
pltr v2

Plotter Toolhead for the Creality Ender 3

Designed by: Andrew Sink

User Guide

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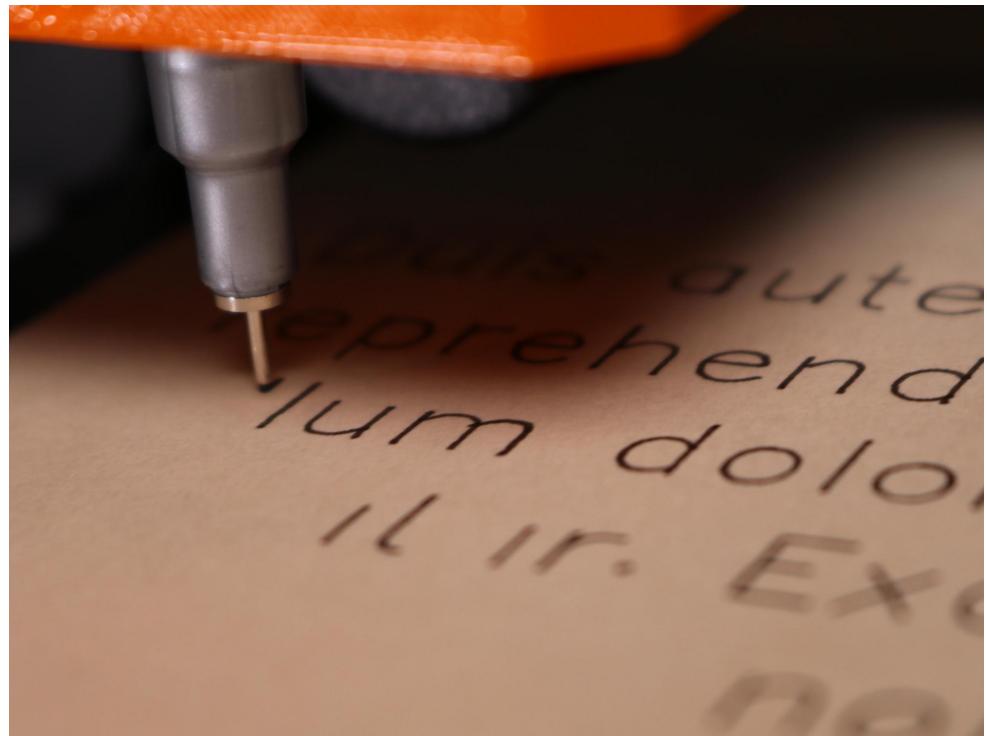
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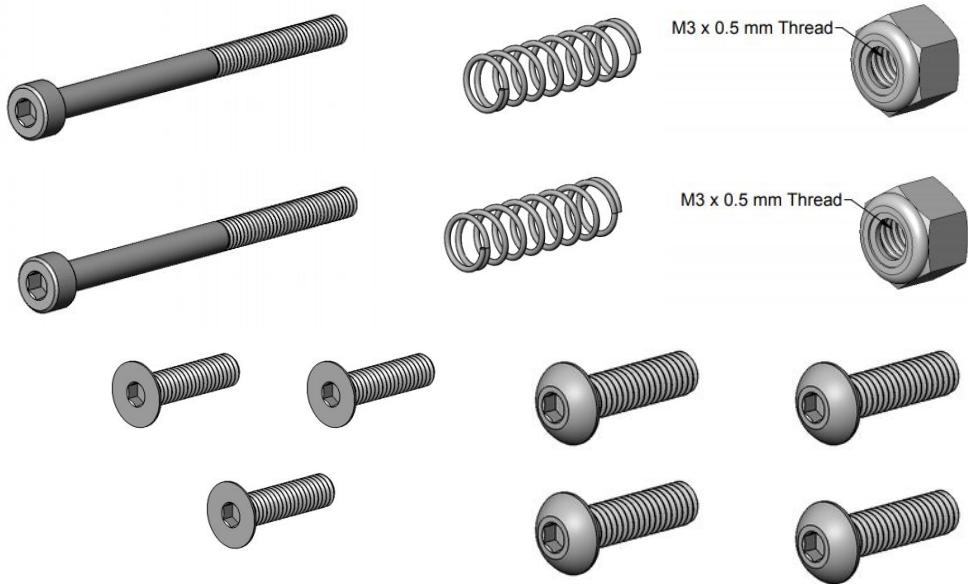
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Bill of Materials

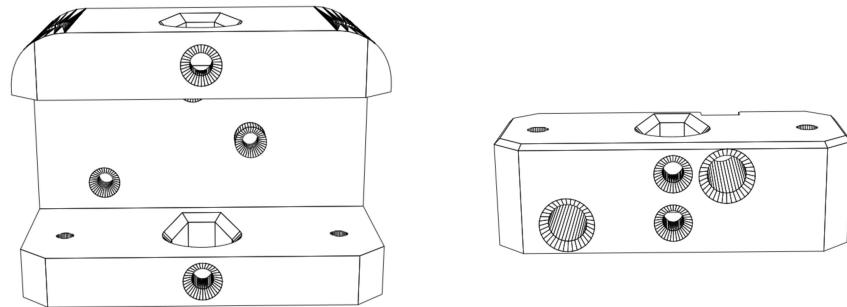
Components:

1. M3x40 bolt (x2)
2. M3 locking nut (x2)
3. M3x10 flathead bolt (x3)
4. M4x15 mushroom cap bolts (x4)
5. Springs (x2)
6. Binder Clips (x4)
7. 2.5mm Allen Key
8. 2mm Allen Key



Printed Components:

