

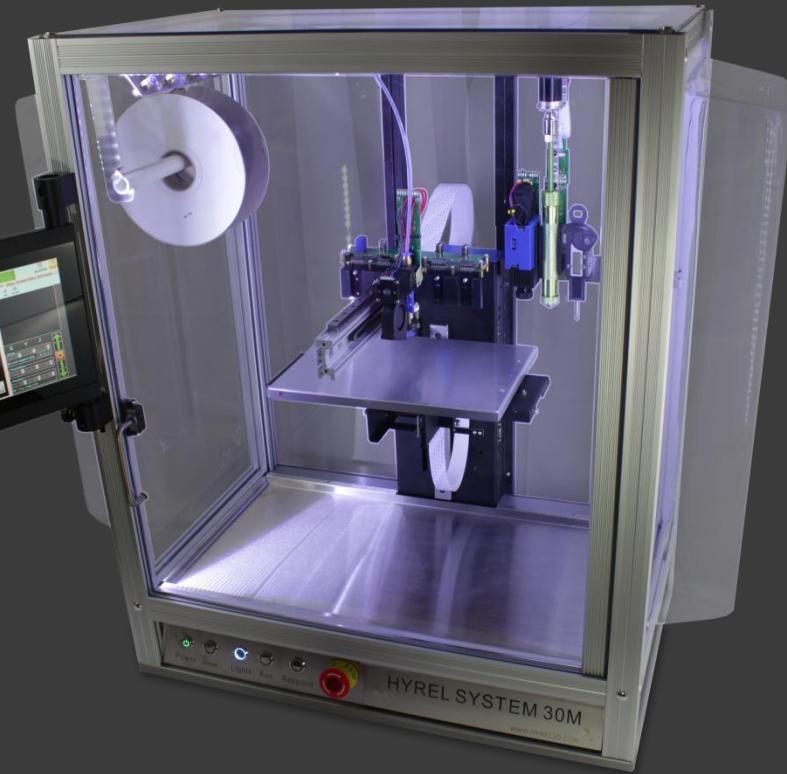
T1 Training Session

HYREL 3D TRAINING SERIES

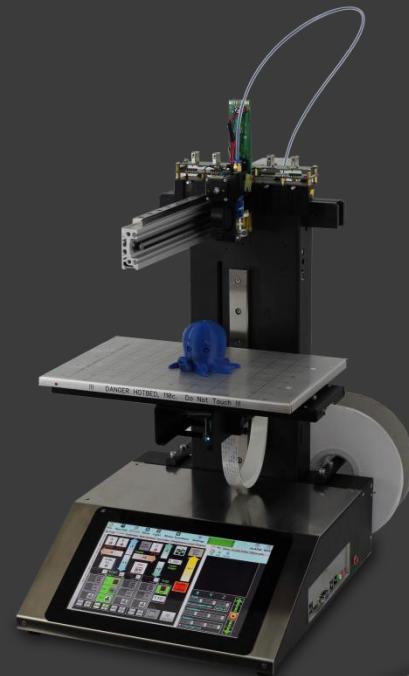
Agenda

- Breaking the Ice
- Physical Setup
- Walkthrough of REPETREL
- First Print

Breaking the Ice

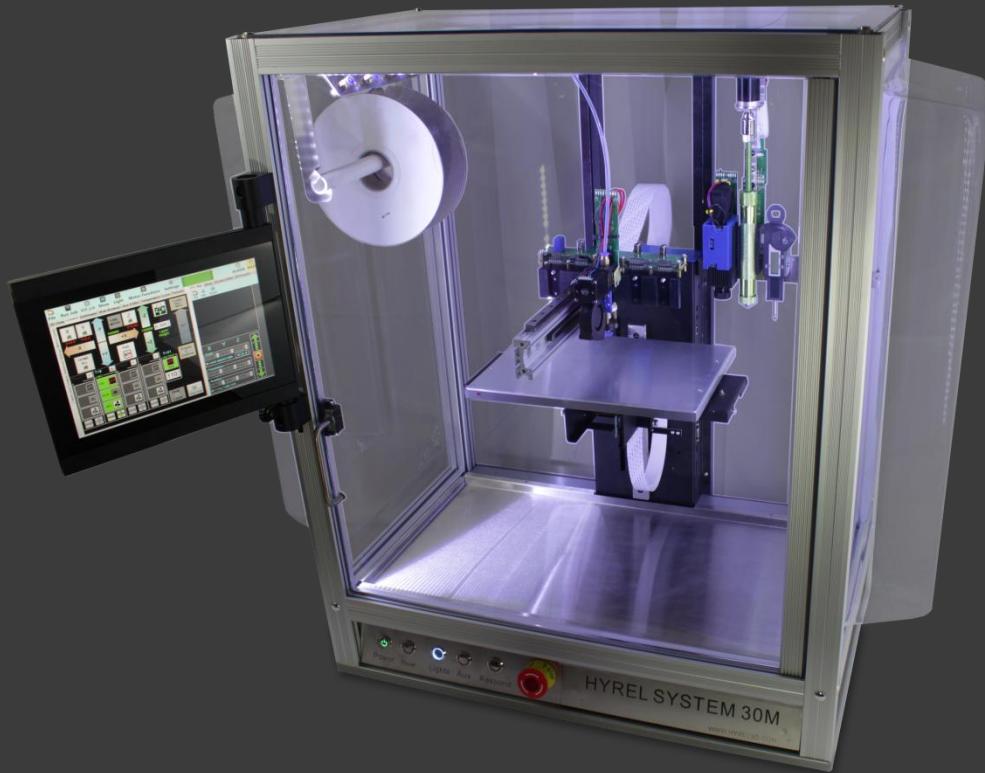


SYSTEM 30M



ENGINE

Breaking the Ice

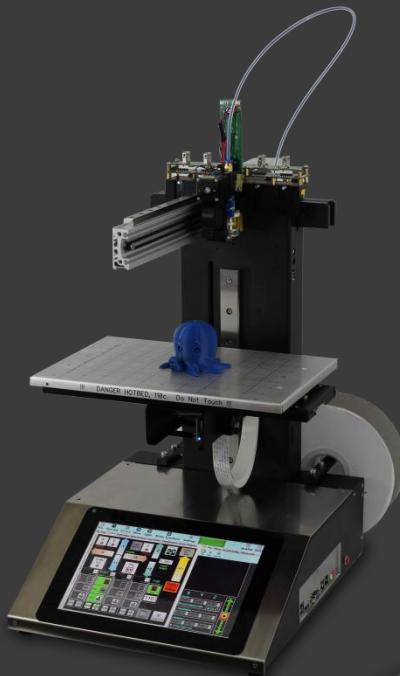


- Protected build environment
- Slightly larger build area
- Better printing results

SYSTEM 30M

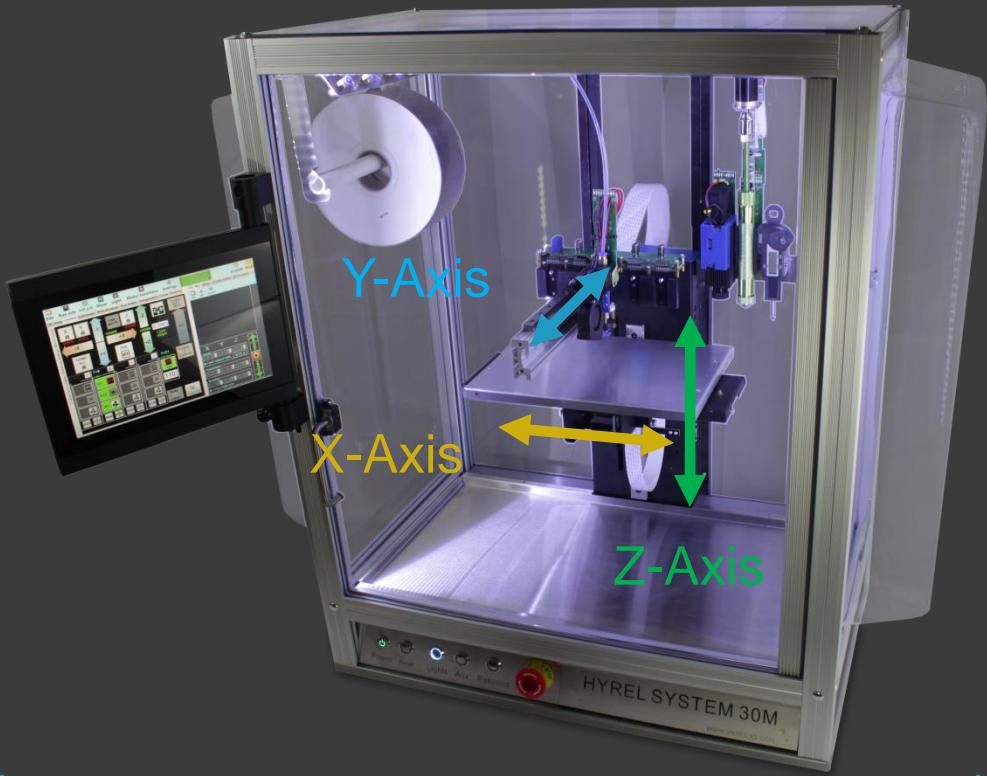
Breaking the Ice

- Entry-Level HYREL
- All metal construction
- Built to last

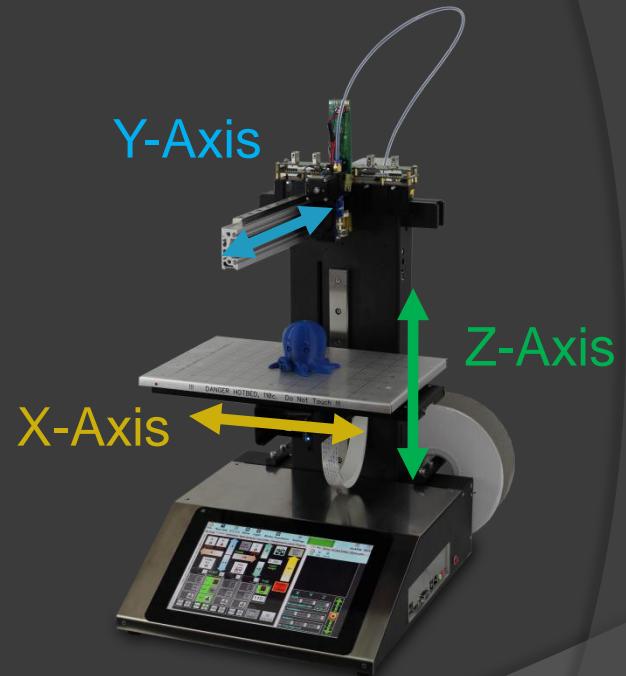


ENGINE

Physical Setup

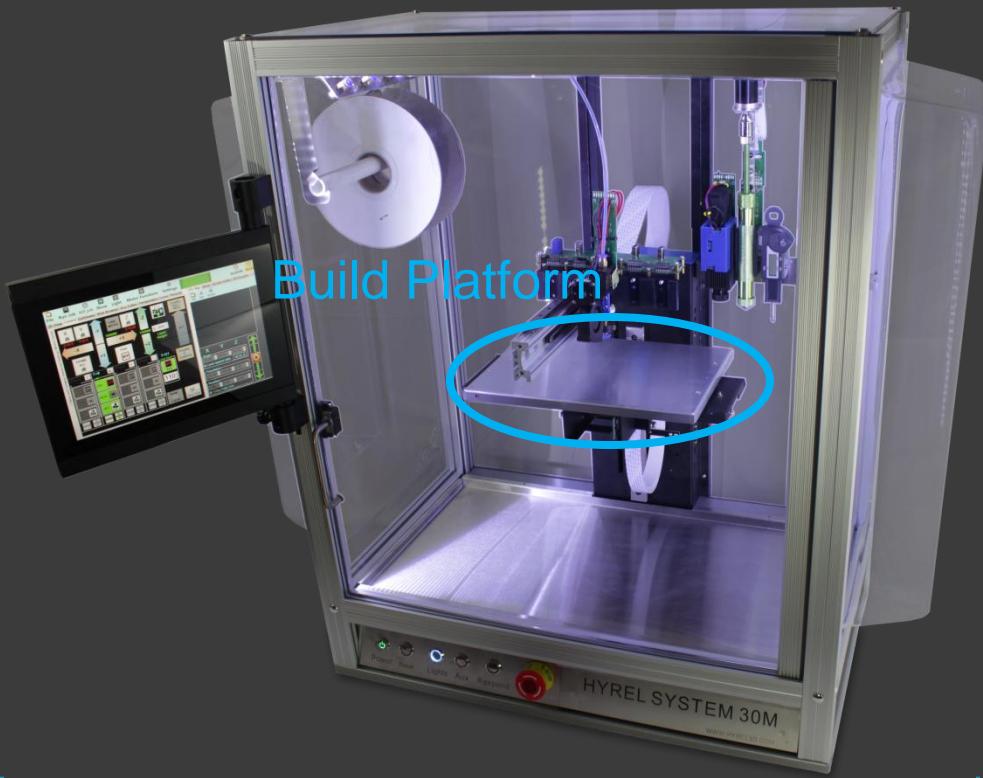


SYSTEM 30M



ENGINE

Physical Setup

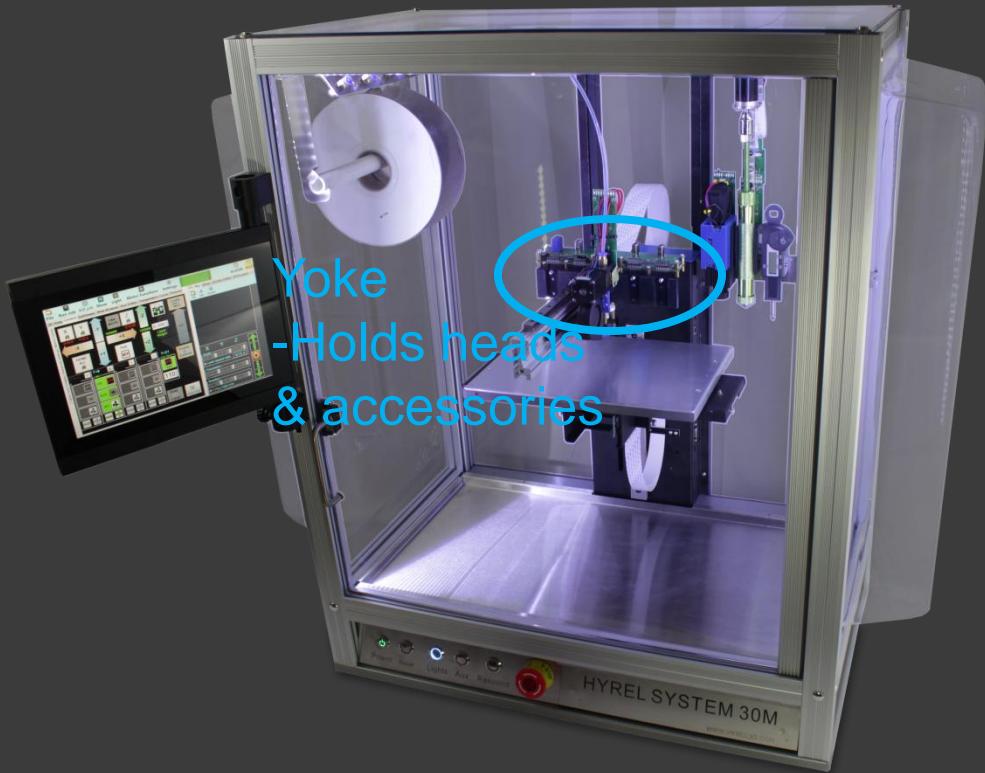


SYSTEM 30M



ENGINE

Physical Setup



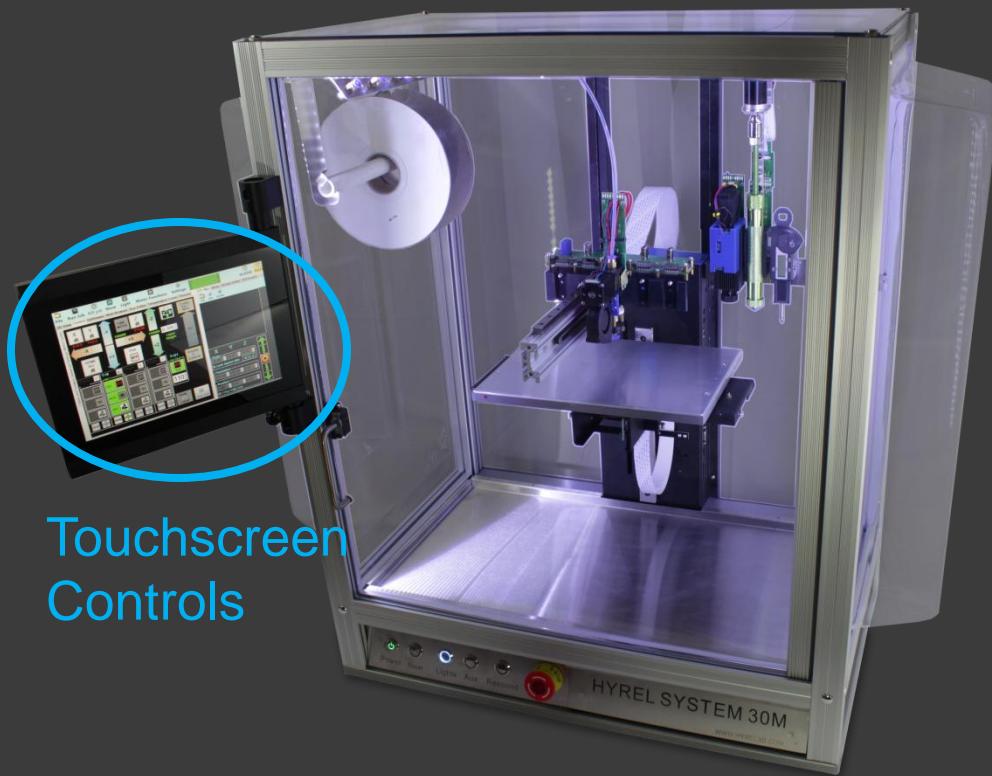
SYSTEM 30M

Yoke
-Holds heads
& accessories



ENGINE

Physical Setup



Touchscreen
Controls

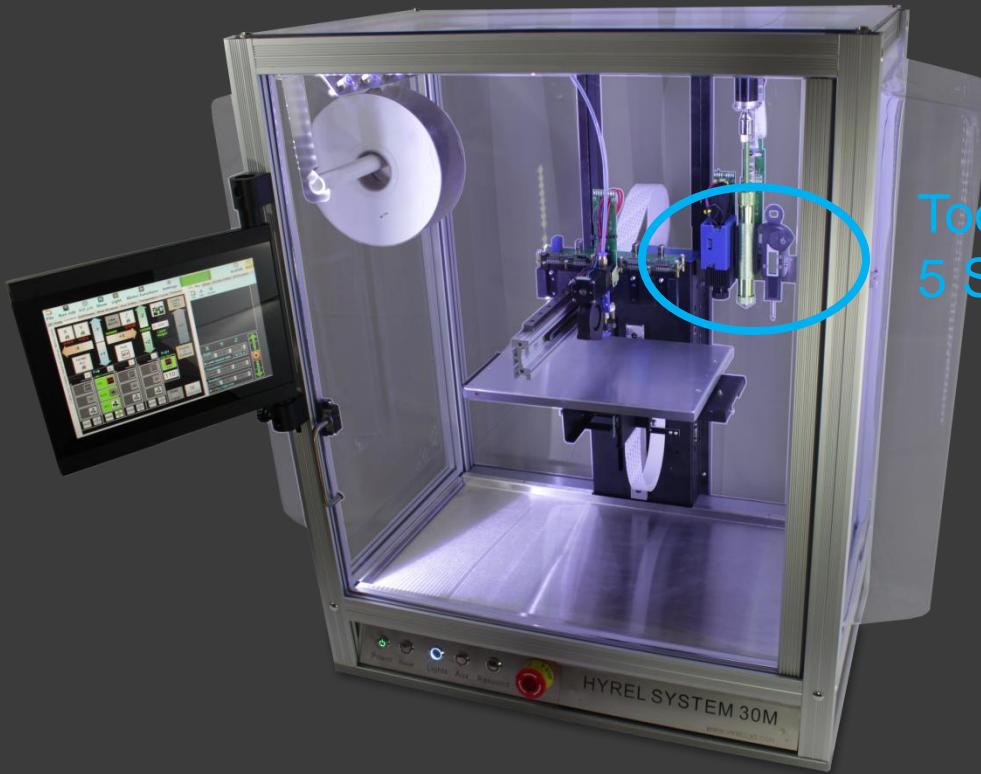
SYSTEM 30M

Touchscreen
Controls



ENGINE

Physical Setup



Tool Tree
5 Slots

SYSTEM 30M

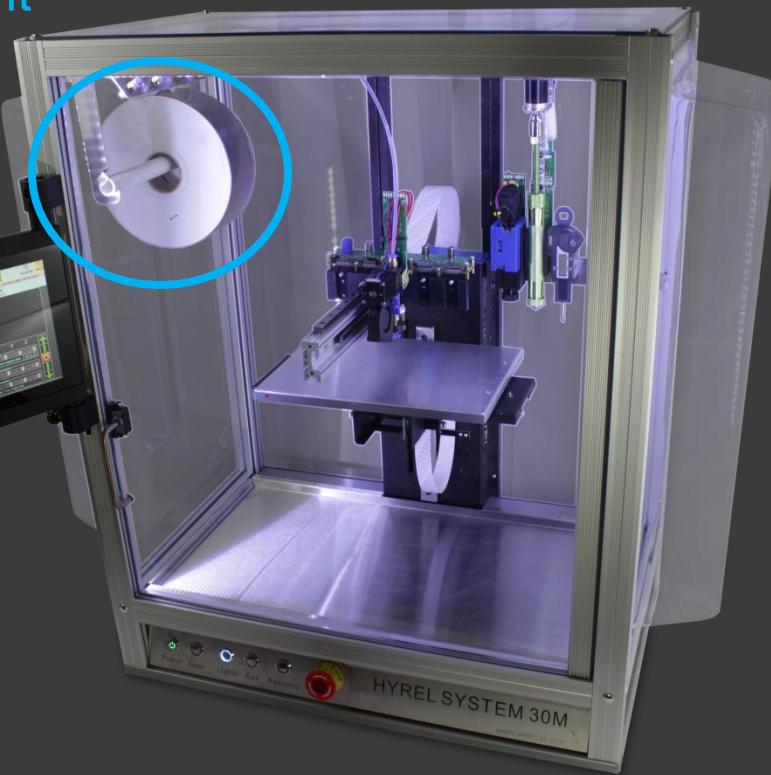


Tool Tree:
2 Slots

ENGINE

Physical Setup

Filament
Spool
Holder



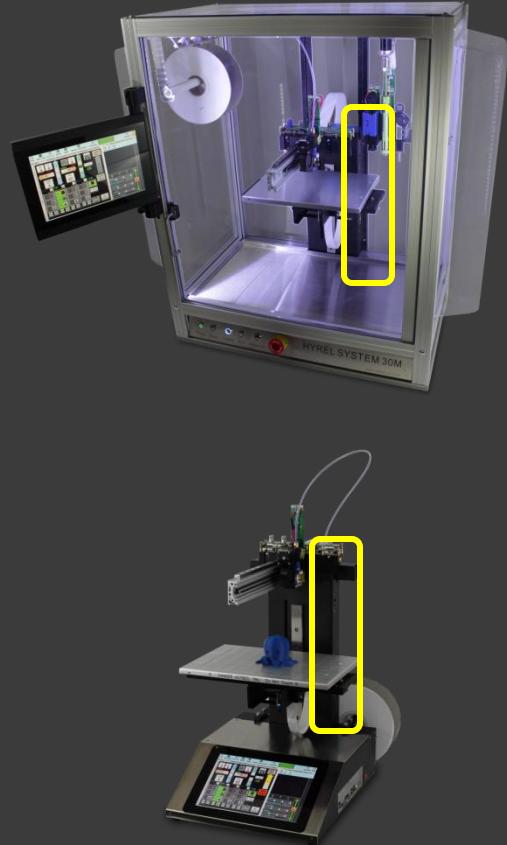
SYSTEM 30M



ENGINE

Filament
Spool
Holders

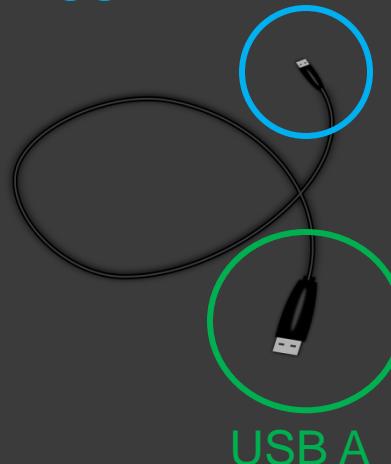
Physical Setup



USB Mini
Connector

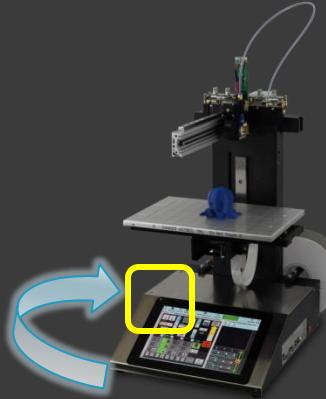
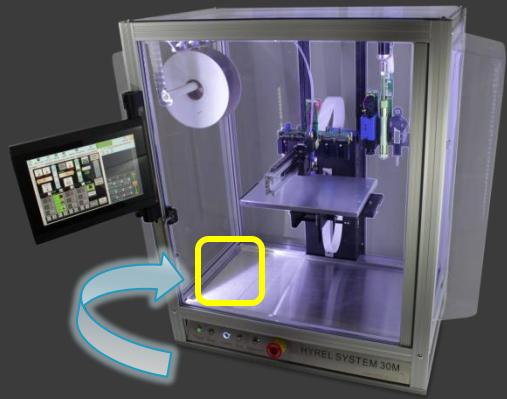
USB Mini

USB A
Connector



Control your HYREL from a separate PC

Physical Setup



Power Supply:
ATX Form Factor
500W



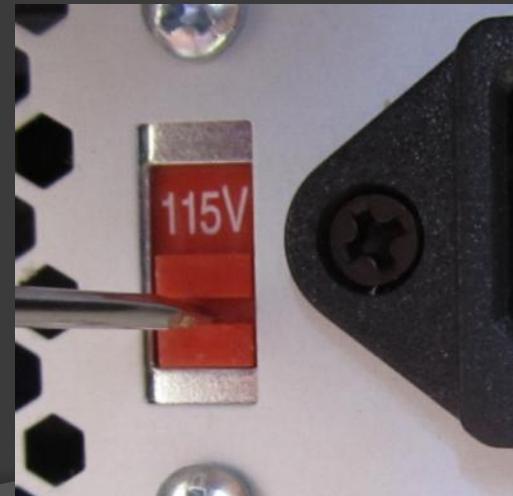
Physical Setup

CAUTION:

Make sure you know your Outlet's Voltage Requirements.

