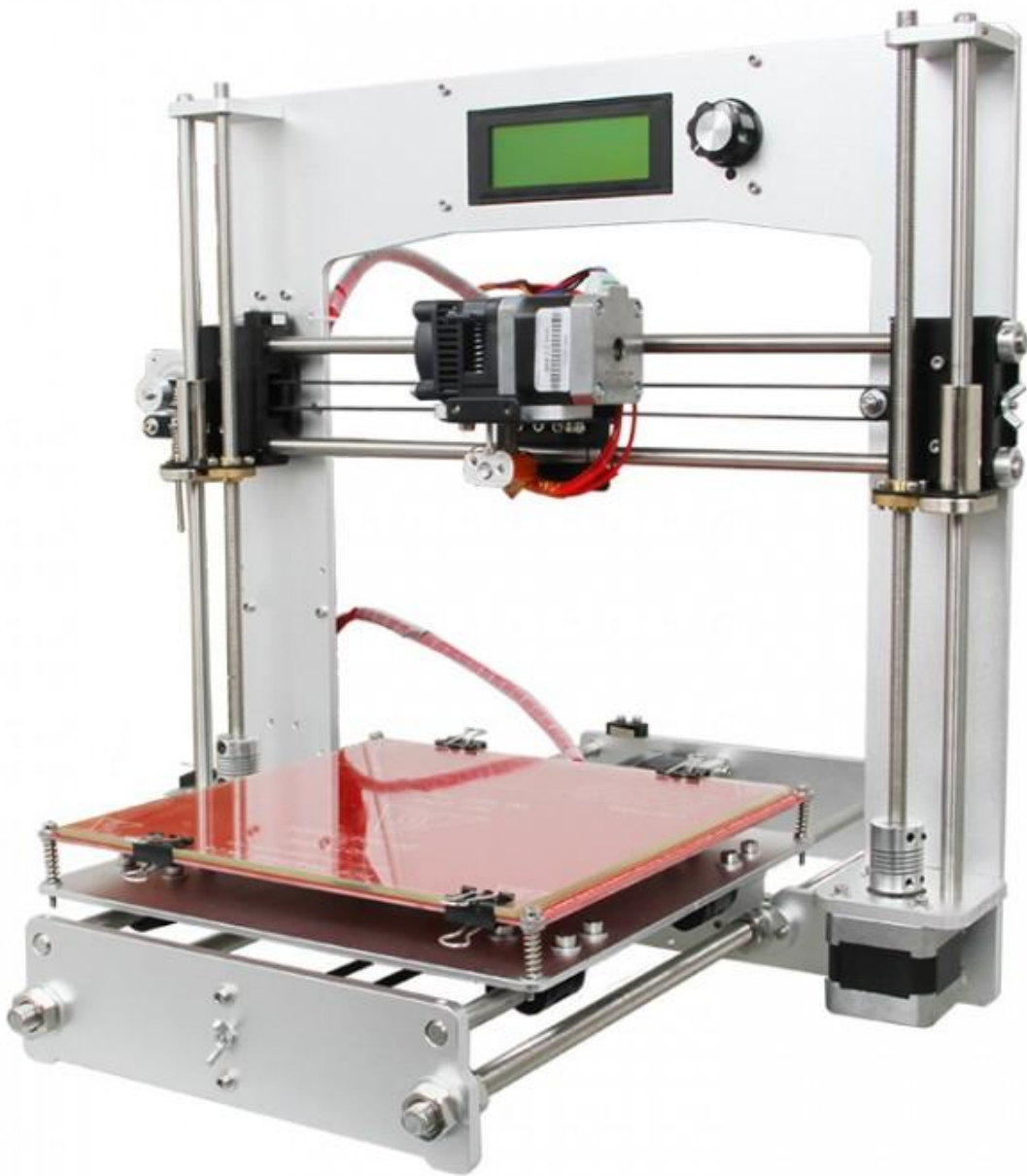


Geeetech Aluminum Prusa I3

User Manual



Safety Instructions

Building the printer will require a certain amount of physical dexterity, common sense and a thorough understanding of what you are doing. We have provided this detailed instruction to help you assemble it easily.

However ultimately we cannot be responsible for your health and safety whilst building or operating the printer, with that in mind be sure you are confident with what you are doing prior to commencing with building or buying. Read the entire manual to enable you to make an informed decision.

Building and operating involves electricity, so all necessary precautions should be taken and adhered to, the printer runs on 12V supplied by a certified power supply, so you shouldn't ever have to get involved with anything over 12V but bear in mind there can still be high currents involved and even at 12V they shouldn't be taken lightly.

High temperatures are involved with 3D Printing, the Extrusion nozzle of the hot end can run about 230 °C, the heated bed runs 110 °C and the molten plastic extruded will initially be at around 200 °C, so special care and attention should be made when handling these parts of the printer during operation.

Check the power input of the power supply unit. You can choose either 110V or 220V according to the Power regulation in your country.

We wouldn't recommend leaving your printer running unattended, or at least until you are confident to do so. We cannot be held responsible for any loss, damage, threat, hurt or other negligent result from either building or using the printer.

