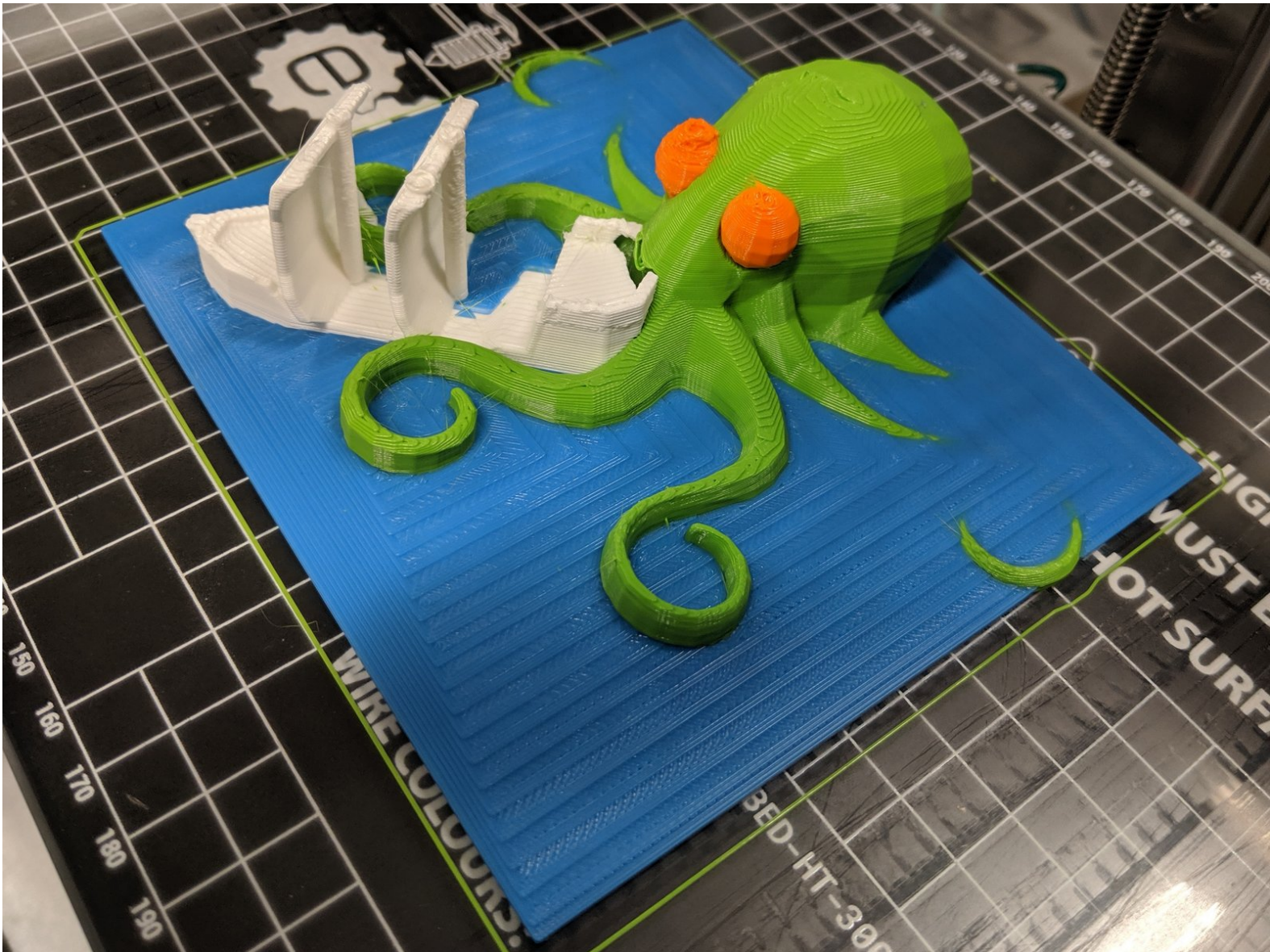


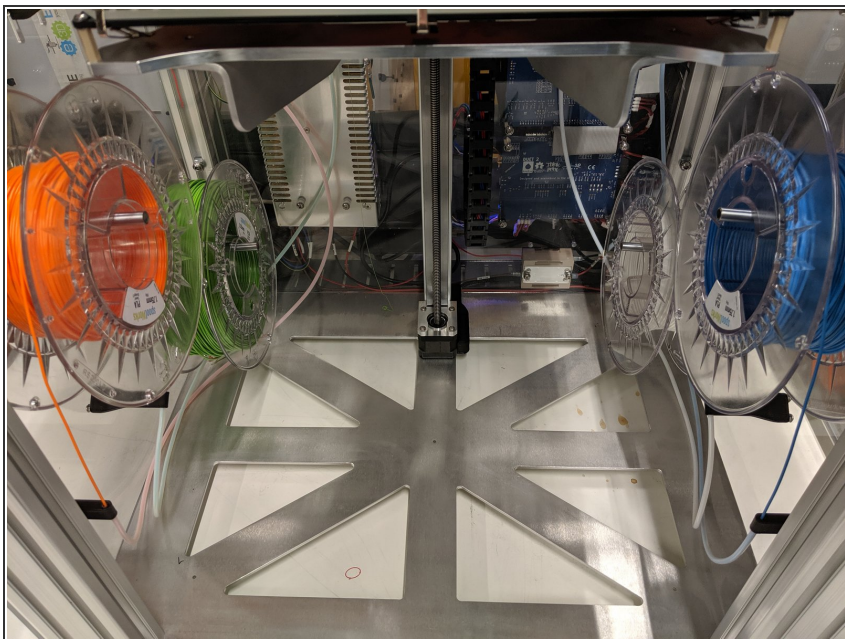


# 12 - Multi-Material Calibration.

Written By: Greg Holloway

