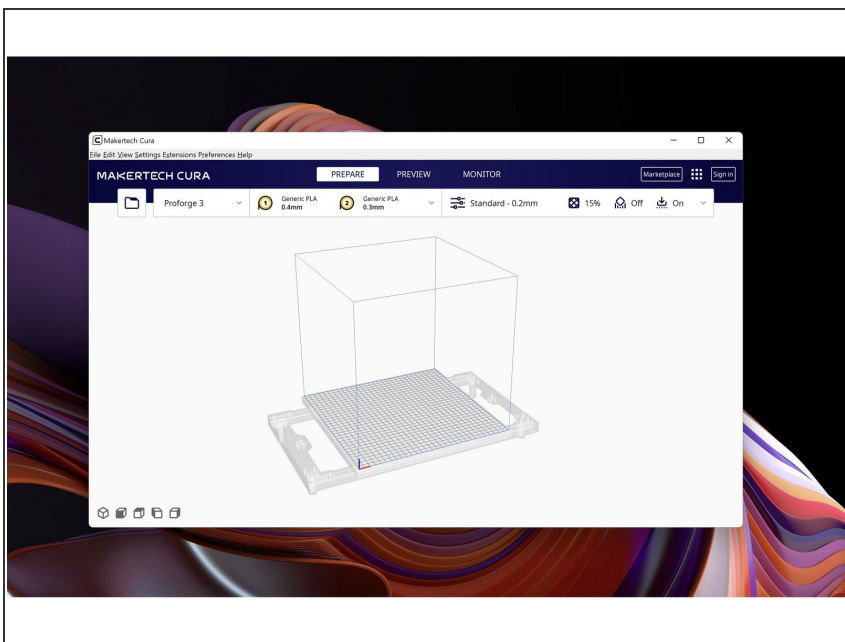
Makertech

Stage 05: First Print/Callibration

Written By: Makertech 3D

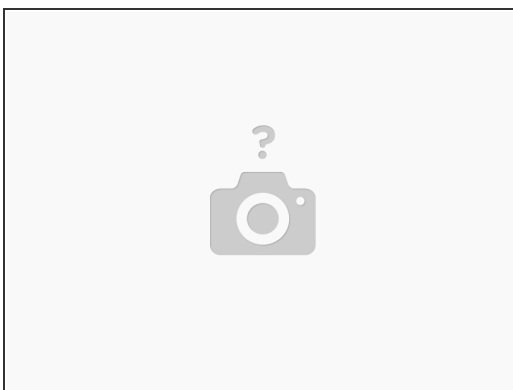


Step 1 — CURA - Windows



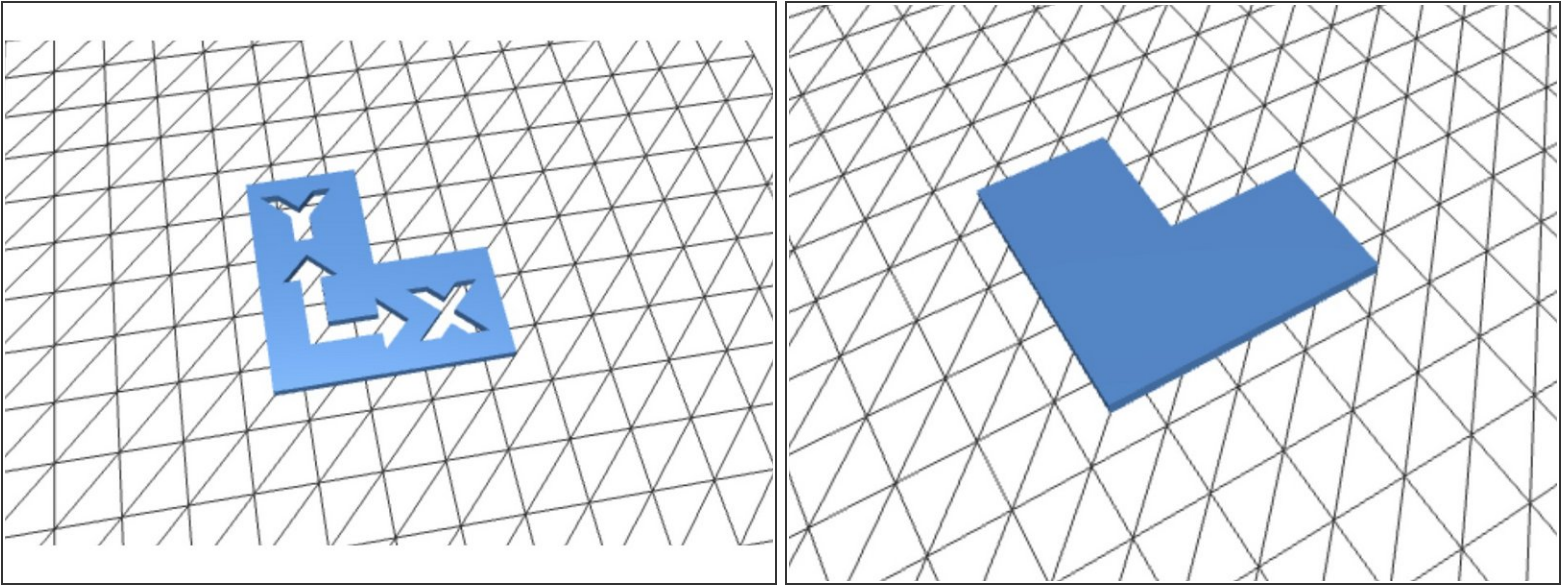
- ❗ Download the new v5.2.1 of Makertech Cura for windows [here](#).
- ❗ Run through the install and setup wizards.
- ⚠ If you have an earlier version of Makertech Cura installed, delete it from your programme folder before installing the new one.