If you are unsure, *start* with the Power Supply set to 230V and turn it on. If the machine does not turn on with the Power Supply set to 230V, then Set the Power Supply to 115V and turn it on.

Doing this in reverse WILL blow a capacitor in your Power Supply and will void your warranty.

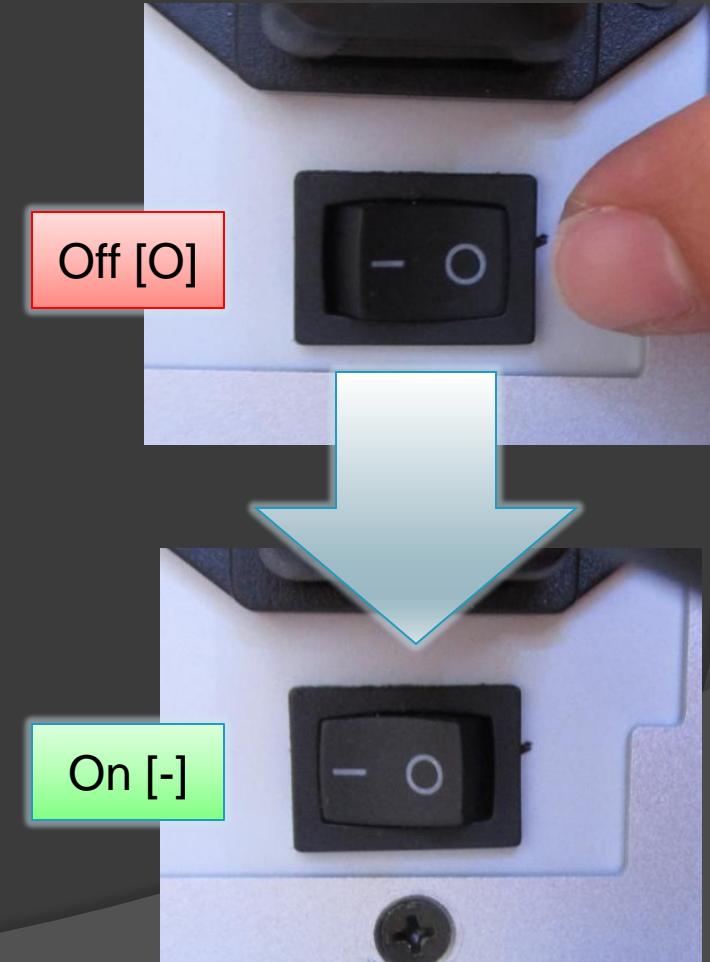


Physical Setup

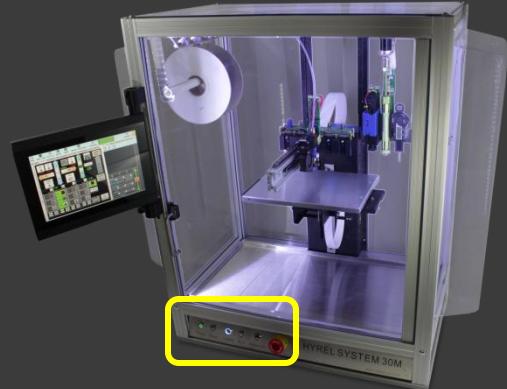
1. Plug in your power cord



2. Turn on your Power Supply



Physical Setup



System 30M Power On Button



Engine Power On Button



Walkthrough of REPETREL

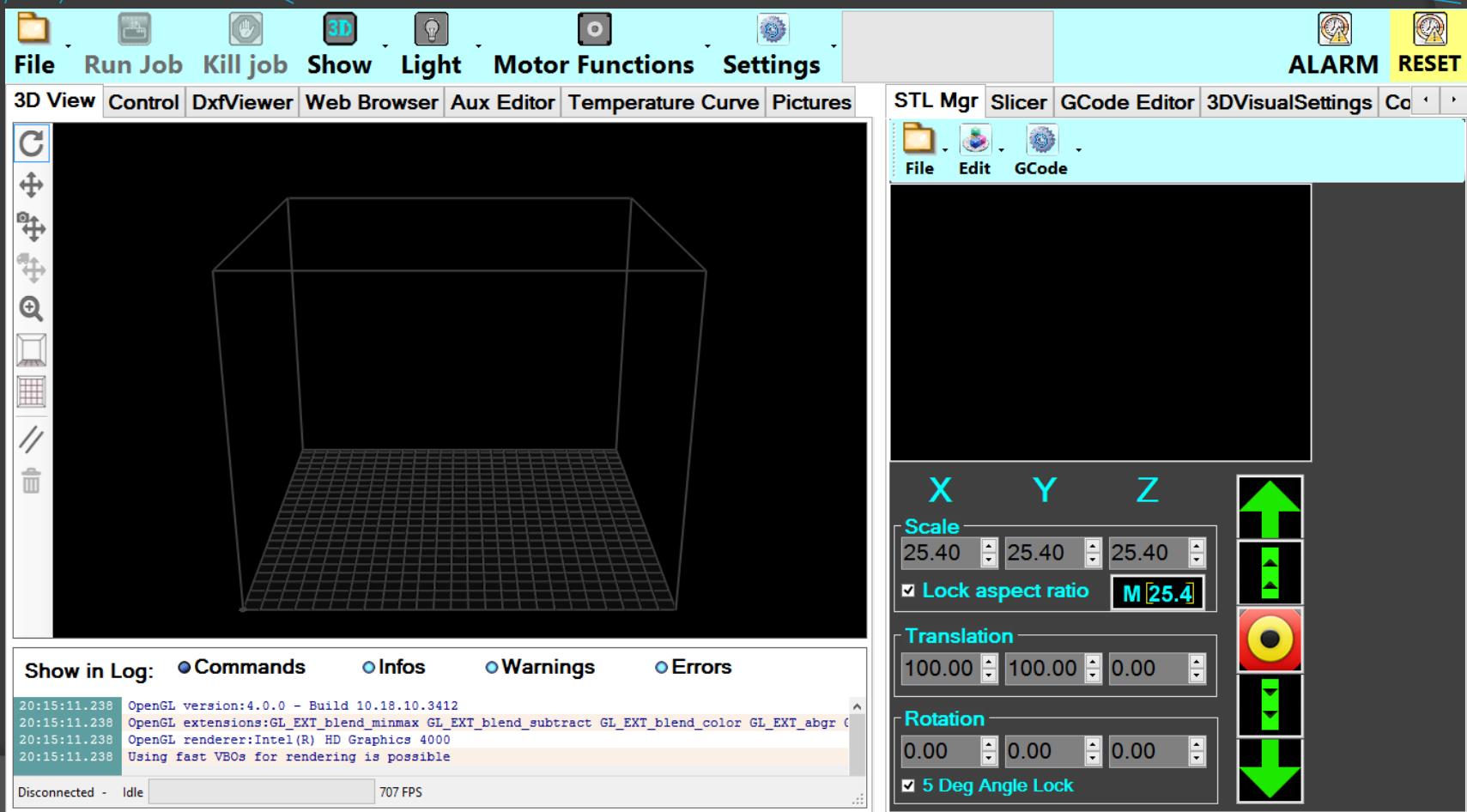
- Q: What is it?
- A: REPETREL is the control software suite included on all HYREL machines.

- Q: Why use it, instead of other software?
- A: Most other 3D printing software, if not all, is based solely around the Arduino. The HYREL machines demand state-of-the-art electronics to handle higher precision movements (such as G2 & G3 moves), multiple heads, and accessories using a CAN bus architecture. REPETREL was programmed to interface with these embedded electronics.

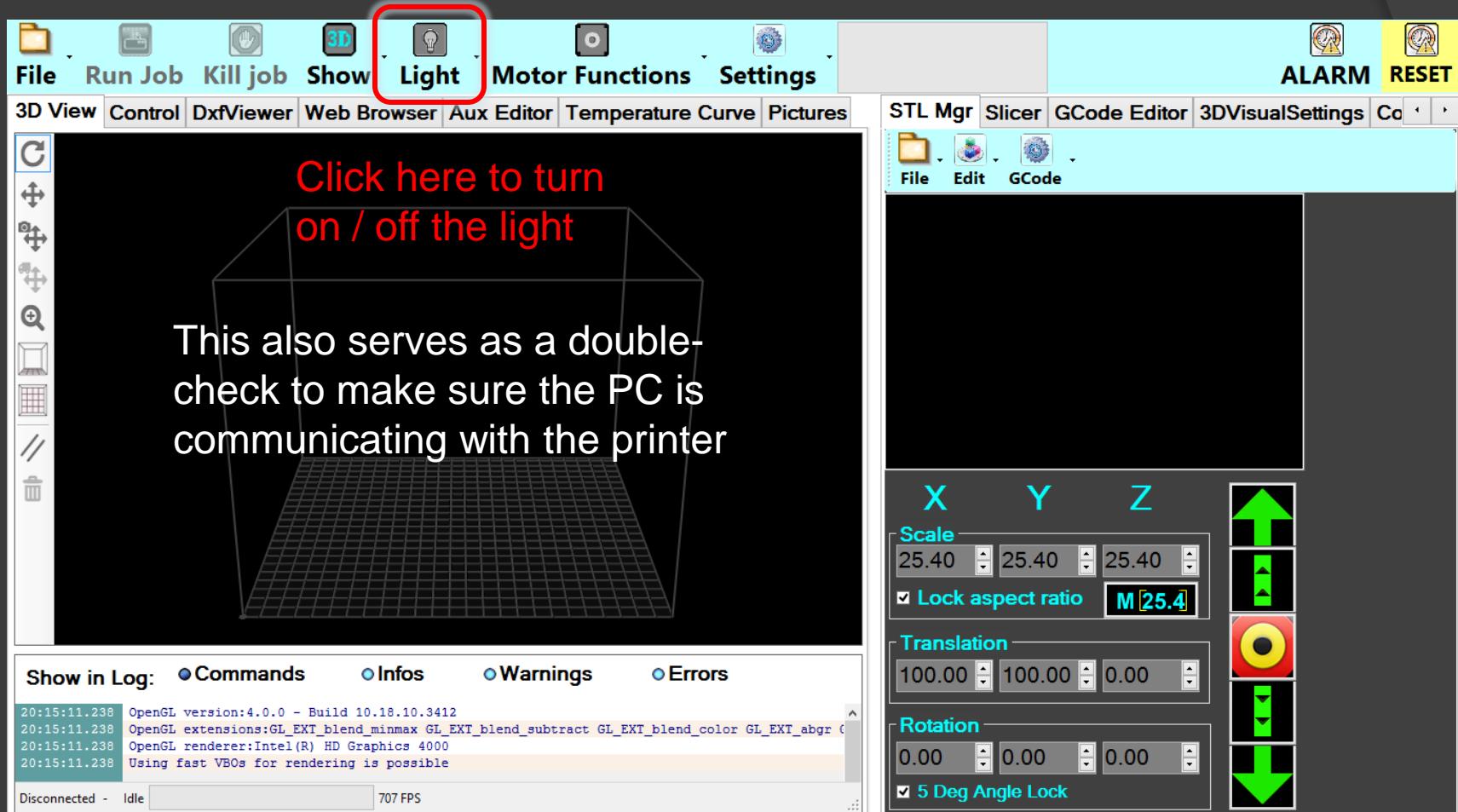
Walkthrough of REPETREL



Desktop Icon
opens this window:



Walkthrough of REPETREL



Walkthrough of REPETREL

Click here for the drop-down menu

To move the x & y axes around, use Unlock Motors

Every time any of the axis move from commands in REPETREL, all of axes motors will lock up. Use this command to unlock them.

UNLOCK MOTORS

Motor Functions

UNLOCK MOTORS

Home XY Motors

Home Z Axis

Send Z To Zero

Clean Head 1

Clean Head 2

Clean Head 3

Clean Head 4

Scale X Y Z
25.40 25.40 25.40
Lock aspect ratio M 25.4

Translation X Y Z
100.00 100.00 0.00

Rotation X Y Z
0.00 0.00 0.00
5 Deg Angle Lock

File Run Job Kill job Show Light 3D View Control DxfViewer Web Browser Auto Motor Functions Settings ALARM RESET

STL Mgr Slicer GCode Editor 3DVisualSettings Camera

Show in Log: Commands Infos Warnings Errors

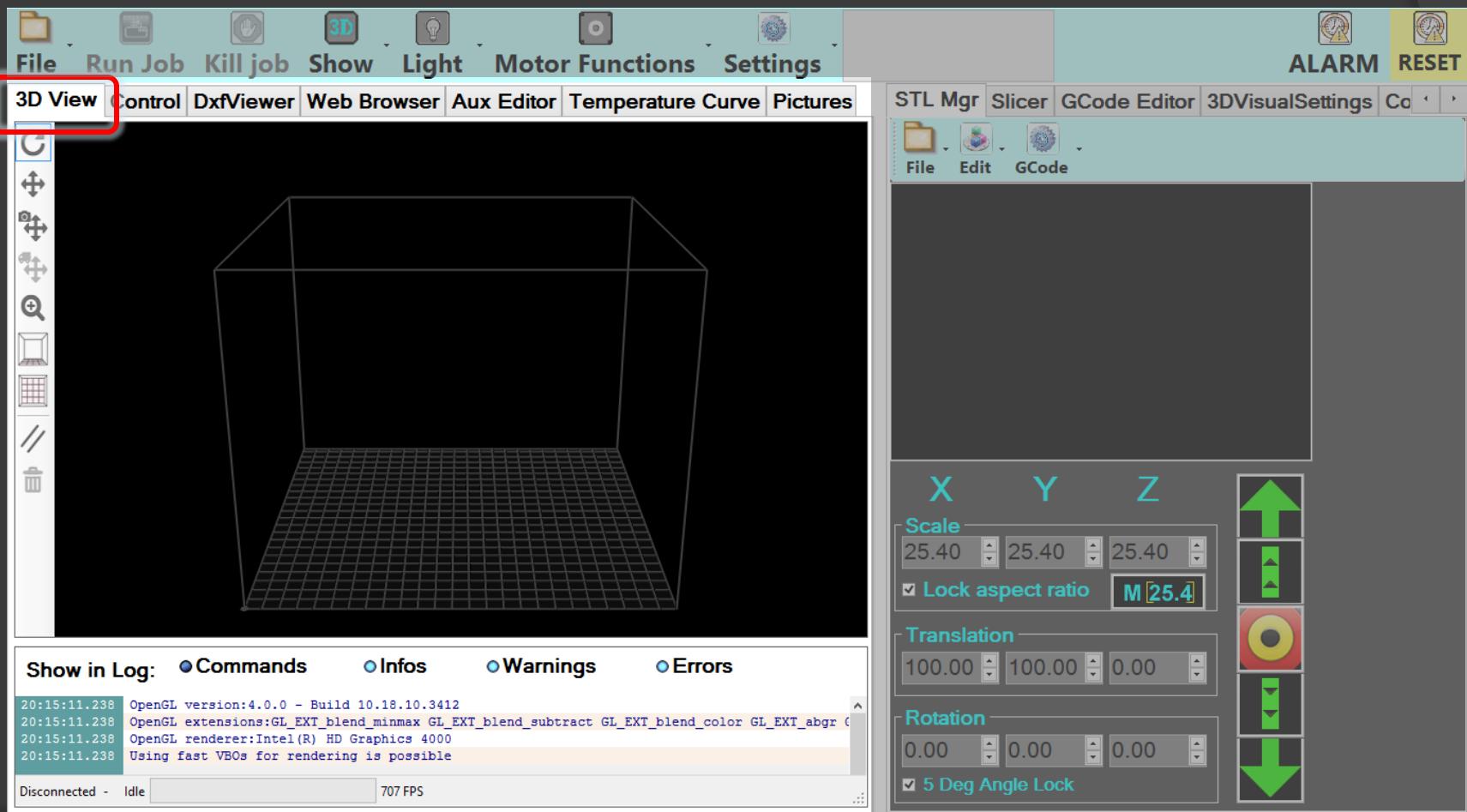
20:15:11.238 OpenGL version:4.0.0 - Build 10.18.10.3412
20:15:11.238 OpenGL extensions:GL_EXT_blend_minmax GL_EXT_blend_subtract GL_EXT_blend_color GL_EXT_abgr
20:15:11.238 OpenGL renderer:Intel(R) HD Graphics 4000
20:15:11.238 Using fast VBOs for rendering is possible

Disconnected - Idle 707 FPS

Walkthrough of REPETREL

“3D View” tab

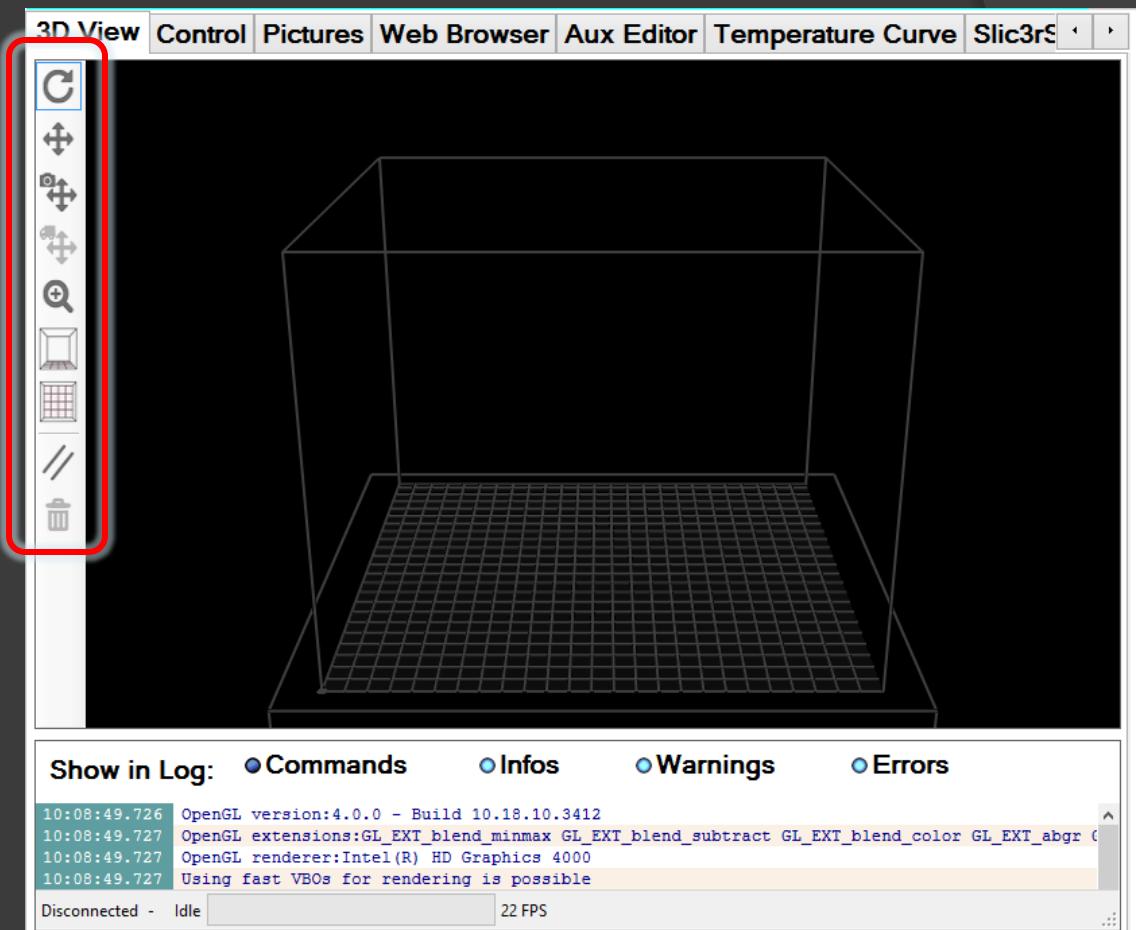
Provides a graphical simulation of the user’s parts



Walkthrough of REPETREL

“3D View” tab
Control Buttons

-  Rotate
-  Move Viewpoint (Pan)
-  Move Camera
-  Move Object (X & Y)
-  Zoom
-  Reset / Front View
-  Top View
-  Parallel Projection
-  Clear All



Walkthrough of REPETREL

“3D View” tab
Log Filters

Commands

Displays commands passed to the ARM processor in the printer

Infos

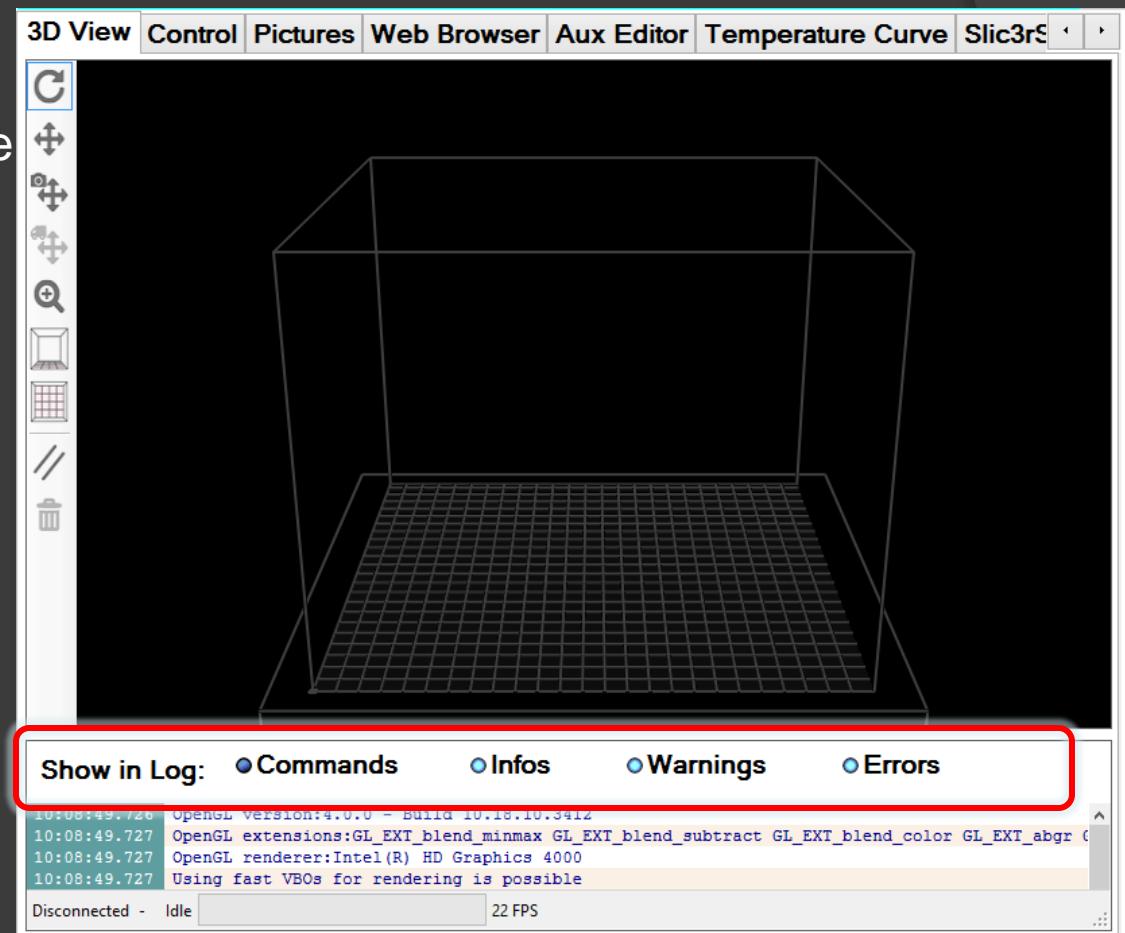
Displays information/text messages to/from the printer

