Firmware Installation Instructions

For Proto-Plastik Marlin-based controllers

Before you start

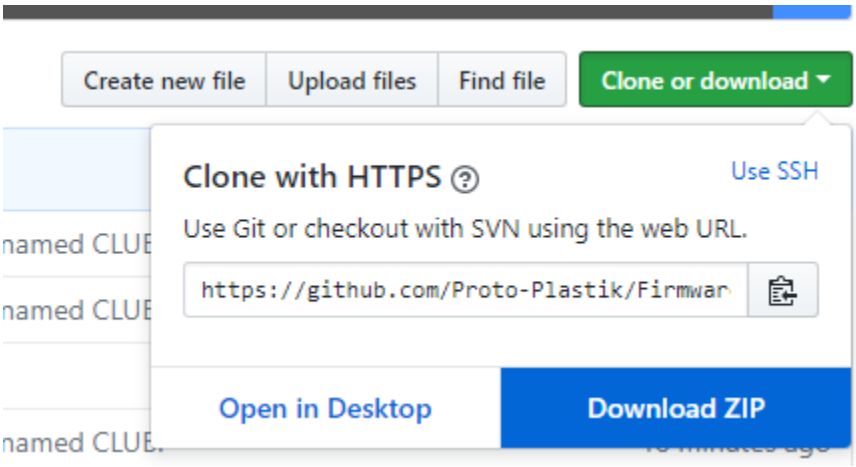
If you are using a RMPS 1.4 (Arduino + RAMPS shield) it should be fully assembled. You do not need to power the board but you do need the USB cable that came with the board. DO NOT plug in the cable at this time.

You will need the following applications installed:

- The **Arduino IDE** (Windows). You will need this to compile and upload the Marlin firmware onto the RAMPS 1.4 board or the MKS Base 1.5 board.
    - Download and install the latest IDE here https://www.arduino.cc/en/Main/Software
    - This will also install the USB driver
- **Repetier Host** for printer controller software.
    - https://www.repetier.com/
    - Note: you may also use other printer controller software such as Matter Control. However, all instructions here will use Repetier. Other software should provide the same functionality.

Download the Marlin firmware for your printer from the Proto-Plastik github repository.

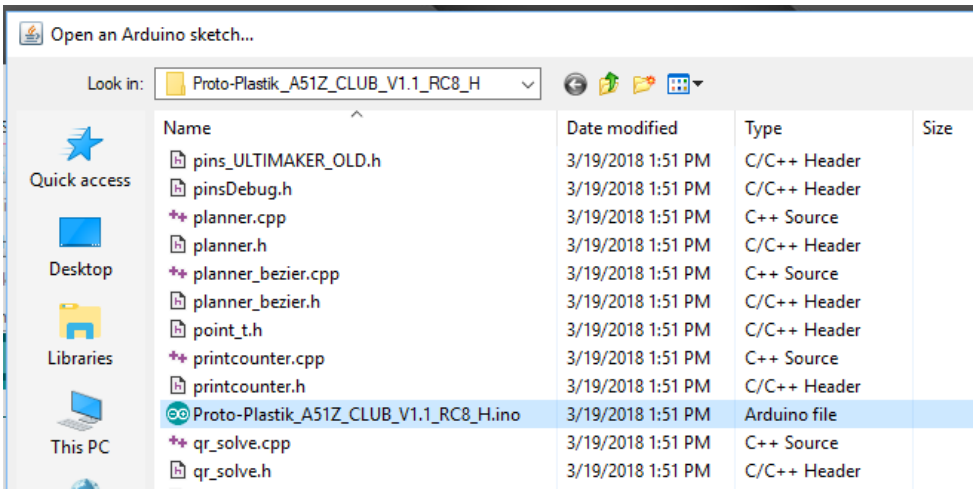
- https://github.com/Proto-Plastik/Firmware
- Click the **Clone or download** button at the upper right of the repository. Select Download ZIP



- In your download location, you will see a .zip file called **Firmware-master.zip**. That .zip file will contain firmware for all Proto-Plastik 3D printers. Unzip the firmware matching your printer.