Step 2 — CURA - MacOS/Linux



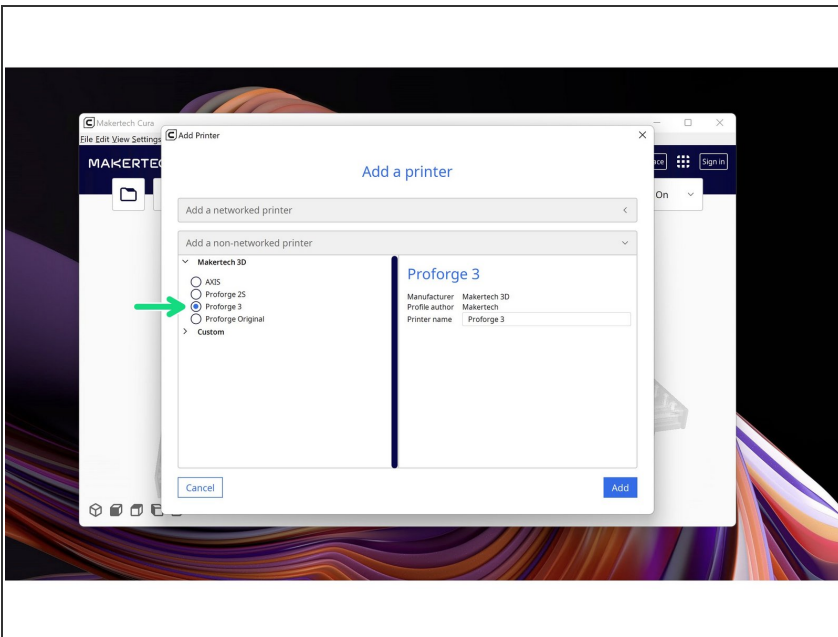
- ❗ If you are running Mac OS or Linux the 3.5 profiles will be made available in the next release of the [official Ultimaker Cura](#).
- 🔖 Follow the progress of this request [here](#).

Step 3 — Calibration Model



- Download the two part DSH calibration model [here](#).

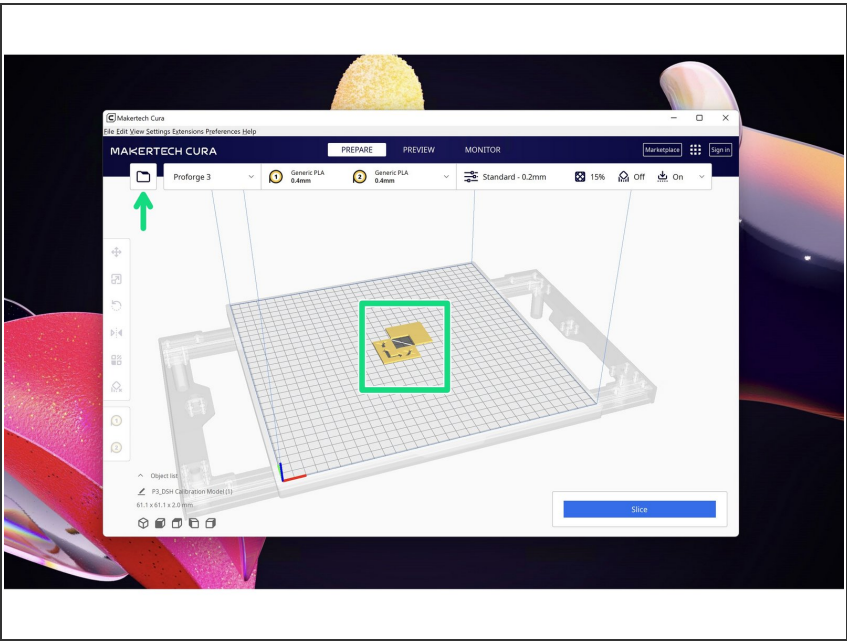
Step 4 — CURA Setup



- In Cura add the Proforge 3 3D printer.

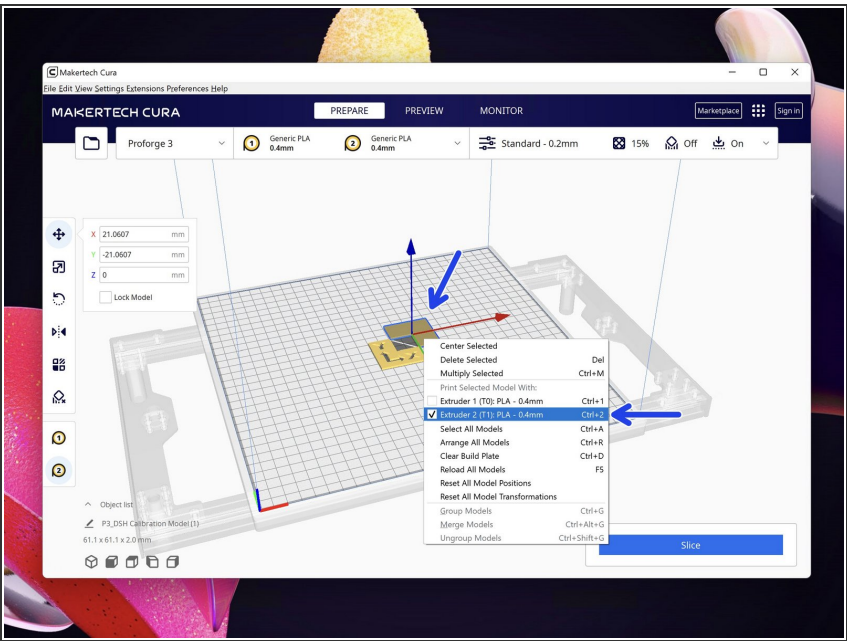
Step 5 — Loading STL's

- Load both parts of the DSH calibration model.

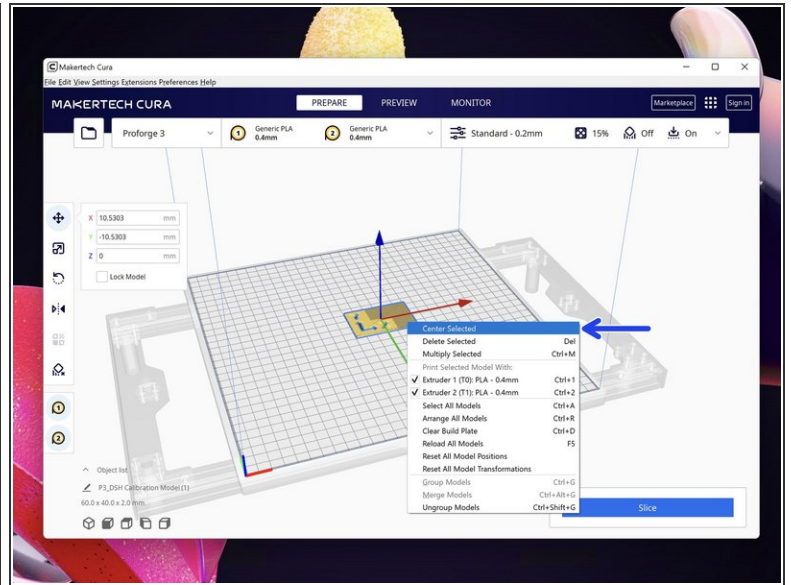
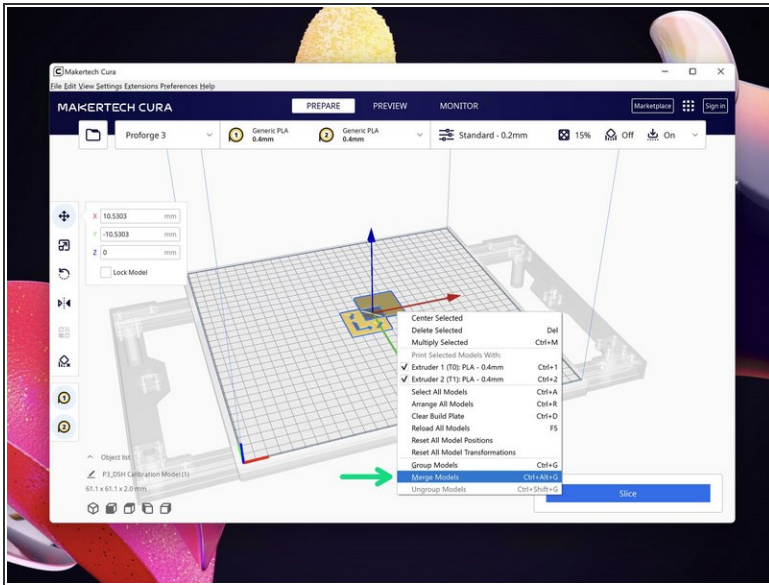