1. Base.stl
2. Stamp.stl



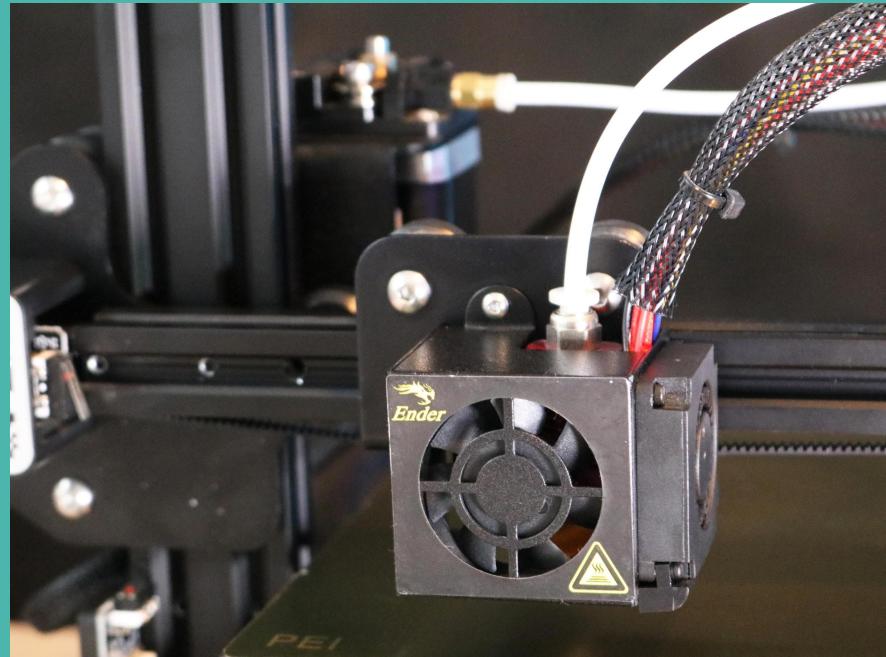
pltr v2

Ender 3

Hot End Removal

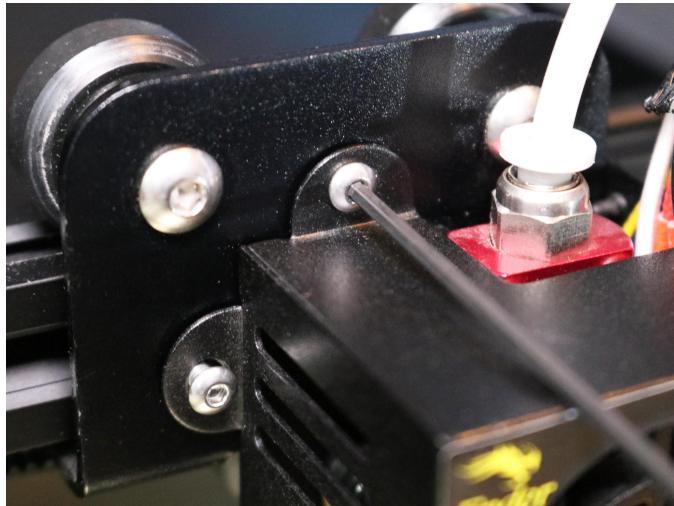
Before you can install your pltr v2, you need to remove the hot end from your printer.

This process is quick, easy, and completely reversible.

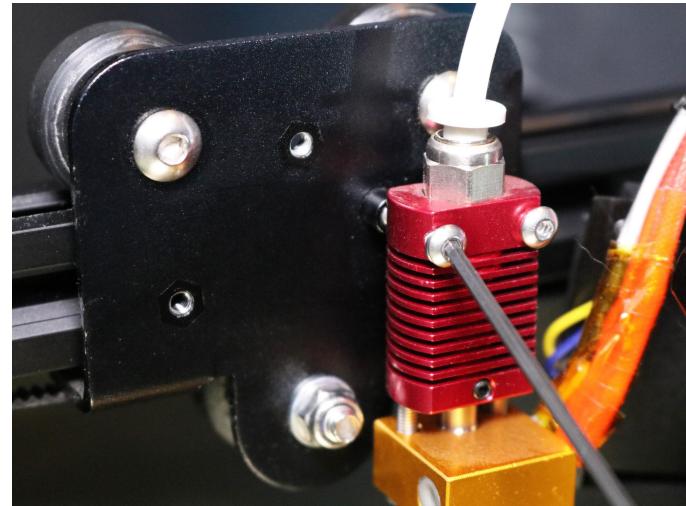


Hot End Removal

Remove the hot end cover using the included 2mm allen key.

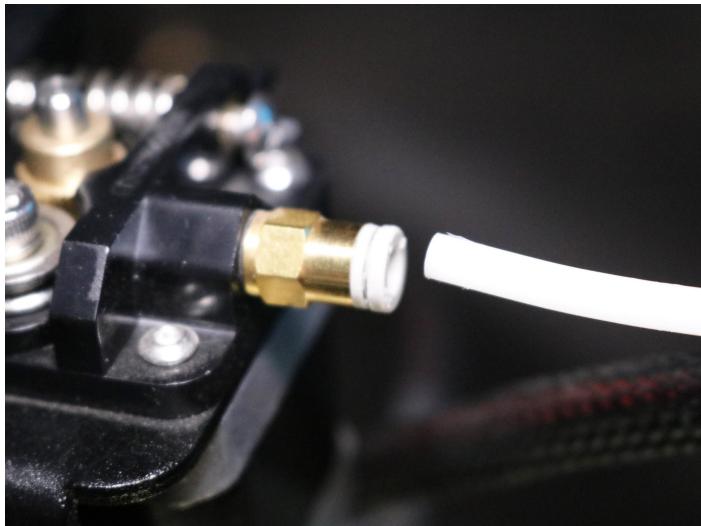


Remove the hot end using the included 2mm allen key.

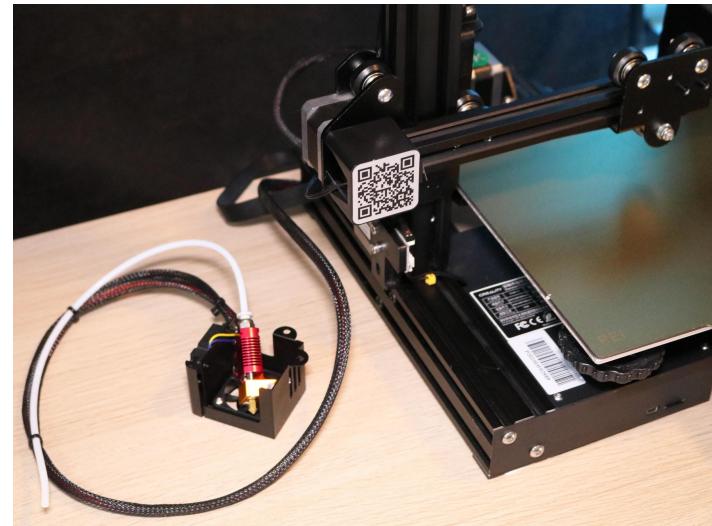


Hot End Removal

Remove the PTFE tube from the extruder bracket.

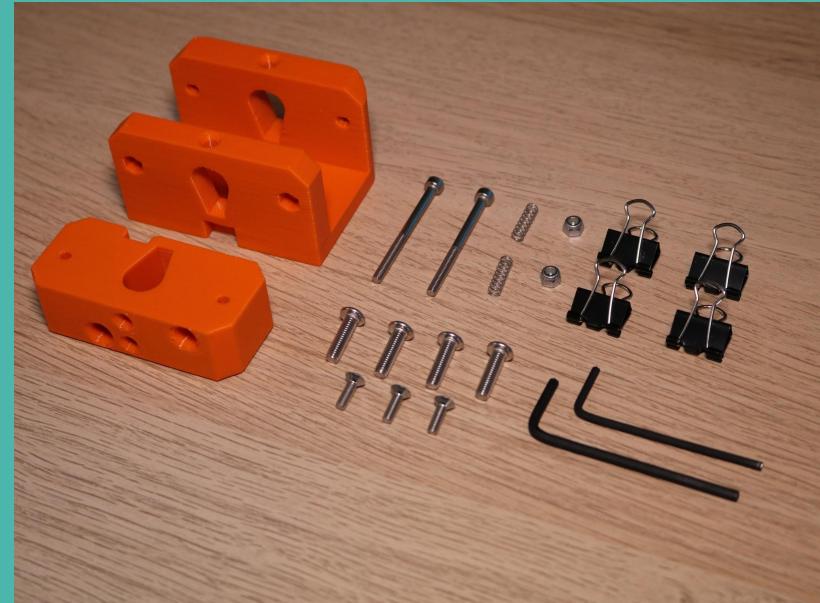


Move the harness to the side of the printer, leaving the hot end resting in the cover.



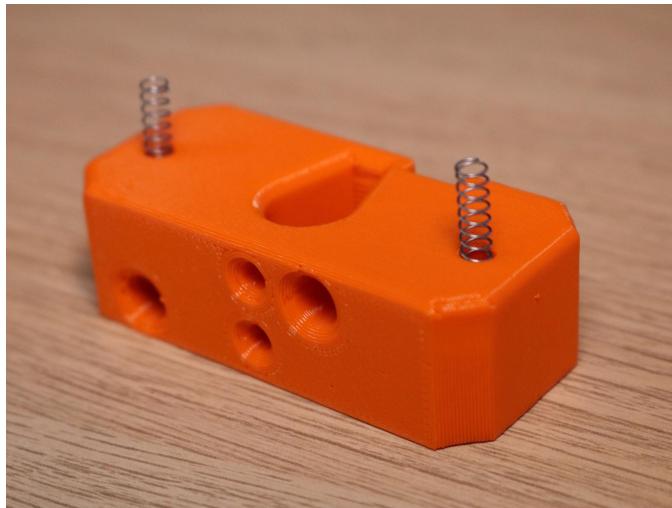
pltr v2 DIY Kit Assembly Guide

For pre-assembled module
installation, skip to Step 5



Step 1

Insert the springs firmly into the stamp.