Warnings

Displays warning messages to/from the printer

Errors

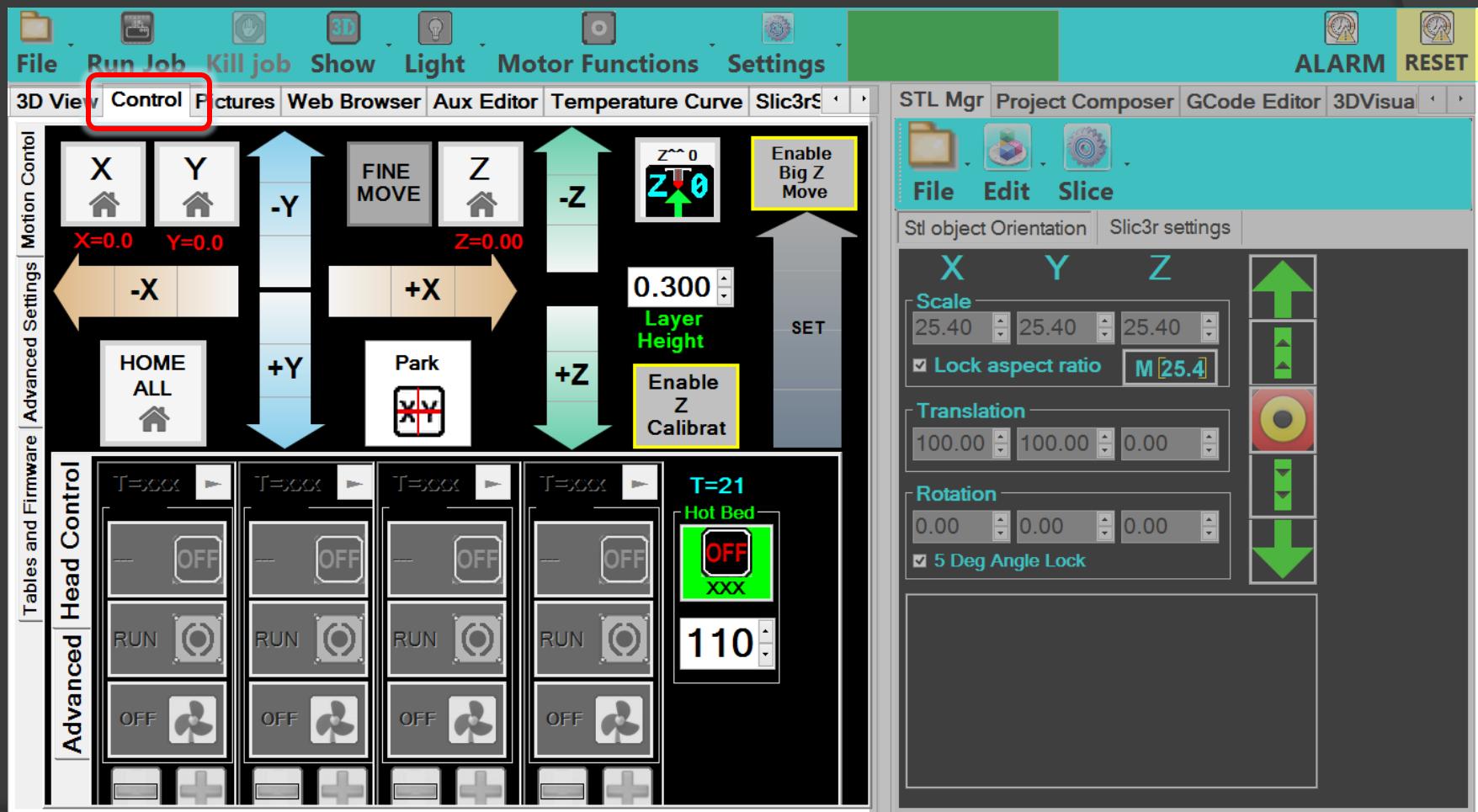
Displays errors messages to/from the printer



Walkthrough of REPETREL

“Control” tab

Provides manual movement, head, & bed calibration and controls



Walkthrough of REPETREL

“Control” tab

Most Used Buttons



Sends X & Y Axis
to Home Position

Home = X0, Y0

Does not move Z-Axis

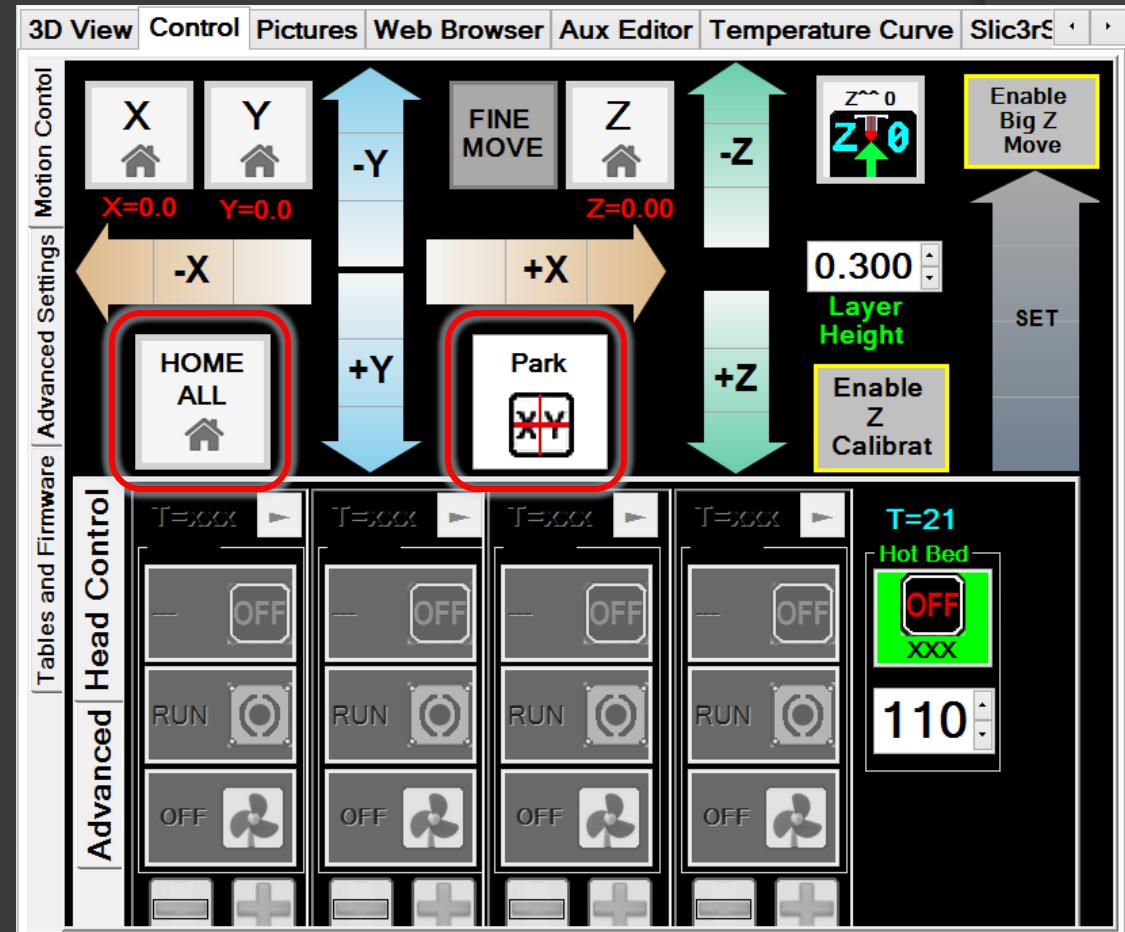


Sends X & Y Axis
to Park Position

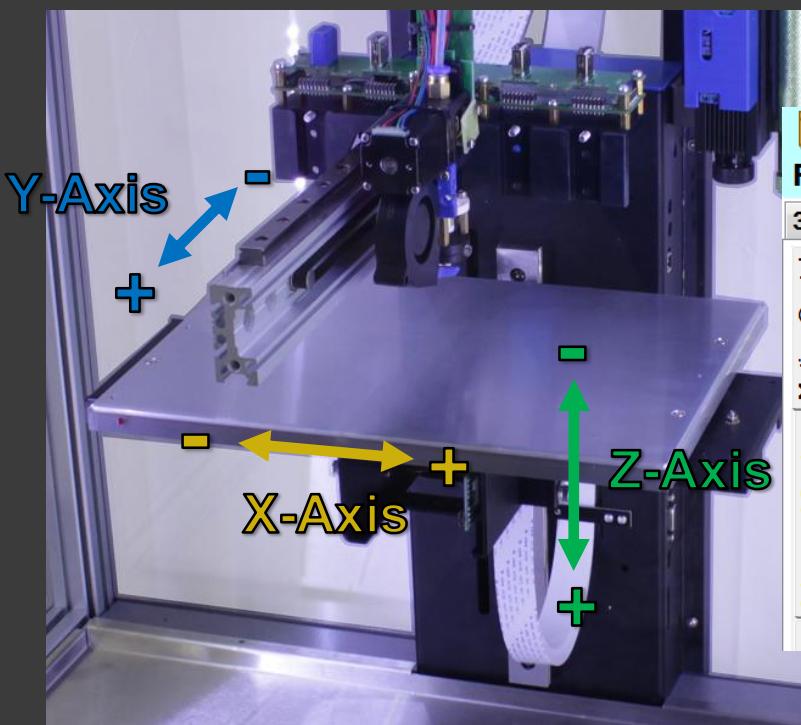
Park = X130, Y130

Does not move Z-Axis

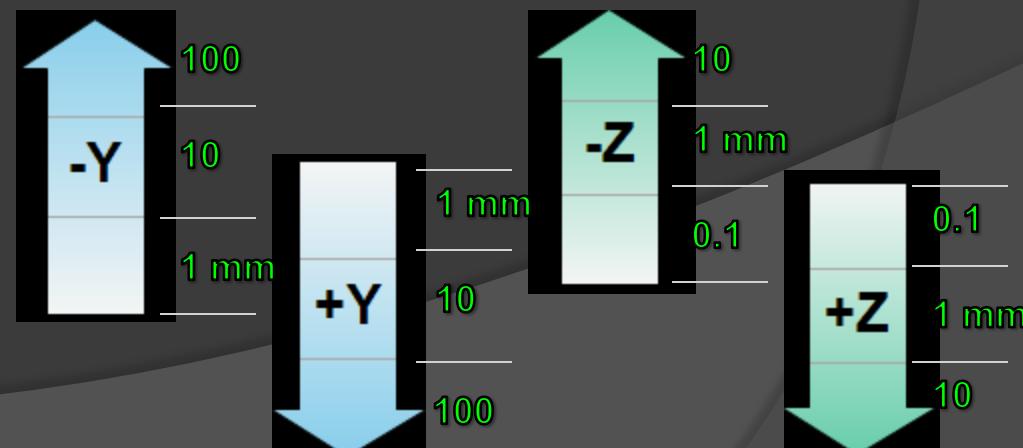
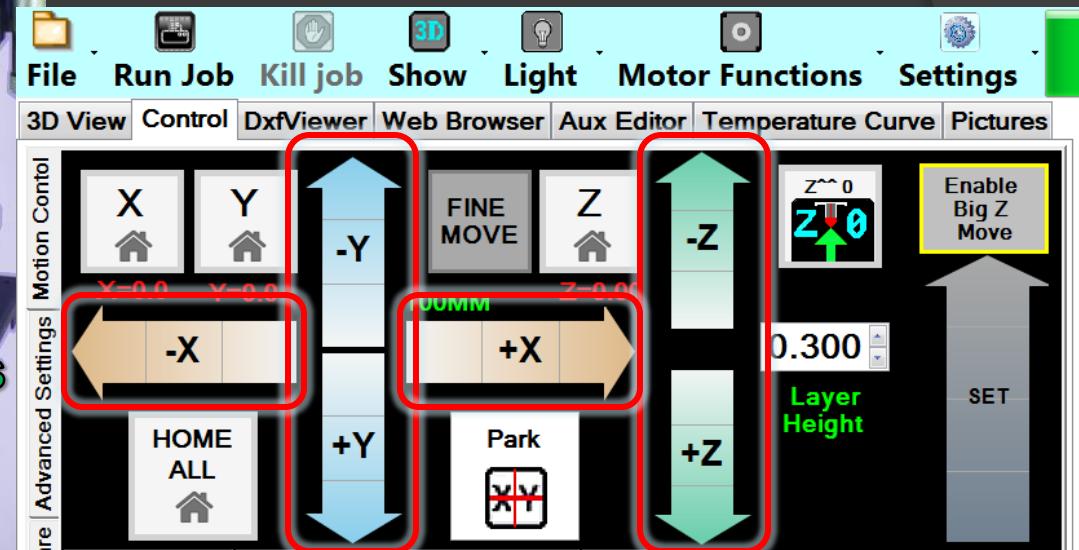
NOTE: Both the Home & Park
X&Y Axis values can be
changed in the
“Printer Settings”



Walkthrough of REPETREL



“Control” tab
Manual Move Arrows



Walkthrough of REPETREL

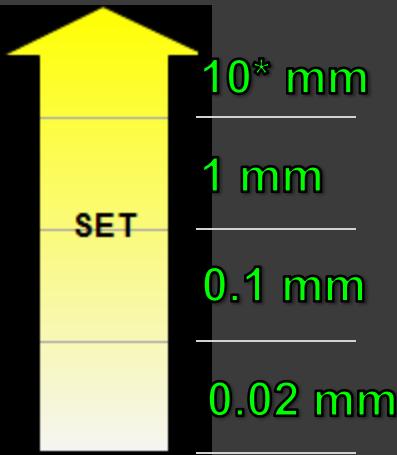
“Control” tab

Setting the Z-Height Buttons, Part 1 of 2



Off

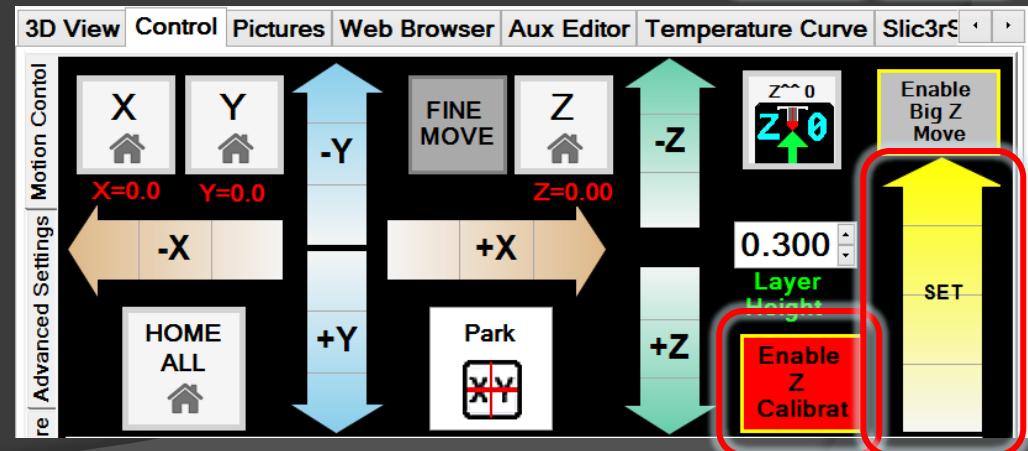
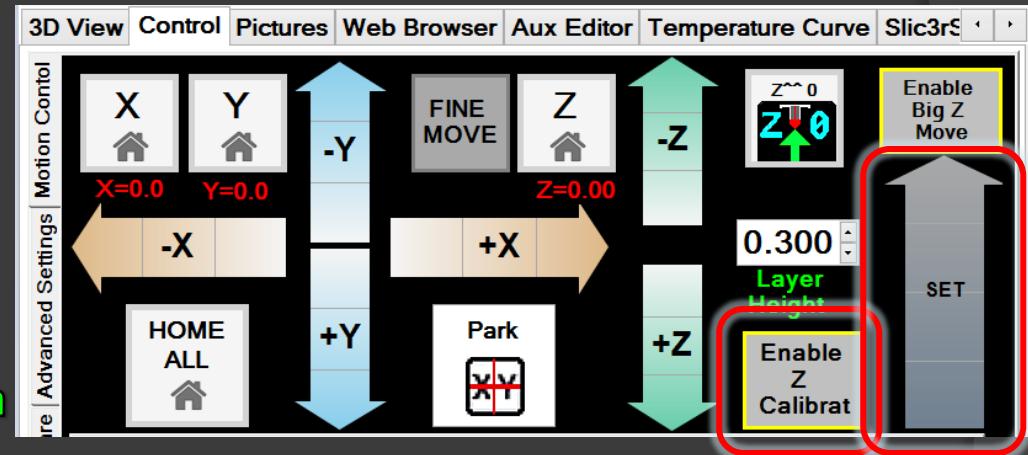
Enable
Z
Calibrat



On

Enable
Z
Calibrat

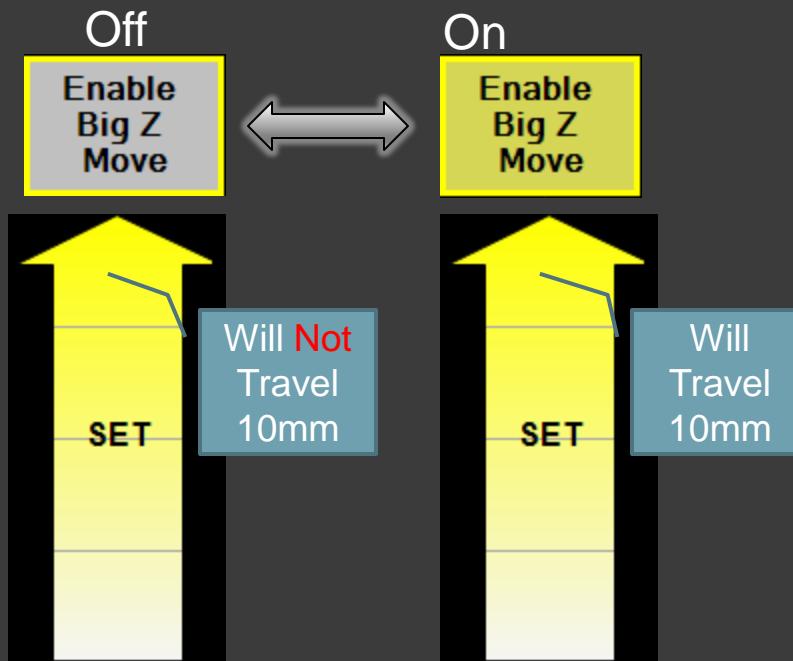
* 10mm moves only possible
when “Enable Big Z Move” is On
More information on next slide



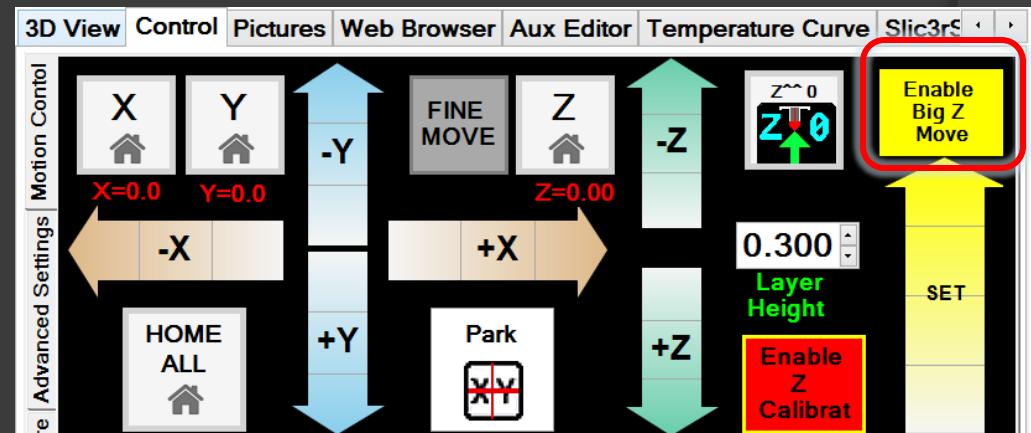
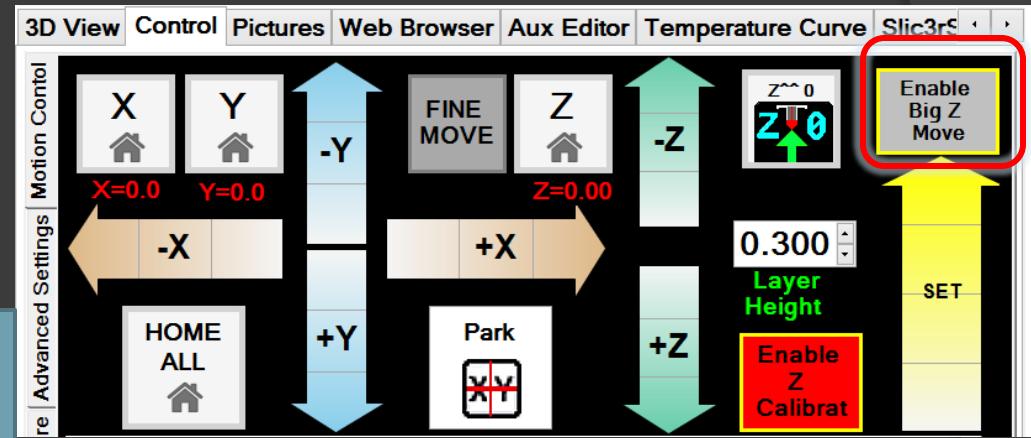
Walkthrough of REPETREL

“Control” tab

Setting the Z-Height Buttons, Part 2 of 2



Every time you use the 10mm move, the Enable Big-Z Move *turns off*. We purposely coded this in to prevent head crashes from “Spamming” top arrow button.



Walkthrough of REPETREL

“Control” tab

Setting the Z-Height Buttons, Part 2 of 2



Sends X-Axis to the Home Position
Home = X0

Does not move Y or Z Axis

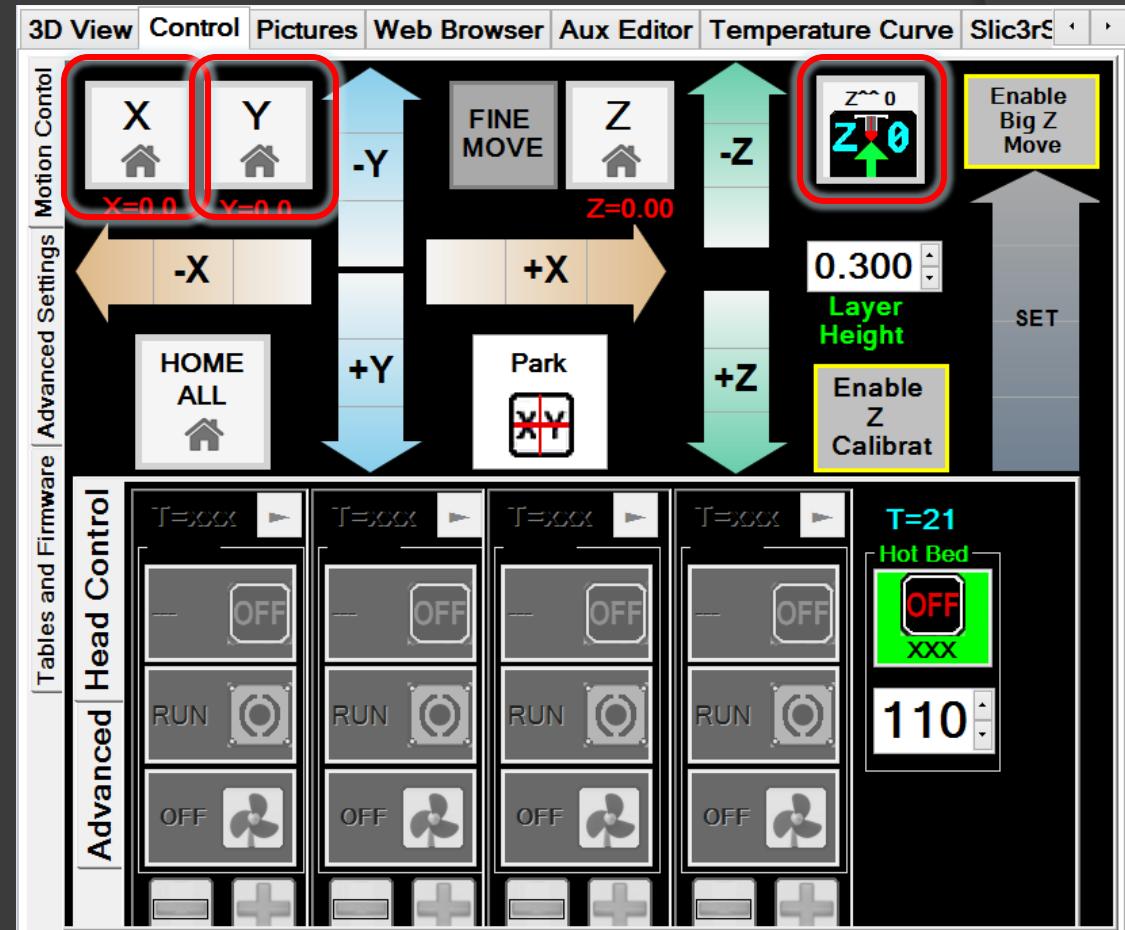


Sends Y-Axis to the Home Position
Home = Y0

Does not move X or Z Axis



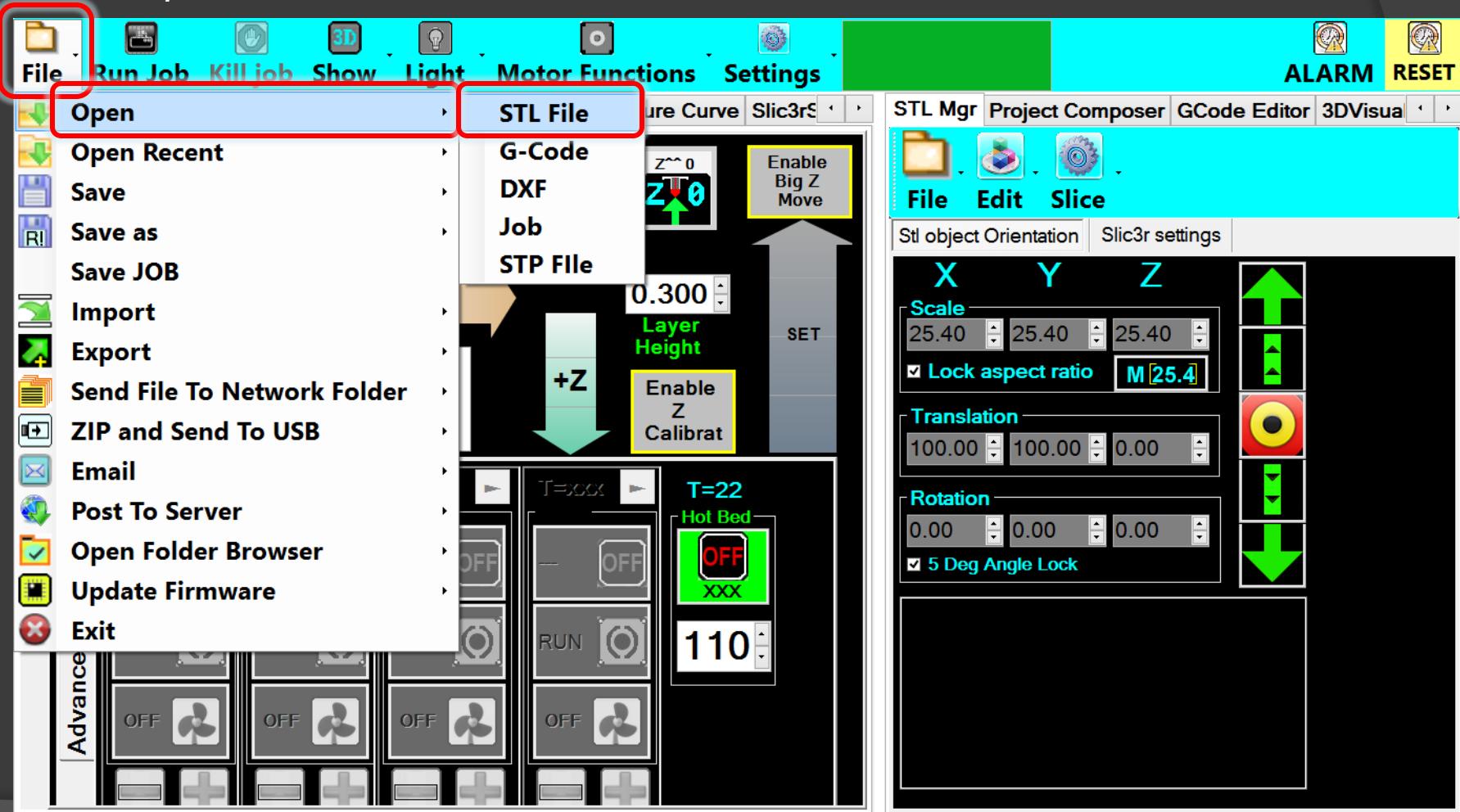
Sends Z-Axis to the last Height-Set Position
Home = Z0