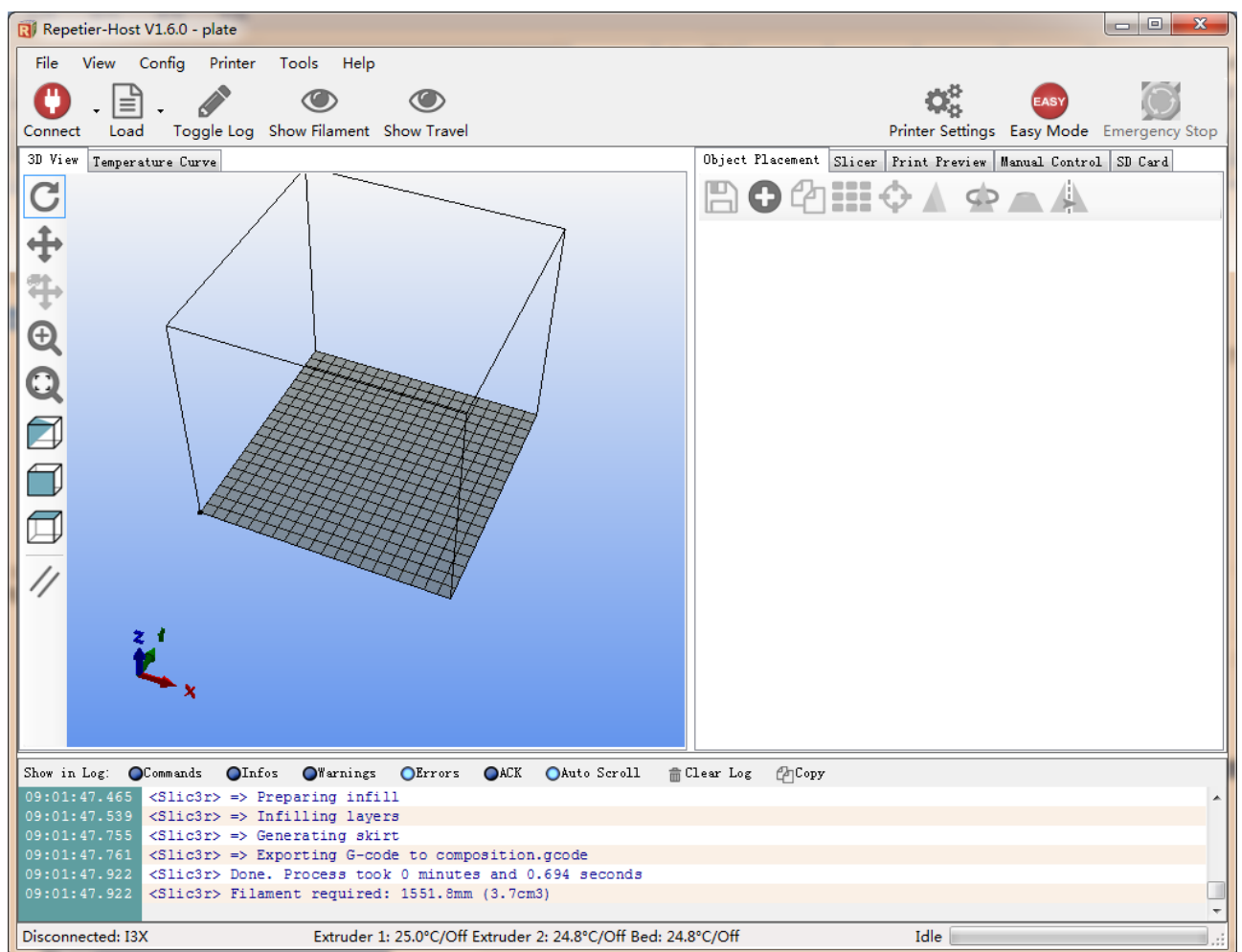
1 Software resources

1.1 Printer control software Repetier-Host

We use the latest Repetier host V1.6.0 as the printer control software, link for downloading:

<http://www.geeetech.com/wiki/index.php/Repetier-Host#Download>

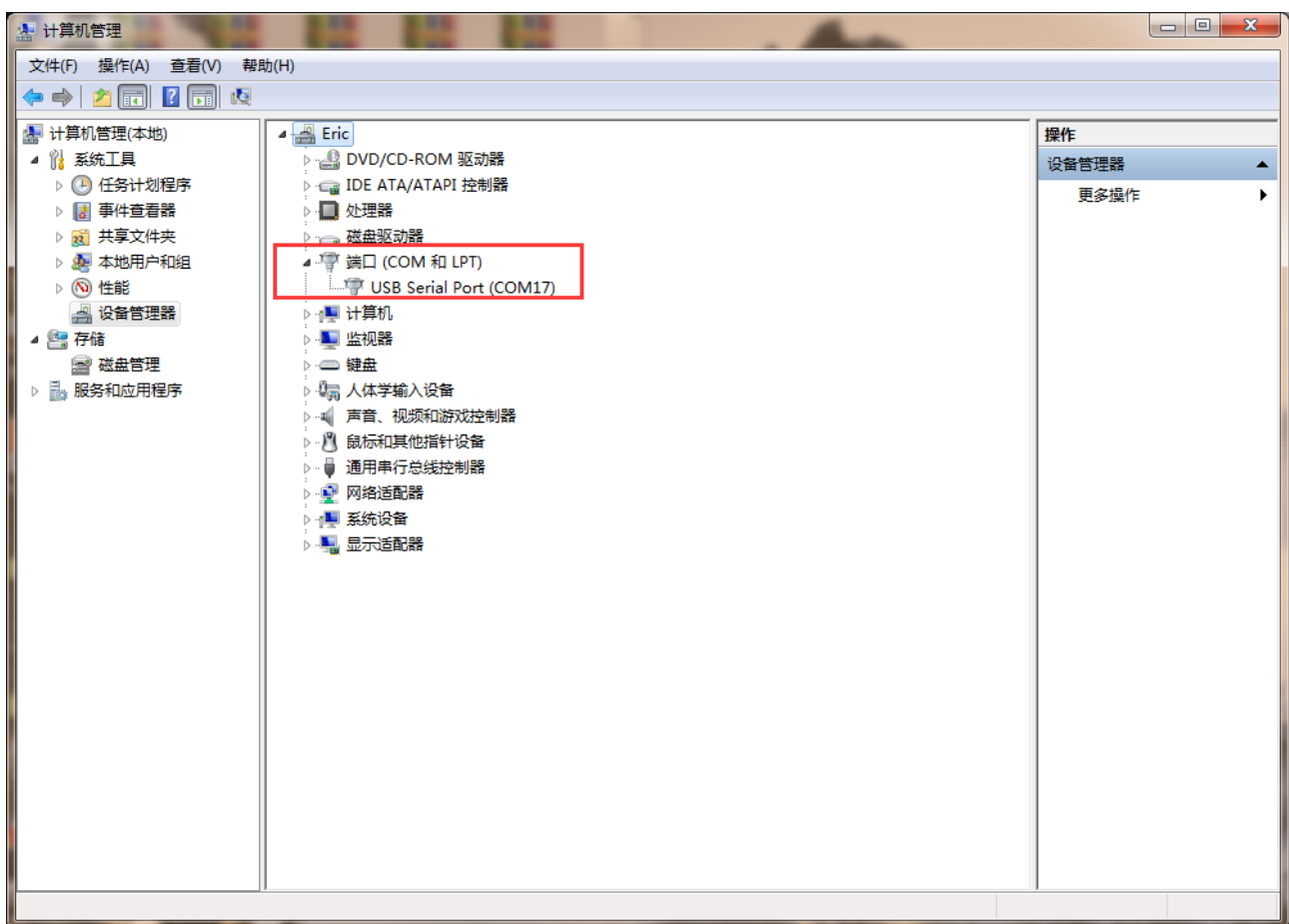
After downloading and installation, it can be used.



1.2 Driver

Connect the printer to computer with USB cable; the motherboard driver installer will automatically appear. If not, you can download FT232RQ [here](#), which is the driver of Sanguinololu:

Download and install, you can find the corresponding serial port in the Windows "Device Manager":



