How to check the accuracy of your filament drive

In this guide we will look at our filament drive's steps per mm. This will affect the amount of filament extruded.

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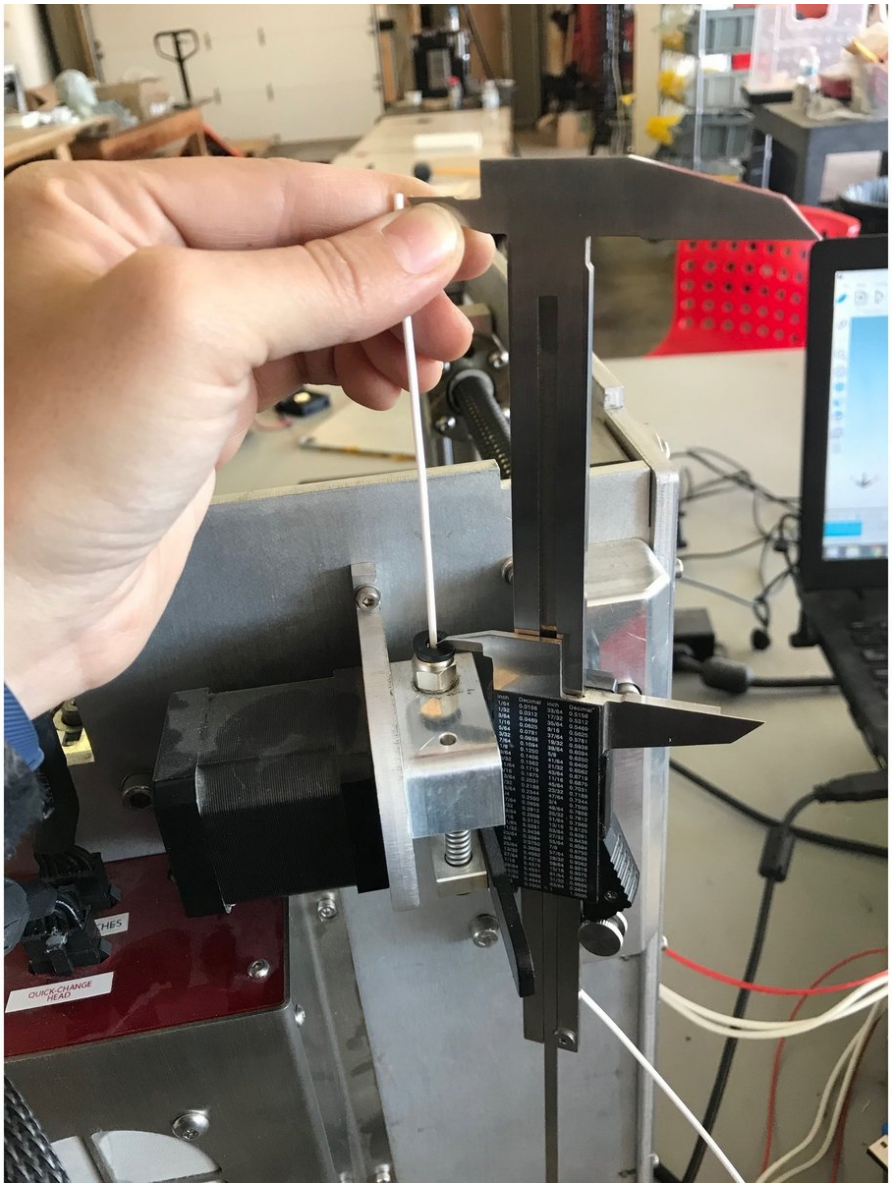

INTRODUCTION

Your filament drive's steps per millimeter setting can vary slightly BoXZY to BoXZY. This setting ensures that when you tell the BoXZY to extrude a specific amount of filament it does precisely that. No more and no less. It is part of of your BoXZY's firmware. Please take the time to go through this guide if you have recently updated your BoXZY's firmware, or have replaced any parts of your filament drive system. Also its a good place to start when troubleshooting under / over extrusion issues. To find the most current version of the Arudino and Eeprom firmware click here

TOOLS:

- Digital Caliper (1)

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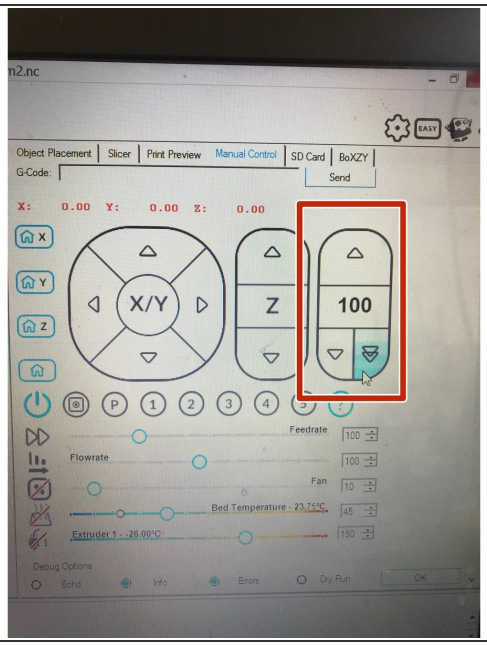
Step 1 — Load Filament into filament drive