Step 2

Insert the stamp into the base, aligning the springs to snap into the through holes.



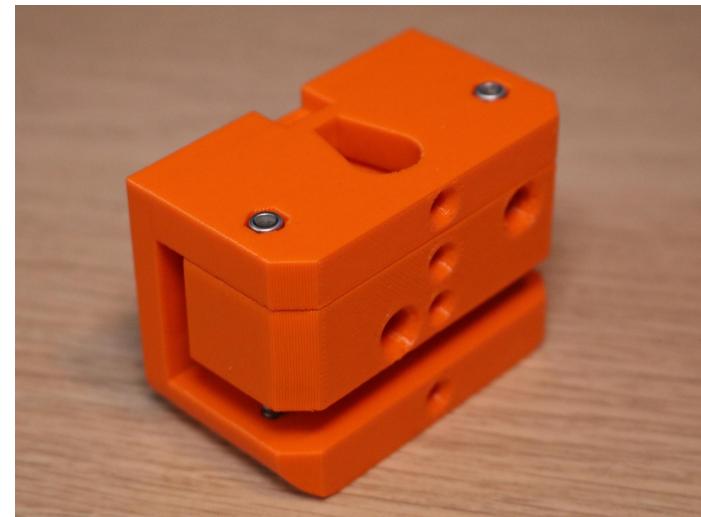
Step 3

Insert the M3x40 bolts into the base.



Step 4

Place the M3 locking nuts into the base (flat side facing the pocket) and tighten the M3x40 bolts until they are secure.



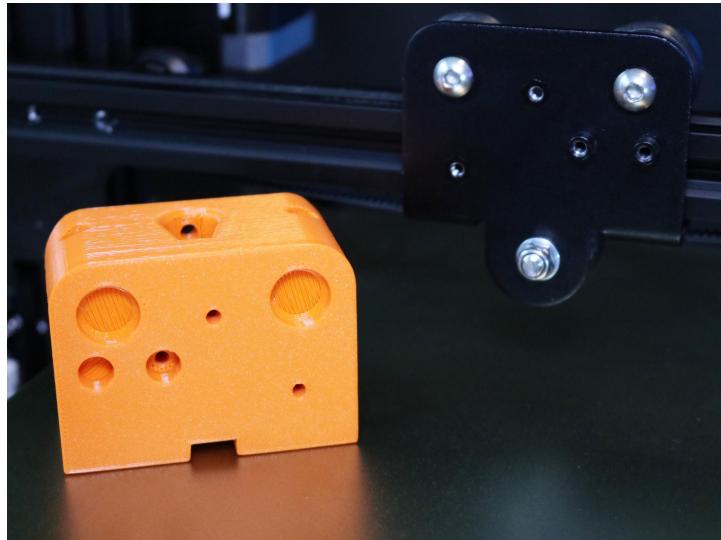
pltr v2

Assembled Module Installation Guide



Step 5

Notice the alignment guides on the pltr toolhead and line up the base with the hot end bracket



Step 6

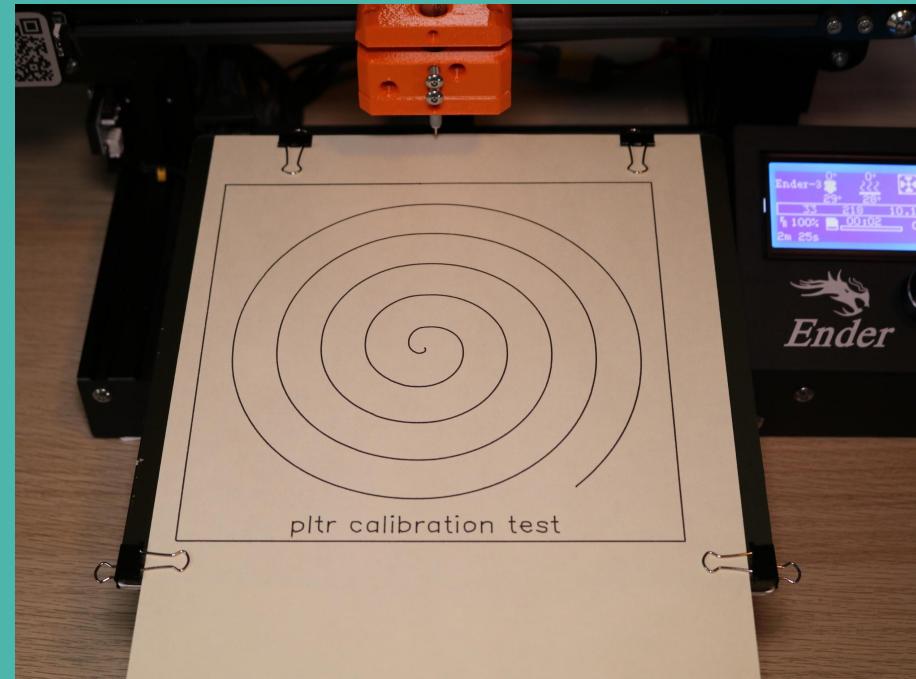
Using the M3x10 flathead bolts to attach the base to the hot end bracket



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Calibration Process

Installing your writing implement and calibrating your printer is the best way to ensure a quality plot!



Step 7

Once the base has been installed and no pen is installed, select **Auto Home** by navigating from **Home Screen -> Prepare -> Auto Home**



Step 8

Once the printer has homed, select **Move Z** by navigating from **Home Screen -> Prepare -> Move Axis -> Move Z -> Move 0.1mm**



Step 9

Turn the knob clockwise one click to select **+000.1mm** to increase the Z height by .1mm



Step 10

Once raised .1mm, select **Disable Steppers** by navigating from **Home Screen -> Prepare -> Disable Steppers**



Step 11

Attach two binder clips to the bottom front left and right of the build platform with the clips aligned with the X axis.



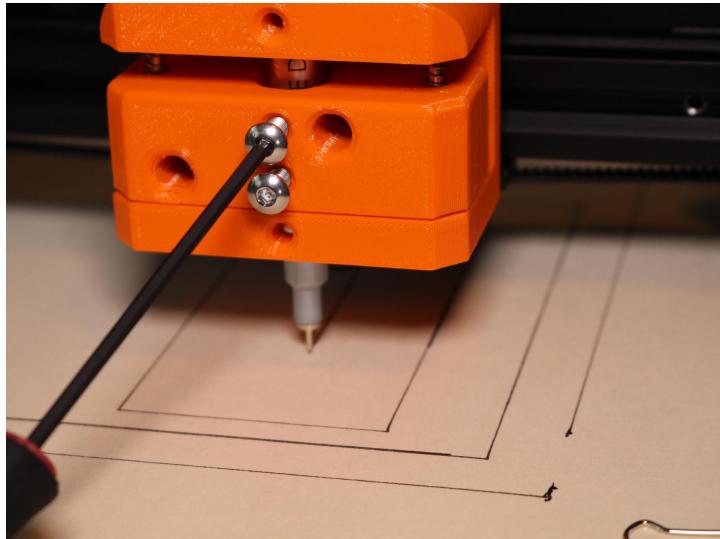
Step 12

Attach the last two binder clips to the back of the build platform with the clips aligned with the Y axis. Flip the top clips over to secure the paper flat against the platform.