First Print with Plasticine

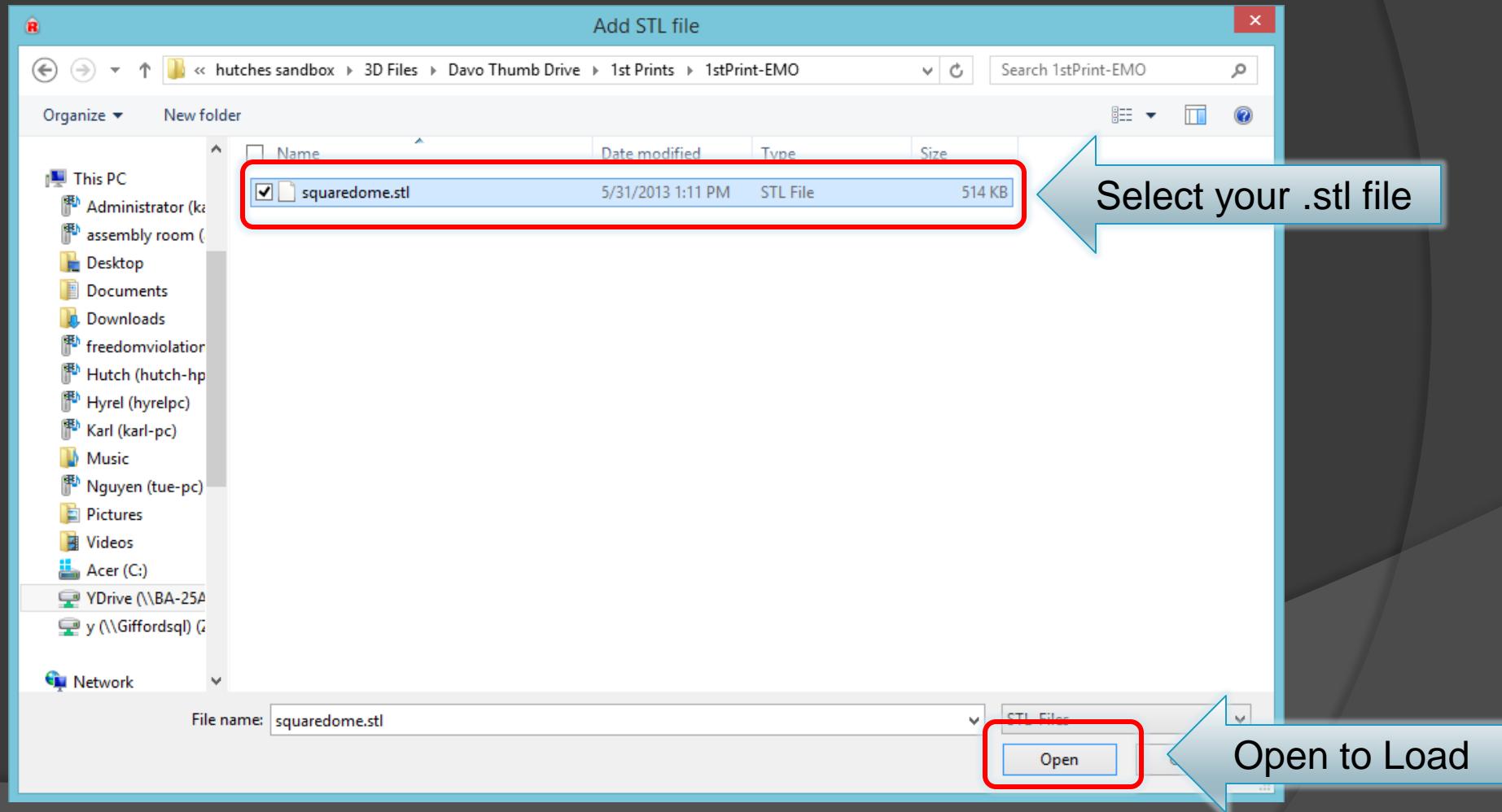
Ch1: Turn your .stl file into G-Code

Step 1: Load a .stl file



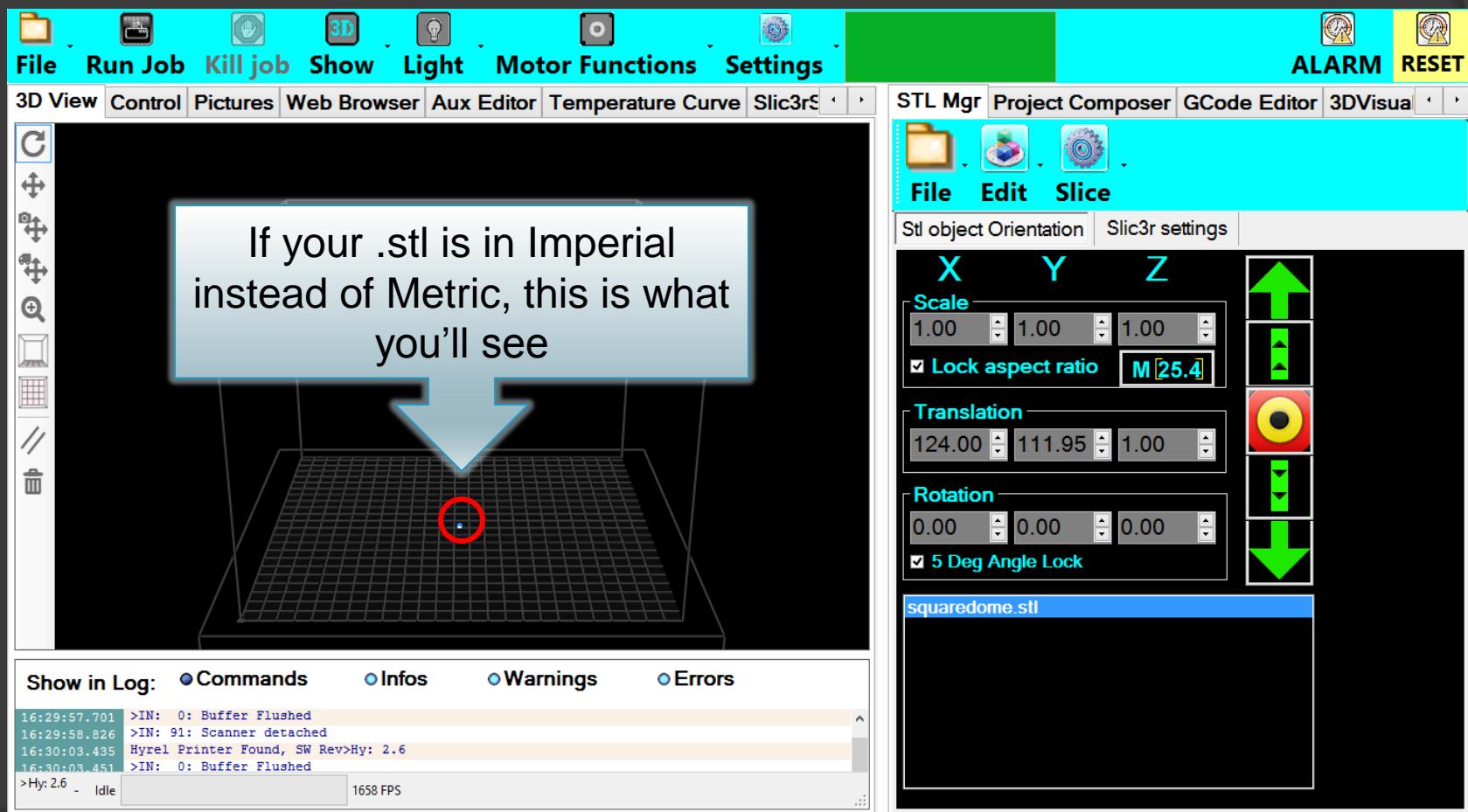
First Print with Plasticine

Ch1: Turn your .stl file into G-Code
Step 1: Load a .stl file



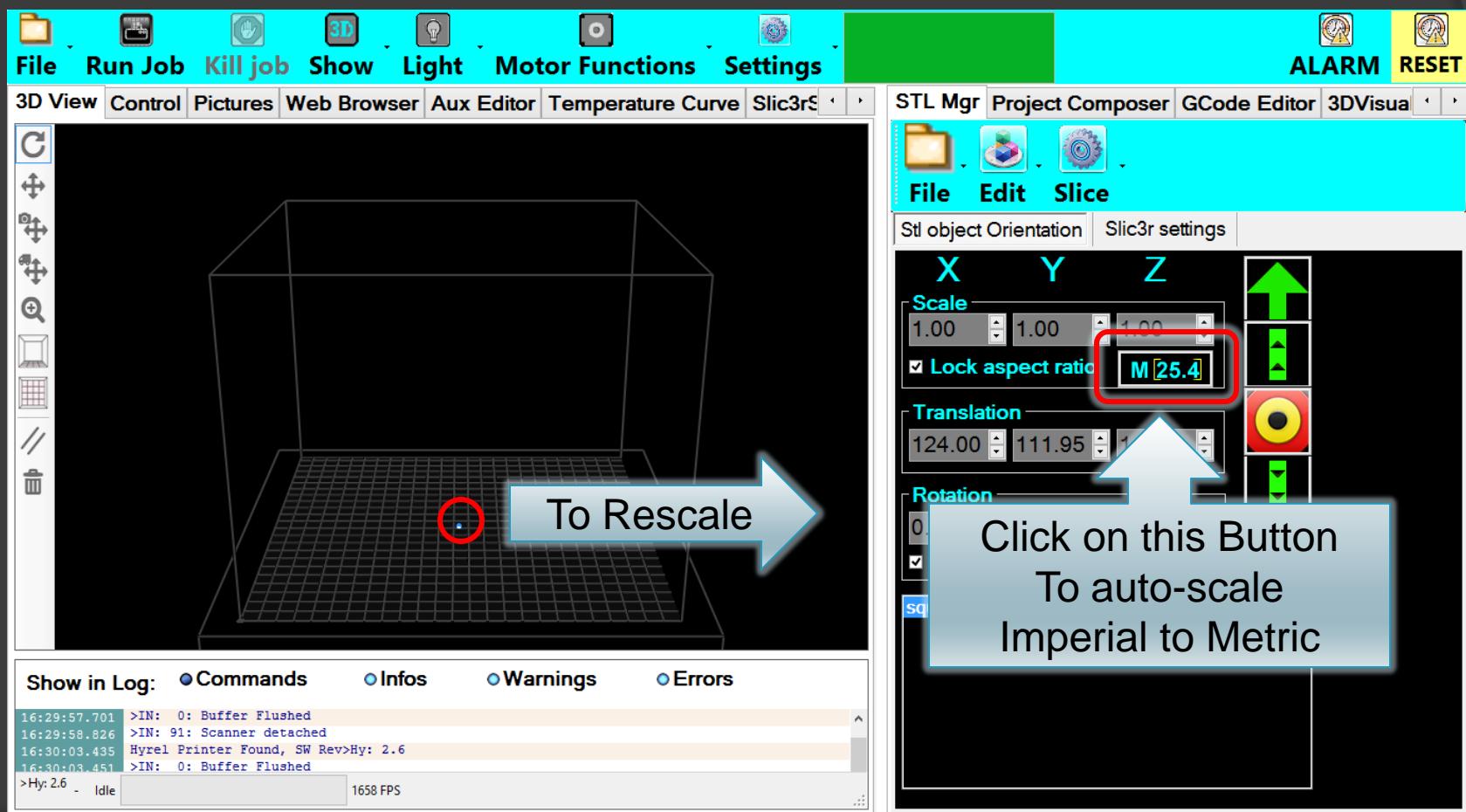
First Print with Plasticine

Ch1: Turn your .stl file into G-Code
Step 2: Scale, Rotate, & Translate



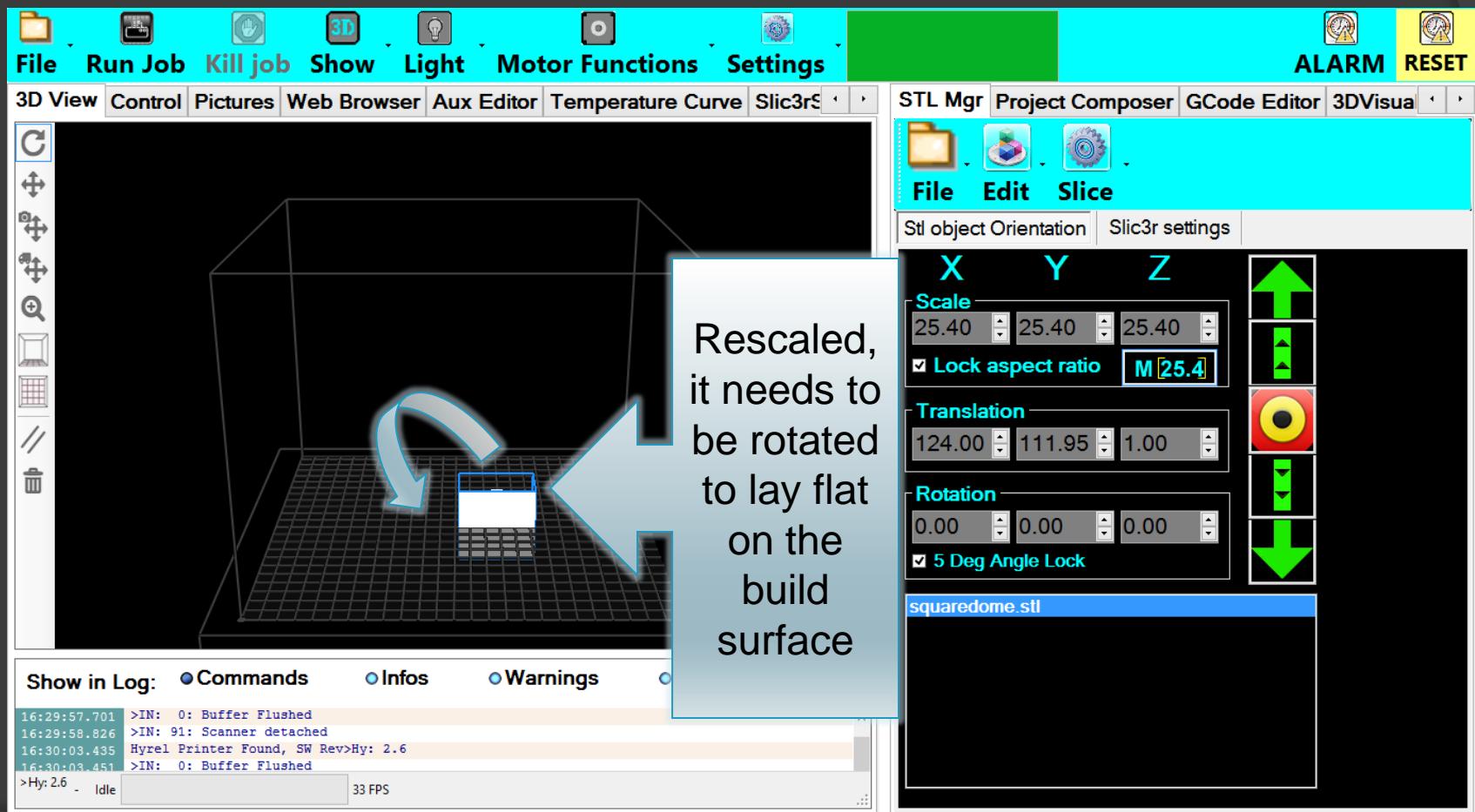
First Print with Plasticine

Ch1: Turn your .stl file into G-Code
Step 2: Scale, Rotate, & Translate



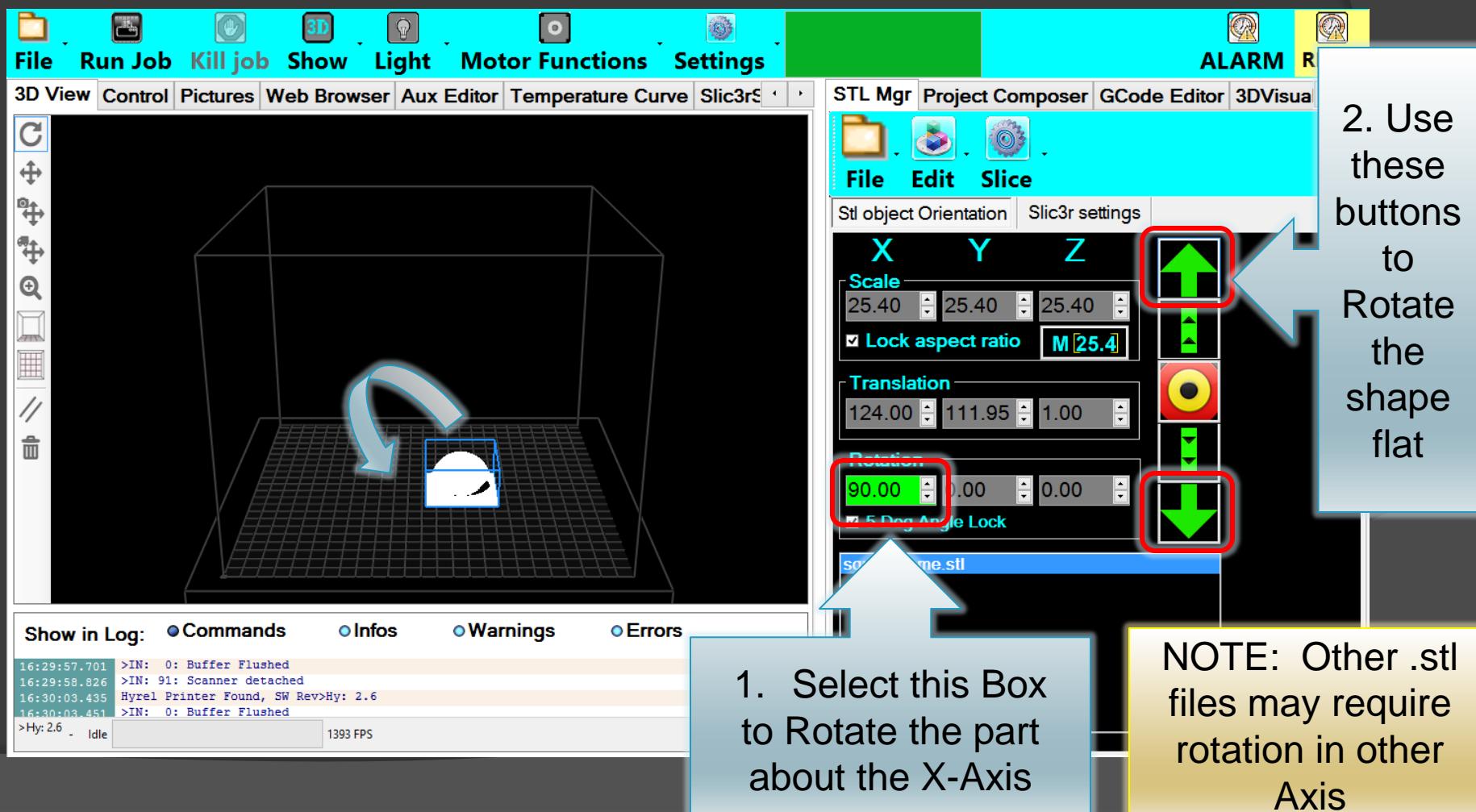
First Print with Plasticine

Ch1: Turn your .stl file into G-Code
Step 2: Scale, Rotate, & Translate



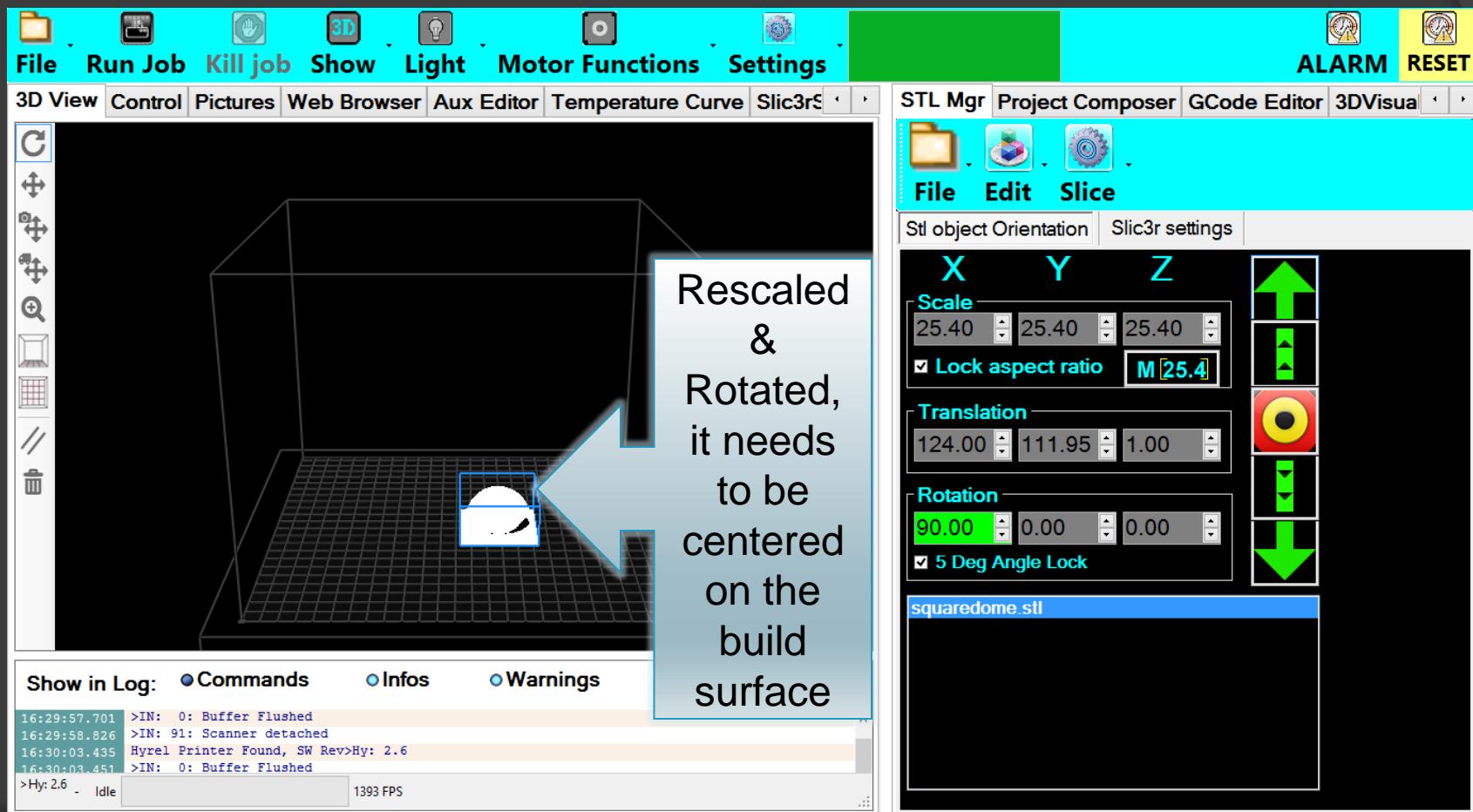
First Print with Plasticine

Ch1: Turn your .stl file into G-Code
Step 2: Scale, Rotate, & Translate



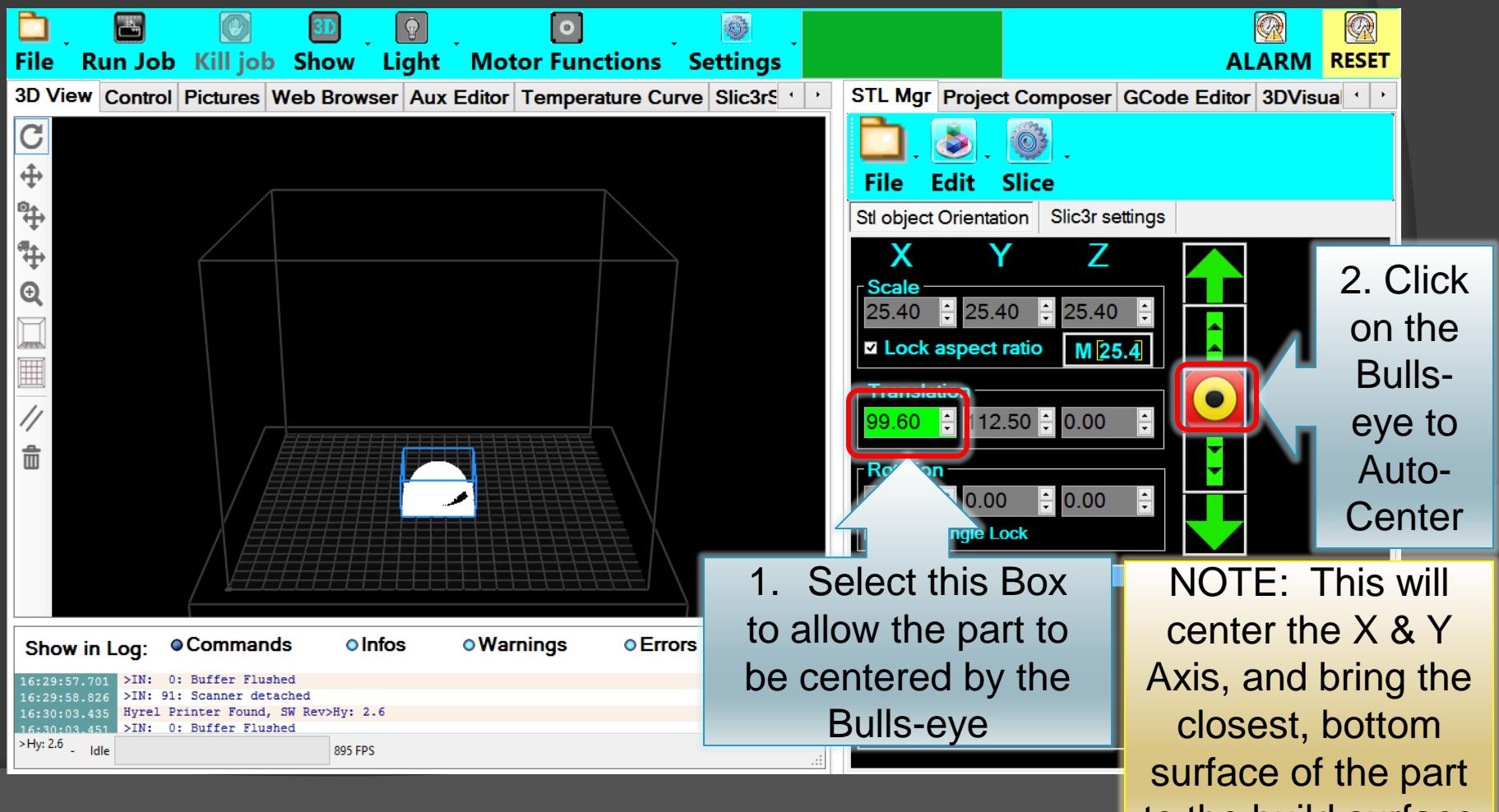
First Print with Plasticine

Ch1: Turn your .stl file into G-Code
Step 2: Scale, Rotate, & Translate



First Print with Plasticine

Ch1: Turn your .stl file into G-Code
Step 2: Scale, Rotate, & Translate



First Print with Plasticine

Ch1: Turn your .stl file into G-Code

Step 3: Check your EMO Nozzle Diameter Size

2 mm