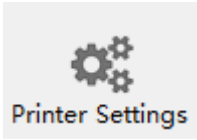
1.3 Arduino IDE

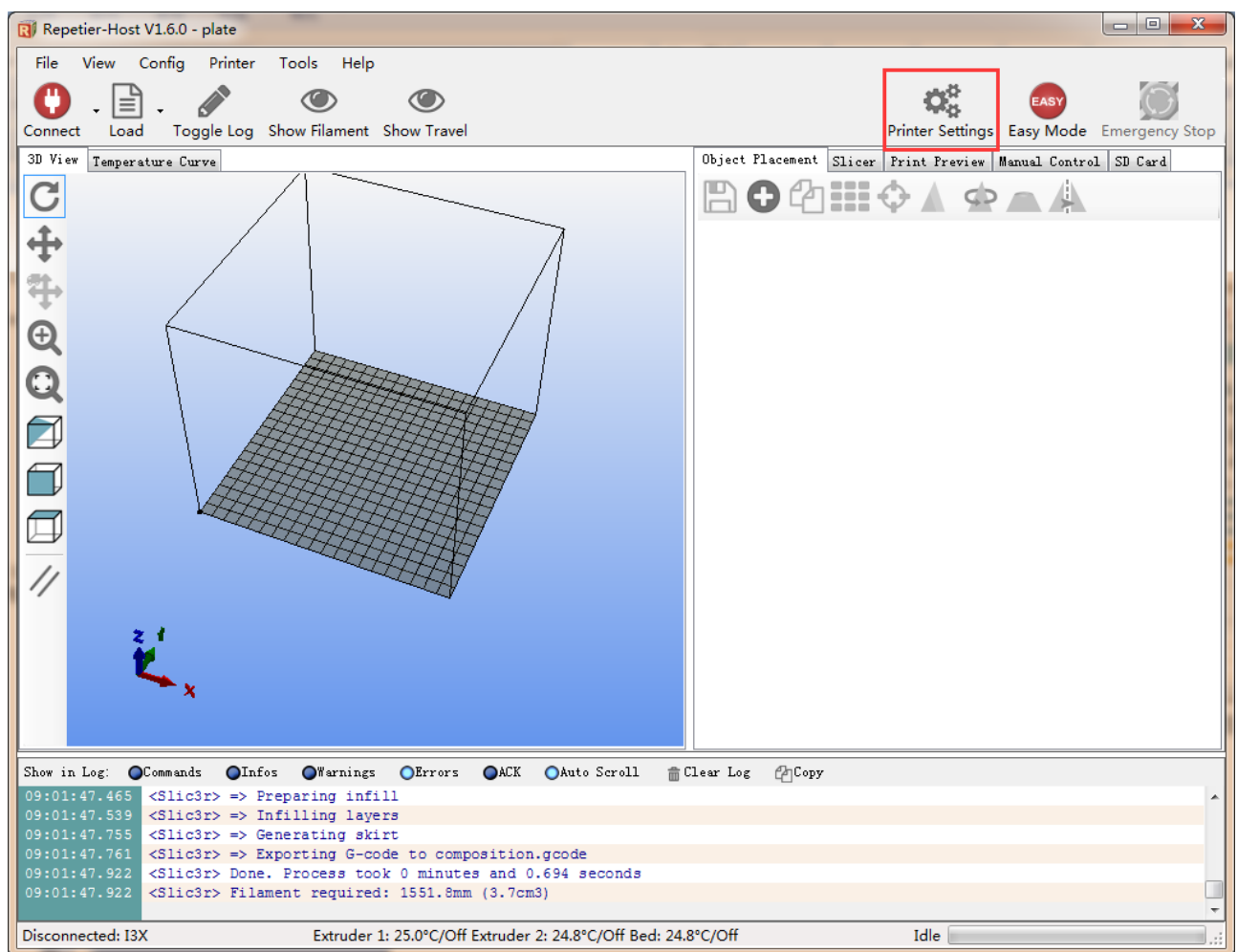
In the process of using the printer you may need to re-upload the firmware, and the software you need to use is Arduino, Arduino IDE 1.0.1.

How to upload firmware? [Please refer to FAQ.](#)

2 Connect the printer

After the above software is installed, we can connect the printer to the computer. Plug the USB into

the computer, open Repetier host, click the  icon in the top right corner, and the dialog box of printer settings will appear.



Select corresponding COM port of the printer and baud rate 250,000 in the dialog box. Click Apply after the setting, shown as below.

Printer Settings

Printer: I3 Aluminium

Connection Printer Extruder Printer Shape Scripts Advanced

Connector: Serial Connection

Port: COM28

Baud Rate: 250000

Transfer Protocol: Autodetect

Reset on Emergency: Send emergency command and reconnect

Receive Cache Size: 127

Communication Timeout: [s]

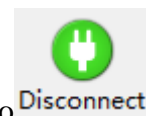
☐ Use Ping-Pong Communication (Send only after ok)

The printer settings always correspond to the selected printer at the top. They are stored with every OK or apply. To create a new printer, just enter a new printer name and press apply. The new printer starts with the last settings selected.

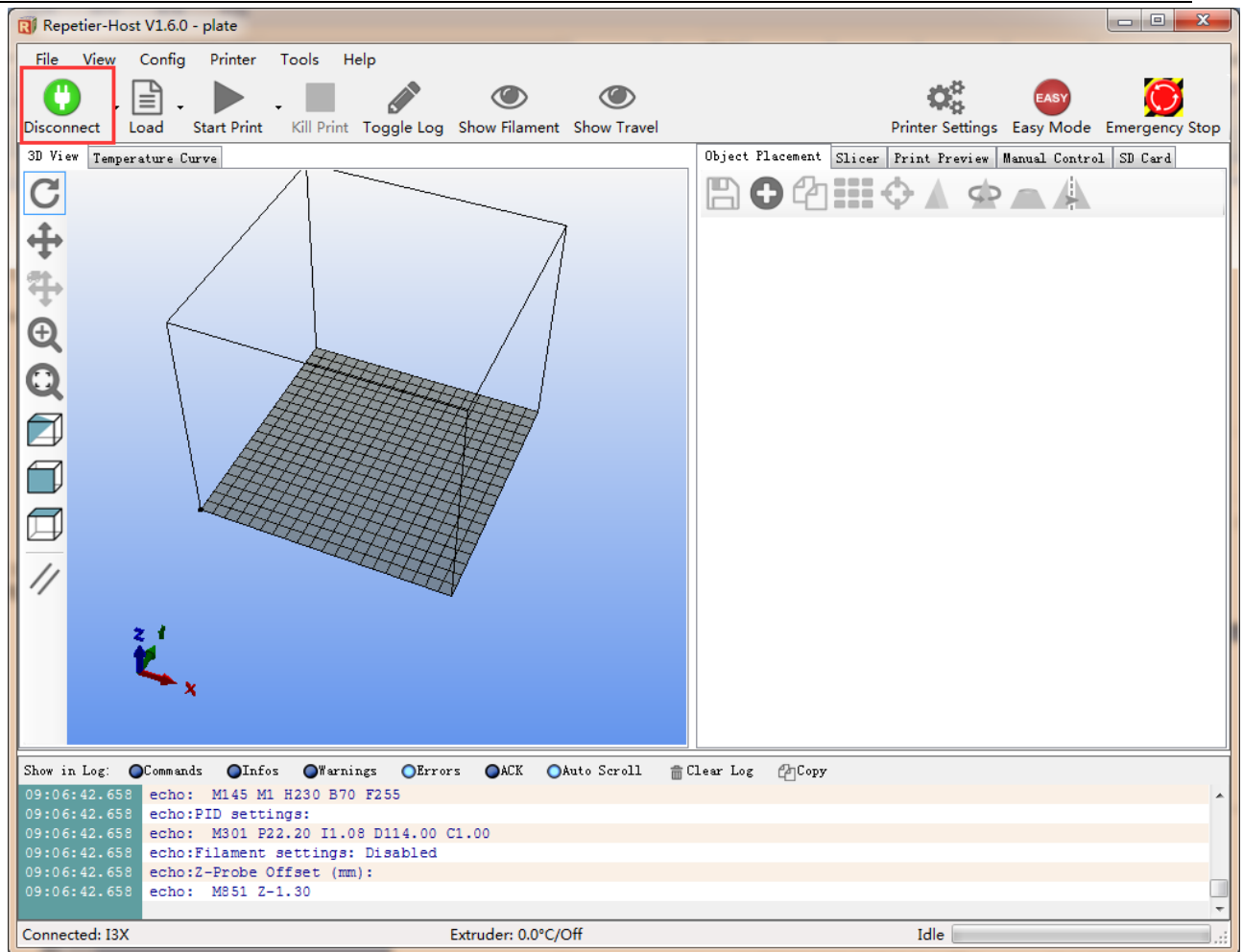
OK Apply Cancel



After setting, click the button in the top left corner of Home Page. When the button turns



green and changes into , the printer connection is successful.