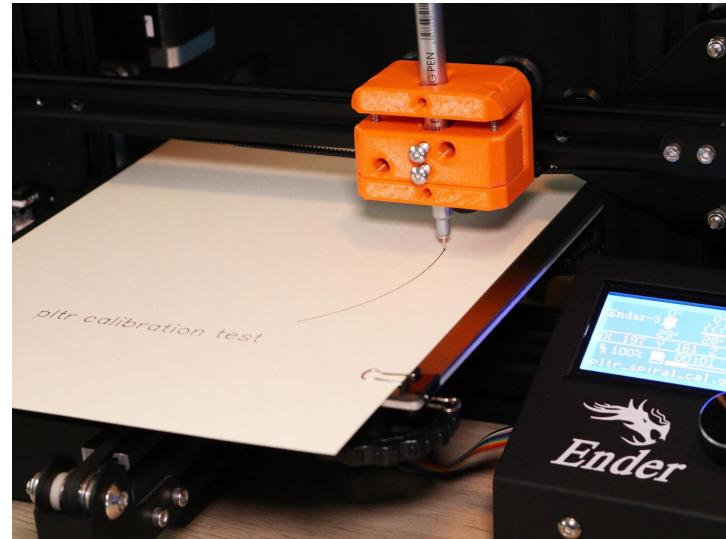
Step 13

Manually move the base over the platform and insert your pen into the base. Use two M4x15 mushroom head bolts to secure the pen to the stamp while moving it around the bed.



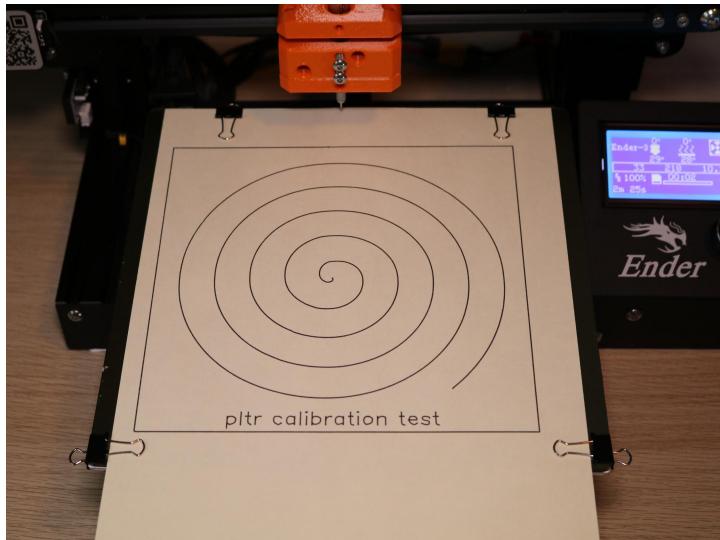
Step 14

Once the pen is secured, run the pltr_spiral_cal.gcode file to run a calibration test.



Step 15

Pictured below is a successful calibration.



Step 16

If the build platform is uneven, you may see blank spots on the calibration test. If you see this, relevel the platform and print the pltr_spiral_cal file again.



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Software Setup

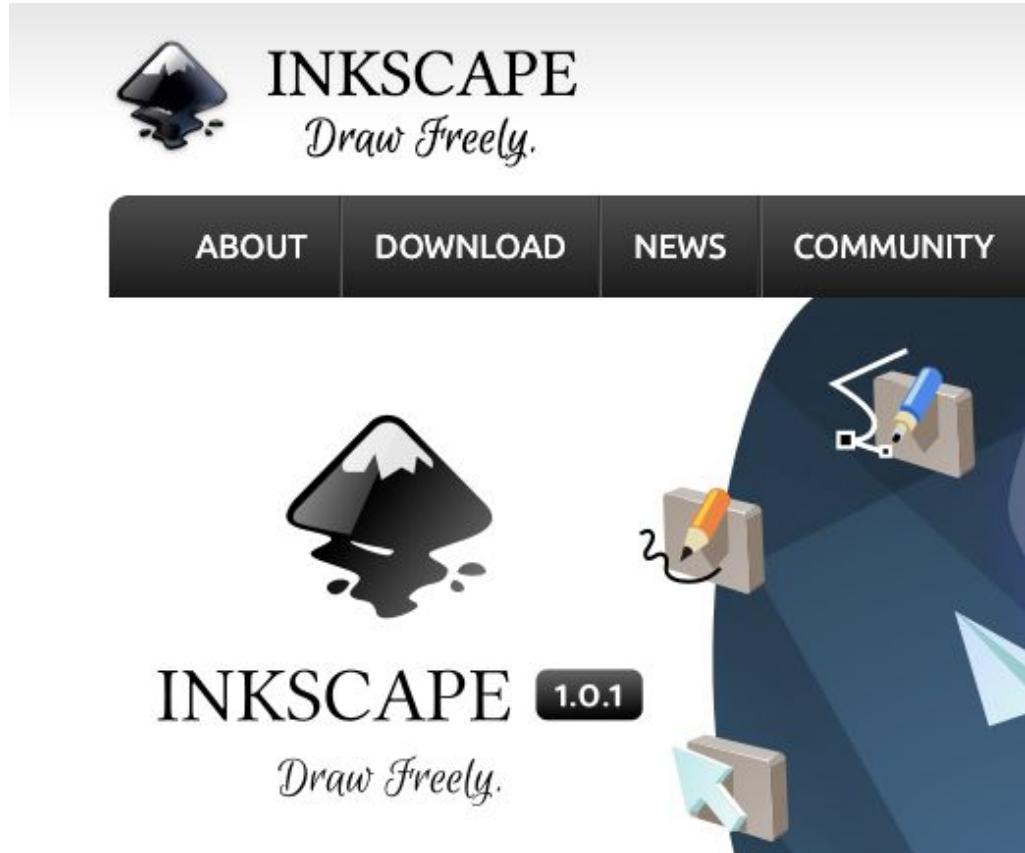
Converting a vector-based drawing into a plottable path can be complex, but this guide should act as a good starting point to get you up and running!

```
1 G00 S1; endstops
2 G00 E0; no extrusion
3 G01 S1; endstops
4 G01 E0; no extrusion
5 G21; millimeters
6 G91 G0 F900.0 Z10.000; pen park !!Zsafe
7 G90; absolute
8 G28 X; home
9 G28 Y; home
10 G28 Z; home
```

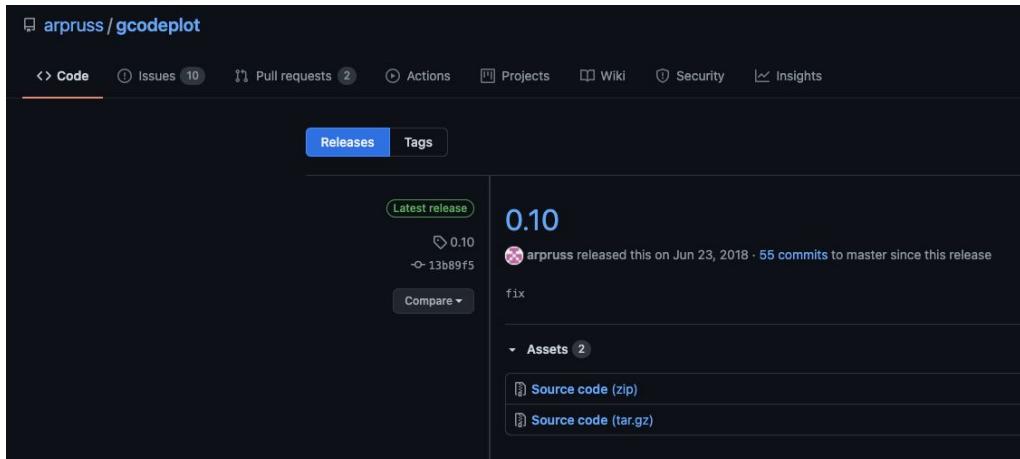
Download/Install Inkscape

[Inkscape](#) is a powerful vector editing program that is perfect for converting files to gcode for plotting.