Firmware Installation

- Plug the controller into the computer with the supplied USB cable. Do not plug in the power cable at this time. The controller should be recognized by your computer and will show up as a com port (e.g. COM4). The light on the controller will blink slowly.
- Open up the Arduino IDE
- Navigate to the folder where your firmware is located
- Select the file with the .ino extension

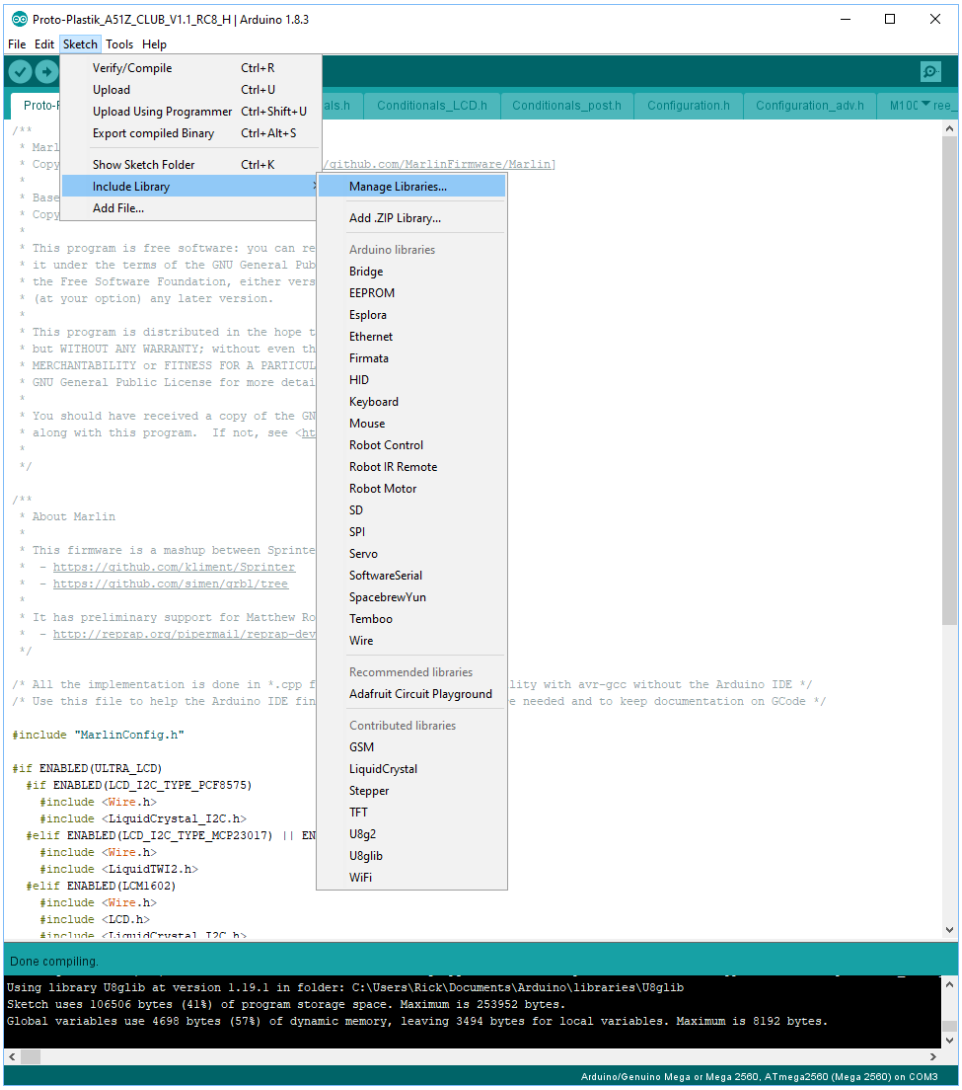


Configure Arduino IDE

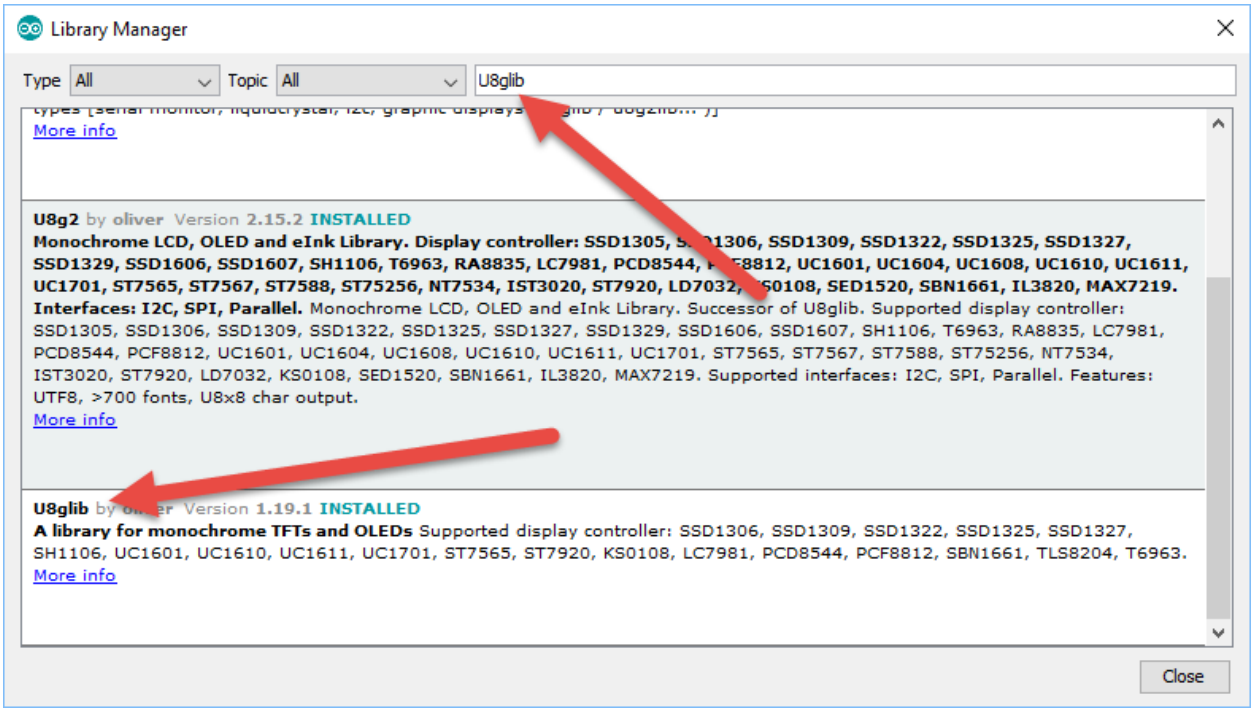
If the IDE has never been installed before, you will need to add one additional library called **U8glib**.

To add this library:

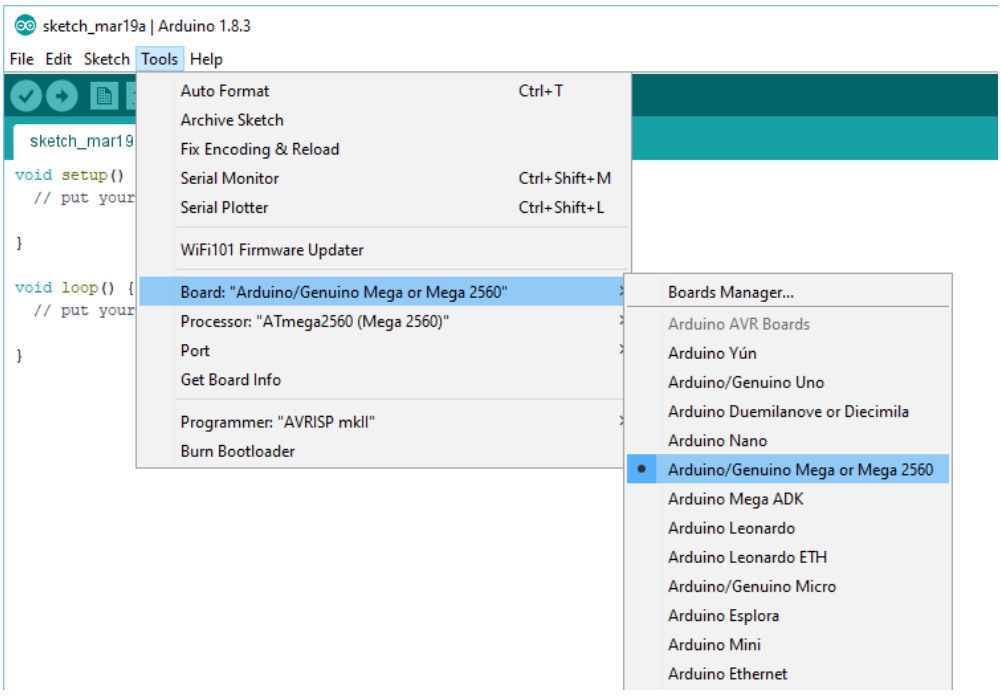
- In the IDE, go to the Sketch->Include Library->Manage Libraries