Step 6 — Hotend Assignment

- Right click this part of the model and set it to print with Extruder 2 (T1).

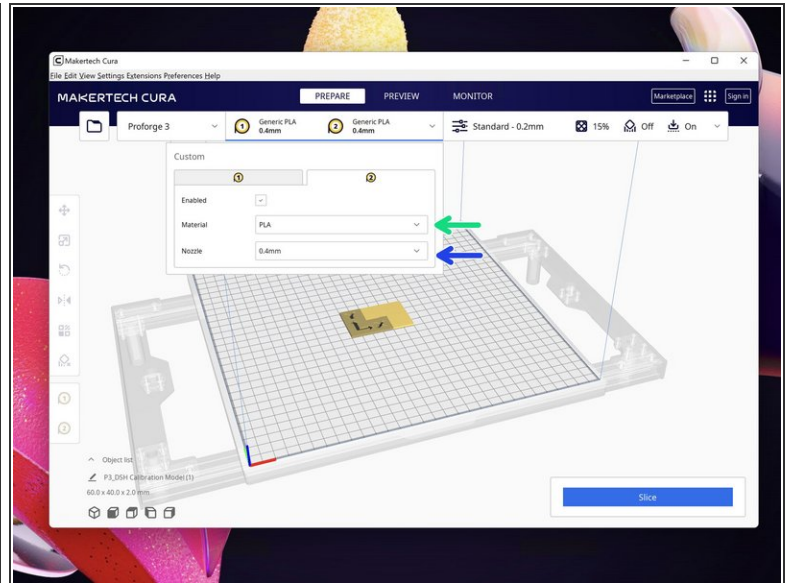
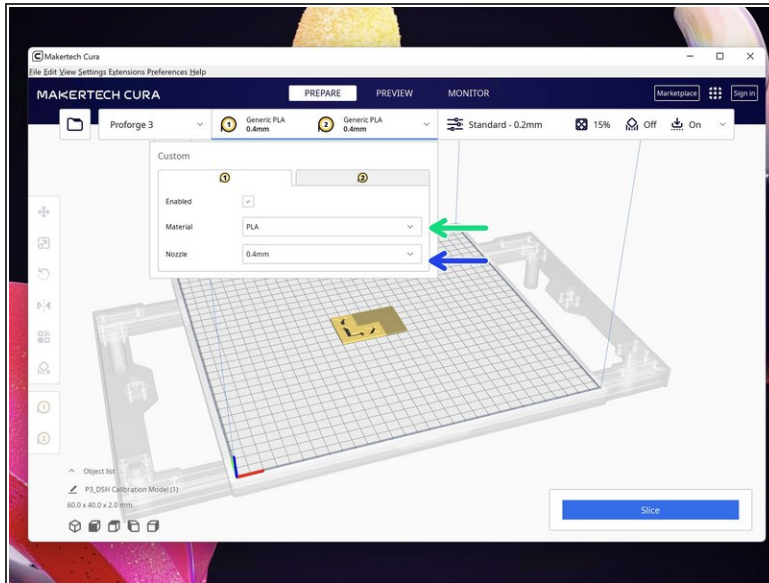


Step 7 — Merging the Parts



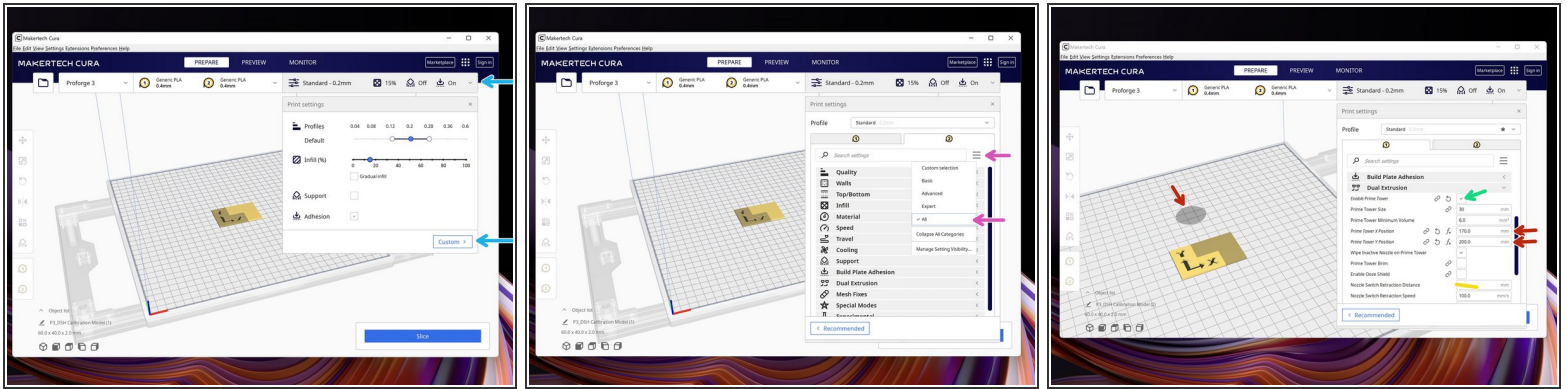
- ① Use shift to select both parts of the model.
- Right click either model and hit *Merge Models*.
- Once merged, right click on the model and hit *Centre selected Model*.