IMPORTANT: Make sure you are running at version 1.0 or above of Inkscape; older versions may not work correctly with the gcodeplot plugin.



Download Gcodeplot Plugin



Download the [Gcodeplot plugin release 0.10 for Inkscape](#).

This plugin will allow you to convert an SVG file into a plottable path through gcode, with no additional slicer required.

The next page covers the installation process for this plugin.

Install Gcodeplot Plugin

Locate the [User Extensions](#) folder by opening the “Preferences” menu, selecting “System” and clicking “Open” next to “User Extensions”.

Extract the .zip folder into your Inkscape extensions folder to install the plugin, and restart Inkscape to make it available.

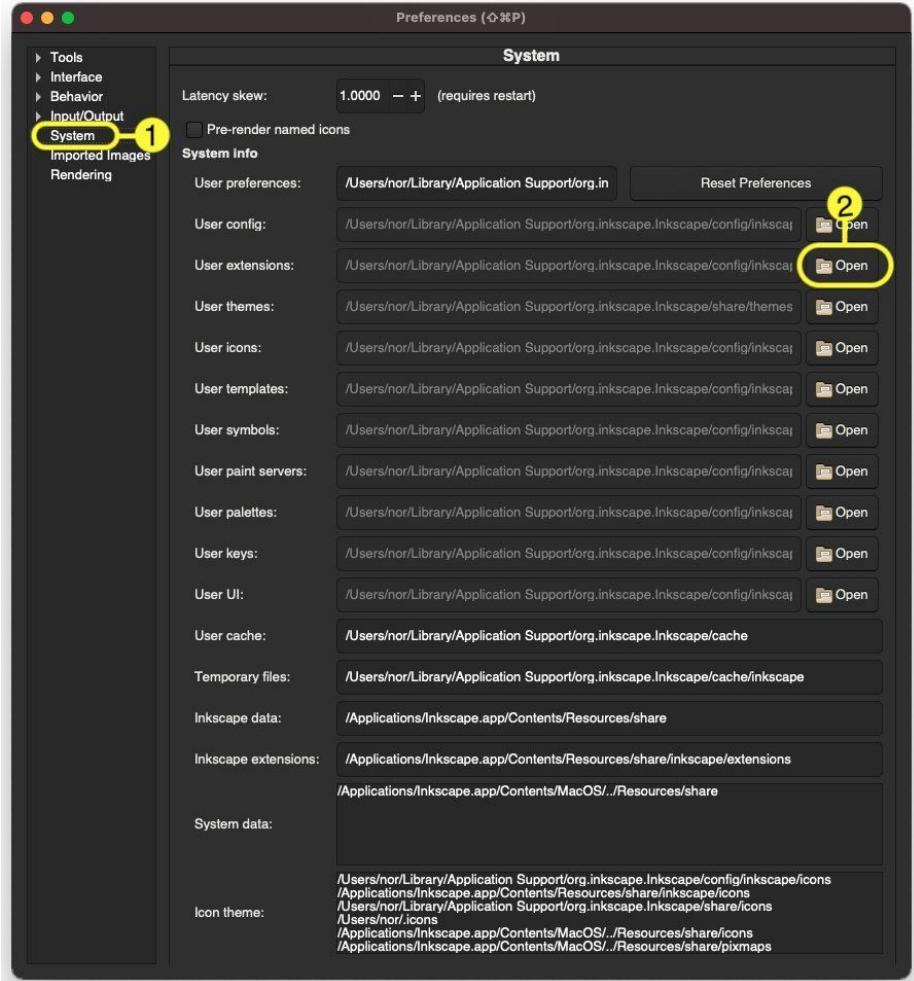
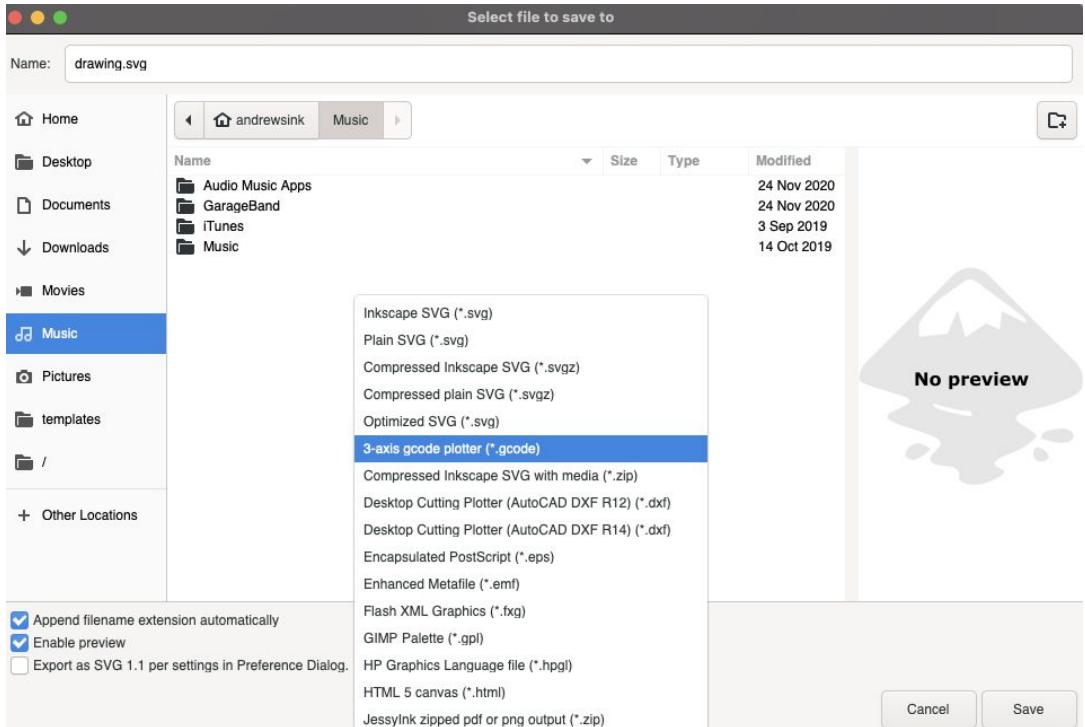