1.5 mm

1 mm

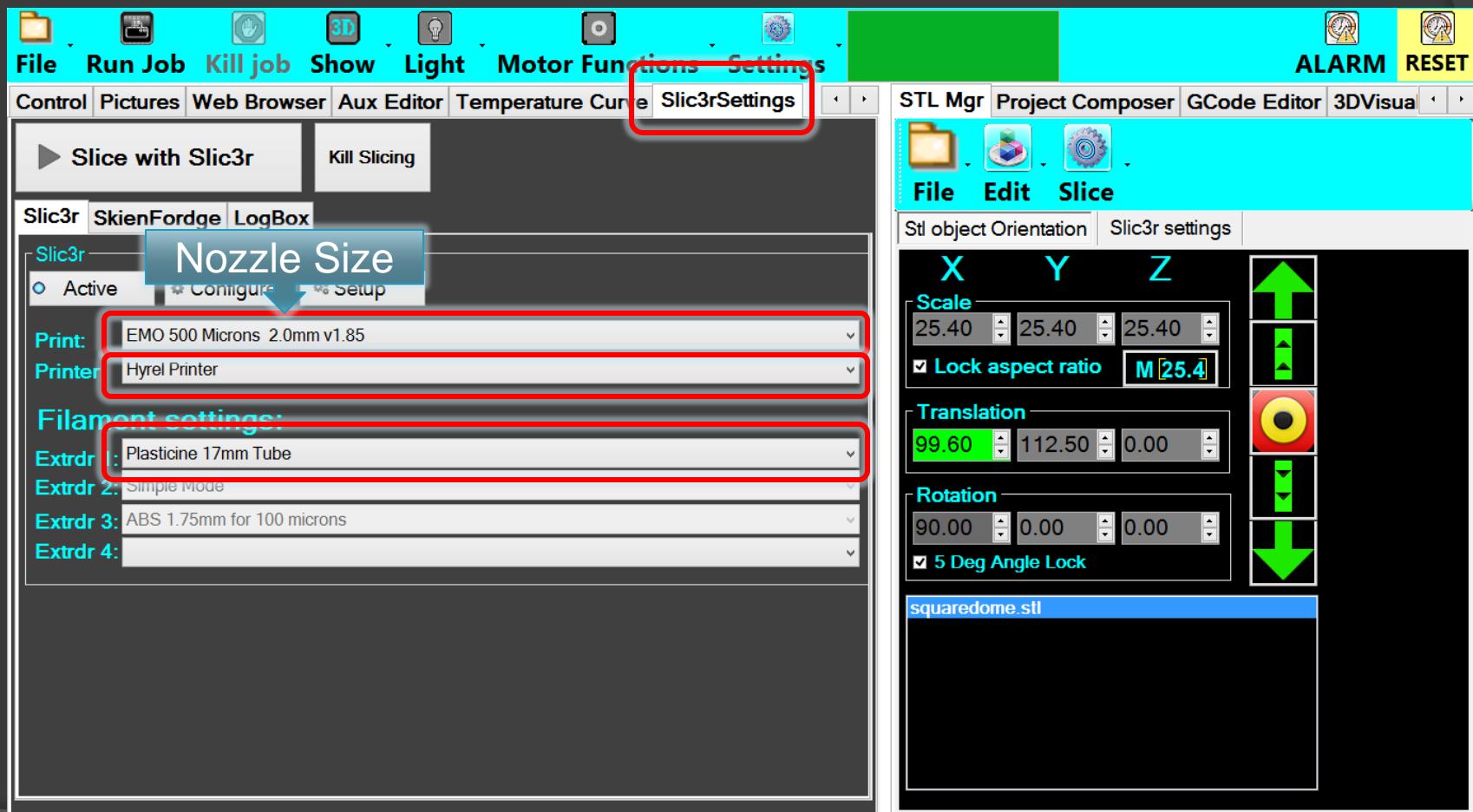


For the rest of this documentation,
we will be using the 2 mm nozzle

First Print with Plasticine

Ch1: Turn your .stl file into G-Code

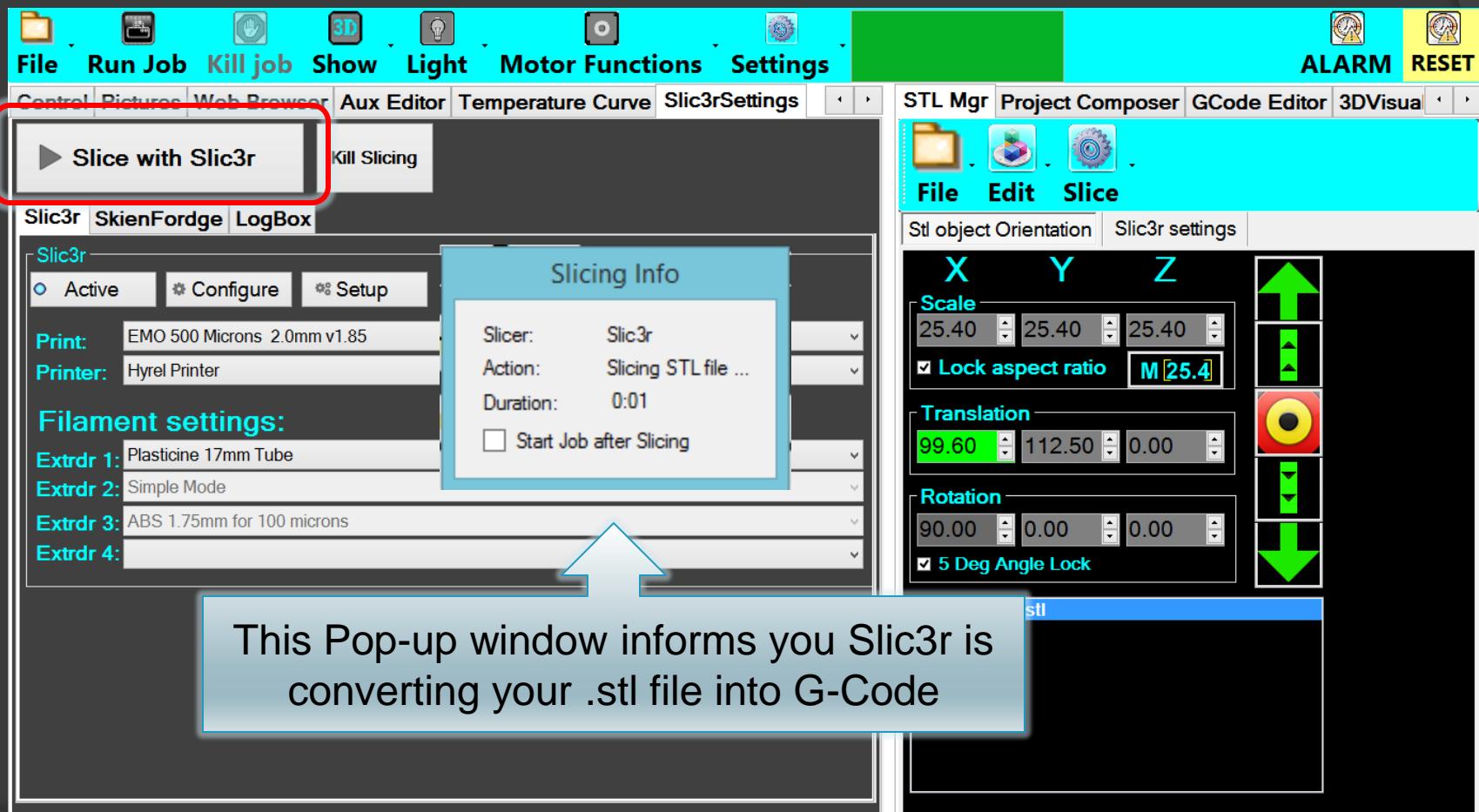
Step 4: Select the appropriate Slic3r Recipes



First Print with Plasticine

Ch1: Turn your .stl file into G-Code

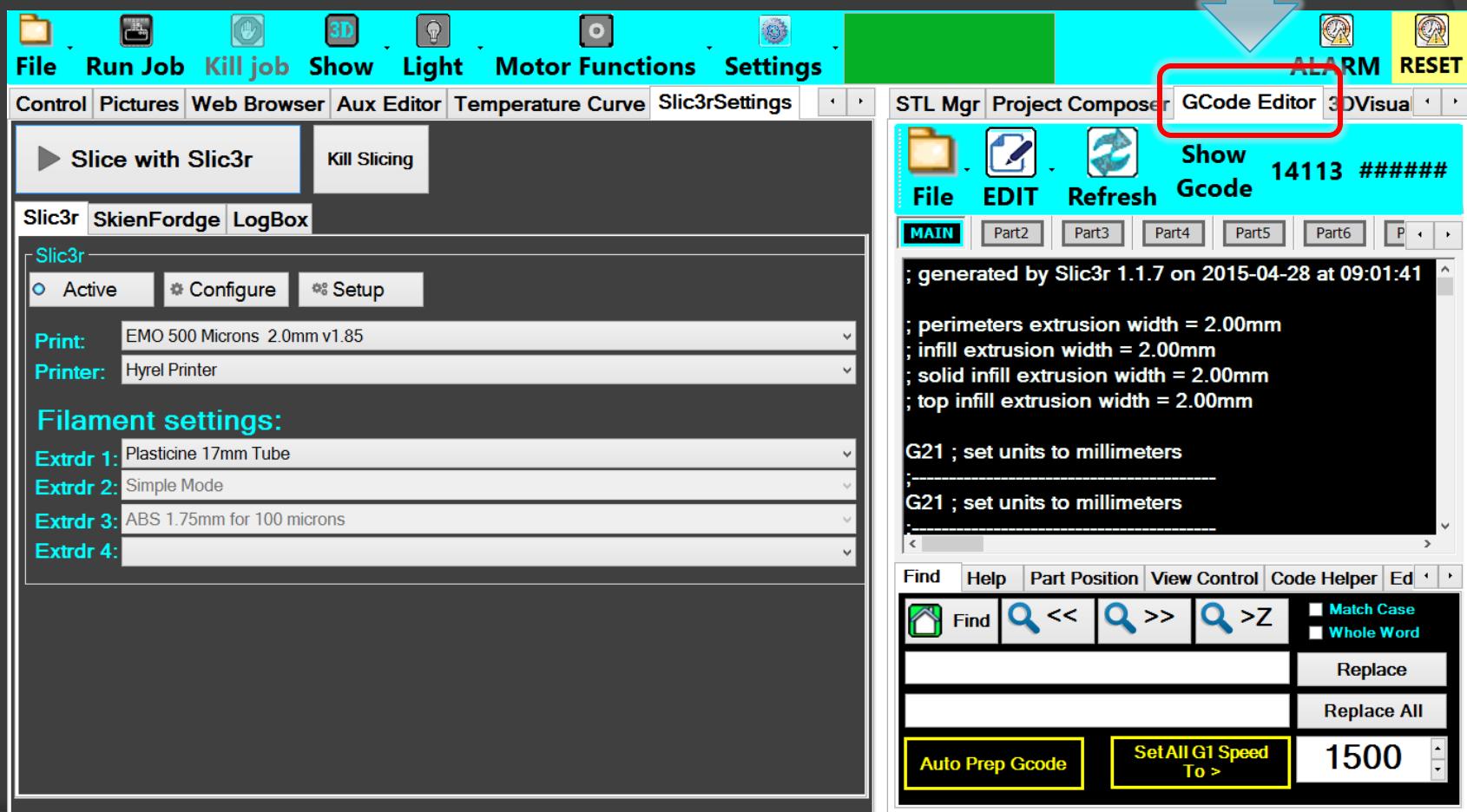
Step 5: Slice – *NOTE: This can be a long process*



First Print with Plasticine

Ch1: Turn your .stl file into G-Code
Step 6: G-Code ready to print

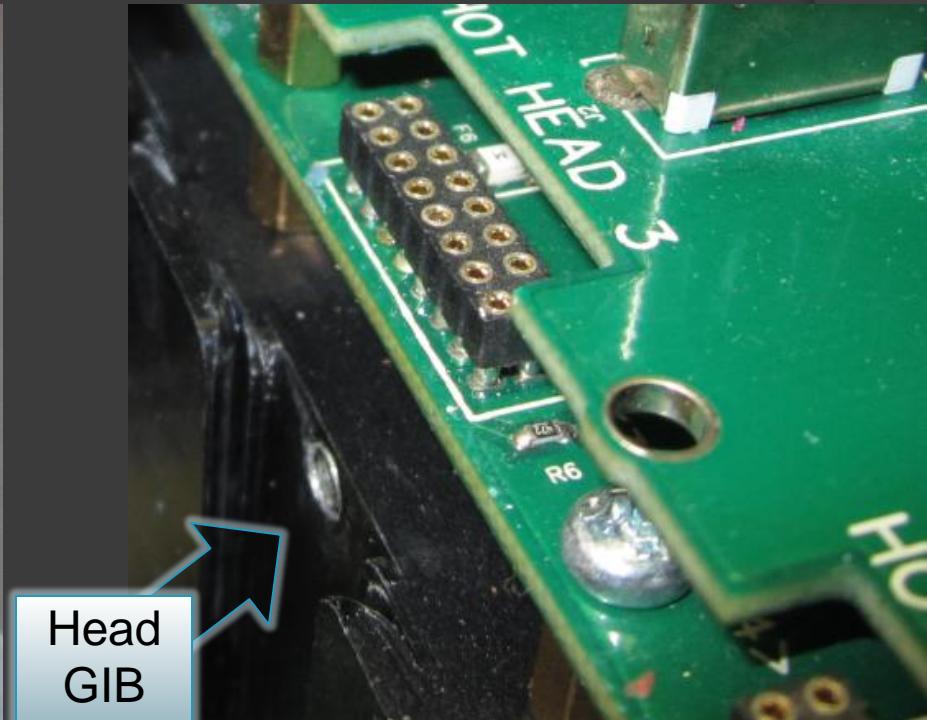
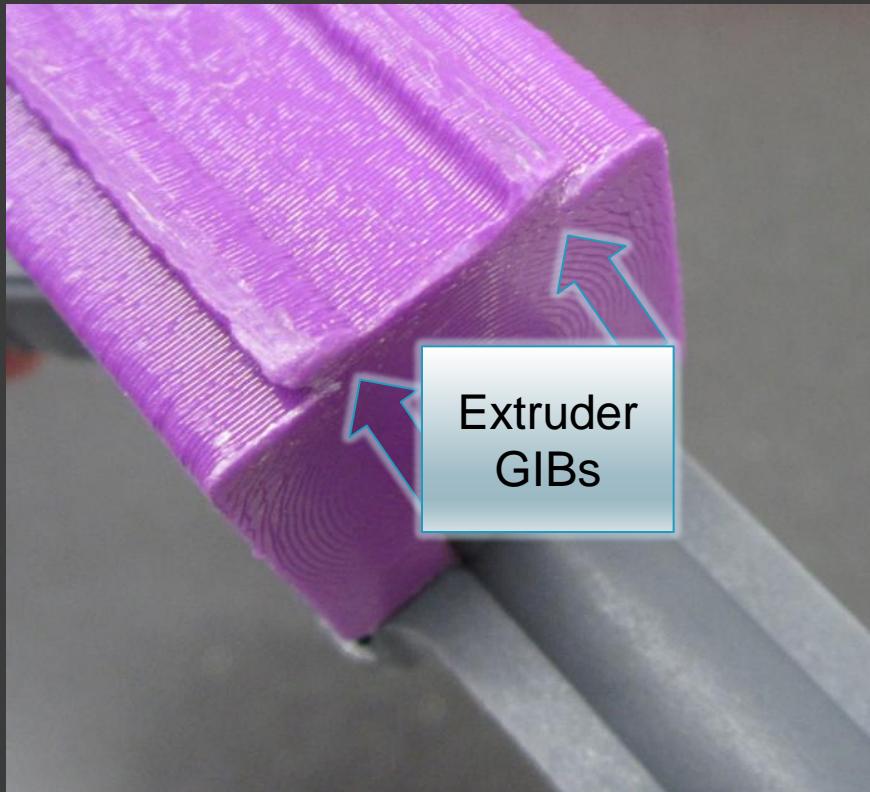
Gcode Editor tab automatically opens when slicing is complete



First Print with Plasticine

Ch2: Prep Printer for Printing

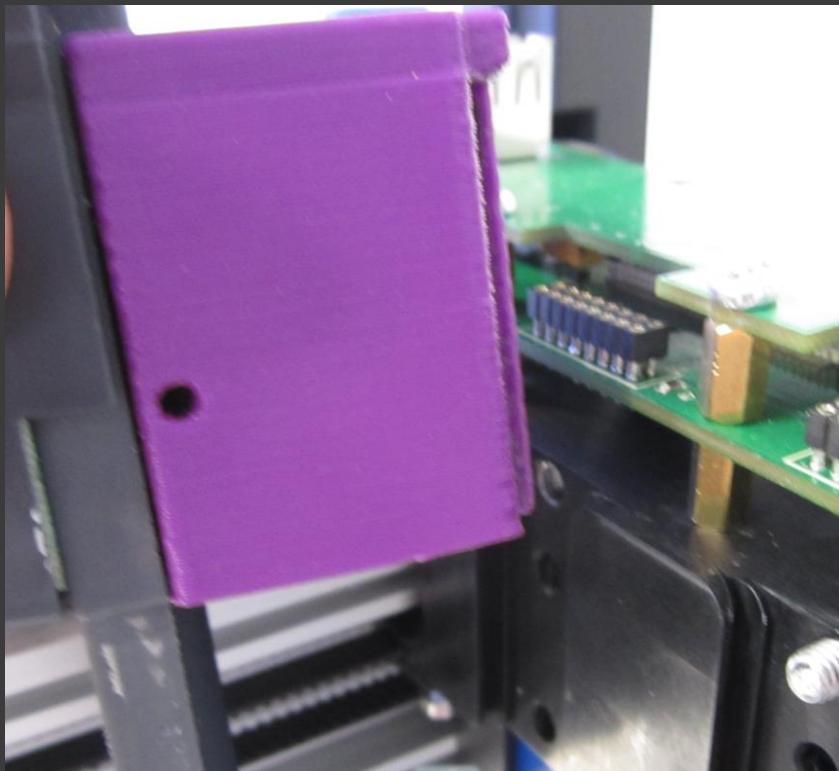
Step 1: *Tram – Install Digi-tram*



First Print with Plasticine

Ch2: Prep Printer for Printing

Step 1: *Tram – Install Digi-tram*



First Print with Plasticine

Ch2: Prep Printer for Printing

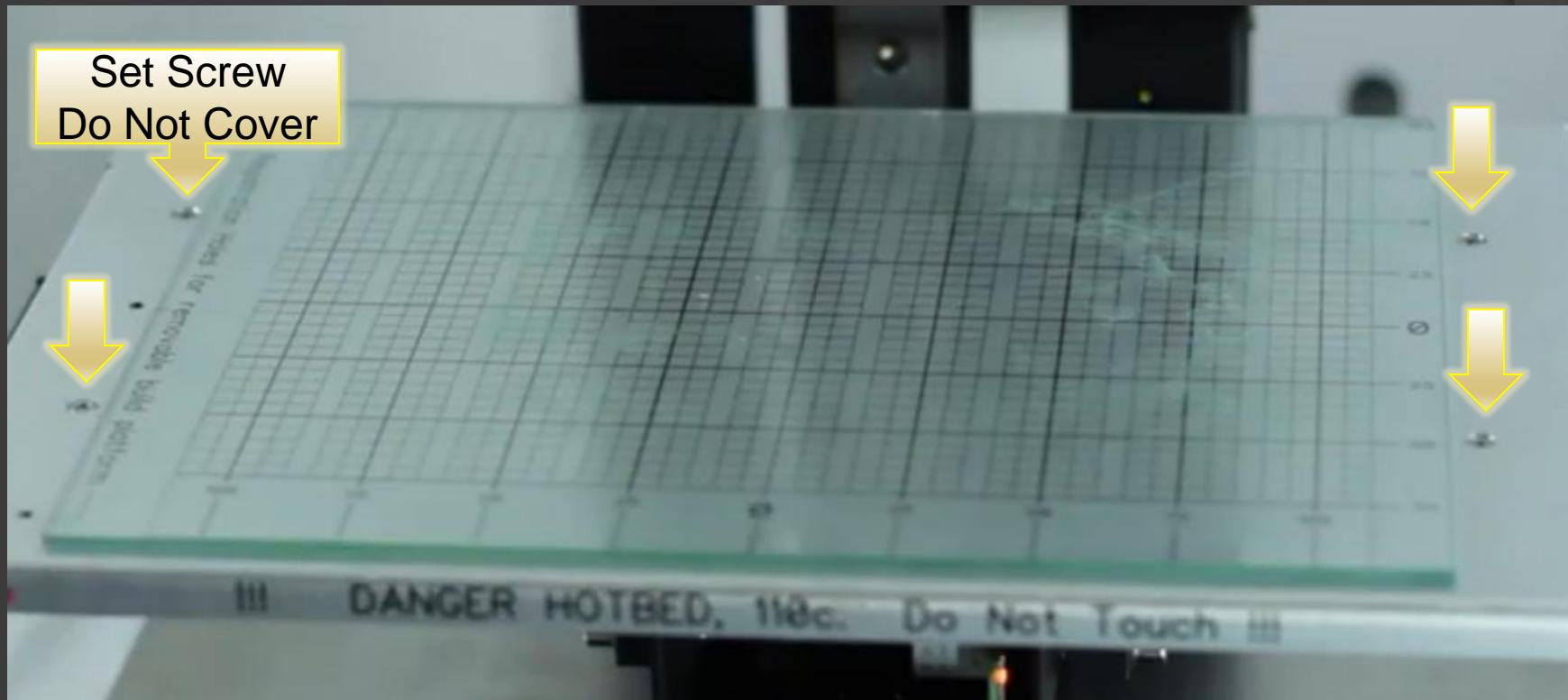
Step 1: Tram – Install Digi-tram



First Print with Plasticine

Ch2: Prep Printer for Printing

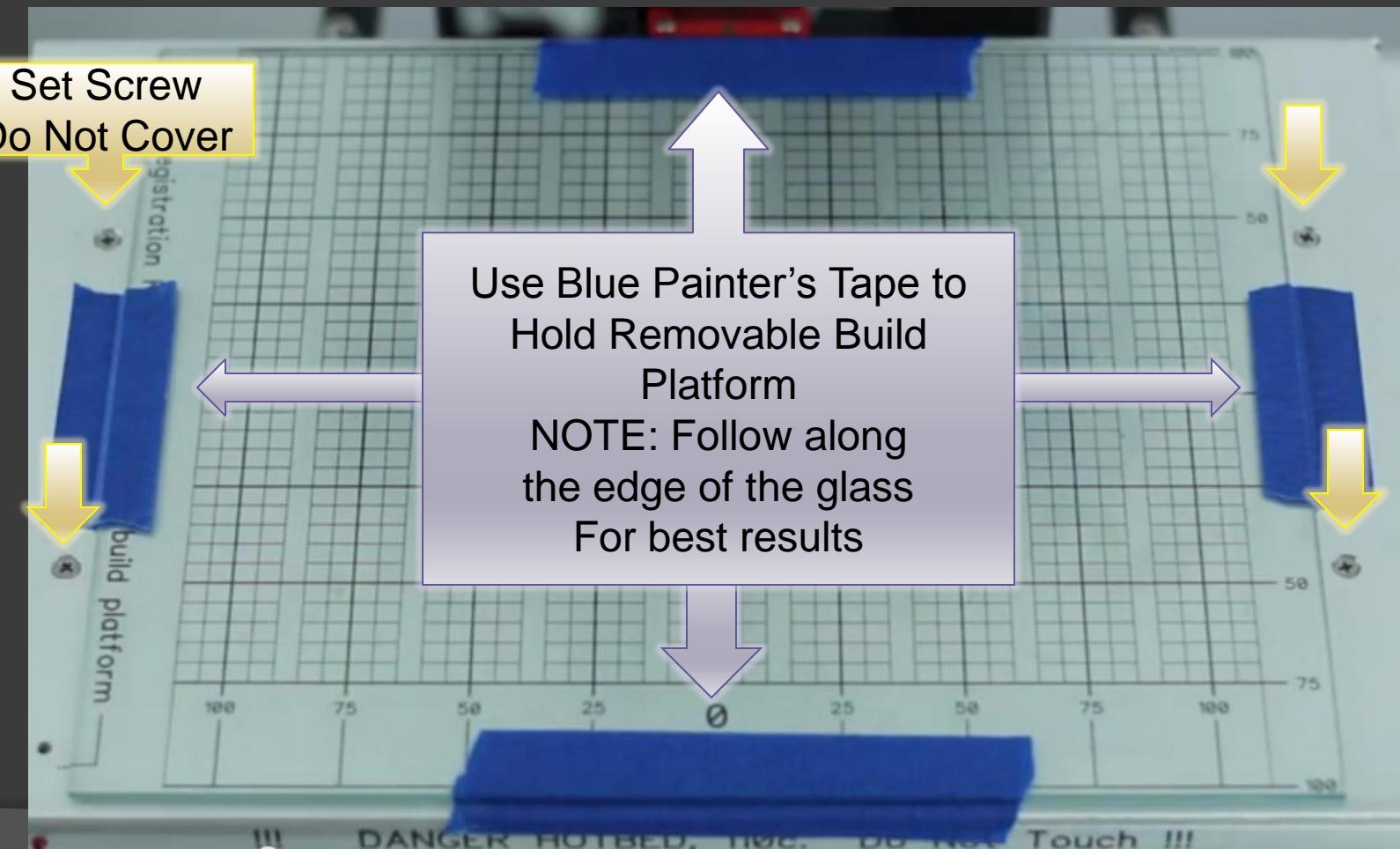
Step 1: Tram – Place Removable Build Platform