Step 8 — Material and Nozzle Size



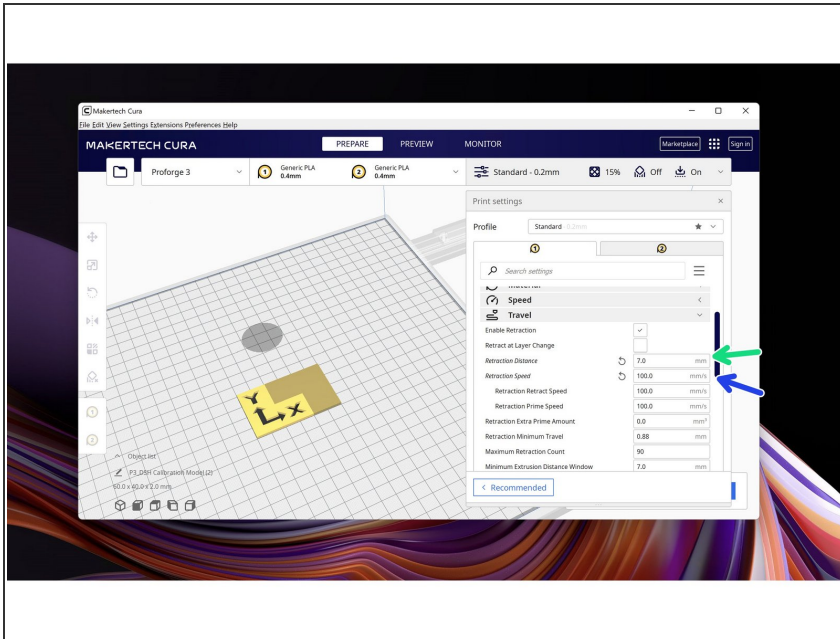
- Select the material you are using, we recommend PLA or ABS for this first print.
- Select the nozzle size you have installed.

Step 9 — Prime Tower



- ❗ The Prime Tower is not 100% necessary, but it does improve print quality when doing a dual print.
- Go to custom settings.
- Click the menu icon and display *ALL* settings.
- In the Dual Extrusion menu select "Enable Prime Tower"
- Set the Prime Tower position.
 - On the build platform, you should see a shadow of where it will be placed. Aim to place it behind your model.
- ⚠ The prime tower should also be placed along the centre of the X-Axis, this is where switching is the most efficient. i.e. the X position should always be near 170.
- Set the nozzle switch retraction distance to 7mm.

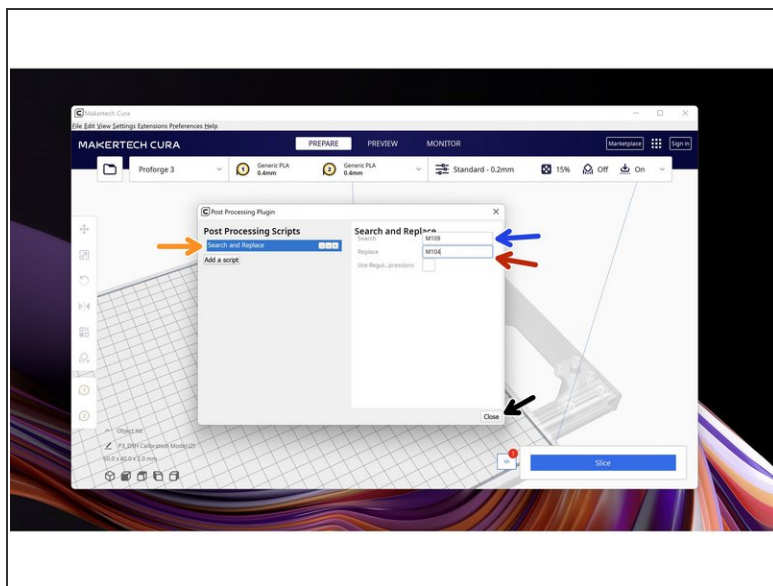
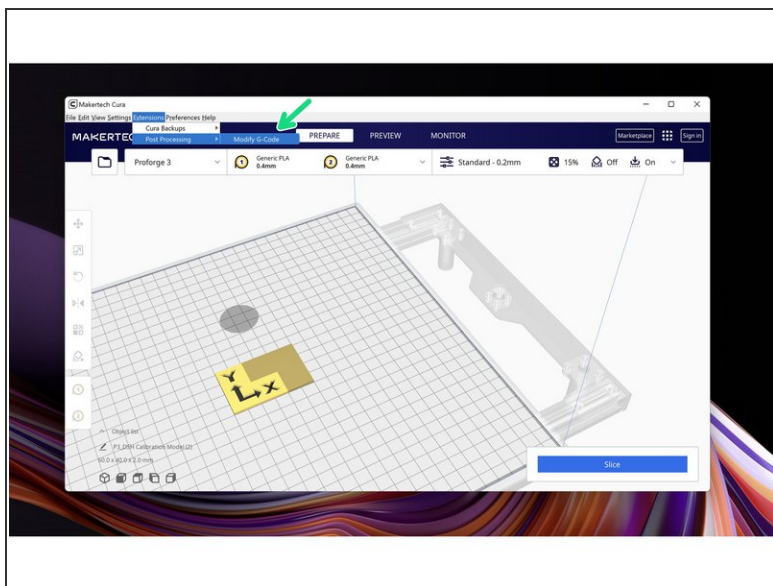
Step 10 — Retraction Settings



i The DSH is Bowden setup, this requires more aggressive retraction.

- Set the Retraction amount to 7mm.
- Set the retraction speed to 100mm/s.