Image: Kyle Paul

Check Gcodeplot Plugin

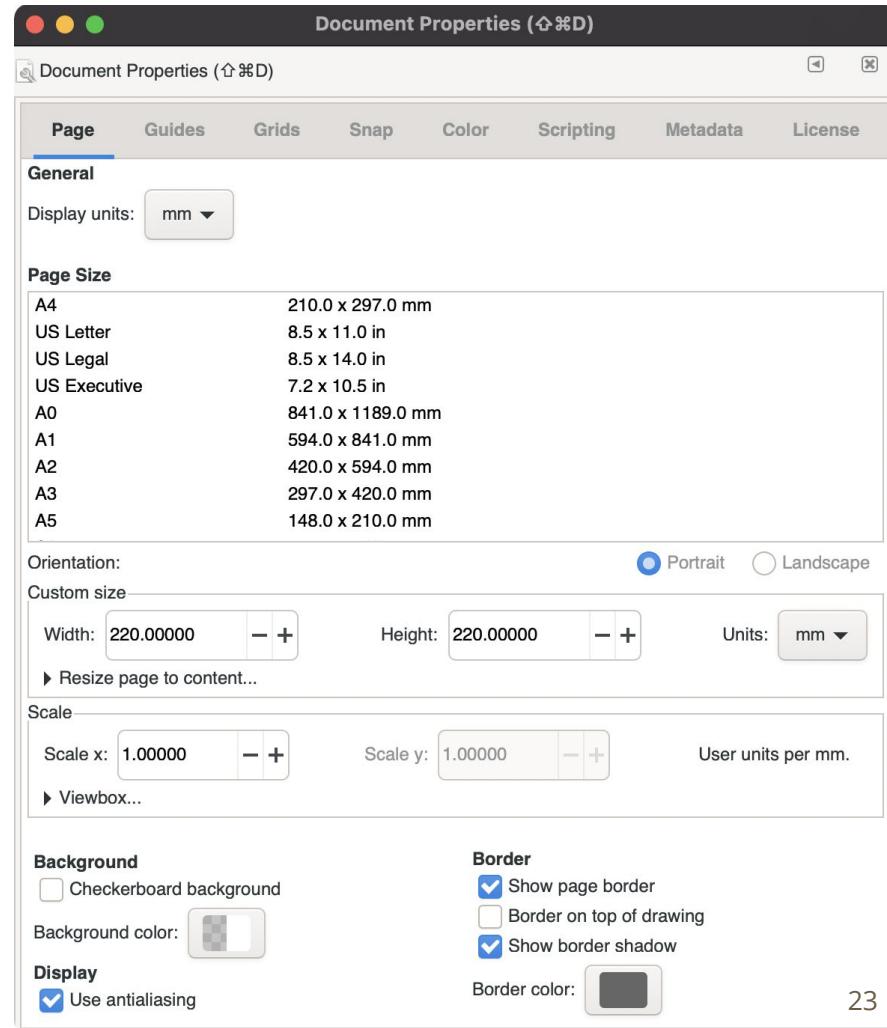
You can verify the plugin has been successfully installed by selecting “File”, “Save As”, and scrolling through the extensions until you see “3-axis gcode plotter (*.gcode)”.

If you see this extension available, you’re ready to get Inkscape set up to start making plotter art!



Inkscape Document Settings

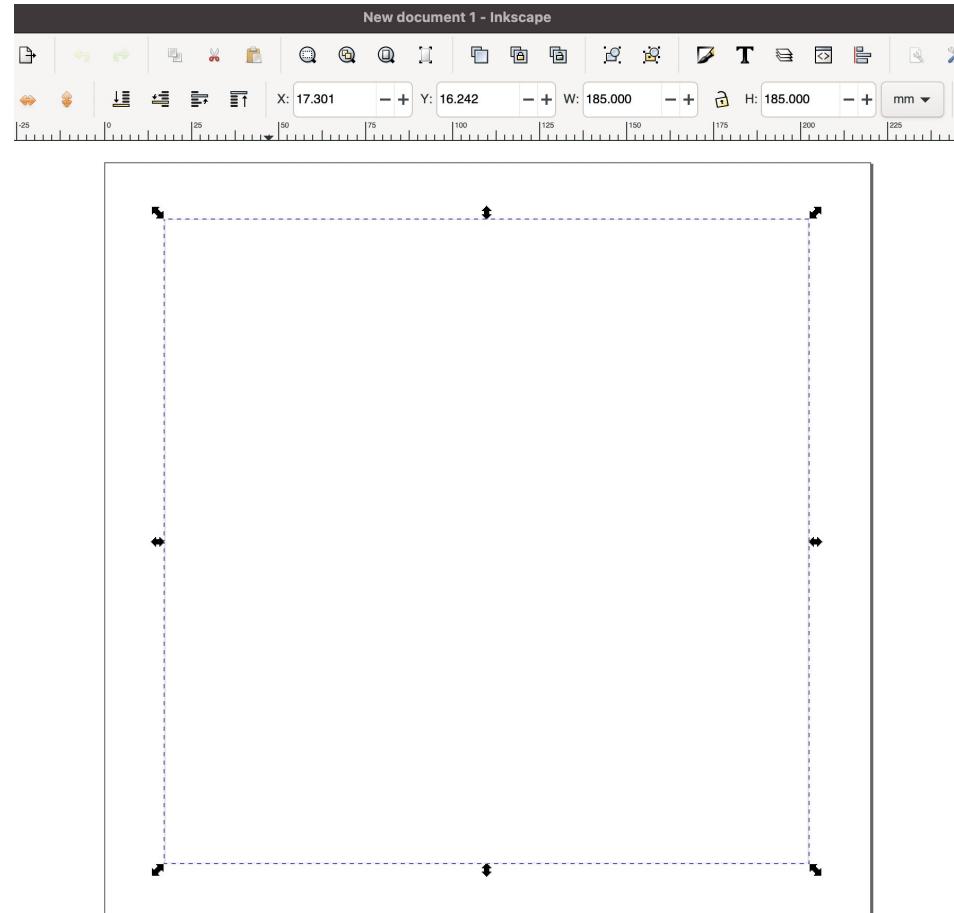
To create your canvas, set the width and height to match the X and Y size of your printer. In this example, I'm using a Creality Ender 3 so I have set my width and height to 220 and 220.



Inkscape Document Border

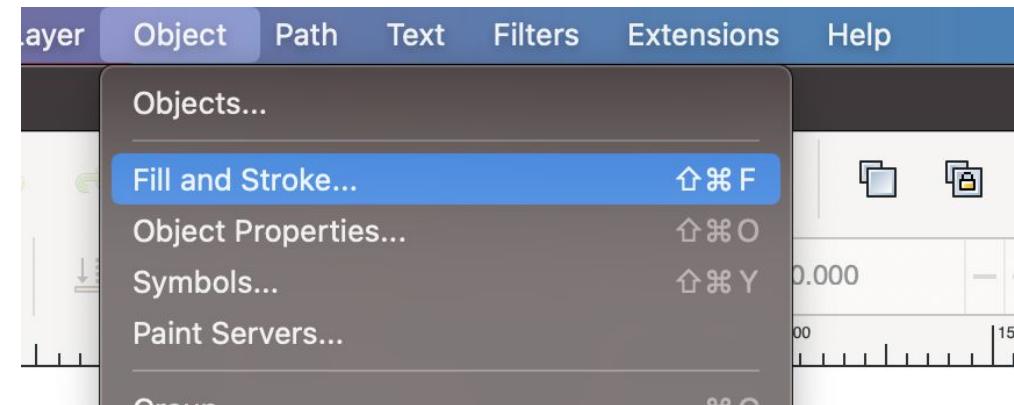
To prevent the pen from colliding with the binder clips, add an internal border to the document to plot inside.

Creating a centered rectangle with a height and width of 185mm is a good default to use.



Inkscape Document Settings

Once you've created your border, it's time to edit the Fill and Stroke parameters. This will allow Inkscape to export your art as plottable lines.