First Print with Plasticine

Ch2: Prep Printer for Printing

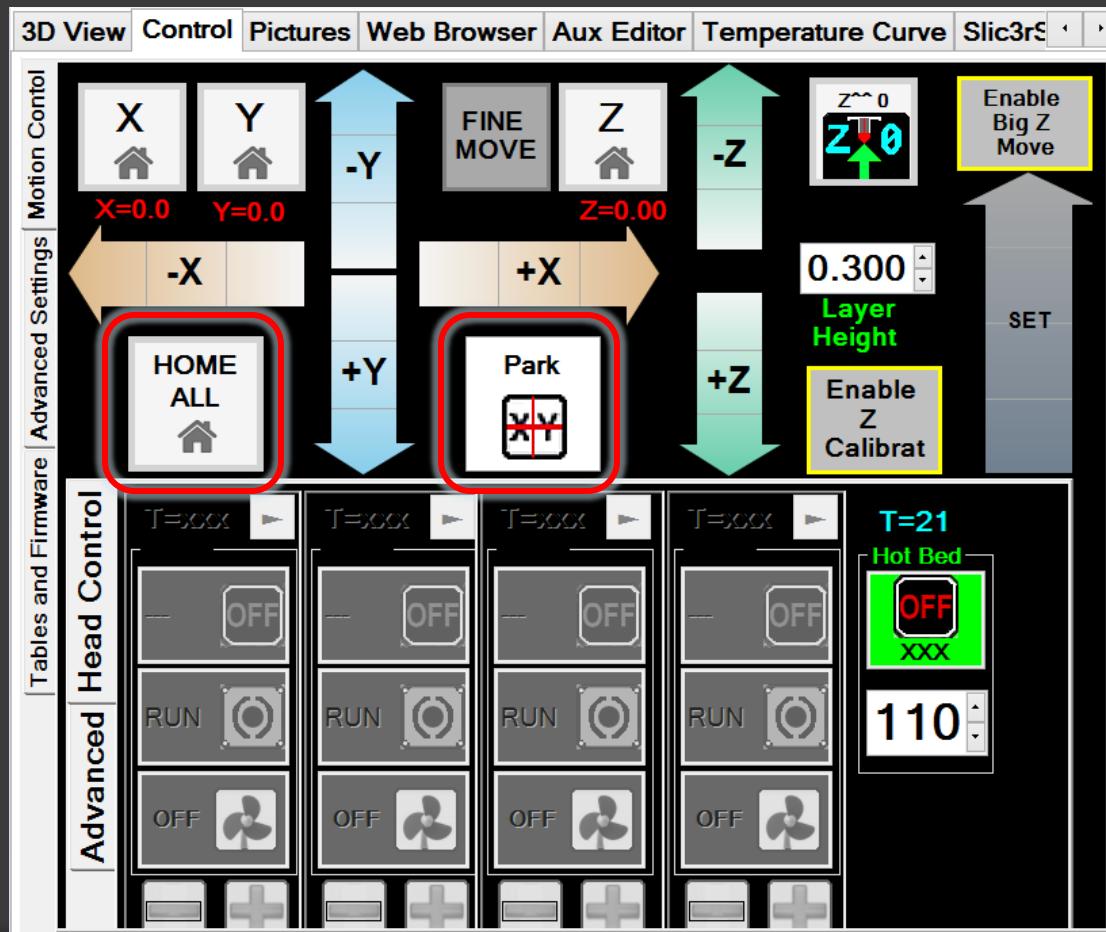
Step 1: Tram – Place Removable Build Platform



First Print with Plasticine

Ch2: Prep Printer for Printing

Step 1: *Tram – Home, then Park*

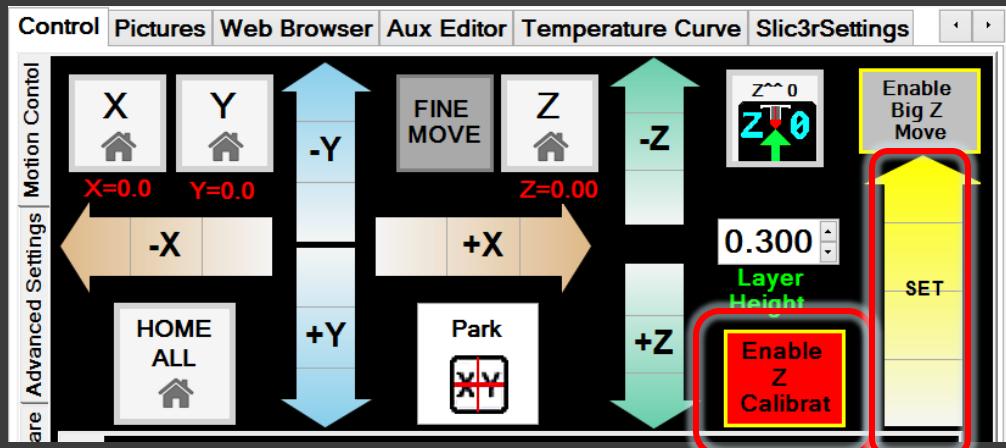


This will place the Digi-tram over the center of the build platform

First Print with Plasticine

Ch2: Prep Printer for Printing

Step 1: Tram – Setting the Zero



Elevate the build platform just pass the point the pin of the Digi-tram touches.

The Digi-tram will register the distance the pin was displaced.



First Print with Plasticine

Ch2: Prep Printer for Printing

Step 1: Tram – Setting the Zero

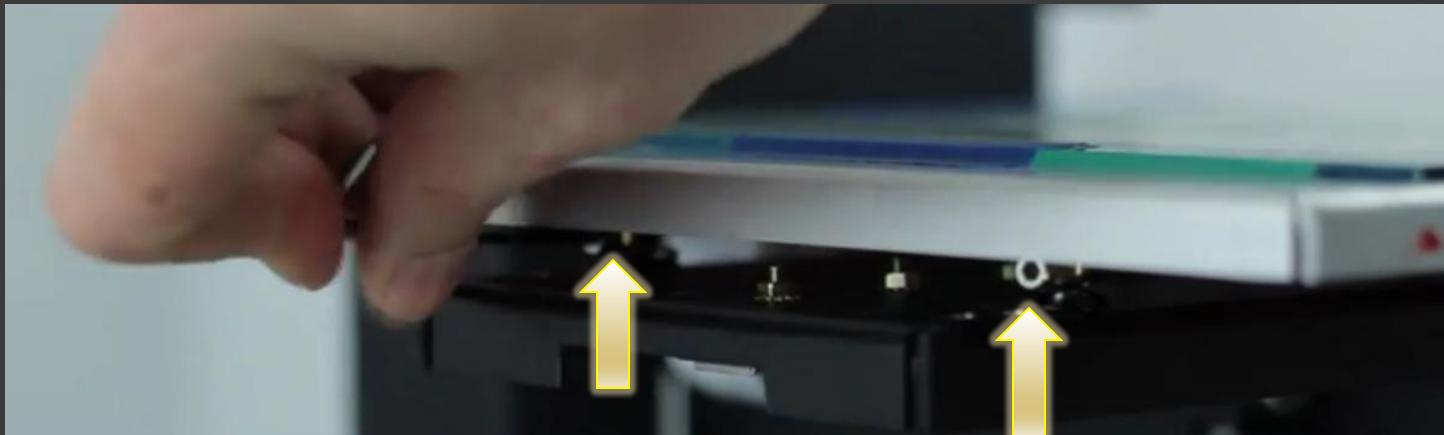


Press the “Zero” button to set this point to zero

First Print with Plasticine

Ch2: Prep Printer for Printing

Step 1: Tram – Unlock the Four (4) Lock Screws



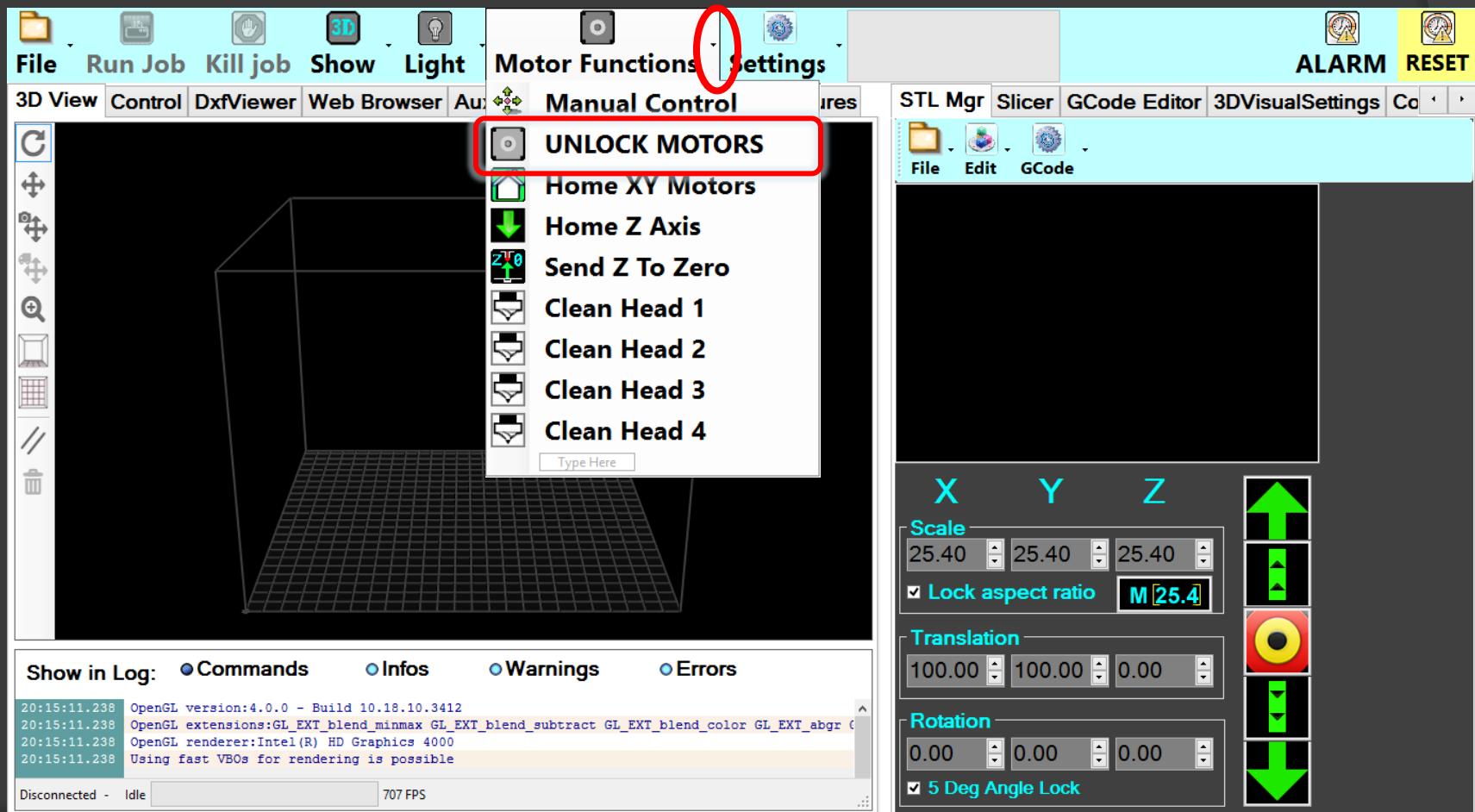
Included in your kit, use the 2.5mm Allen wrench to unlock the four (4) lock screws under the build platform



First Print with Plasticine

Ch2: Prep Printer for Printing

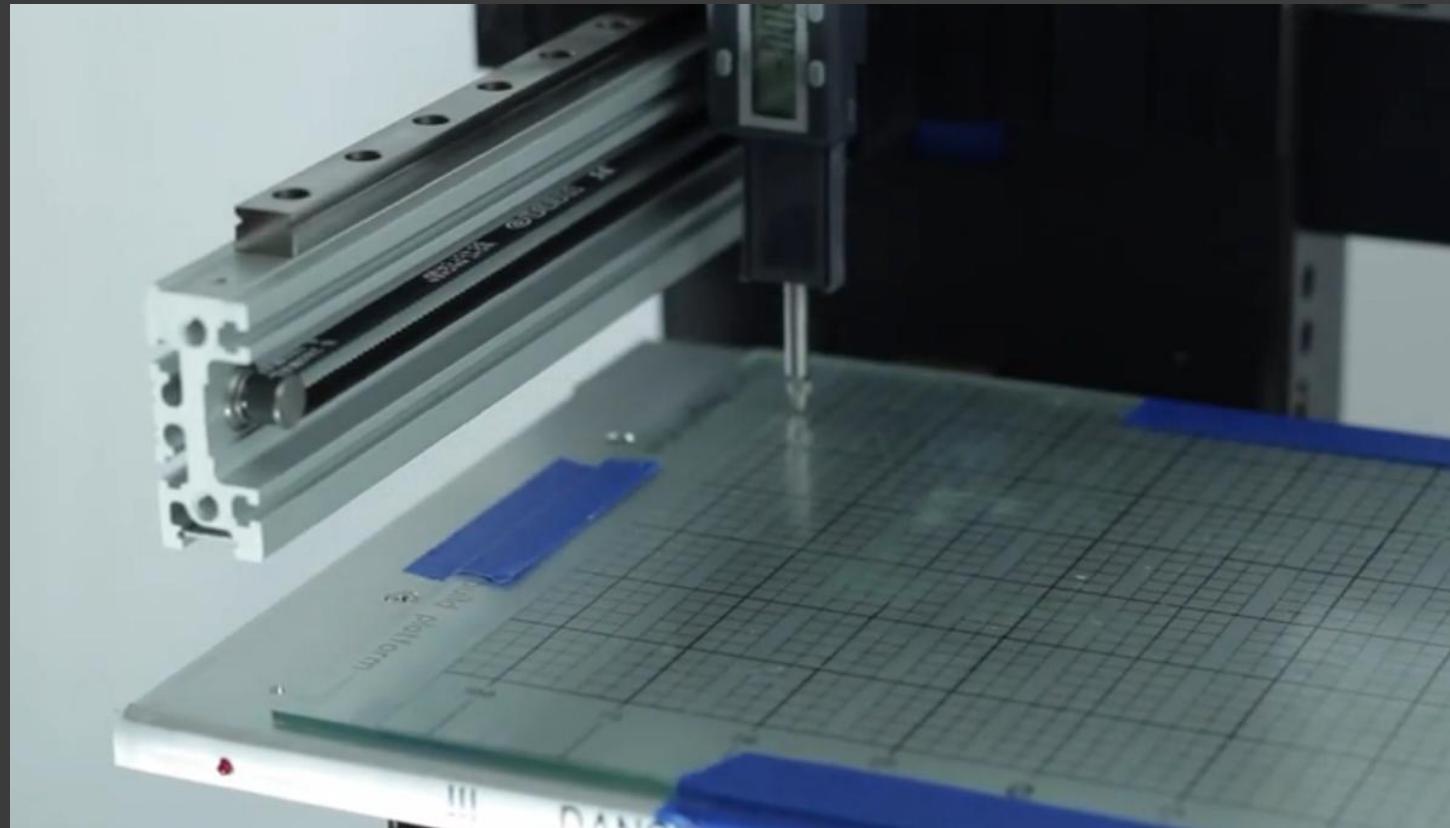
Step 1: Tram – Unlock your Motors



First Print with Plasticine

Ch2: Prep Printer for Printing

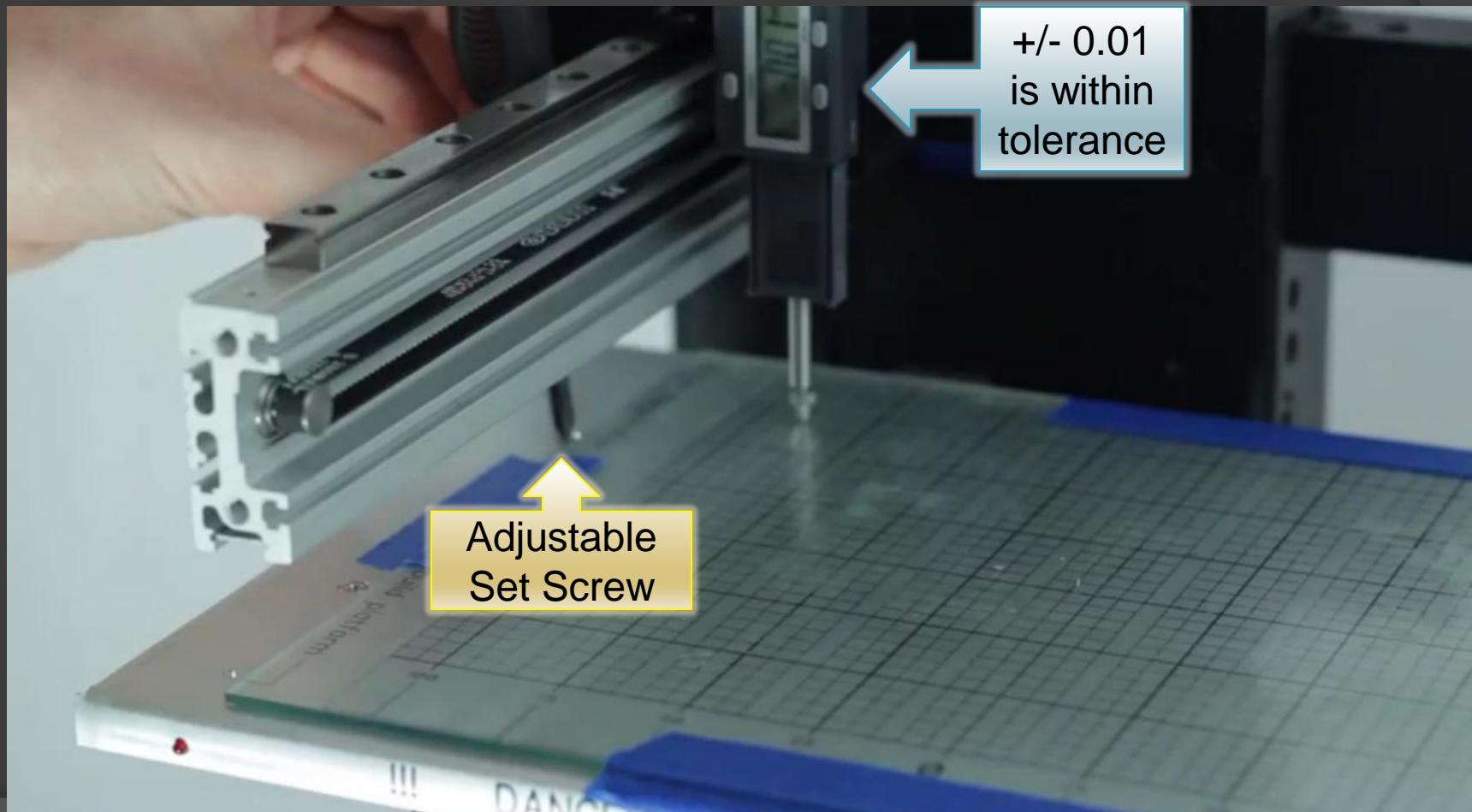
Step 1: Tram – Position Pin in first corner



First Print with Plasticine

Ch2: Prep Printer for Printing

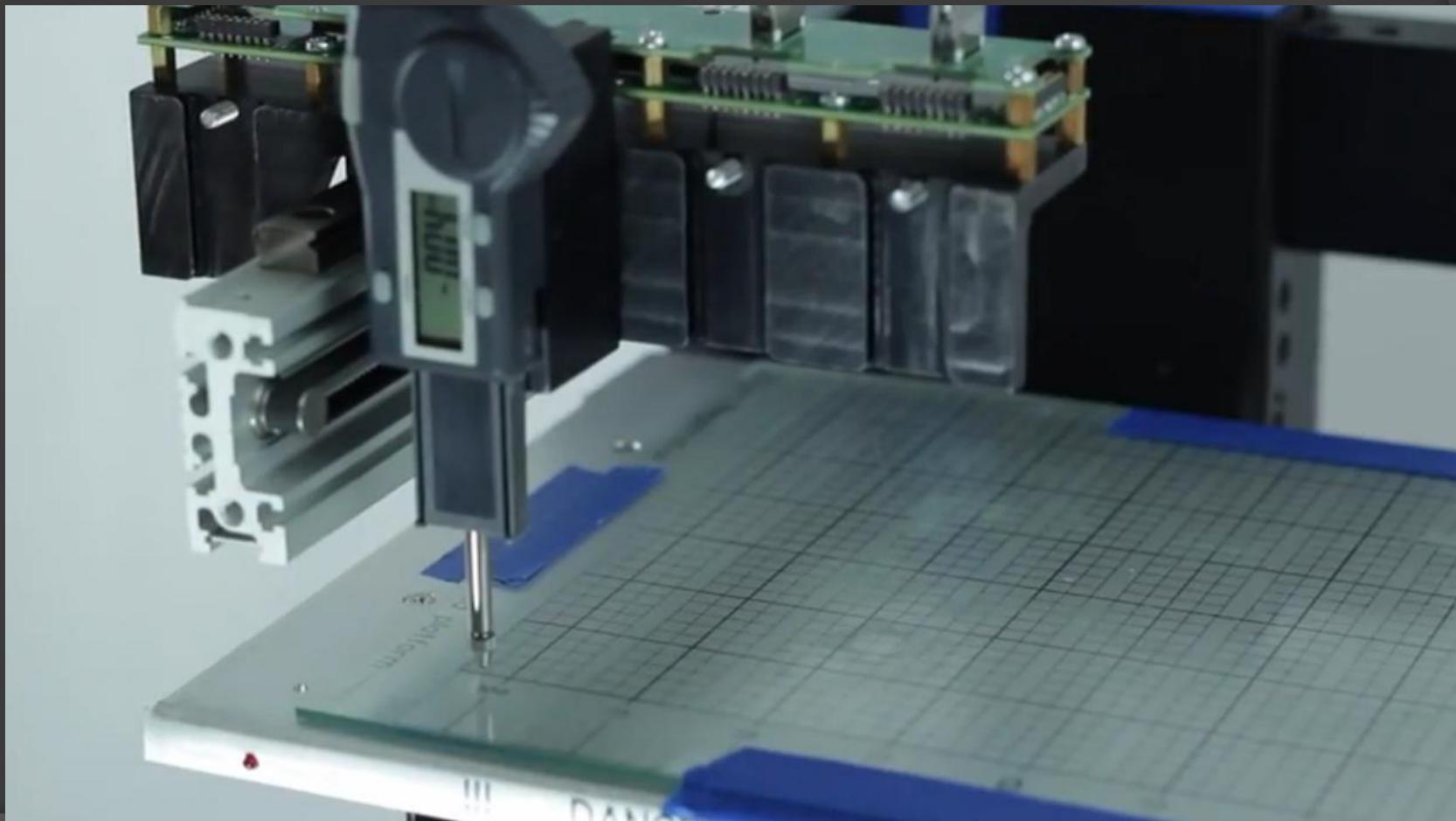
Step 1: *Tram – Adjust Set Screw with Philips Head Screwdriver*