- In the dialog search bar, type in **U8glib**. The library will show up in the list (it is shown as installed here). Click anywhere in the box and an Install button will appear. Install the library.

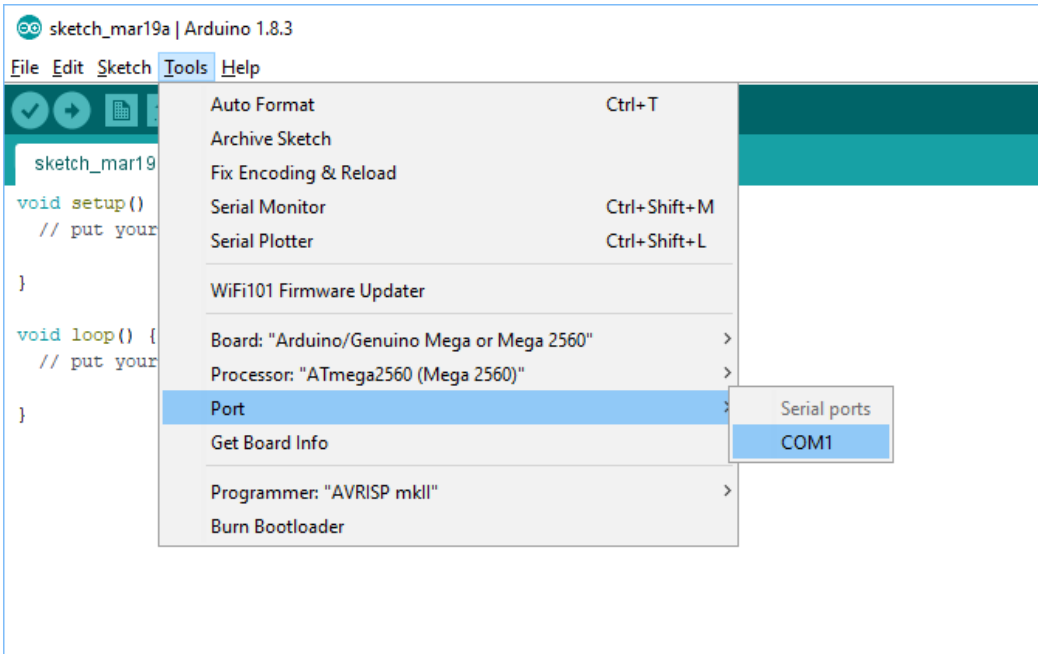


- Next, ensure '…Mega 2560' is selected and that the Processor is also ATmega2560