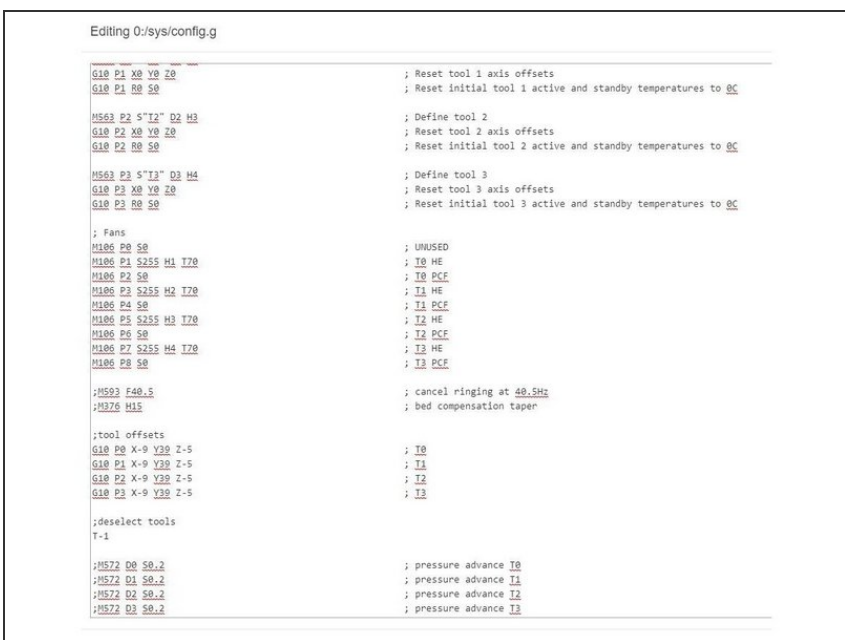


## Step 1 — Load Up.



- Install filament into each of the four tools.