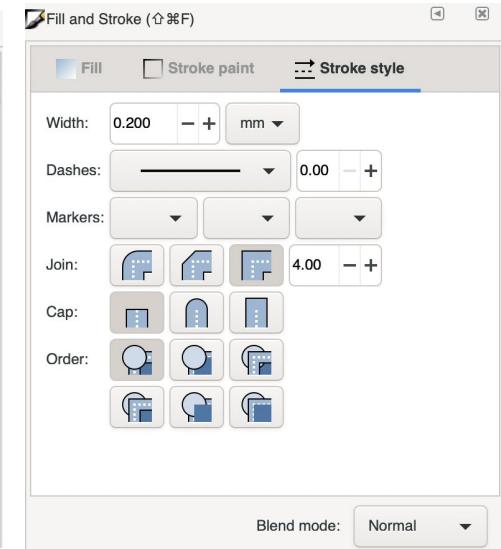
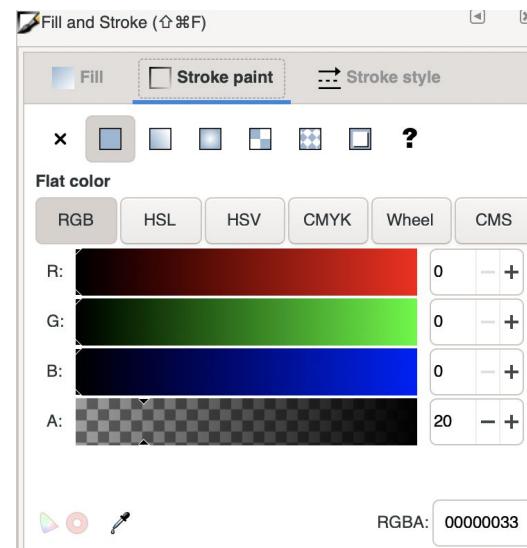
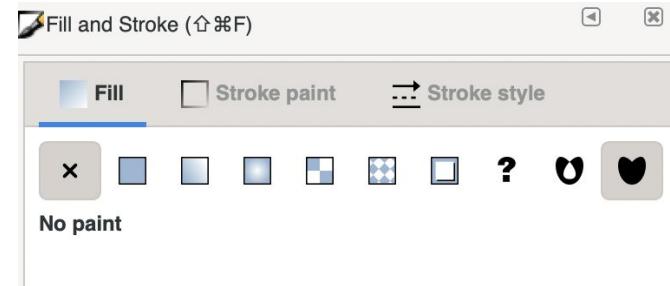
To enable this menu, select “Fill and Stroke” under Object after selecting your border.

Inkscape Document Settings

Disable fill by selecting “No paint” under Fill.

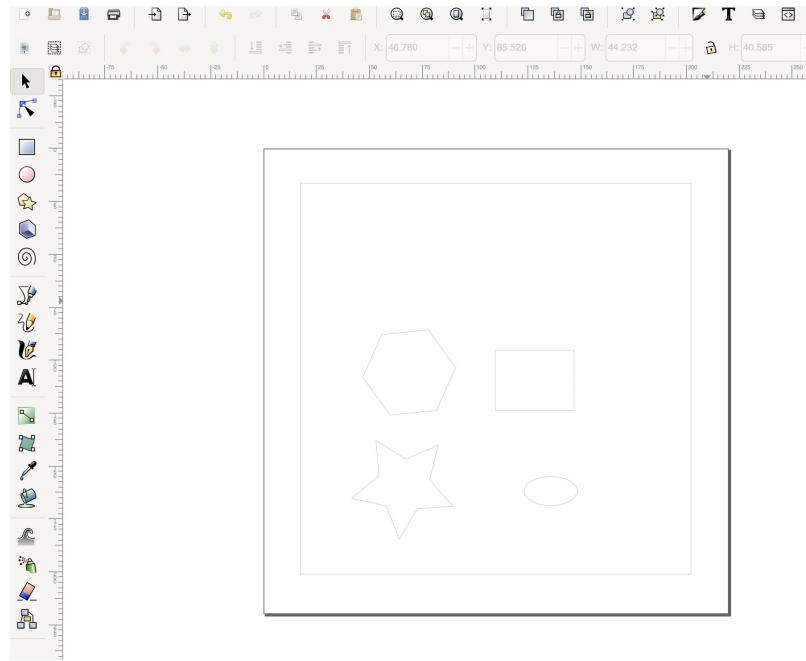
Stroke Paint should be set to “Flat Color”, with the settings provided to create a light grey line.

Stroke Style should be set to a solid line, with the width set at .2mm. You can adjust this as needed depending on your pen width.



Create your Masterpiece!

You can either create an SVG from scratch in Inkscape, or import one that was made with a program that exports SVG files. Some examples to get you started can be found at the end of this guide.



Inkscape Export Settings

General Settings Fitting and Extracting Drawing Settings Cutting Settings

Tool mode: drawing ▾

Precision (mm): 0.050 - +

Left x-coordinate (mm): 15.0 - +

Lower y-coordinate (mm): 15.0 - +

Right x-coordinate (mm): 220.0 - +

Upper y-coordinate (mm): 220.0 - +

Work z-coordinate (mm): 0.10 - +

Lift z-height (mm): 1.50 - +

Parking z-height (mm): 10.0 - +

Movement speed (mm/s): 150.0 - +

Draw speed (mm/s): 25.0 - +

Z-speed (mm/s): 15.0 - +

Here are the settings I use when exporting from Inkscape. You can adjust the Movement Speed and Draw Speed if you want to slow down or speed up your prints.