3 Printer Setting

3.1 Printer speed

Set the running speed of printer as 1000 in the printer settings in order to avoid collision because of high speed during the test. After follow-up tests are completed it can be changed back to the original value. (Recommend speed of Z-axis should not be too high, 1000 is OK)

Travel feed rate: 1000mm/min

Z-Axis feed rate: 1000mm/min

Printer Settings

Printer: I3 Aluminium

Connection | **Printer** | Extruder | Printer Shape | Scripts | Advanced

Travel Feed Rate: 1000 [mm/min]

Z-Axis Feed Rate: 1000 [mm/min]

Manual Extrusion Speed: 2 20 [mm/s]

Manual Retraction Speed: 30 [mm/s]

Default Extruder Temperature: 210 °C

Default Heated Bed Temperature: 65 °C

☒ Check Extruder & Bed Temperature

☐ Remove temperature requests from Log

Check every 3 seconds.

Park Position: X: 0 Y: 0 Z min: 0 [mm]

☒ Send ETA to printer display ☐ Go to Park Position after Job/Kill

☒ Disable Extruder after Job/Kill ☒ Disable Heated Bed after Job/Kill

☒ Disable Motors after Job/Kill ☒ Printer has SD card

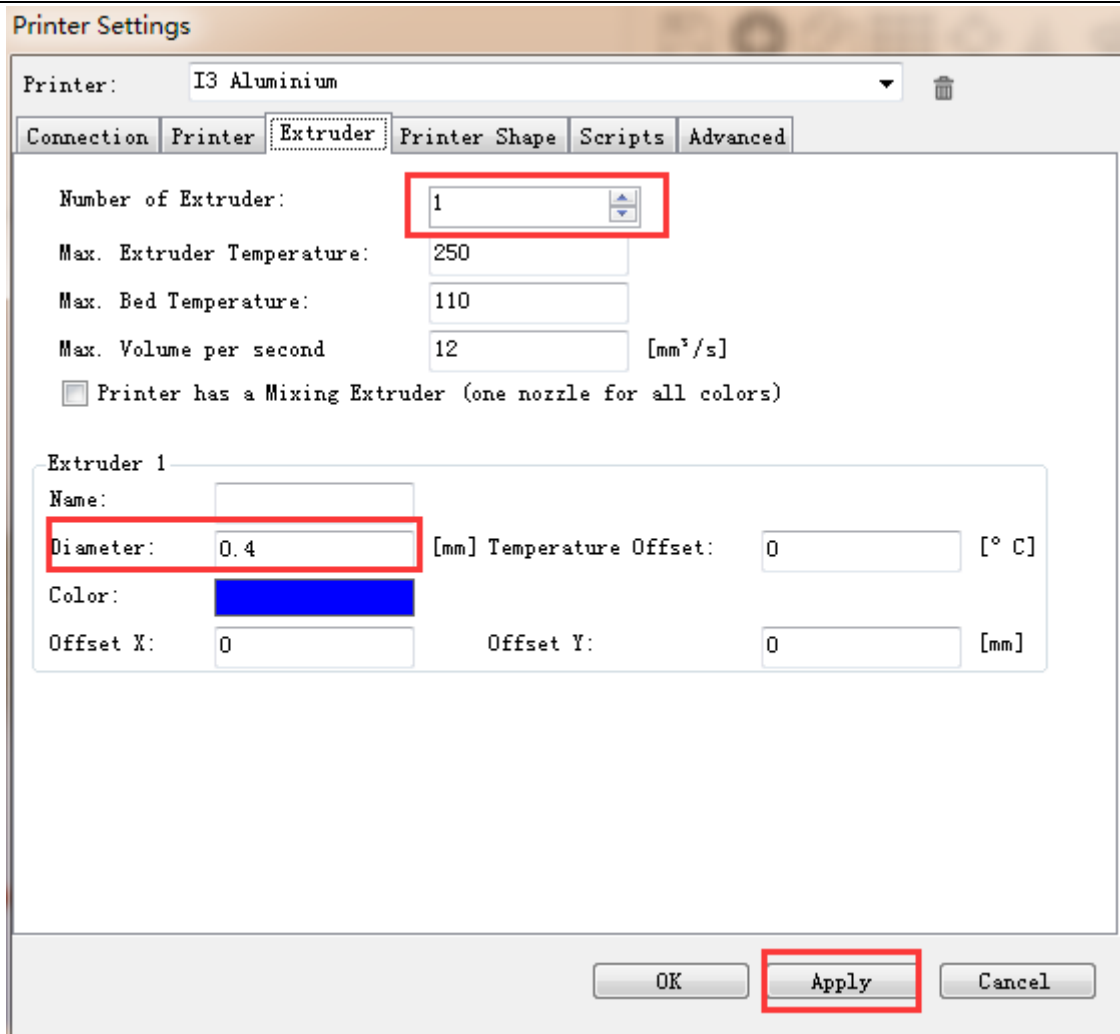
Add to comp. Printing Time 8 [%]

Invert Direction in Controls for ☒ X-Axis ☐ Y-Axis ☐ Z-Axis ☐ Flip X and Y

OK Apply Cancel

3.2 Number of Extruder and Nozzle Diameter

The number of extruders is set to 1. The diameter of nozzle is set according to actual size, here is 0.4mm.



The image shows a 'Printer Settings' dialog box for a printer named 'I3 Aluminium'. The 'Extruder' tab is selected. The 'Number of Extruder' is set to 1. The 'Max. Extruder Temperature' is 250, 'Max. Bed Temperature' is 110, and 'Max. Volume per second' is 12 [mm³/s]. There is a checkbox for 'Printer has a Mixing Extruder (one nozzle for all colors)' which is unchecked. Under 'Extruder 1', the 'Diameter' is 0.4 [mm], 'Temperature Offset' is 0 [° C], 'Color' is blue, 'Offset X' is 0, and 'Offset Y' is 0 [mm]. The 'Apply' button is highlighted with a red box.

Printer:	I3 Aluminium				
Connection	Printer	Extruder	Printer Shape	Scripts	Advanced
Number of Extruder: 1					
Max. Extruder Temperature: 250					
Max. Bed Temperature: 110					
Max. Volume per second: 12 [mm³/s]					
<input type="checkbox"/> Printer has a Mixing Extruder (one nozzle for all colors)					
Extruder 1					
Name:					
Diameter: 0.4 [mm] Temperature Offset: 0 [° C]					
Color:					
Offset X: 0 Offset Y: 0 [mm]					
OK Apply Cancel					

3.3 Printer shape

Here the printer shape of I3 aluminum is Classic Printer;

For home position, choose Min;

The printer's maximum printing volume 200 * 200 * 180 (length / width / height)

Printer Settings

Printer: I3 Aluminium

Connection Printer Extruder **Printer Shape** Scripts Advanced

Printer Type: Classic Printer

Home X: Min Home Y: Min Home Z: Min

X Min: 0 X Max: 200 Bed Left: 0

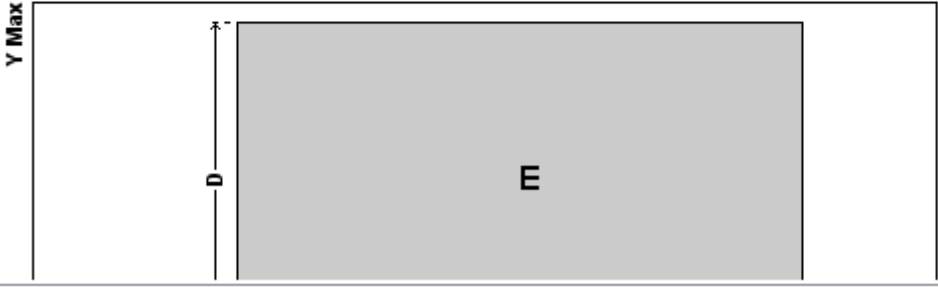
Y Min: 0 Y Max: 200 Bed Front: 0

Print Area Width: 200 mm

Print Area Depth: 200 mm

Print Area Height: 180 mm

The min and max values define the possible range of extruder coordinates. These coordinates can be negative and outside the print bed. Bed left/front define the coordinates where the printbed itself starts. By changing the min/max values you can even move the origin in the center of the print bed, if supported by firmware.