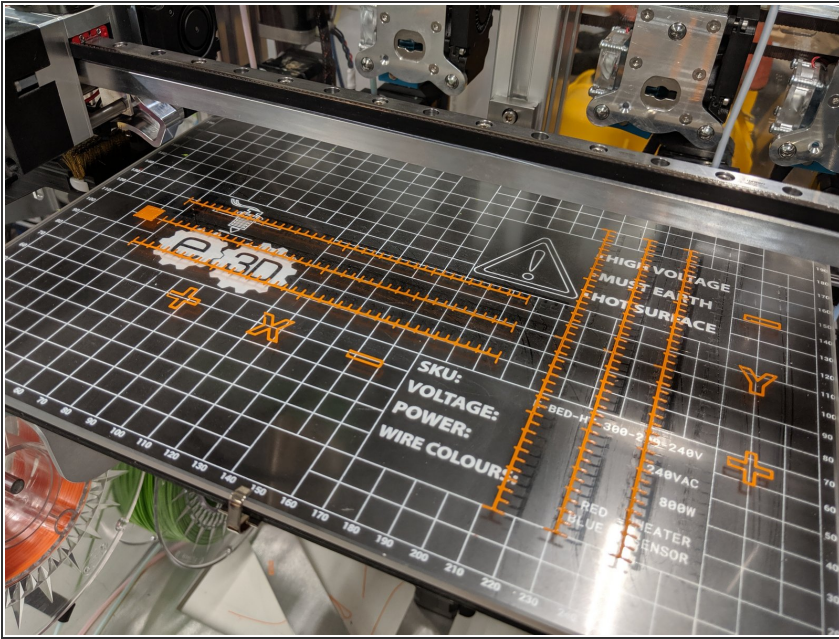
## Step 2 — Offsets.



- The config.g file has approximate numbers for the tool offsets, set by a G10 command towards the end of the file.
- This guide will fine tune those offsets so you can print multi materials.



## Step 3 — T0

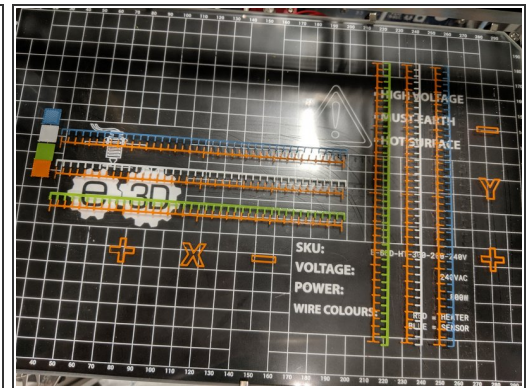
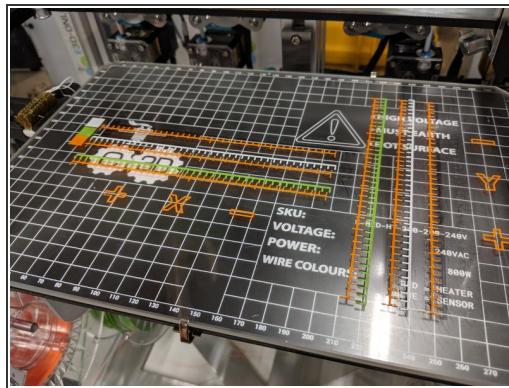
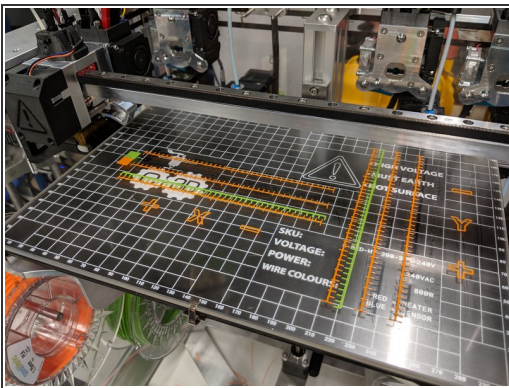


- Set the Active temperatures for the Tools and Bed for the material(s) you are using. In this case I am using PLA.

⚠ Remember to Home the machine and Mesh Compensate the bed.