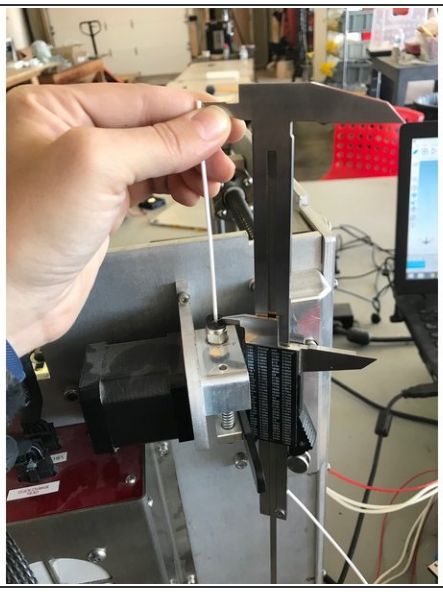
- Load a length of filament into your filament drive. Stop when the filament is flush with the top of your filament tube connector, as shown in the pictures.
- You want the end you loaded to have a nice clean edge to it. Use snips to clip of the tip of the filament if needed.

Step 2 — Extrude 100 mm of filament



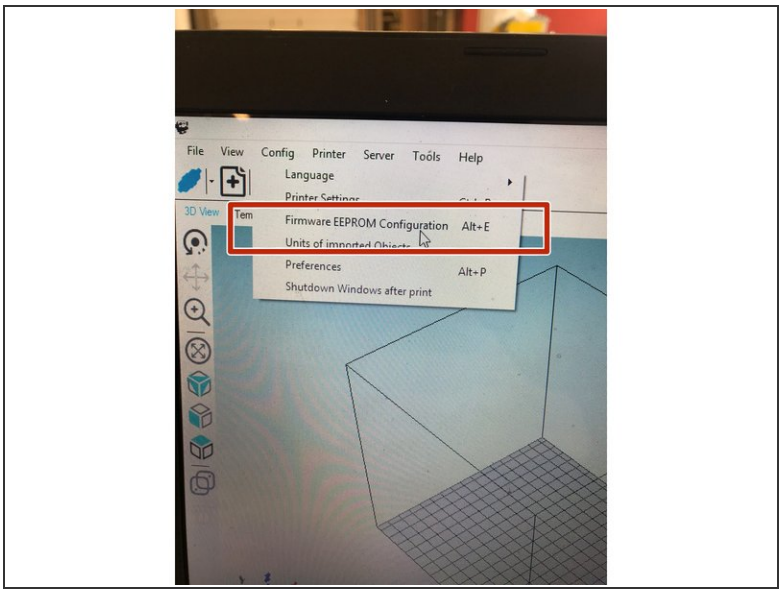
- Extrude 100 mm of filament using the arrow keys in your BoXZY Interface's Manual Control tab.

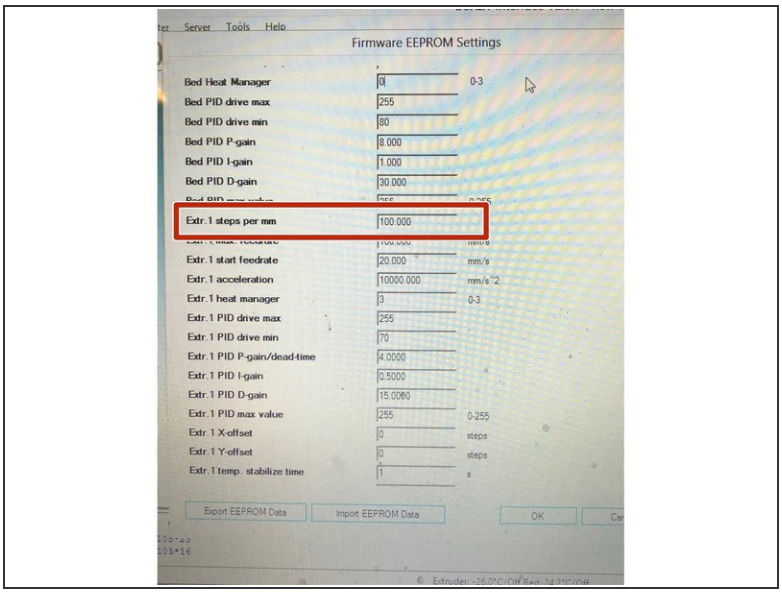
Step 3 — Measure the extruded filament



- Measure in mm the extruded filament from the tip of the filament to the top of the filament tube connector.
  - This needs to be a very precise measurement. Its highly recommended to use a quality pair of calipers.
- In this example you can see that our calipers are measuring 98.89 mm.
- In this case we will need to make an adjustment. What we are aiming for is to have the filament drive extrude the exact length of filament we are telling it to. So when we click 100 mm in the manual control tab, we want to measure 100 mm of filament.