Step 11 — Post Processing

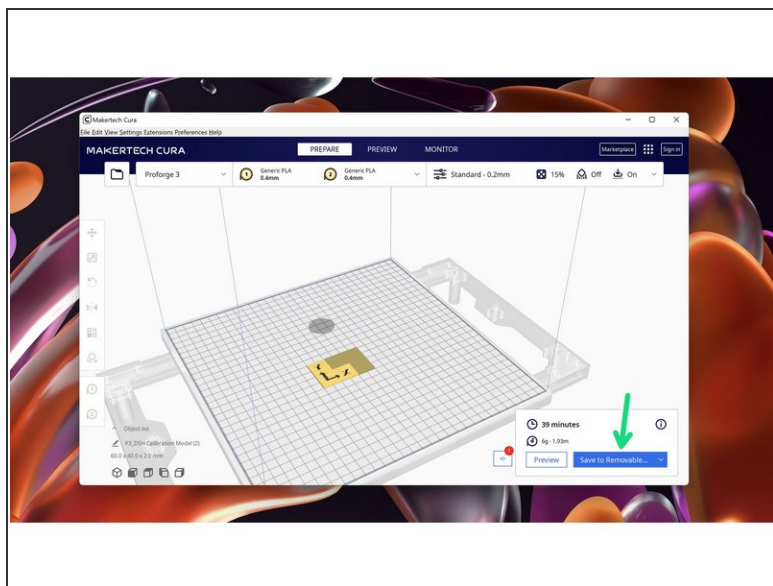
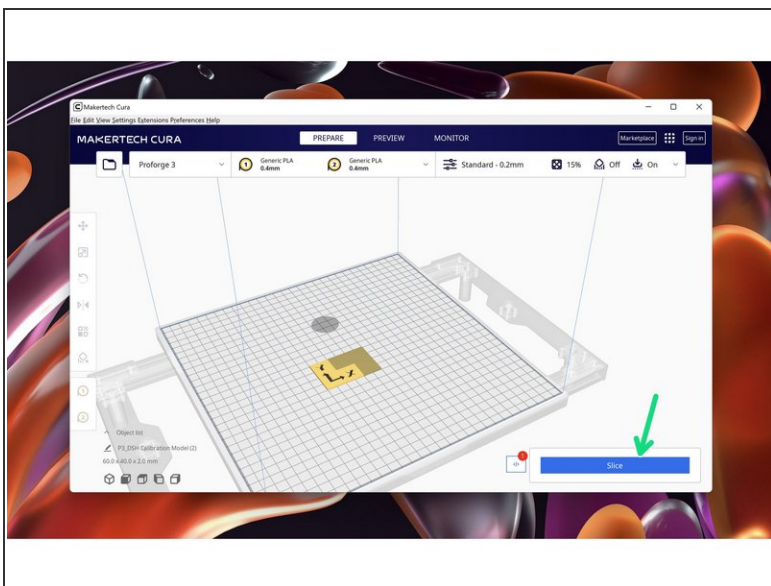


i Finally, due to the way Cura creates gcode we need to add a post-processing script to our set-up.

i This script replaces the *wait for* heat command with a simple heat command.

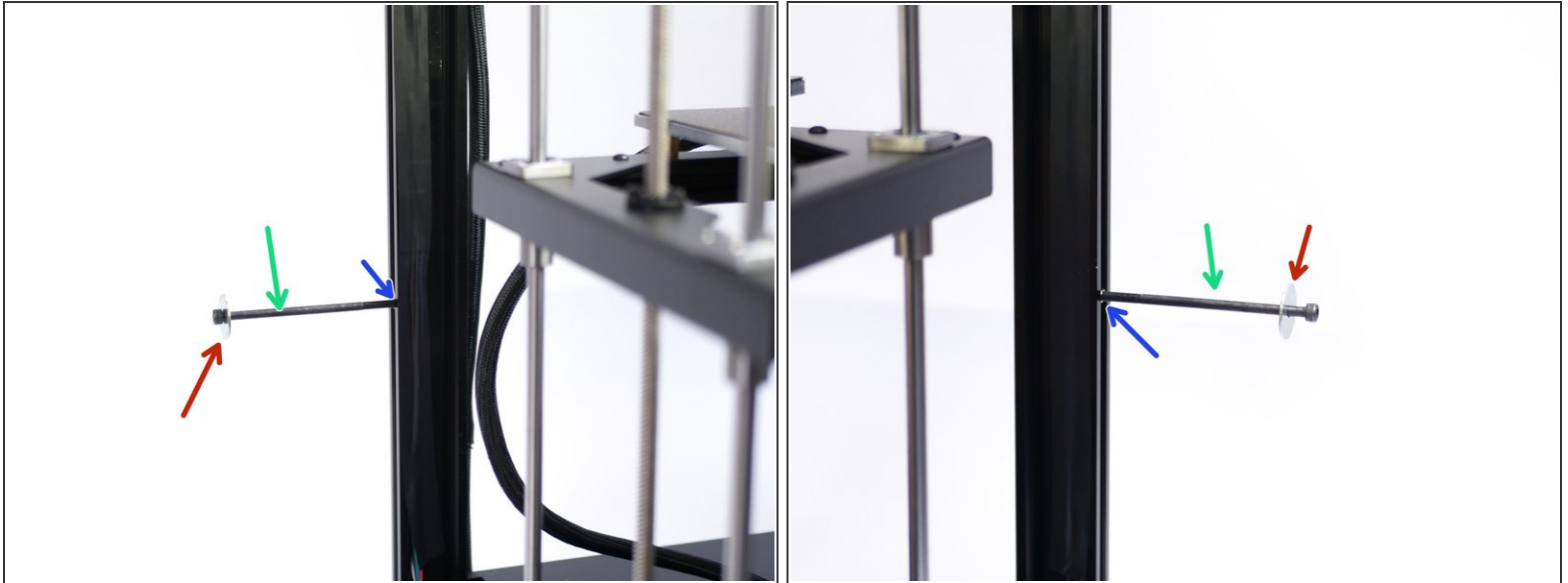
- In the top menu bar go to Extensions -> Post Processing -> Modify G-Code
- Go to Add a script -> Search and Replace
 - Search: M109
 - Replace: M104
- Hit Close when done.


Step 12 — Slice and Save to SD card






- Slice the model and save it to your SD card.

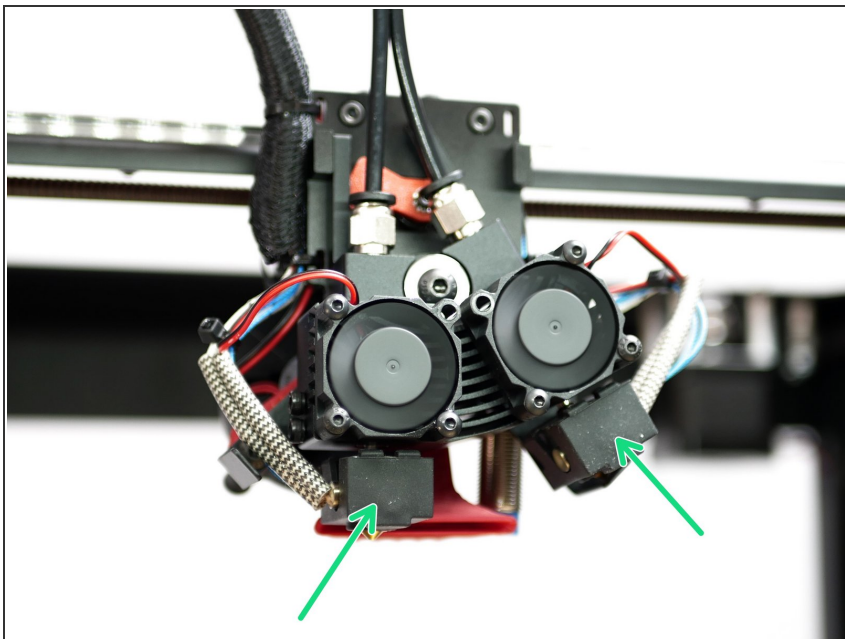
Step 13 — Spool Holders



 Fix the spool holders to the side of the Proforge 3 frame.