OK Apply Cancel

If the object which is being printed is not in the center of the hot bed, you can adjust the following two values to compensate for the distance deviation of X / Y direction:

Bed Left

Bed Right

Printer Settings

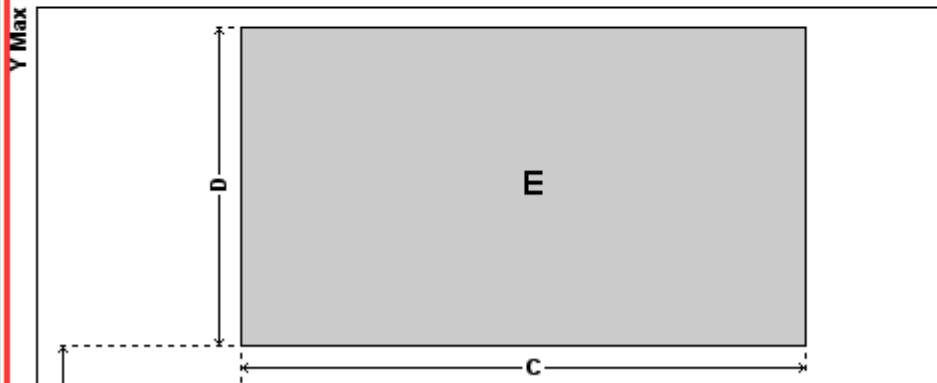
Printer: I3 Aluminum

Connection Printer Extruder Printer Shape Scripts Advanced

X Min: 0 X Max: 200 Bed Left: 0
Y Min: 0 Y Max: 200 Bed Front: 0

Print Area Width: 200 mm
Print Area Depth: 200 mm
Print Area Height: 180 mm

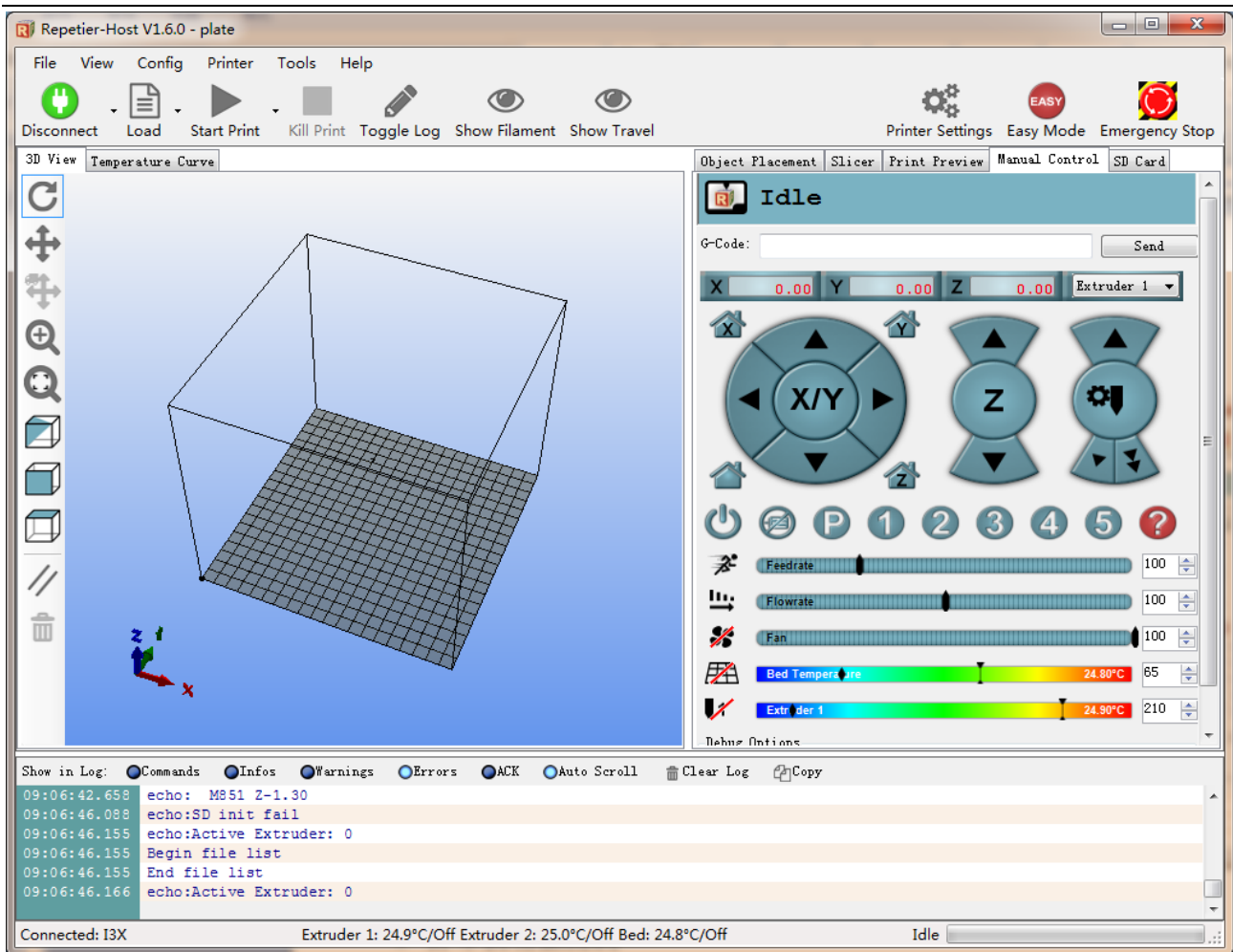
The min and max values define the possible range of extruder coordinates. These coordinates can be negative and outside the print bed. Bed left/front define the coordinates where the printbed itself starts. By changing the min/max values you can even move the origin in the center of the print bed, if supported by firmware.



OK Apply Cancel

After setting, click Apply>OK

The interface after setting is as following:



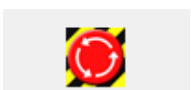
4 Printer Function Test


When we are testing, we can test through LCD control panel or we can also do the test on Repetier Host. The methods are as followings.