Step 4 — Find Steps per mm setting in the Eeprom firmware

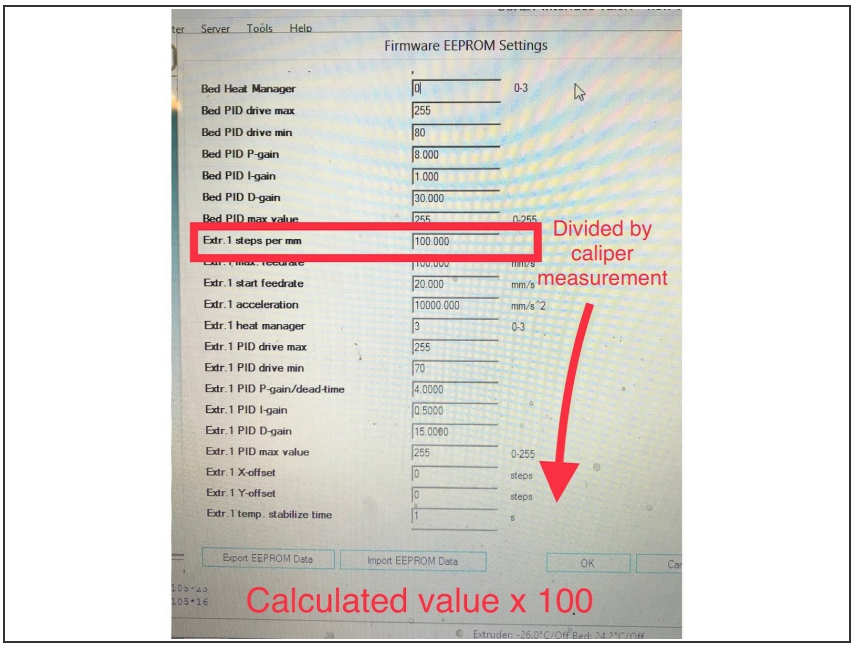




- Click on the Config tab at the top of your BoXZY interface and select **Firmware Eeprom Configuration**.
- A new window will appear. Scroll down until your find where it says **Ext. 1 steps per mm**

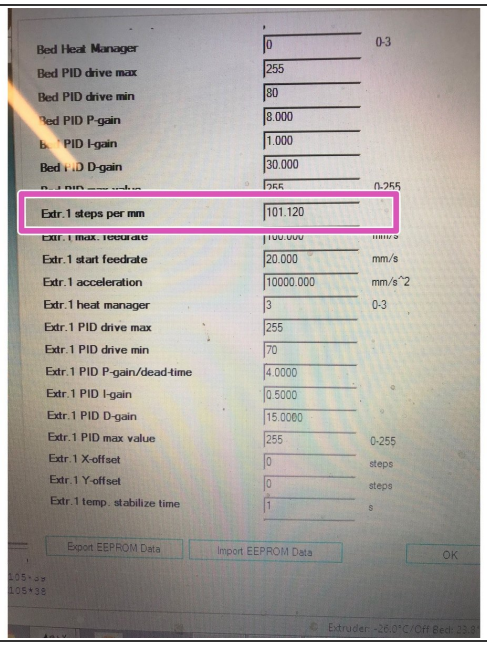
⚠ Your firmware has been thoughtfully set up to help your BoXZY function the best it can. We do not advise you to change any of the other settings in this window. They are set they way they are for a reason.

Step 5 — Calculate adjusted Ext. 1 steps per mm value



- Take the original Ext. 1 steps per mm value and **divide** that by the measurement of the filament your just extruded in mm
- Then take that number and **multiply** it by 100.
- In this example my Ext. 1 steps per mm is 100. I'm going to divide that by 98.89 which is the length of extruded filament that I measured with my calipers.
  - 100 / 98.89 = 1.0112
- Finally I will take that calculated value of 1.0112 and multiply it by 100
  - 1.0112 x 100 = 101.12
- 101.12 is our new adjusted Ext.1 steps per mm.

Step 6 — Substitute your calculated Ext. 1 steps per mm into the Eeprom firmware



- After entering the calculated Ext1. steps per mm click OK at the bottom of the window. This will save the value into BoXZY's firmware.

Step 7 — Remeasure and adjust as needed.

- Once you have saved your firmware setting check your work. Repeat steps 1 - 3.
- If your measurements and calculations were spot on then your length of filament extruded should measure 100.00 mm. The more precise you are the better your 3d prints will look.

Step 8 — Repeat entire process at least 1 or 2 more times, more if needed

- Don't expect your measurement and/or calculation to be perfect the first time around. We are dealing with fractions of a mm. I would aim for an accuracy of + or - 0.05 mm on your final 100 mm measurement.