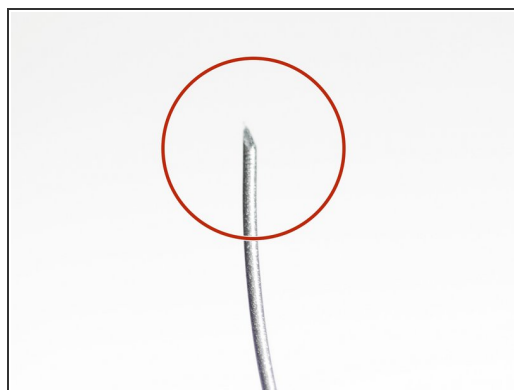
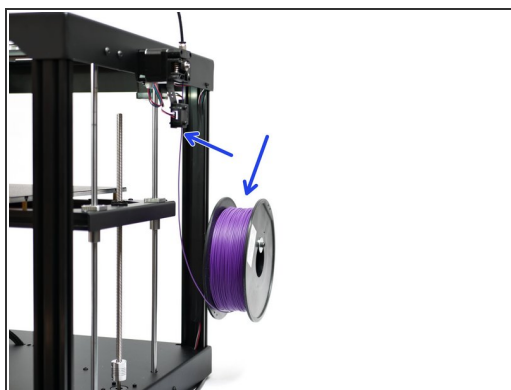
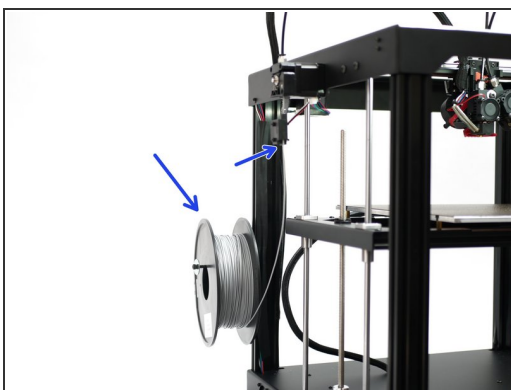
-  M5 x 100mm Bolt
-  M5 T-Nut
-  M5 Penny Washer

Step 14 — Hotend Covers



- Fix the silicone covers over the hotends.

Step 15 — Load Filament



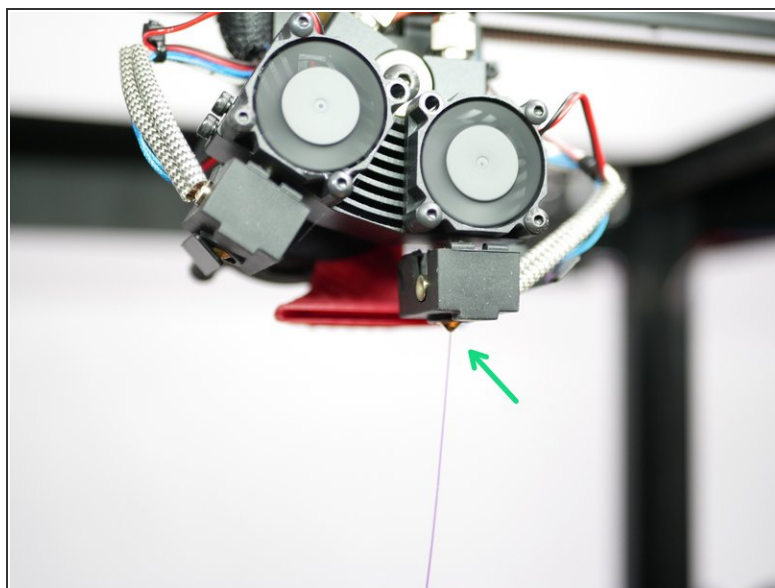
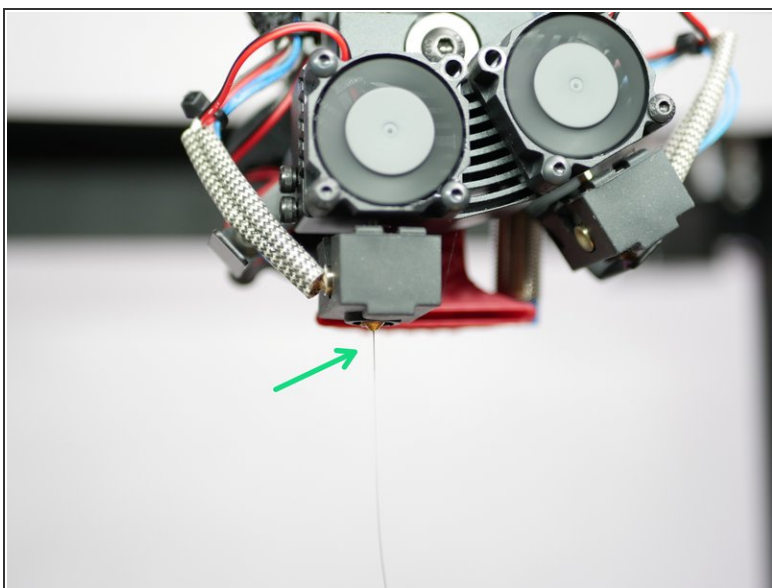
- Load your filament. We're using ESun's PLA+ here.
- Use scissors or side cutters to create a sharp point and feed it into the extruders.

Step 16 — Pre-Heating



- ① Pre-heat the hotends and bed to your printing temp.
- In our case, 200C on both hotends and 60C on the bed.

Step 17 — Priming Hotends



- Run some filament through the hotends to check that you are getting a smooth flow of molten filament.