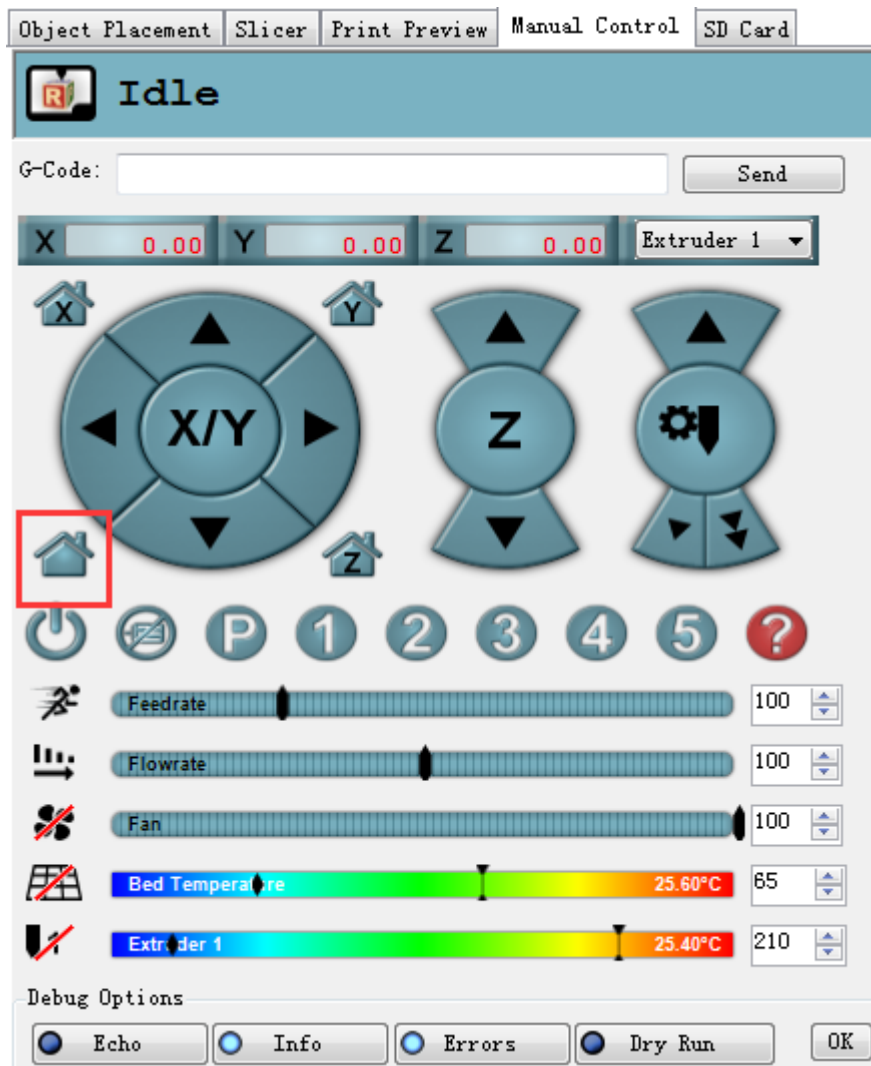
4.1 Use Repetier Host to Test

4.1.1 Motor Direction Test



Before testing, please manually place the motors of X / Y / Z axis at the middle of each axis to avoid accidental collision occurring during the test. There is emergency stop button at the top right

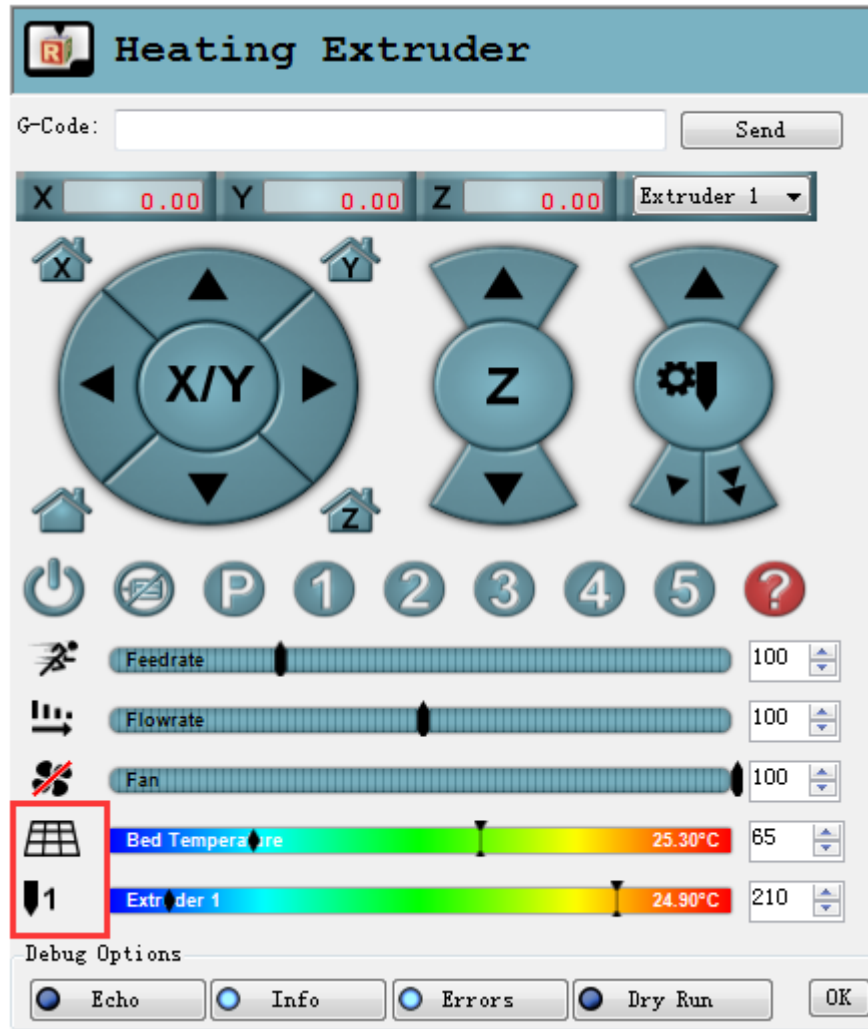
corner  Emergency Stop, or you can cut off the power. Always be prepared for emergency stop.

Open Repetier host and connect the printer. Click Home button , then all three axes will move towards the endstop. After they hit the endstop they will move back for a short distance and then stop the movement. The origin location should be in the right front corner of the printer platform. If the moving direction is reversed, you can change the motor direction in firmware. ([please refer to FAQ](#)).