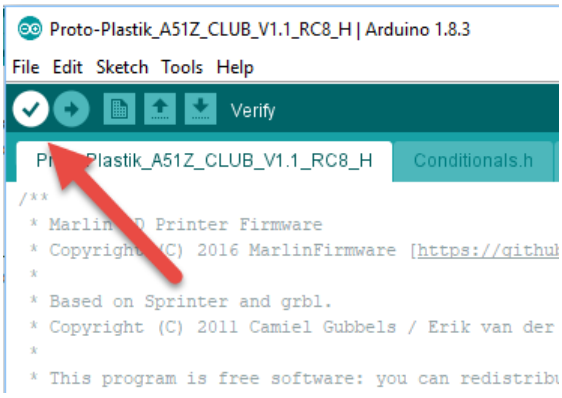


Compile and Upload the Sketch

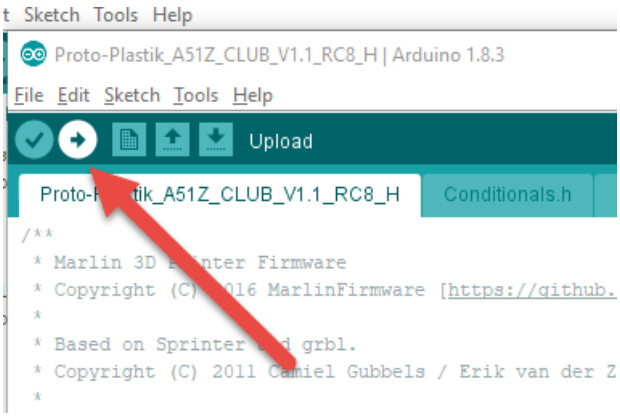
- Select the COM port that was automatically set when you plugged the board in. Note, it is unlikely that it would be COM1.



- Select the **Verify** icon to compile the firmware. You will see an indication at the bottom that says **Compiling Sketch**.



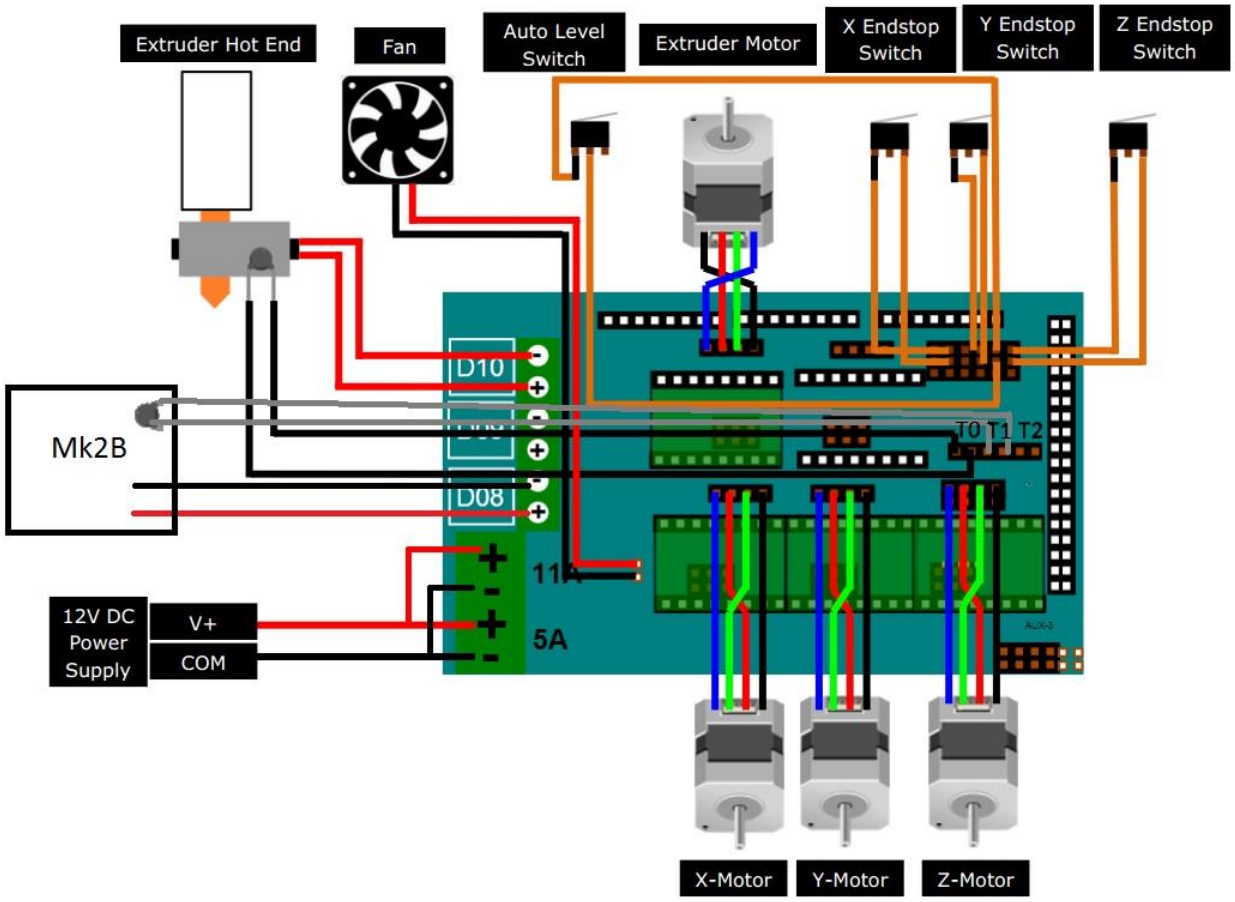
- Once the message 'Done compiling' appears at the bottom, select the **Upload** icon