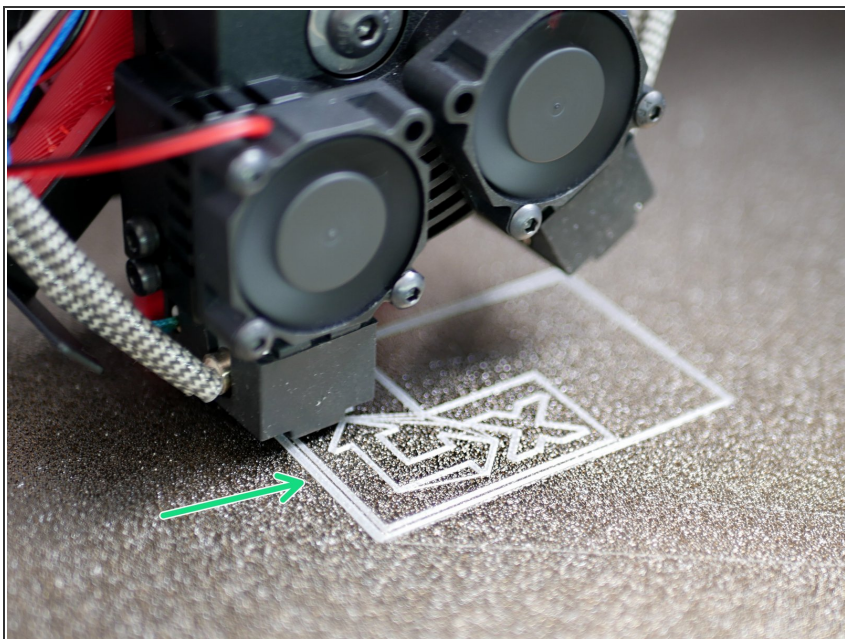
Step 18 — Print from SD Card



i Go to:

- Print
- TFT SD
- P3_DSH Calibration Model

Step 19 — First Layer Check



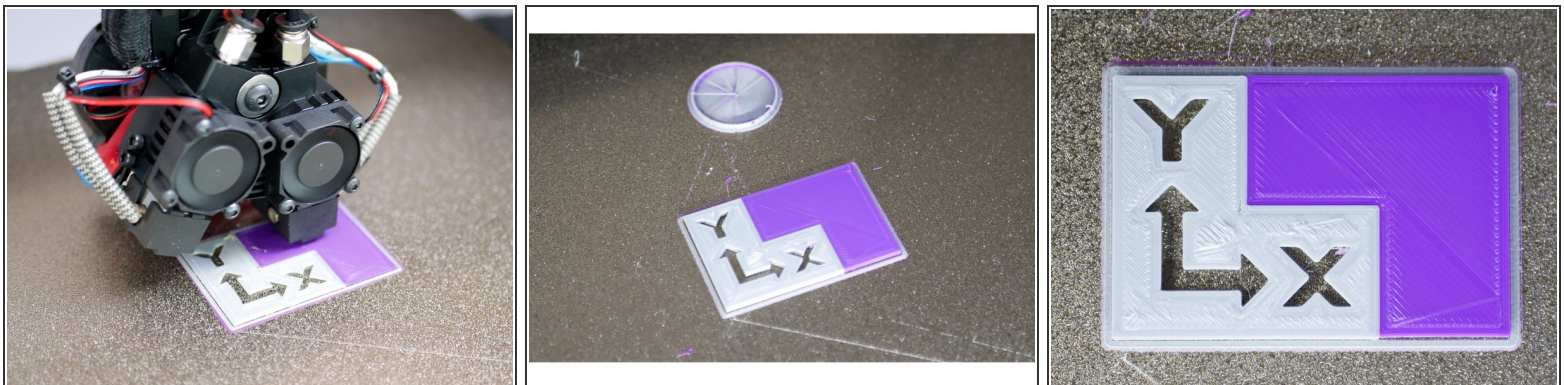
- As your print begins check that a good first layer is being layed down.
- ⚠ If your nozzle is digging into the platform stop the print!
- ⚠ If you find your nozzle printing too high and the first layer not adhering well enough, stop the print!

Step 20 — Adjusting the Offset



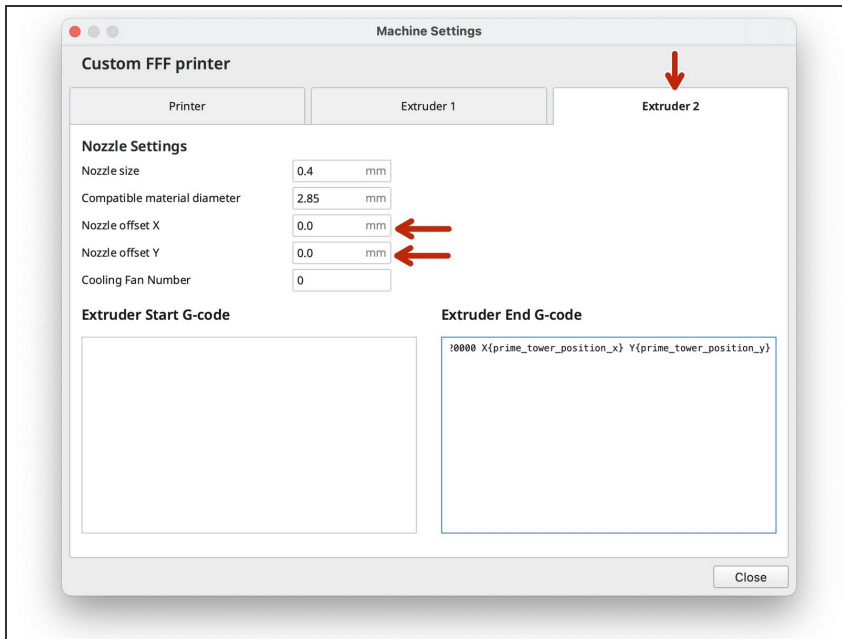
- In the menu go to Settings -> Machine -> Setting
- Scroll down to Probe Offset
- Adjust the Z-Offset
 - ☑ If the nozzle is digging into the platform, increase (+) the offset, so our initial -1.3 becomes -1.1
 - ☑ If the nozzle is too far away from the platform, decrease (-) the offset, so our initial -1.3 becomes -1.5
- ⓘ Save to EEPROM when done.