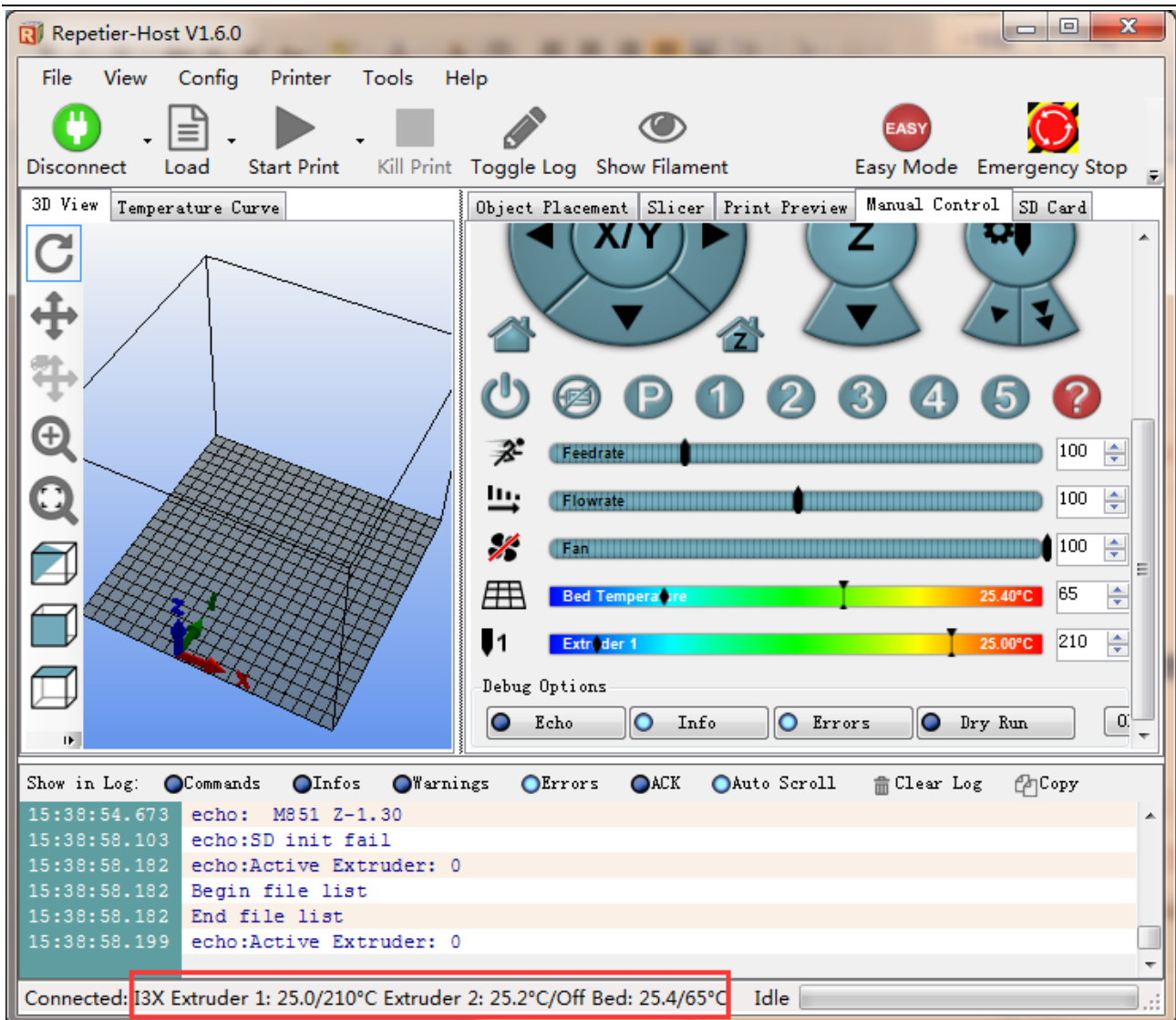
4.1.2 Heating Test

Click the heating button of the hot bed  and the extruder . The slash will disappear and you will see the temperature rising up.



Meanwhile you can see the temperature changing at the bottom of Repetier.

If the hot bed or extruder can heat, please refer to [FAQ](#).

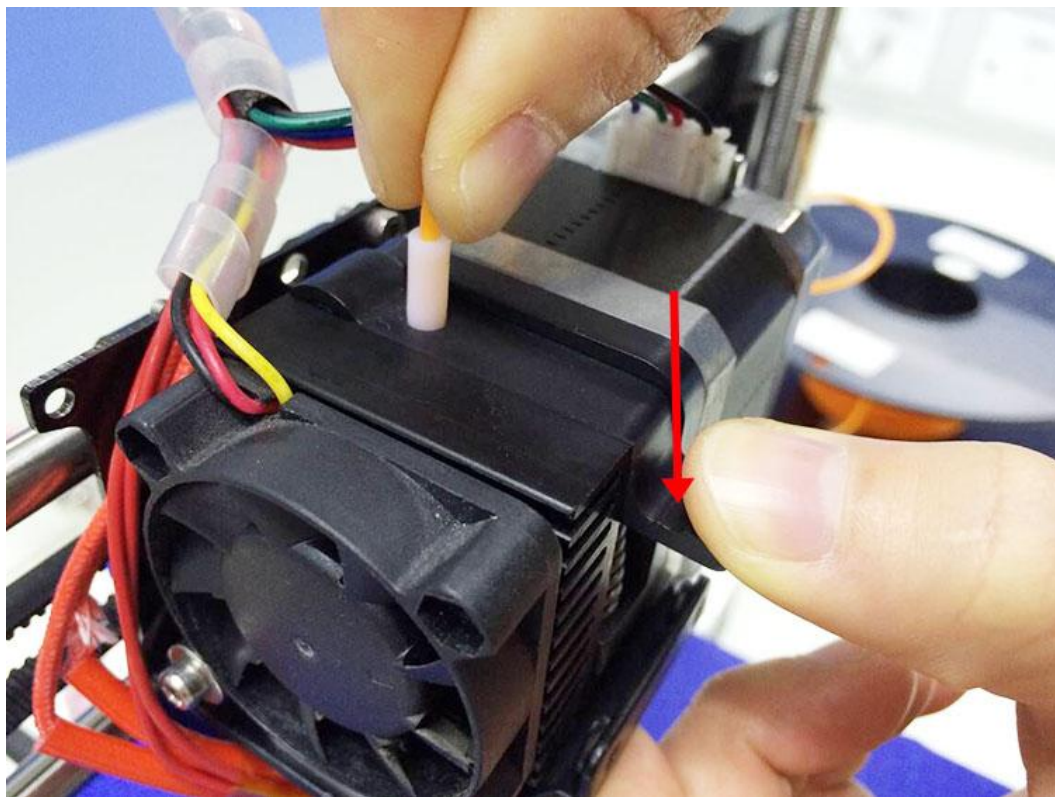
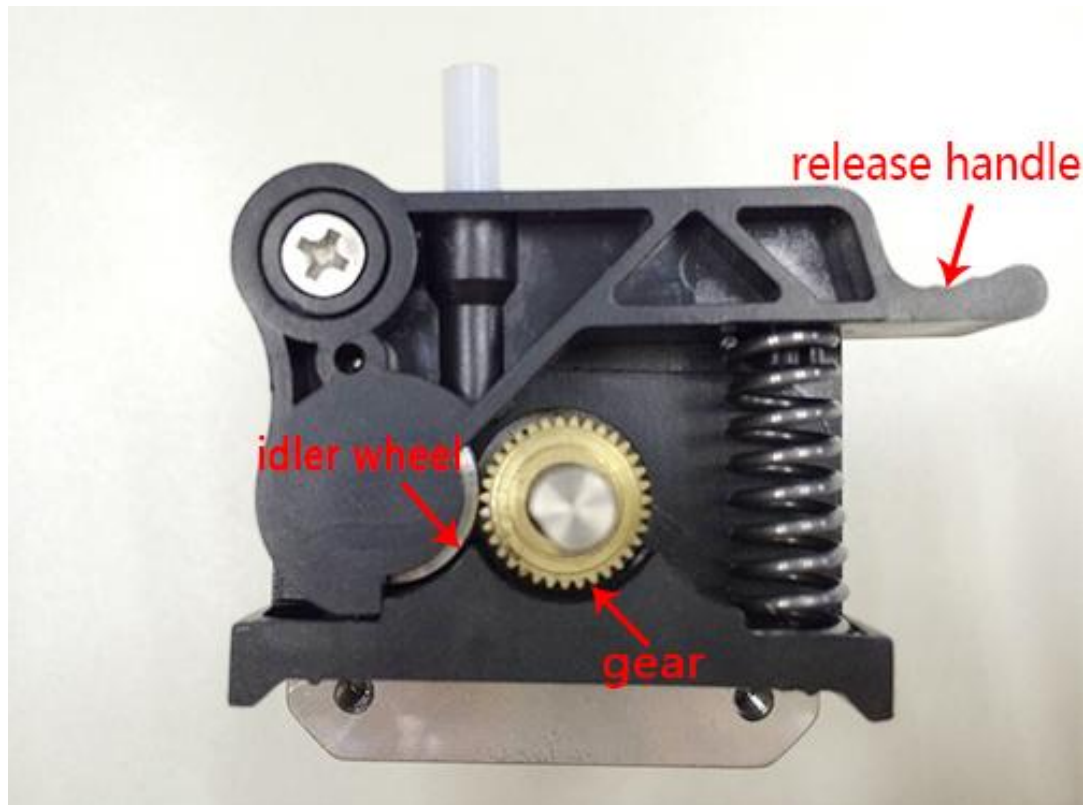