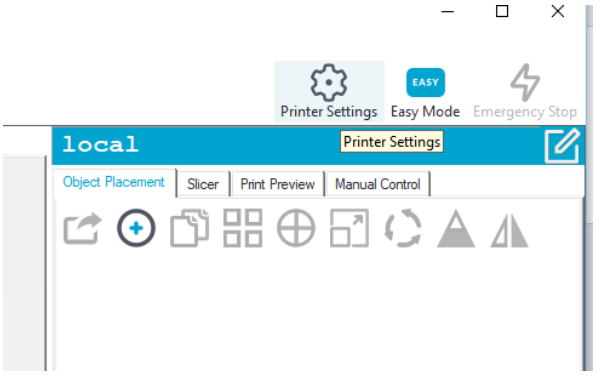
- While uploading, the light on the RAMPS board will blink rapidly until the upload is complete.
- When the upload is complete, the light on the RAMPS board will turn off.

Testing the Firmware

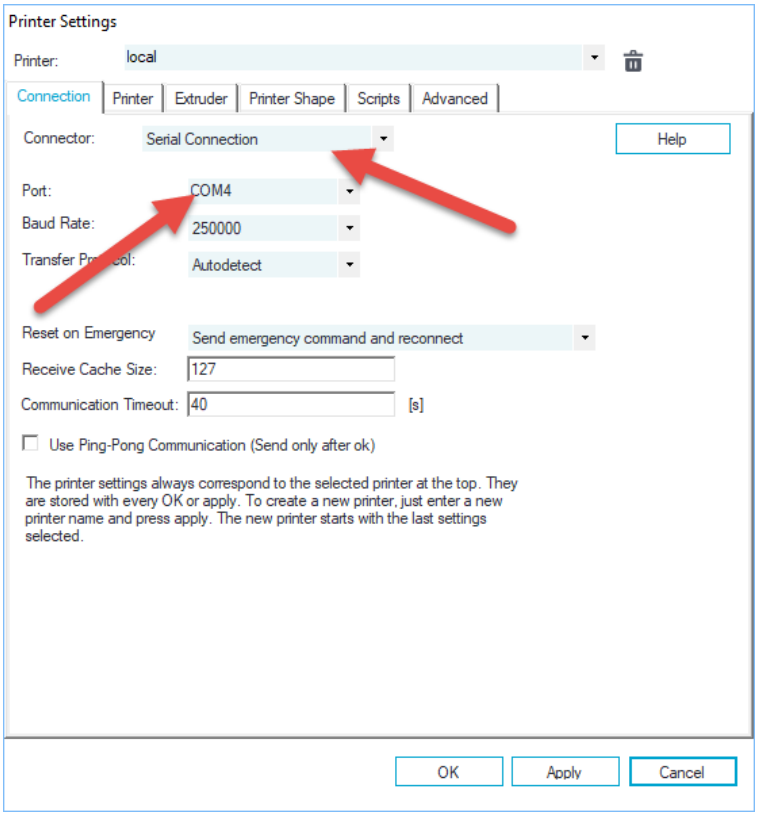
To test the firmware, you need to attach all wires from your printer into the appropriate locations. The diagram below shows a typical setup. Note optional Endstop switches. Connect power as shown below.



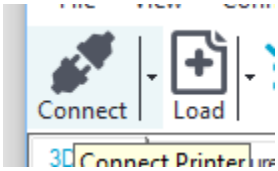
- Connect USB cable
- Open Repetier Host software
- At the upper right hand side, select the **Printer Settings** icon



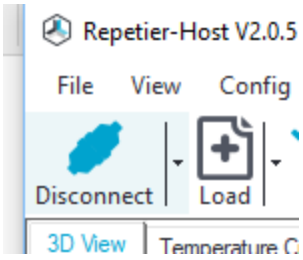
- In the window that appears, select **Serial Connection** then select the COM port that matches the COM port of your printer (typically NOT COM1). Leave the rest at the default. Click **Ok**.