Step 21 — Calibration Print Finishes



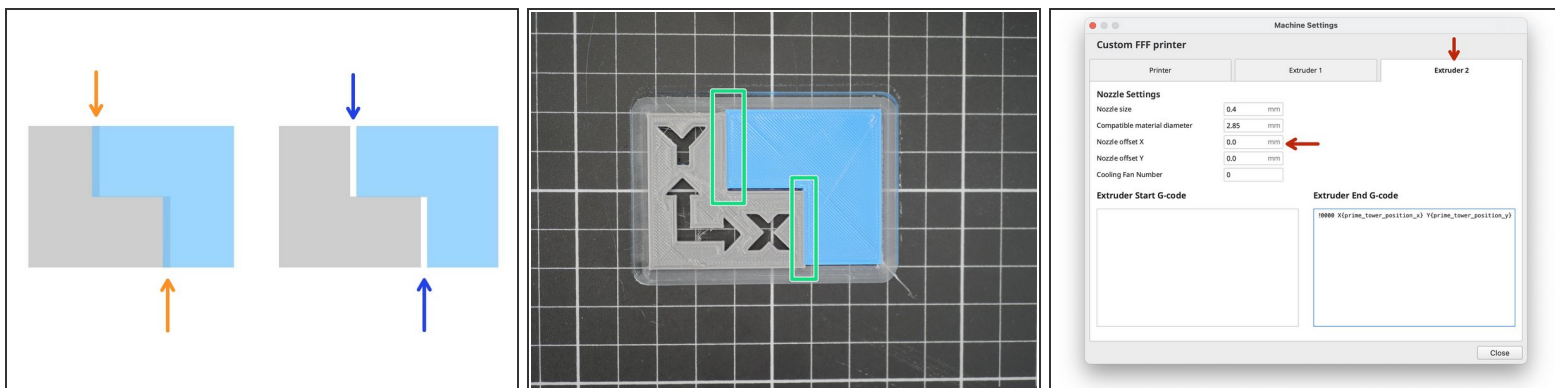
- ⓘ Congratulations you should have your Proforge 3 and Dual Switching Hotend all setup now!
- ☑ If you find the two models to not be aligned perfectly, see the next few steps about calibration.

Step 22 — Inspecting and Calibrating the Print



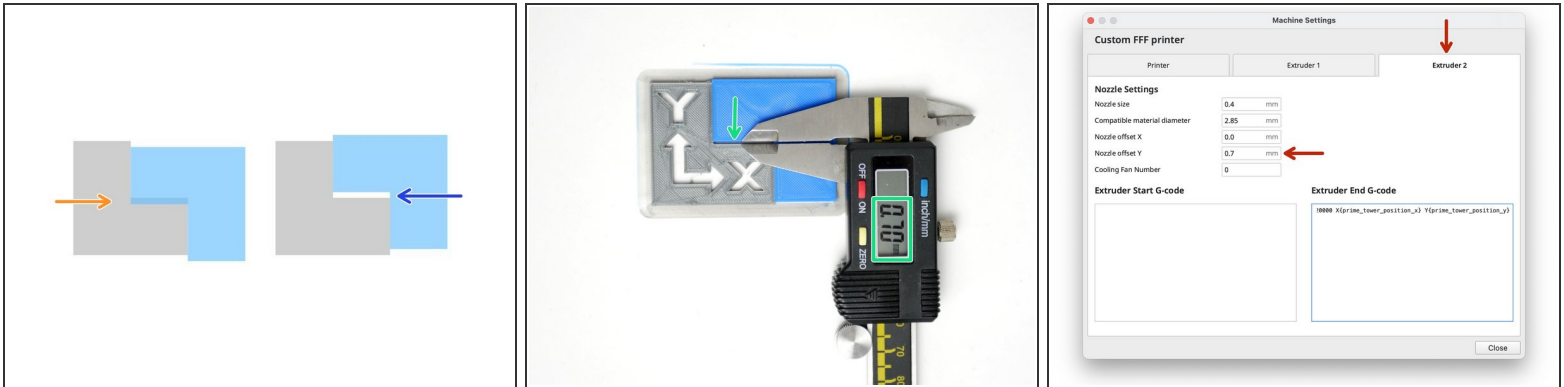
- i** The calibration print should self align. The DSH is CNC machined to a high degree of precision. If you find gaps or overlaps in your print, we recommend first investigating that everything is OK mechanically.
- i** If everything is mechanically OK, then we will adjust the X/Y offsets in Cura with the aim of getting the two parts to line up.
- Offsets are entered in Machine Settings under the **Hotend #2** Tab.

Step 23 — Deciding the X-Offset



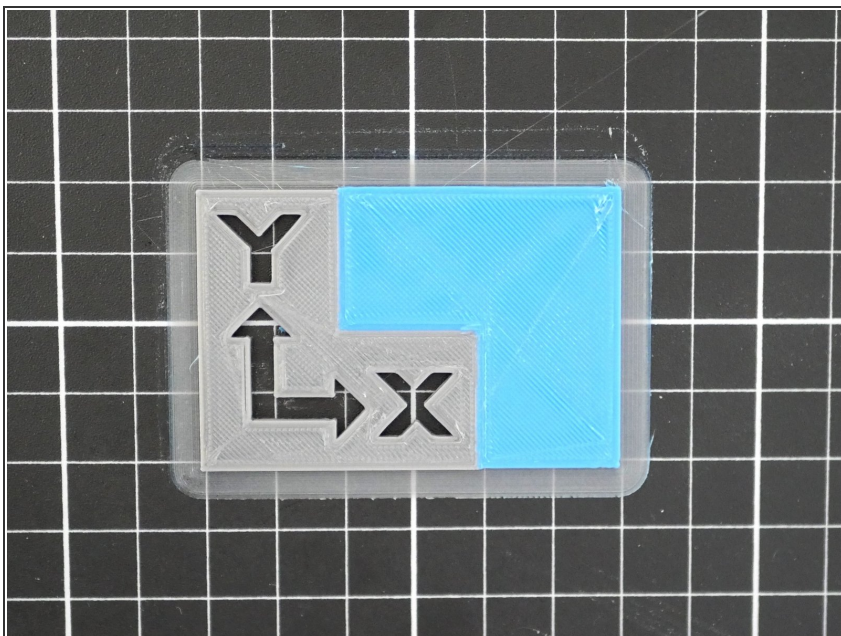
- Overlapping in X Direction:
 - ❗ Decrease/Negative X-Offset
- Gap in X Direction:
 - ❗ Increase/Positive X-Offset
- In this example case the print was fine in the X-Direction, so we left our X-offset as 0.
- ✦ For example, if there had been a gap of 0.25mm, our offset would have been **0.25mm**.
- ✦ An overlap of 0.25mm would have meant an offset of **-0.25mm**.

Step 24 — Deciding Y-Offset Value



- Overlapping in Y Direction:
 - ❗ Decrease/Negative Y-Offset
- Gap in Y Direction:
 - ❗ Increase/Positive Y-Offset
- In our case the print had a gap in the Y Direction, so we set our Y-offset to **0.7mm**.
 - ★ If there had been an overlap of 0.7mm, our offset would have been **-0.7mm**.

Step 25 — 2nd Calibration



- ❗ Re-slice the model in Cura and copy it onto the SD Card.
- ❗ Congratulations! After printing the model again with the dialled in offsets you should have the DSE all setup.