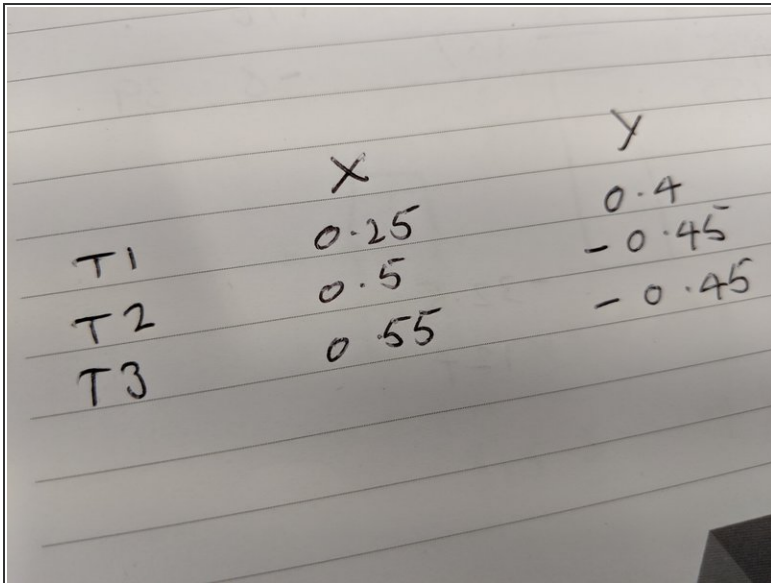
- When ready run **ToolChanger - Calibration.gcode**.
- We are using T0 as the datum for calibrating the tools. T0 will not have any alterations to its G10 offsets.

## Step 4 — T1, T2 & T3.



- Each tool will print matching X & Y Vernier scales.
  - The major divisions are 100 microns and the minor are 50 microns.
  - If the scale for the X-Axis is shifted left, then you add the adjustment to the current offset.
  - If the scale for the Y-Axis is shifted towards the front of the machine then the adjustment is added to the current offset.
- ⓘ There are + & - symbols to help make the process easier to understand.

## Step 5 — Numbers.



Editing 0:/sys/config.g

```

G10 P1 X0 Y0 Z0 ; Reset tool 1 axis offsets
G10 P1 X0 Y0 Z0 ; Reset initial tool 1 active and standby temperatures to 0C

M563 P2 5"12" D2 H3 ; Define tool 2
G10 P2 X0 Y0 Z0 ; Reset tool 2 axis offsets
G10 P2 X0 Y0 Z0 ; Reset initial tool 2 active and standby temperatures to 0C

M563 P3 5"13" D3 H4 ; Define tool 3
G10 P3 X0 Y0 Z0 ; Reset tool 3 axis offsets
G10 P3 X0 Y0 Z0 ; Reset initial tool 3 active and standby temperatures to 0C

; Fans
M106 P0 S0 ; UNUSED
M106 P1 S255 H1 T70 ; T0 HE
M106 P2 S0 ; T0 PCF
M106 P3 S255 H2 T70 ; T1 HE
M106 P4 S0 ; T1 PCF
M106 P5 S255 H3 T70 ; T2 HE
M106 P6 S0 ; T2 PCF
M106 P7 S255 H4 T70 ; T3 HE
M106 P8 S0 ; T3 PCF

M593 F400.5 ; cancel ringing at 50.5Hz
M376 H15 ; bed compensation taper

; tool offsets
G10 P0 X-9 Y30 Z-5 ; T0
G10 P1 X-8.75 Y38.6 Z-5.12 ; T1
G10 P2 X-8.5 Y39.45 Z-5.1 ; T2
G10 P3 X-8.45 Y39.45 Z-5 ; T3

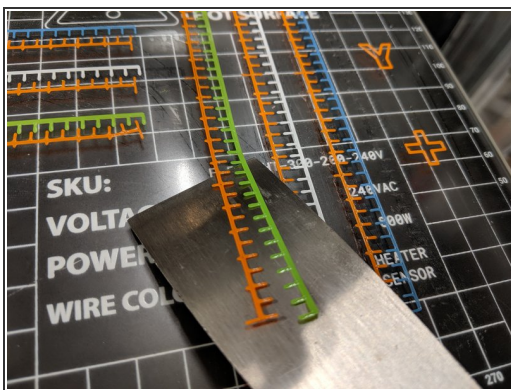
;deselect tools
T-1

M572 D0 S0.2 ; pressure advance T0
M572 D1 S0.2 ; pressure advance T1
M572 D2 S0.2 ; pressure advance T2
M572 D3 S0.2 ; pressure advance T3

```

- Make a note of the offsets for each tool.
- Make the adjustments in config.g.
- Save the file.