GcodePlot

General Settings Fitting and Extracting **Drawing Settings** Cutting Settings

Shading threshold: 0.90 - +

Lightest shading spacing (mm): 2.0 - +

Darkest shading spacing (mm): 0.5 - +

Shading angle (degrees) 45.0 - +

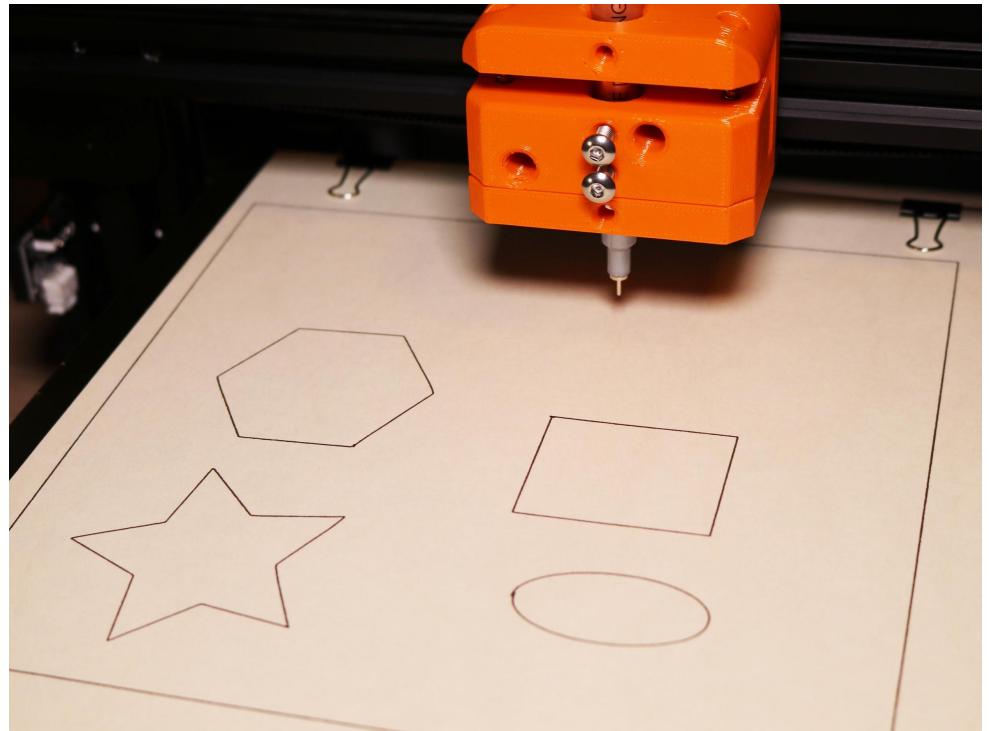
Crosshatching

Optimization time (sec.): 120 - +

Preferred drawing direction (degrees): none ▾

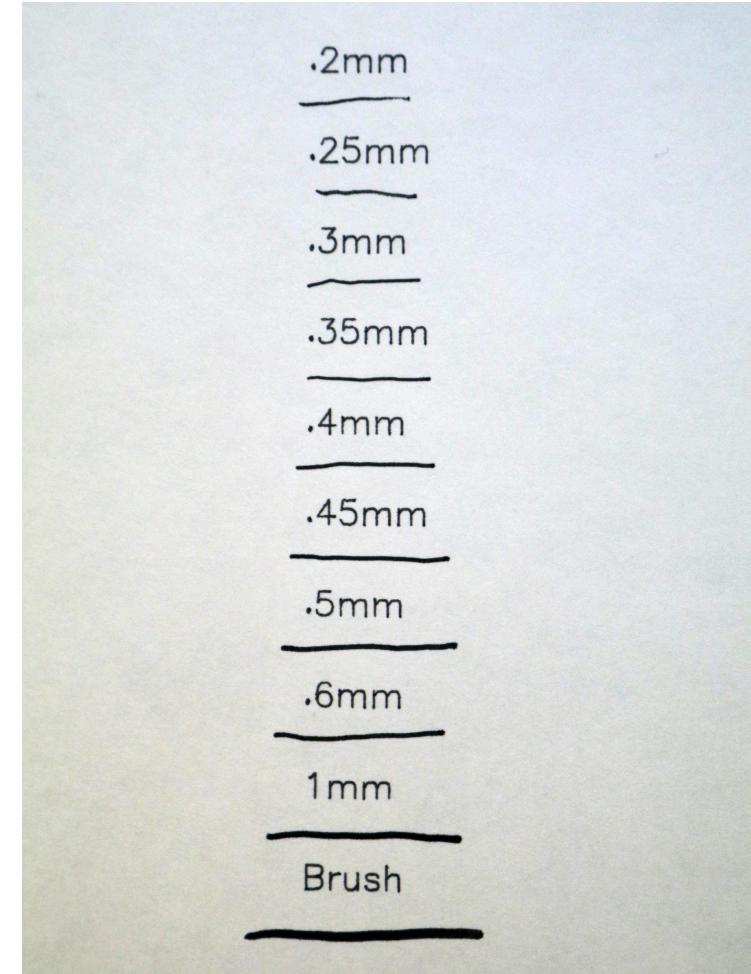
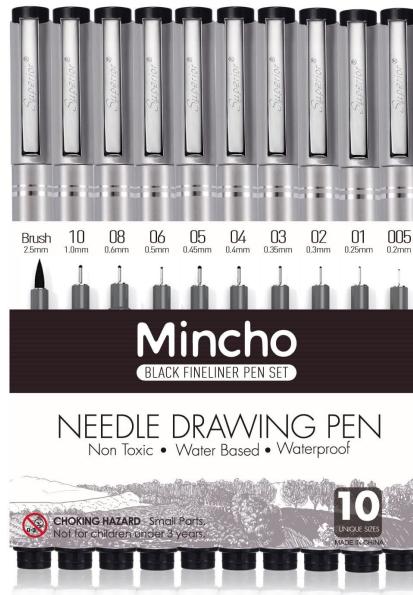
Start Plotting!

Once you've exported a .gcode file from Inkscape, save it to an SD card and start plotting!



Have Fun and Experiment

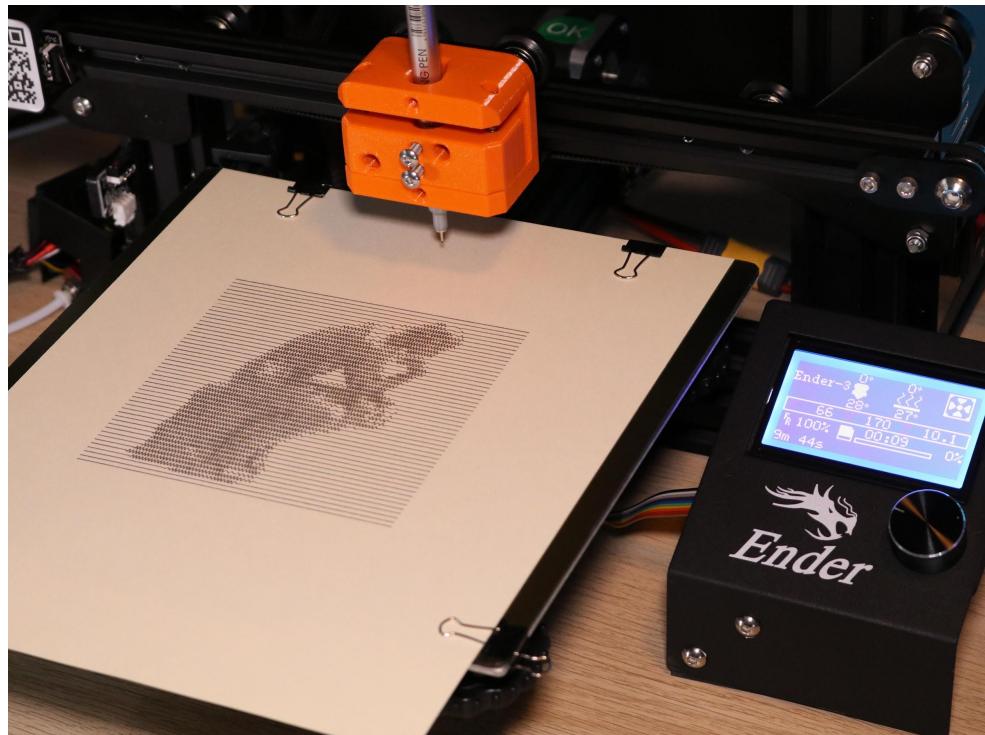
The pltr is designed to accommodate a wide variety of different writing implements, but you can get consistent results by using a fine-liner needle drawing pen for detailed plots. The Mincho pens (available on Amazon) are an inexpensive way to try various widths and you can see the difference between these pens in the image to the right.



Further Reading

Once the pltr v2 toolhead is installed, it's time to start making some vector-based art of your own! For some fun plotting ideas, check out the sites below to get started!

- [SquiggleCam](https://msurguy.github.io/SquiggleCam/)
<https://msurguy.github.io/SquiggleCam/>
- [Slopes](https://tinkersynth.com/)
<https://tinkersynth.com/>
- [PlotterFun](https://mitxela.com/plotterfun/)
<https://mitxela.com/plotterfun/>
- [STL to SVG](https://plotter.vision/)
<https://plotter.vision/>



Troubleshooting

As much fun as plotting is, sometimes things can go a little sideways. Here's a quick guide that covers some common problems.

Problem: Lines appear to merge together.

Solution: For finely detailed plots, use a fine width pen (.2mm) to capture detail.

Problem: Letters/lines aren't even during plotting.

Solution: Calibrating the bed to all four corners with the pen installed is the best way to ensure an even application of ink across the surface.

Problem: Writing implement requires a rigid mount that doesn't move.

Solution: The pltr has two additional mounting holes on the top and bottom of the base attaching a rigidly mounted implement.

Thanks!

Questions? Reach out!

hello.pltr@gmail.com

User Guide
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