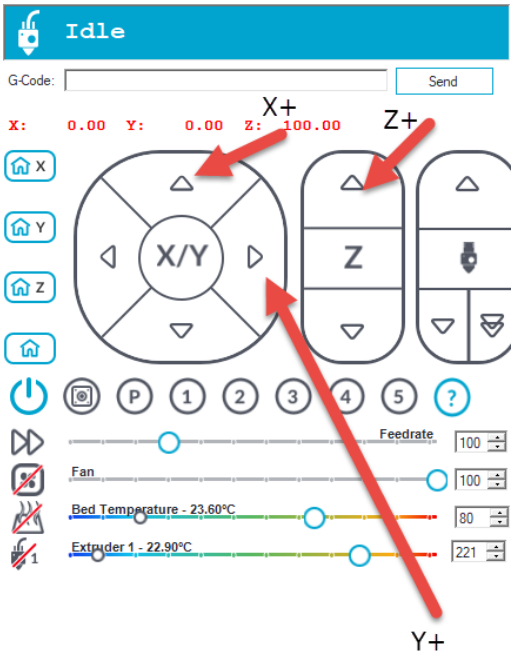
- In the upper left window, select **Connect**



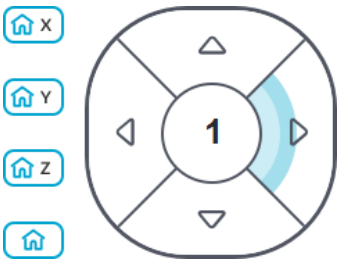
- Once successfully connected, the icon will change



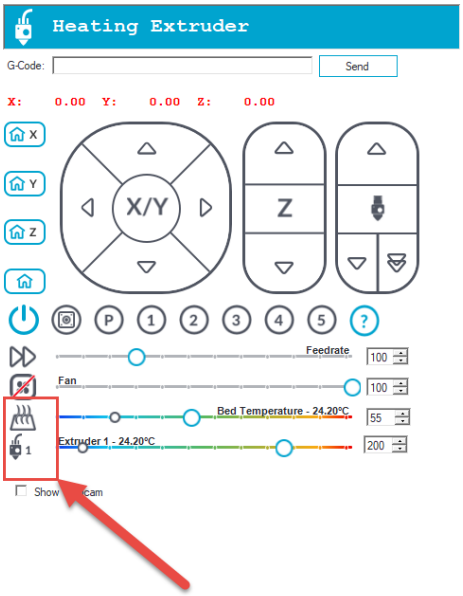
- On the righthand side, select the **Manual Control** tab. Use the Manual Control to move the printer in the X, Y, and Z axes.



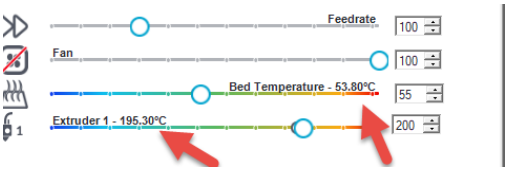
- Start with SMALL increments first to verify movement in the correct direction. X+ moves the print carriage to the right, Y+ moves the bed forward toward the front, Z+ moves the print carriage up. If any of the axes go in the wrong direction, turn the connector on the board 180 degrees for that axis.



- Test the hot end and heated bed. Note that you should be reading an ambient temperature between 20C and 30C. For both the heated bed and hot end. If you have a reading of zero or a reading well over 30C, you will need to verify connection of the thermistors and make sure there are no broken wires.



- After a few seconds, you should notice the temperatures on both the hot end and heated bed starting to rise. Also, the fan on the power supply may start up. That's normal. There will also be red LED indicators on the controller board.



- If all the tests pass, you may shut down the printer. You can do this simply by pulling the power supply's plug from the wall outlet or by clicking the hot end and heated bed icons in Manual Control to turn them off.

Printer Setup Instructions