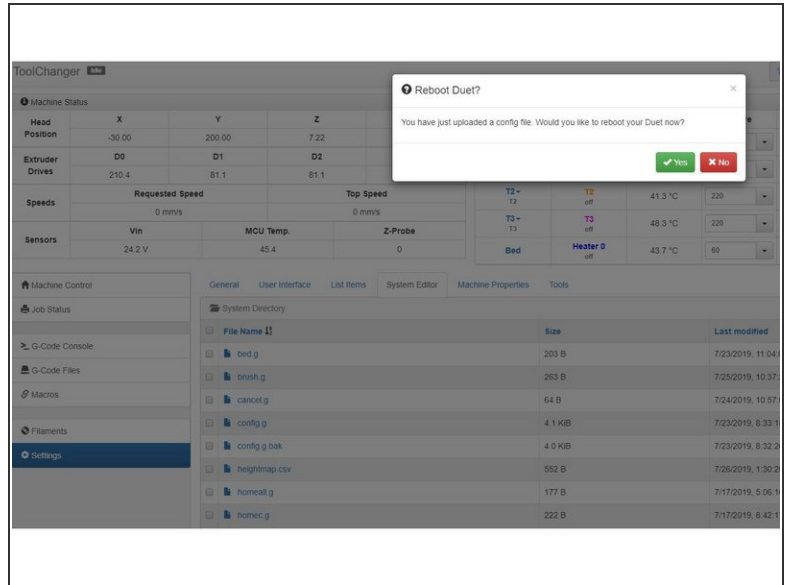
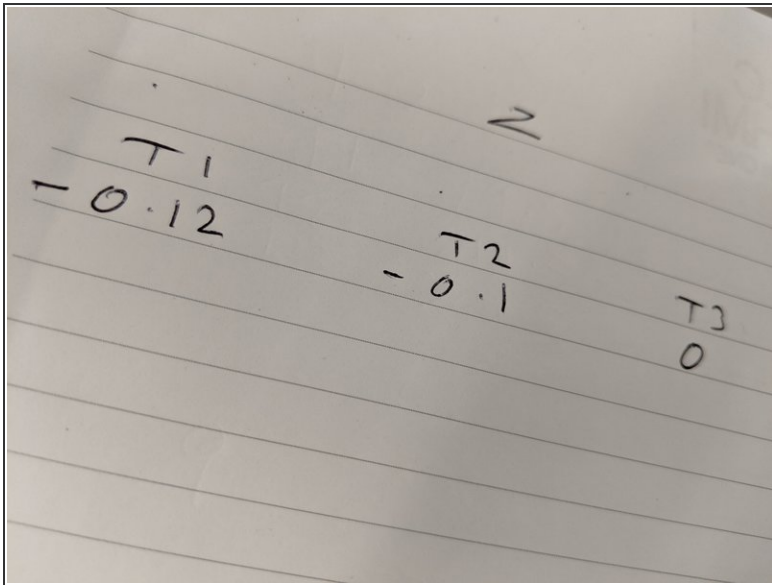
## Step 6 — Z-Axis.




- Carefully list up a pair of verniers.
- Using calipers measure the T0 print.
- Measure the T<1,2,3> print.