First Print with Plasticine

Ch2: Prep Printer for Printing

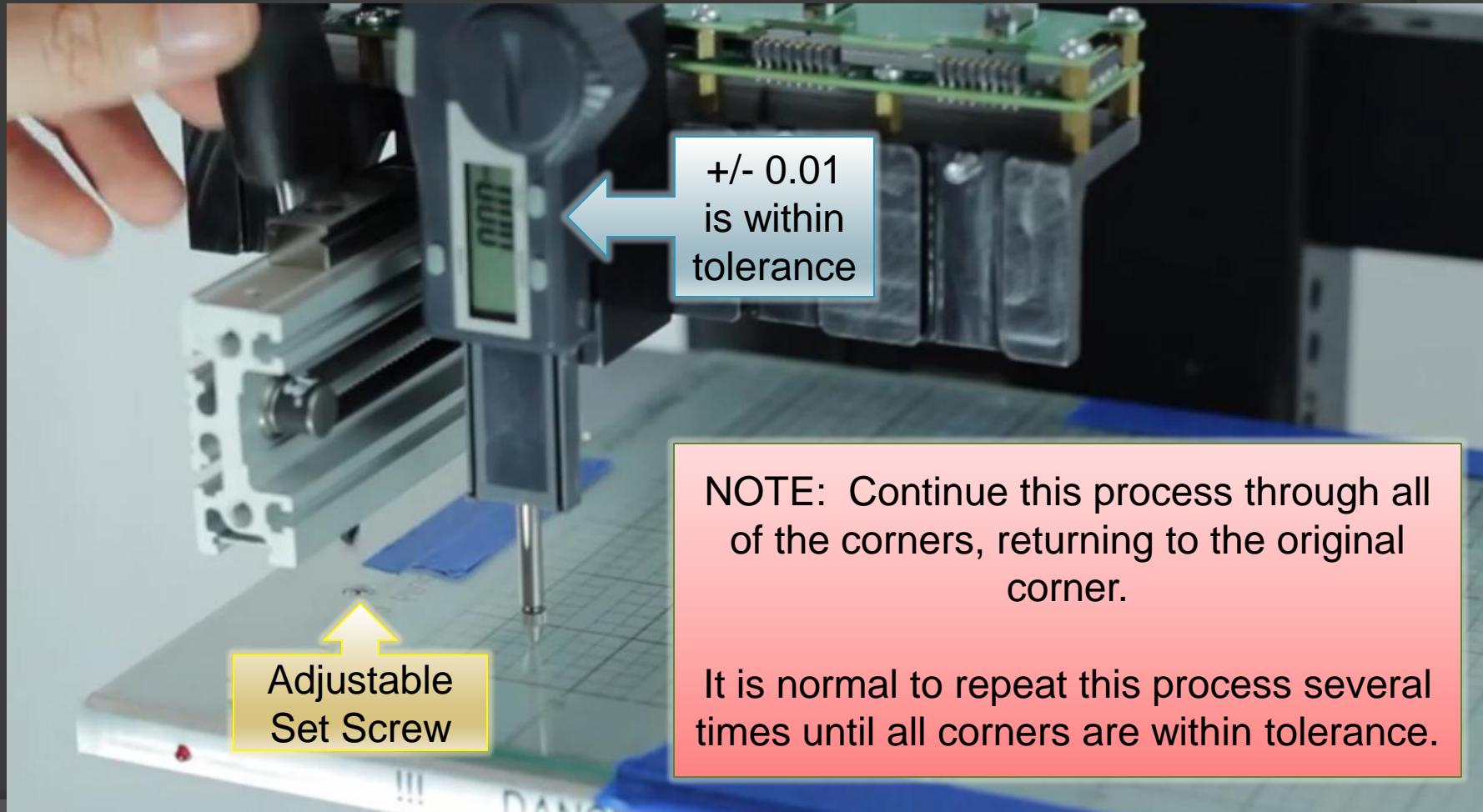
Step 1: Tram – Position Pin in next corner



First Print with Plasticine

Ch2: Prep Printer for Printing

Step 1: Tram – Adjust Set Screw with Philips Head Screwdriver



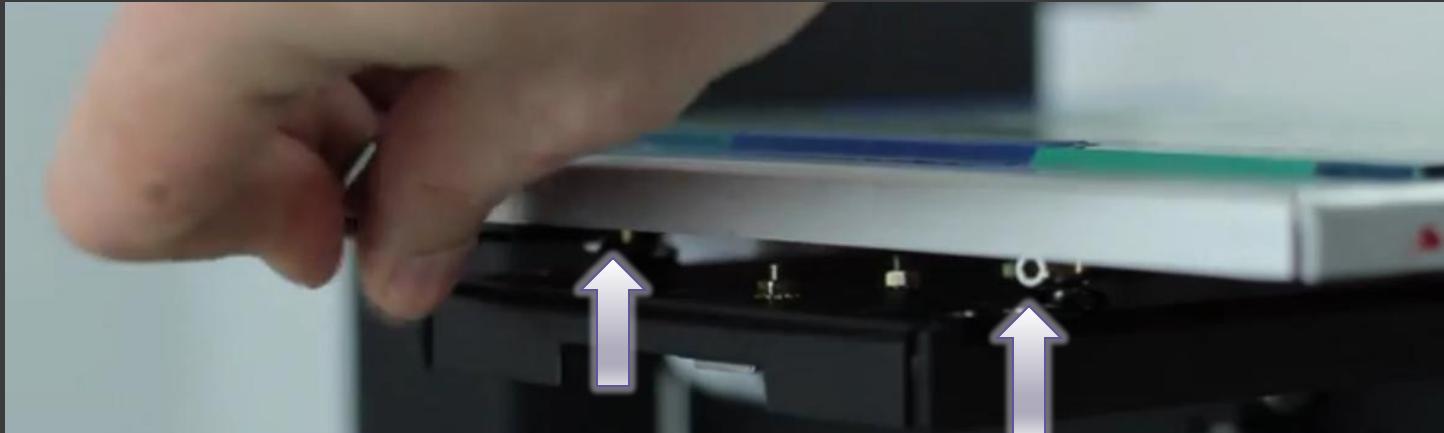
NOTE: Continue this process through all of the corners, returning to the original corner.

It is normal to repeat this process several times until all corners are within tolerance.

First Print with Plasticine

Ch2: Prep Printer for Printing

Step 1: Tram – Lock the build platform lock screws



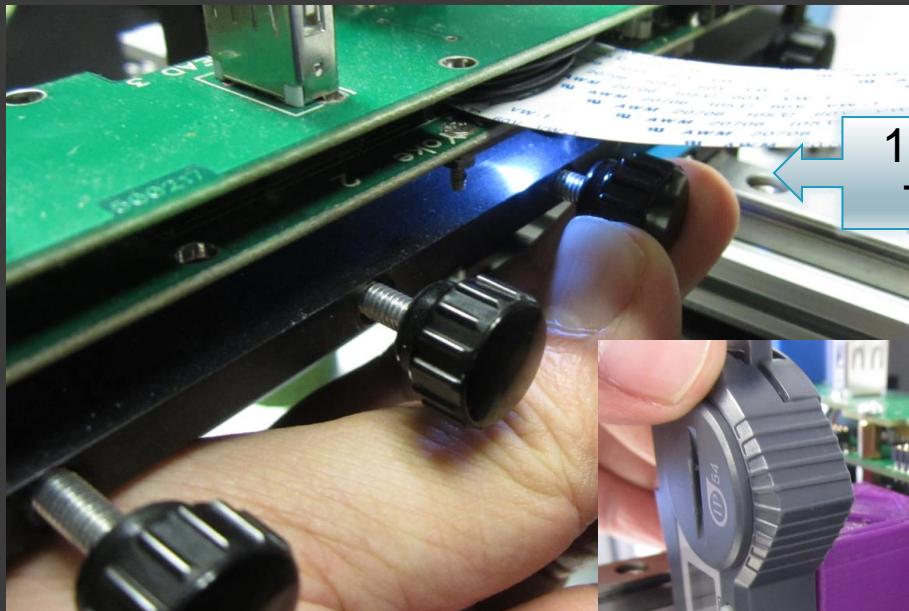
Included in your kit, use the 2.5mm Allen wrench to lock the four (4) lock screws under the build platform.



First Print with Plasticine

Ch2: Prep Printer for Printing

Step 1: *Tram – Remove Digi-tram*



1. Unlock Yoke
Thumbscrew



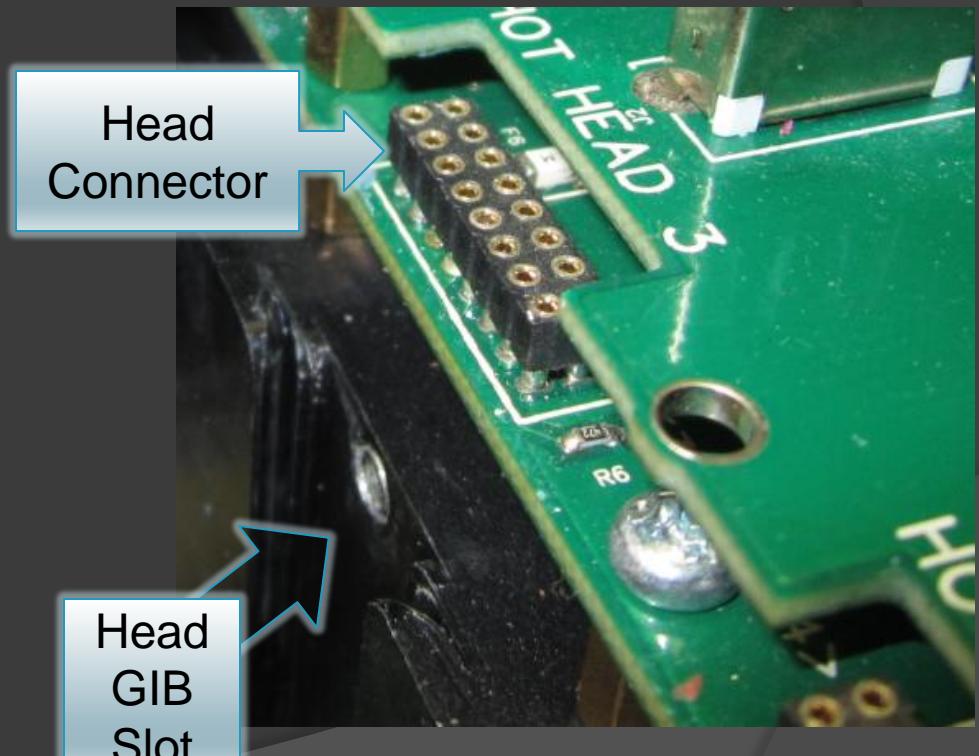
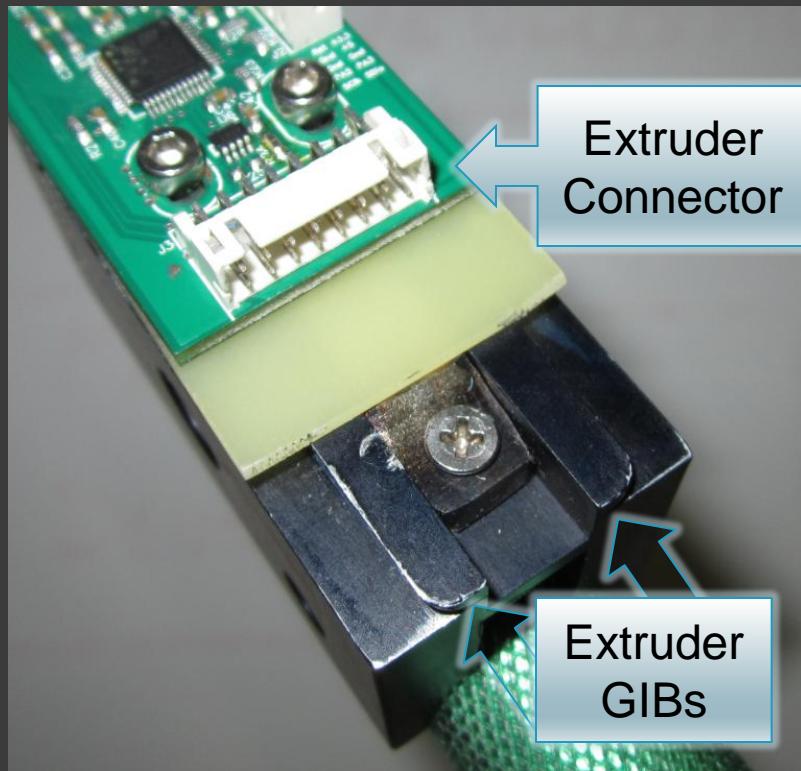
2. Remove
Digi-tram



First Print with Plasticine

Ch2: Prep Printer for Printing

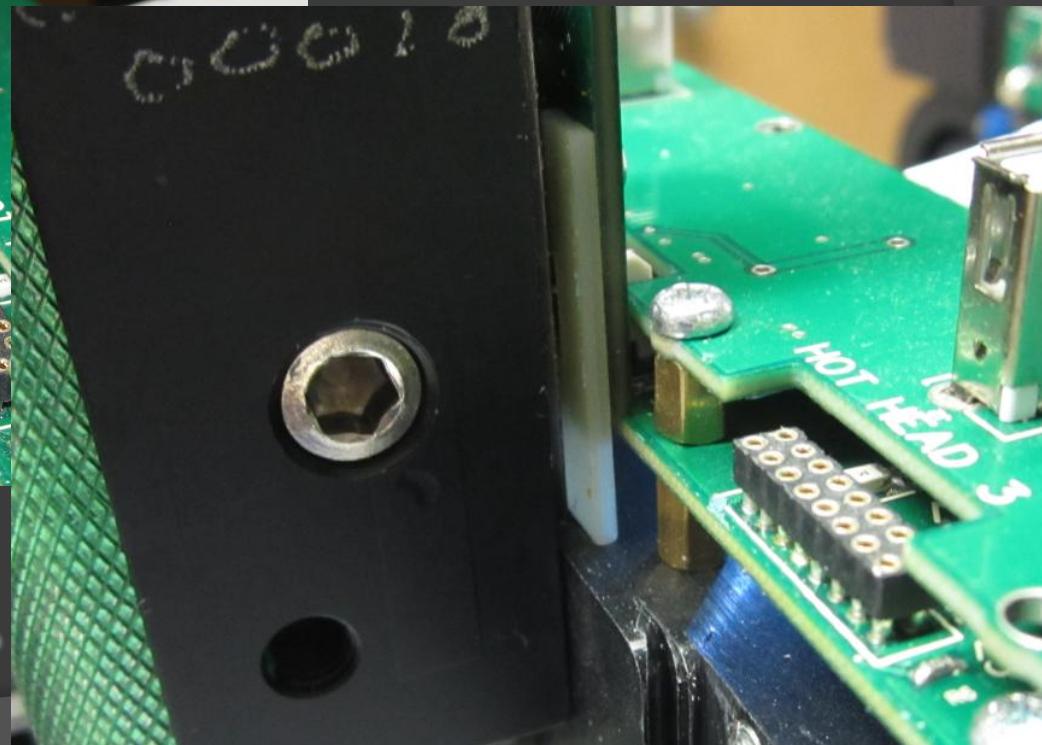
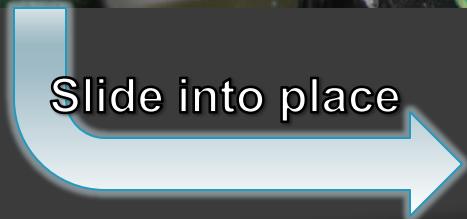
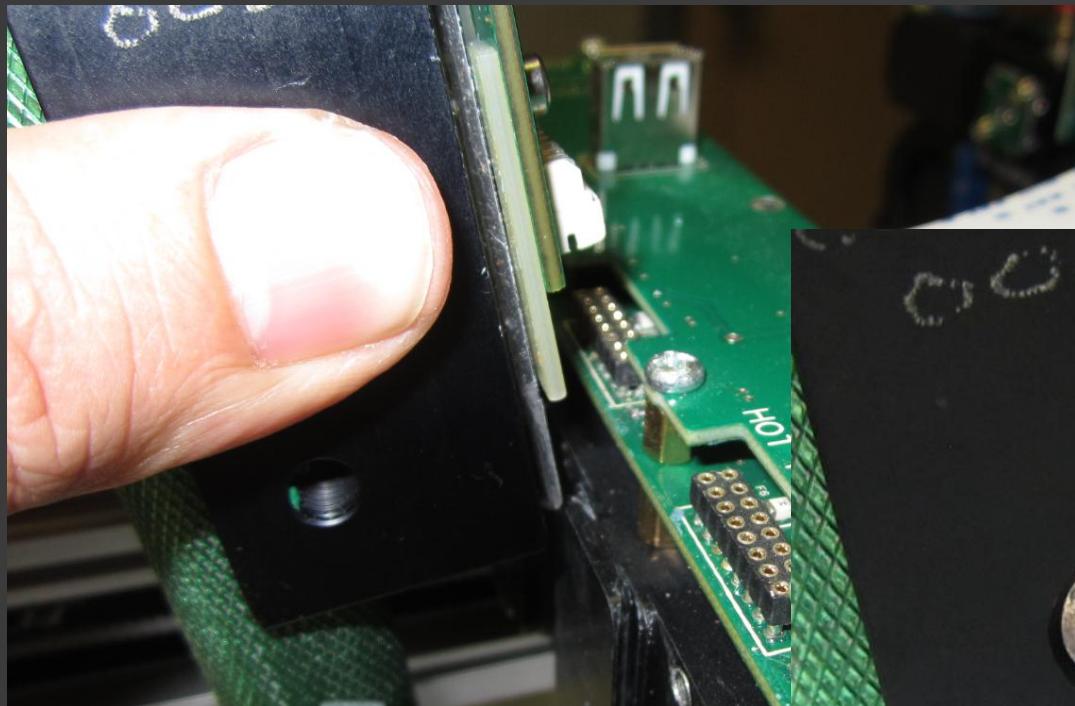
Step 2: *Install Extruder Head – Physical Installation*



First Print with Plasticine

Ch2: Prep Printer for Printing

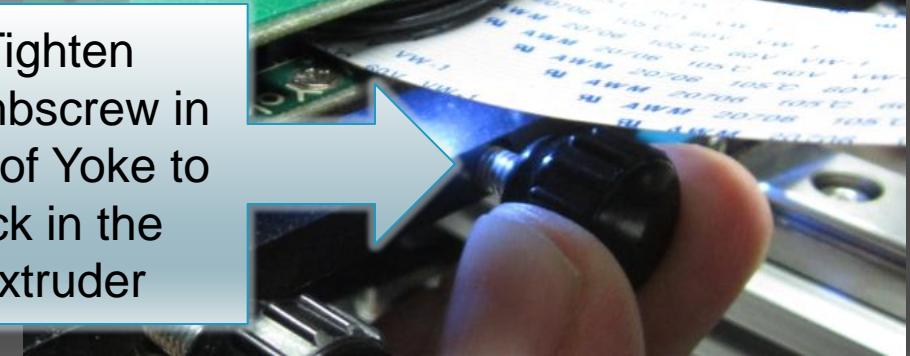
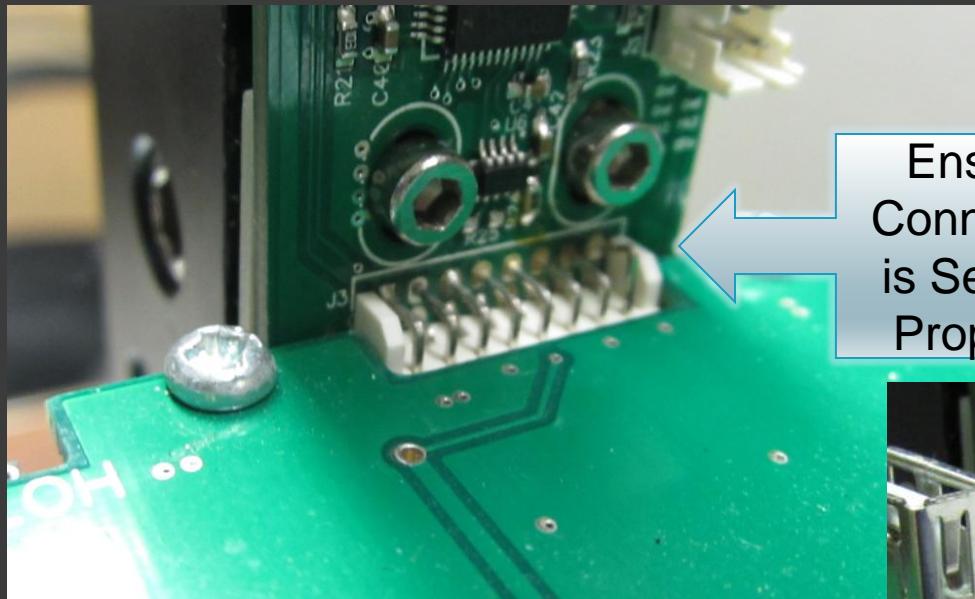
Step 2: Install Extruder Head – Physical Installation



First Print with Plasticine

Ch2: Prep Printer for Printing

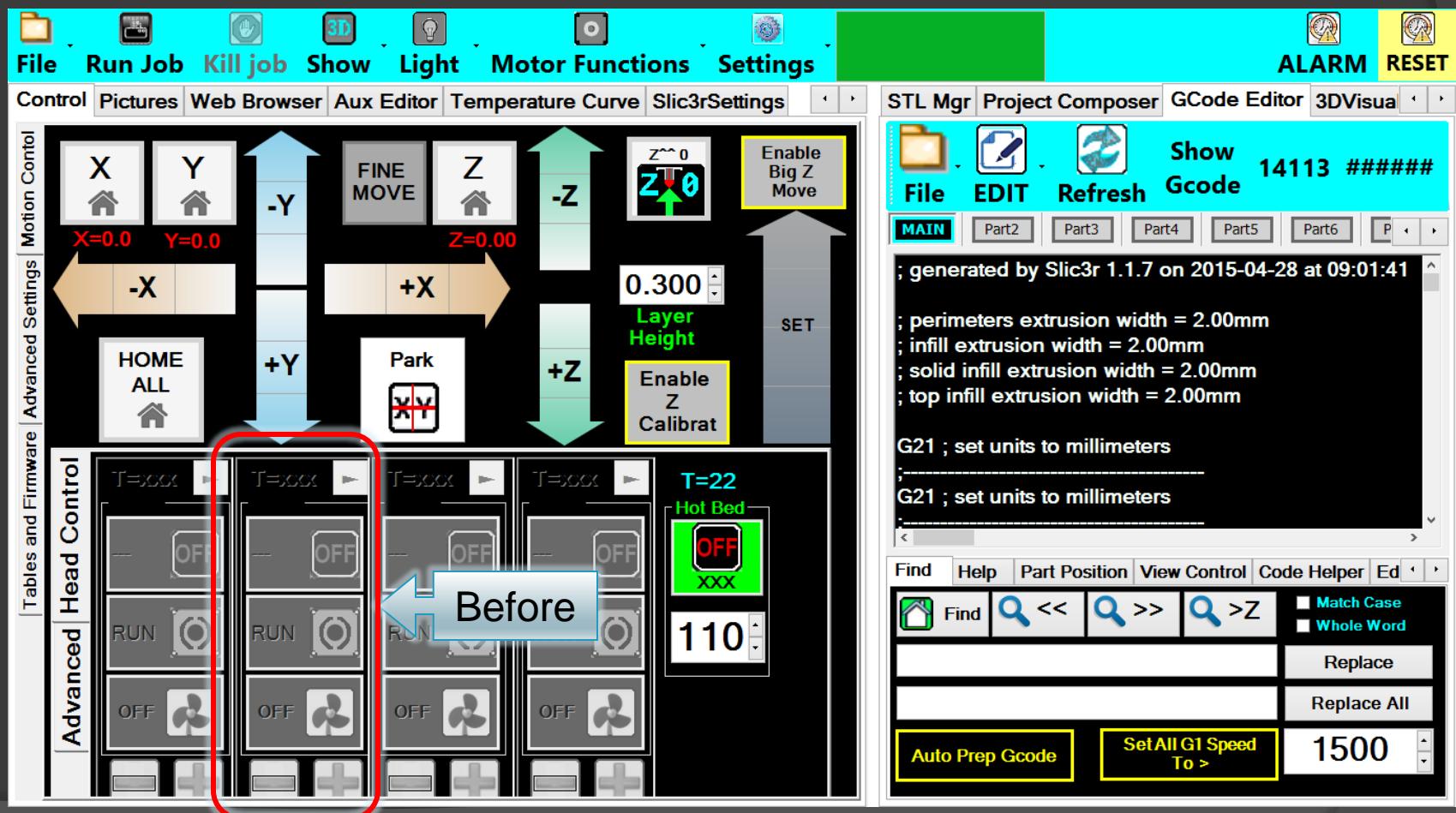
Step 2: *Install Extruder Head – Physical Installation*



First Print with Plasticine

Ch2: Prep Printer for Printing

Step 2: Install Extruder Head – What you see in REPETREL, 1 of 2



First Print with Plasticine

Ch2: Prep Printer for Printing

Step 2: Install Extruder Head – What you see in REPETREL, 2 of 2

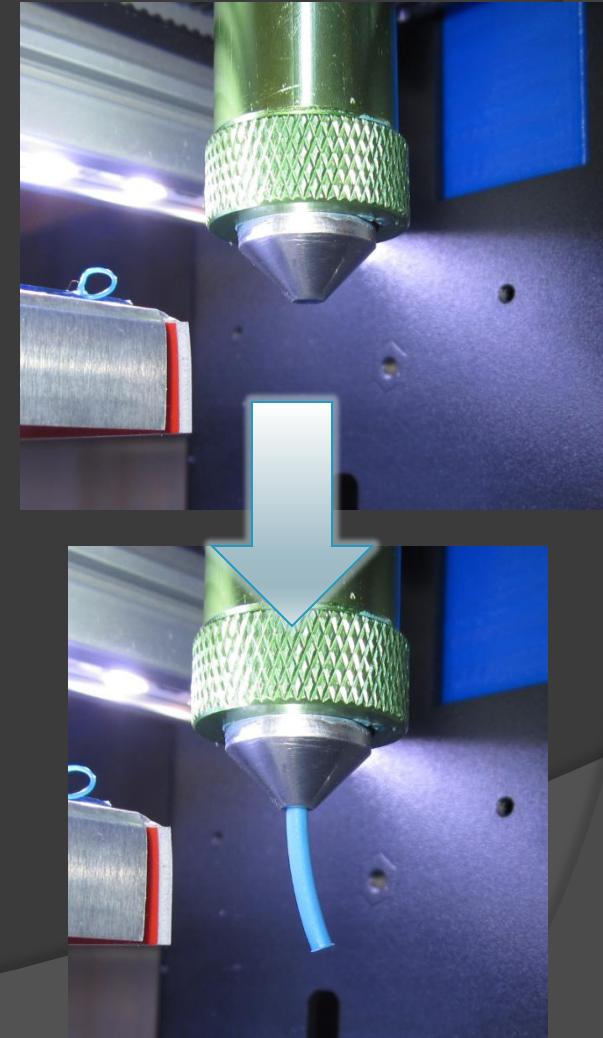
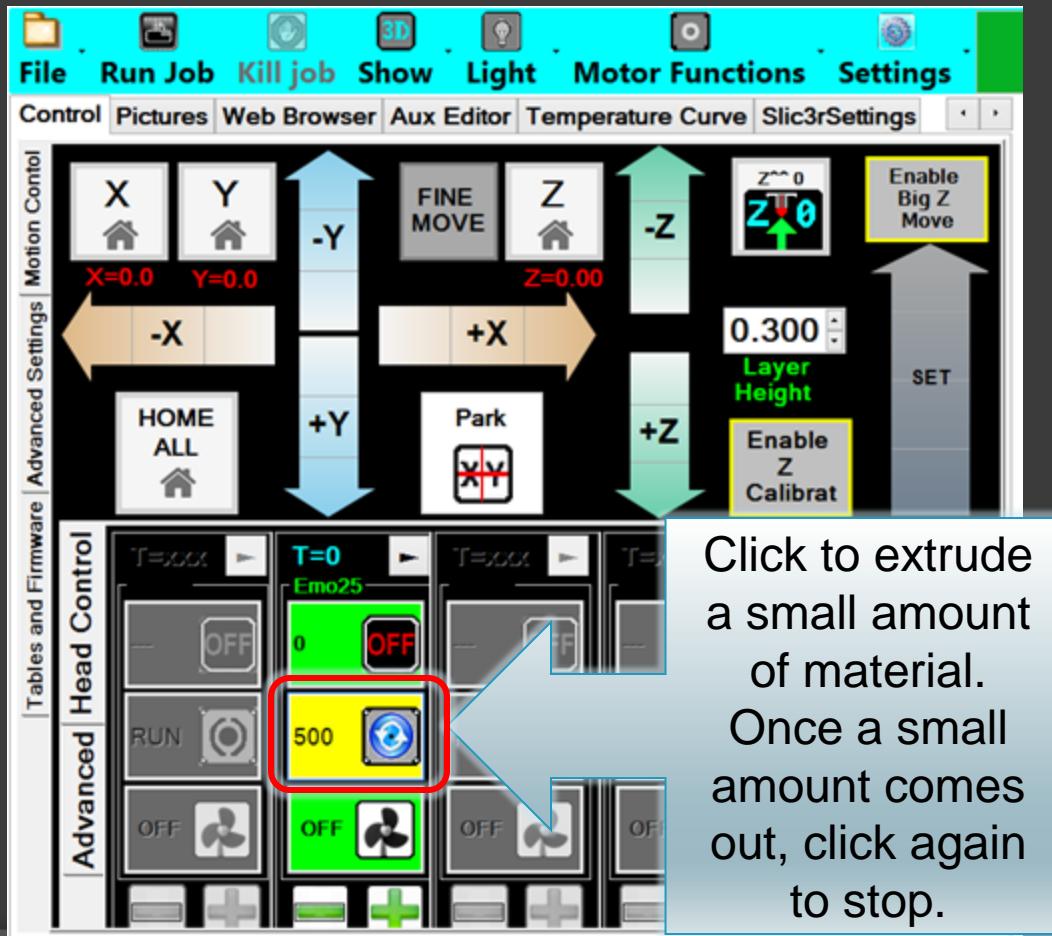
The screenshot shows the Repetree software interface with the following sections:

- Top Bar:** File, Run Job, Kill job, Show, Light, Motor Functions, Settings, ALARM, RESET.
- Motion Control:** X, Y, Z axes with home and park buttons. A yellow box highlights "Enable Big Z Move".
- Advanced Settings:** Motion Control, Tables and Firmware.
- Head Control:** Advanced tab selected. Shows extruder heads T=0 (Emo25), T=000, T=000, and T=22 (Hot Bed). The T=0 head has a red box around its controls (OFF, RUN, OFF) and a blue callout box labeled "After" pointing to the T=000 head's controls. The T=22 head shows a temperature of 110.
- GCode Editor:** Shows generated GCode from Slic3r 1.1.7 on 2015-04-28 at 09:01:41. The code includes:

```
; generated by Slic3r 1.1.7 on 2015-04-28 at 09:01:41
;
; perimeters extrusion width = 2.00mm
; infill extrusion width = 2.00mm
; solid infill extrusion width = 2.00mm
; top infill extrusion width = 2.00mm
;
G21 ; set units to millimeters
;
G21 ; set units to millimeters
```
- Code Helper:** Find, Help, Part Position, View Control, Code Helper, Ed.
- Bottom Tools:** Find, <<, >>, >Z, Replace, Replace All, Auto Prep Gcode, Set All G1 Speed To >, 1500.

First Print with Plasticine

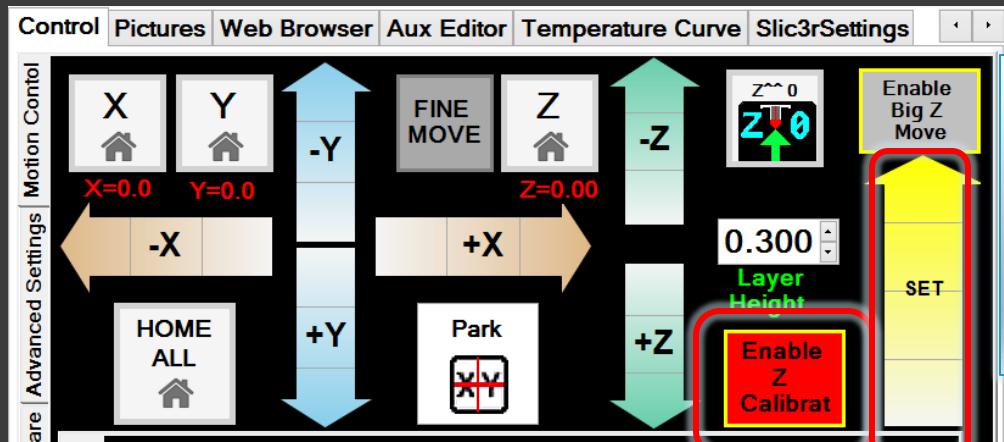
Ch2: Prep Printer for Printing
Step 3: Prime Extruder Head



First Print with Plasticine

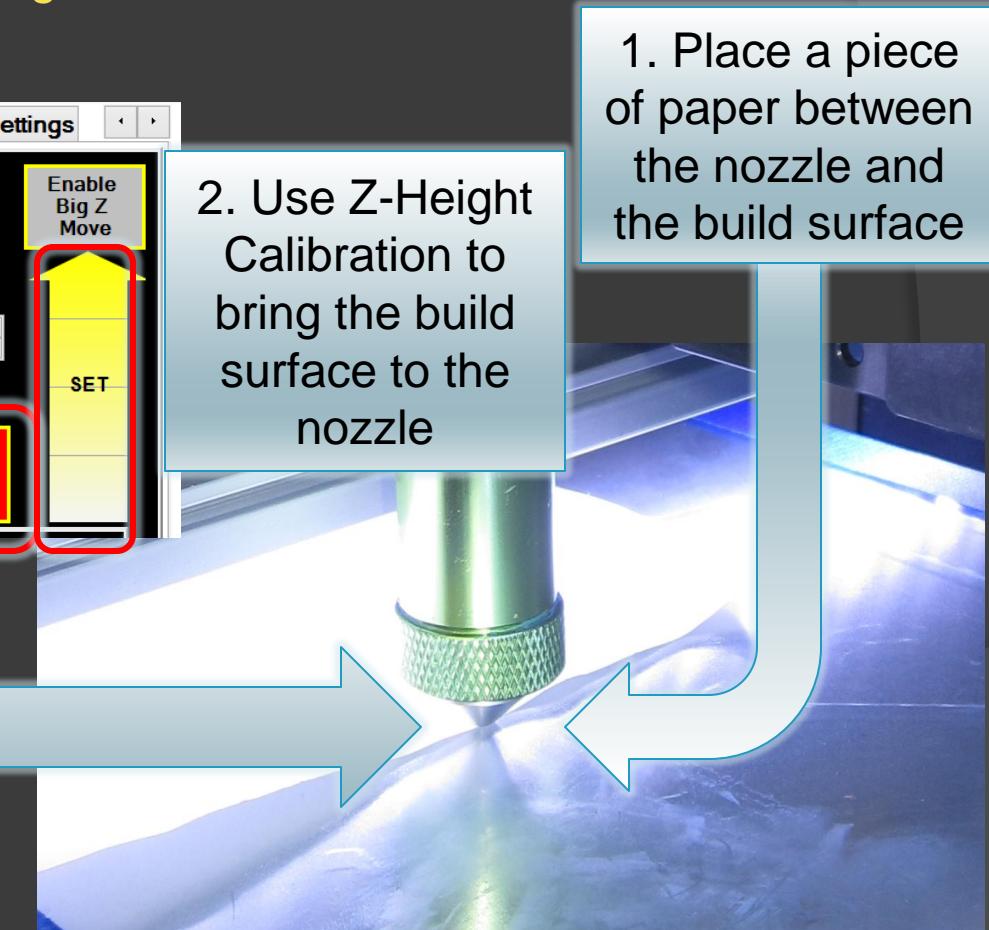
Ch2: Prep Printer for Printing

Step 4: Set the *Extruder Head Height*



2. Use Z-Height Calibration to bring the build surface to the nozzle

3. Once the piece of Paper just starts to pinch, the Extruder Height is correct.

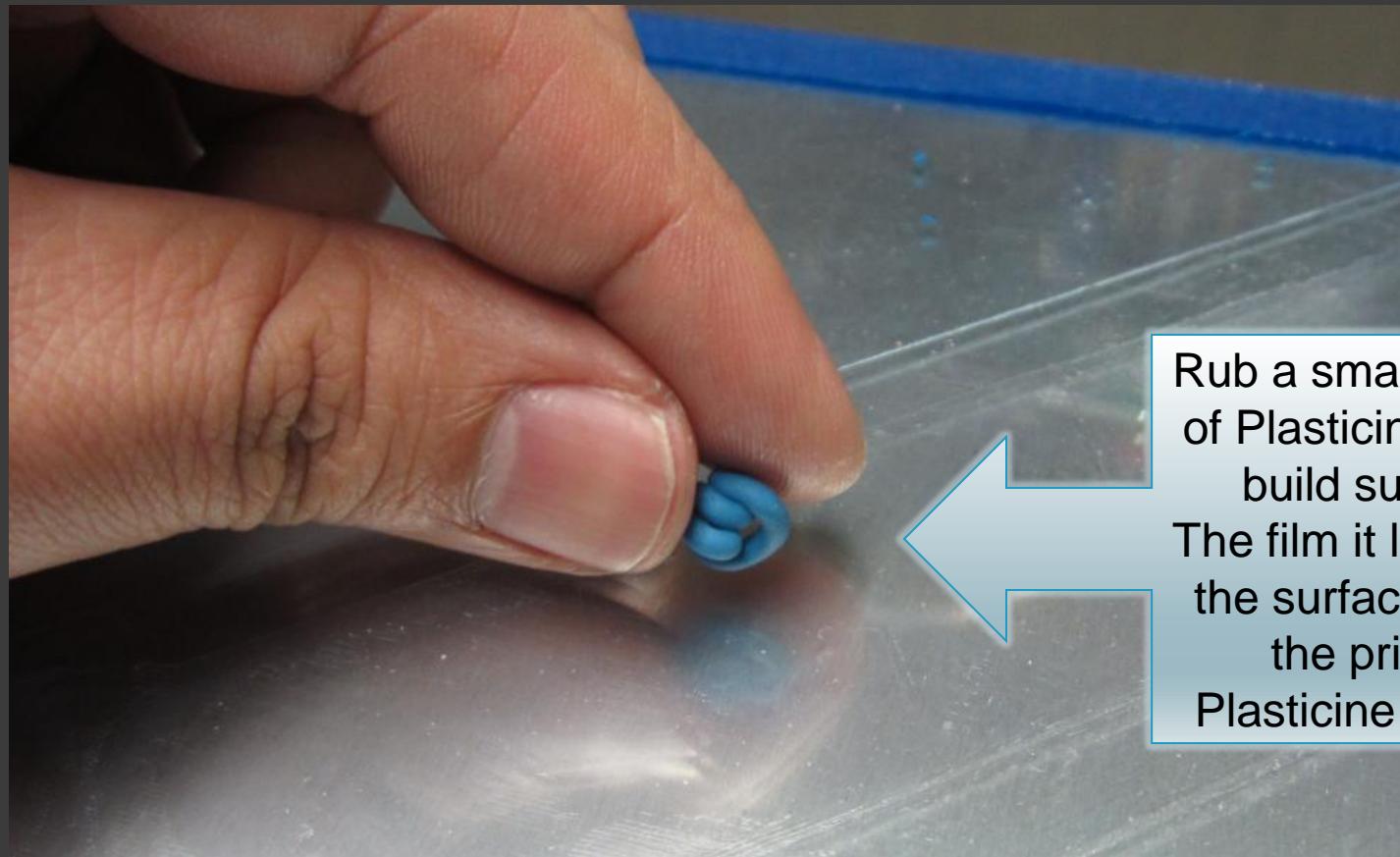


1. Place a piece of paper between the nozzle and the build surface

First Print with Plasticine

Ch2: Prep Printer for Printing

Step 5: Prepare build surface

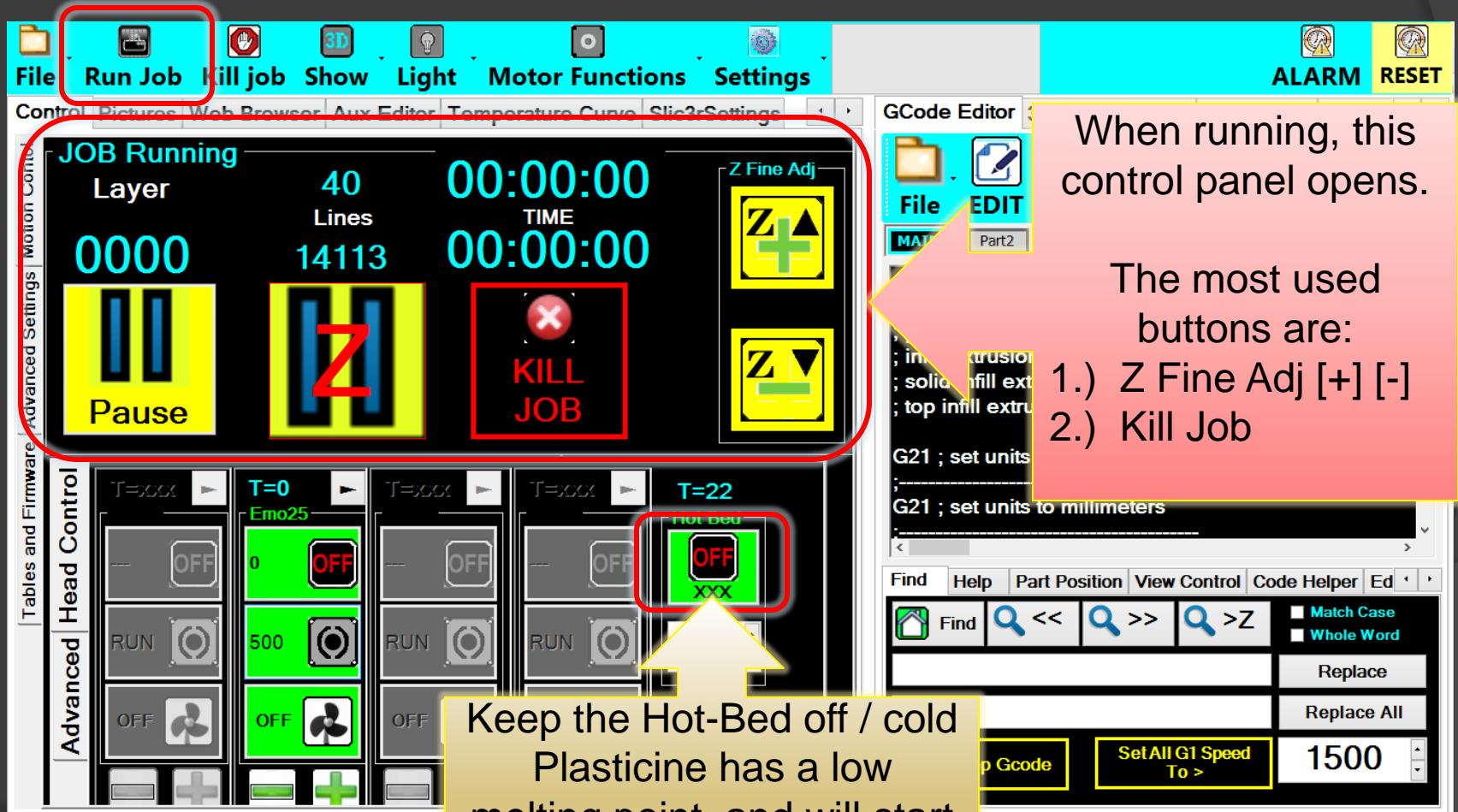


Rub a small amount of Plasticine on the build surface. The film it leaves on the surface allows the printed Plasticine to stick.

First Print with Plasticine

Ch3: Printing

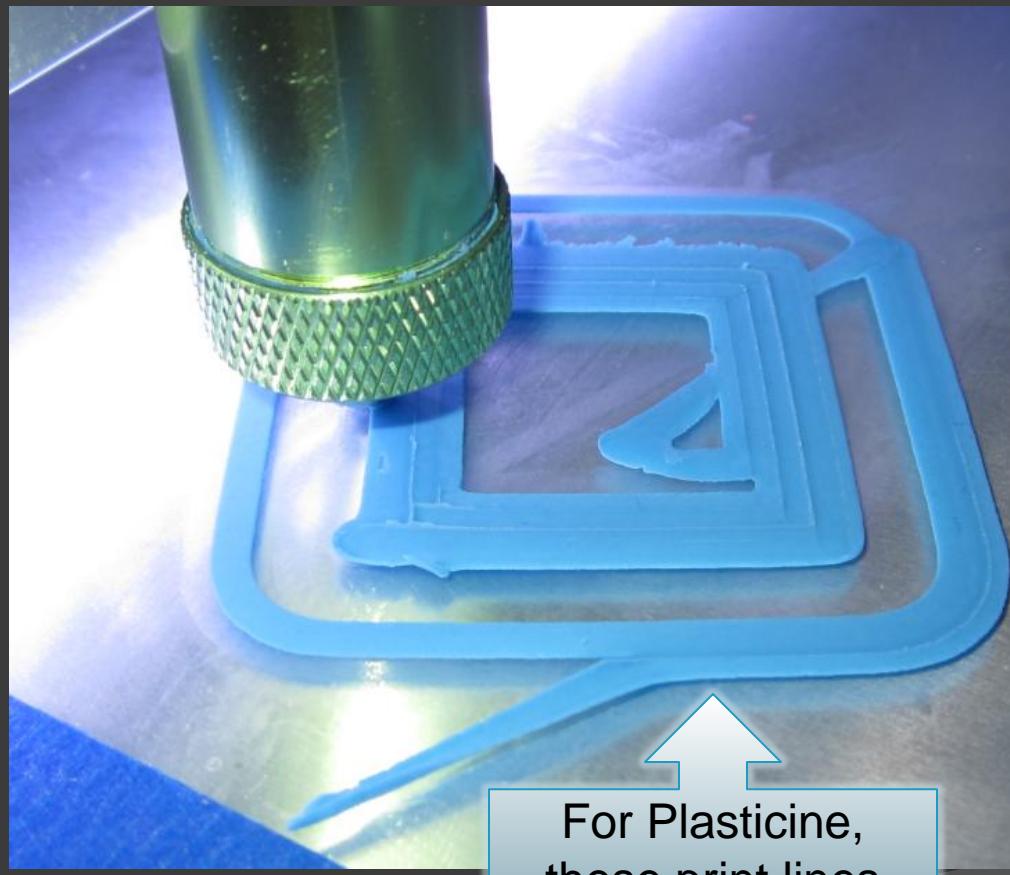
Step 1: Press “Run Job” button



First Print with Plasticine

Ch3: Printing

Step 2: *Pay close attention to the first layers & adjust height while printing*



For Plasticine,
these print lines
are near perfection



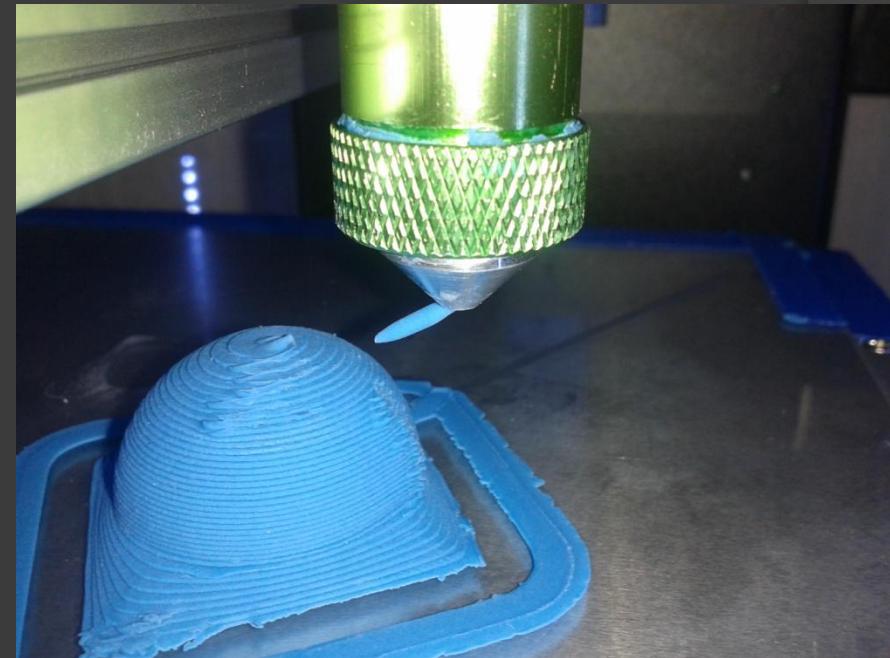
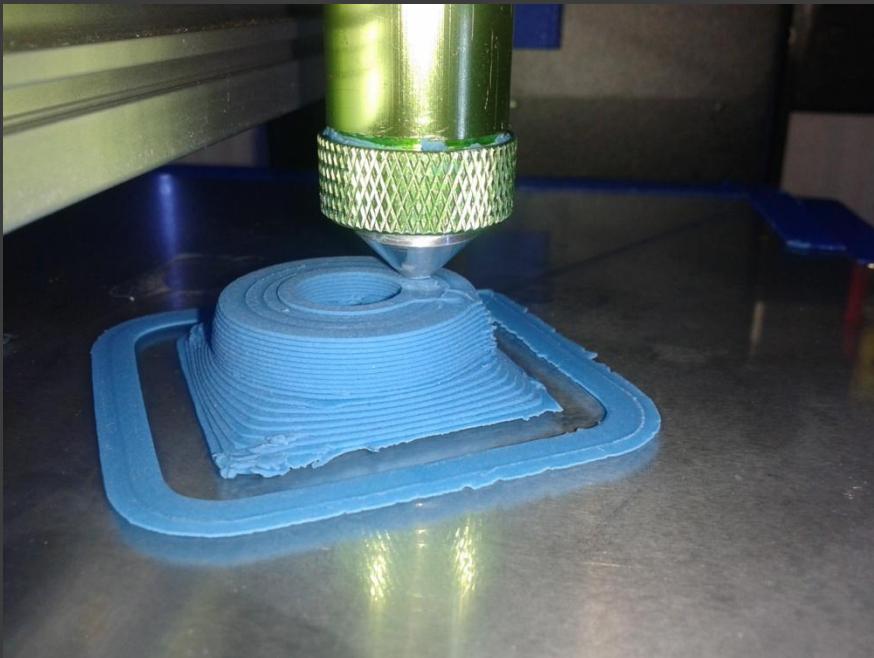
Use when
lines are
not
touching

Use when
lines are
50%
wider than
the
adjacent
lines

First Print with Plasticine

Ch3: Printing

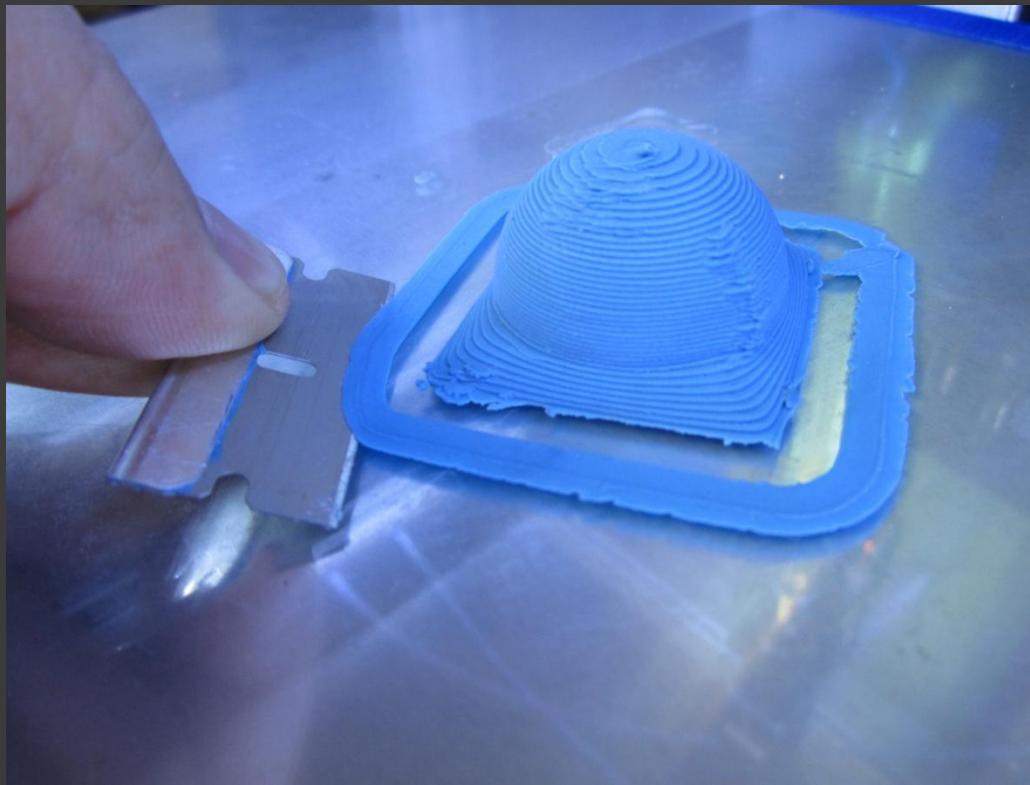
Step 3: Allow the print to finish



First Print with Plasticine

Ch3: Printing

Step 4: When complete, remove the print from the build surface



More Information Available at:

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Ustream: www.ustream.tv/channels/hyrel3d