## Step 7 — Z-Axis.

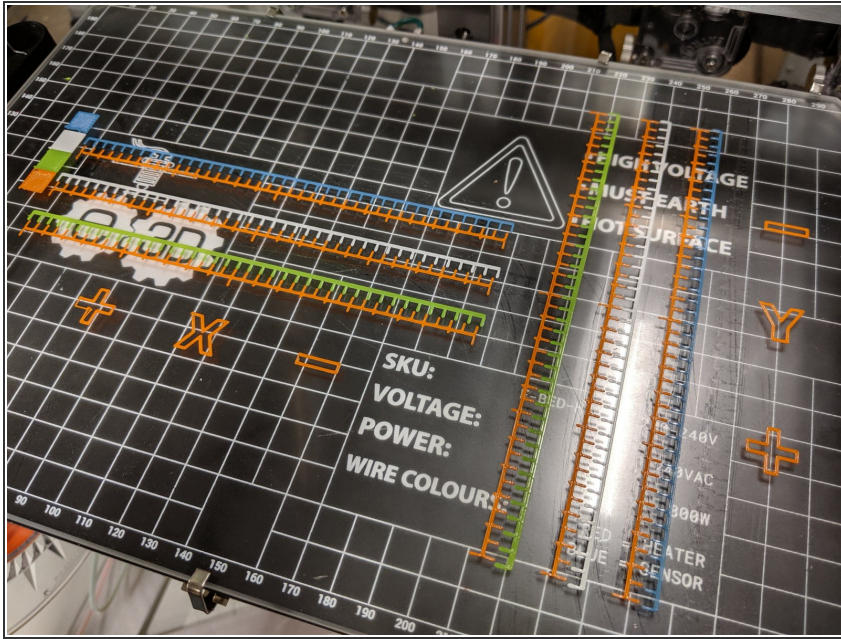


- Make a note of the difference for each tool.
- Adjust the number in config.g

 Note that the values must be reversed. For example T1 adjustment is -0.12. The value must be added (changes for - to +) to the current offset.

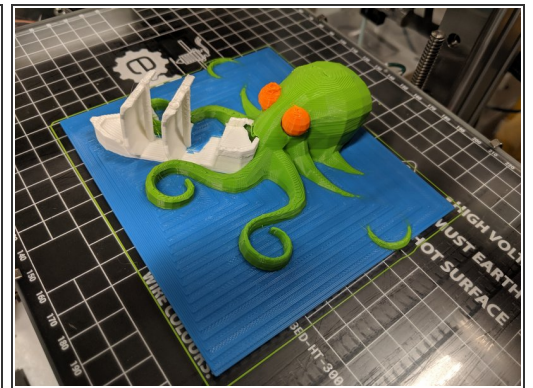
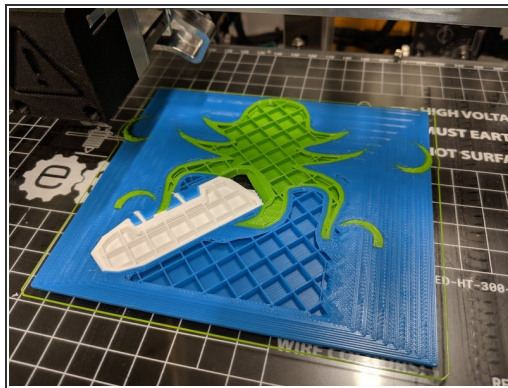
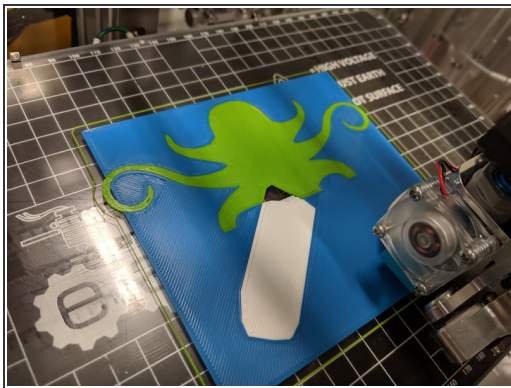
- Save the config.g file and reboot the machine.

## Step 8 — Print.



- Home the machine after the reboot.
- Reprint the calibration file and check that the adjustments have worked.

## Step 9 — Print!



- When you are happy with the calibration go ahead and run a multi material print.
- The included kraken.gcode file should run just great.
- Download the [Kraken](#).
- Download slicer profiles from [GitHub](#).