4.1.3 Extruder test

Please note: The extruder will not begin working until the temperature reaches above 170 °C.

Heat the extruder to 200 °C, and then insert the filament into hotend via push-in fitting. When you are pushing the filament, press the release handle slightly with one hand and push the filament with the other hand through the feeding port.

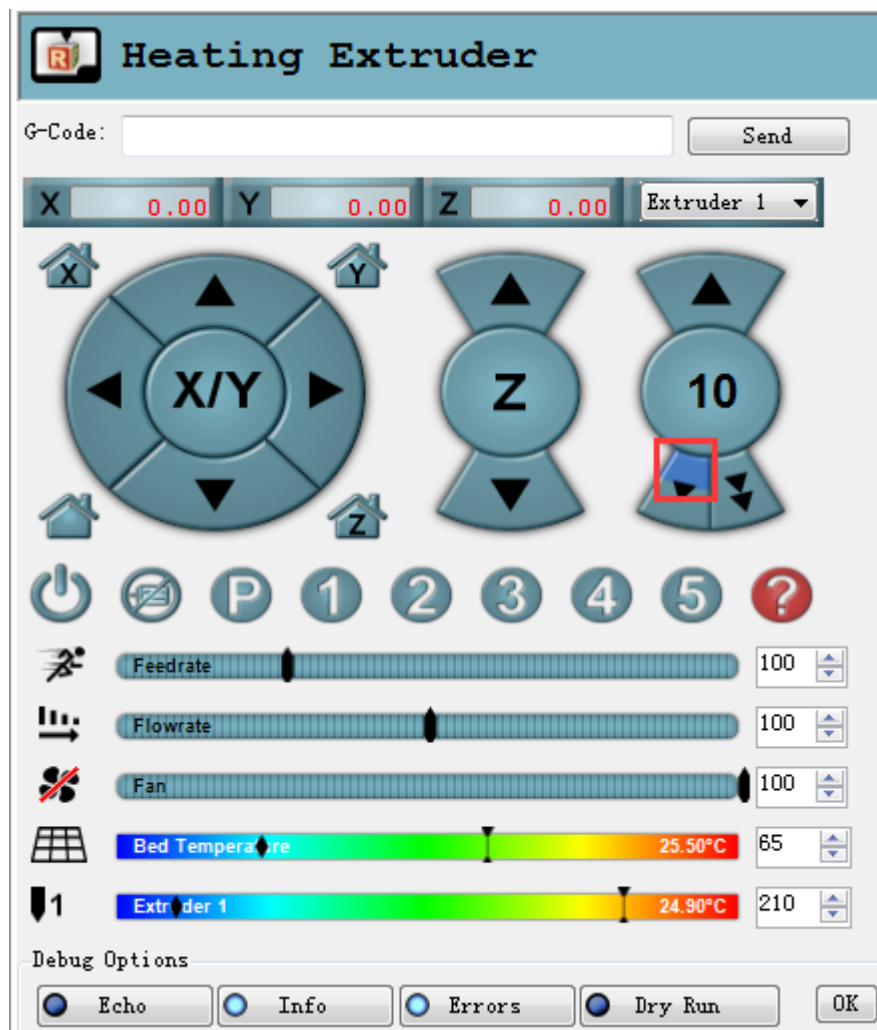
Please note that the filament must be in the slot of the idler wheel, otherwise feeding will not be fluent.



After pushing the filament into the bottom of hotend, use the feeding button on Repetier (as shown

in following picture) to do manual feeding. If the nozzle can extrude filament fluently, the extruder is working well. If not, please refer to [FAQ](#).

Note: If the moving direction of the motor is reversed, which means you found the filament going backwards when you click to feed downwards, change the motor direction of the extruder in the firmware to solve the problem. This method is the same with that for X/Y/Z axis motor.



4.2 Use LCD Control Panel to Test

4.2.1 Motor Direction Test

Functions of the knob on LCD:

1. Press the knob: OK or enter the sub-menu
2. Turn the knob: to scroll through the options, or change parameters

Note: Turn the knob during printing; you can change the Feed rate in real time.



After learning about the functions of the knob on the LCD, press the knob to enter sub-menu and choose Prepare:



Choose Move axis:



Choose Move 1mm:

(Note: the extruder can only support two options: Move 1mm and Move 0.1mm. The 10mm option is disabled.)



Choose the axis that you want to move by using Move X/Y/Z options. Turning the knob can make each axis move left and right or back and forth.



After testing each axis, you can choose Prepare>Auto home in the menu to make it back to home

position.



If you want to manually move the motor, you can unlock the motor. Unlocking method:

Prepare>Disable steppers:



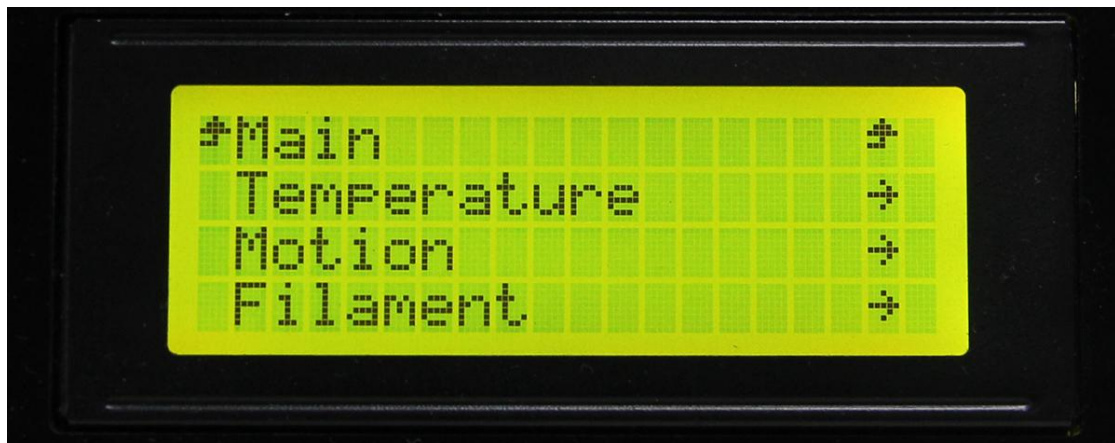
4.2.2 Heating Test

In the Control menu, you can select temperature setting of hotbed and extruder.

Choose control:



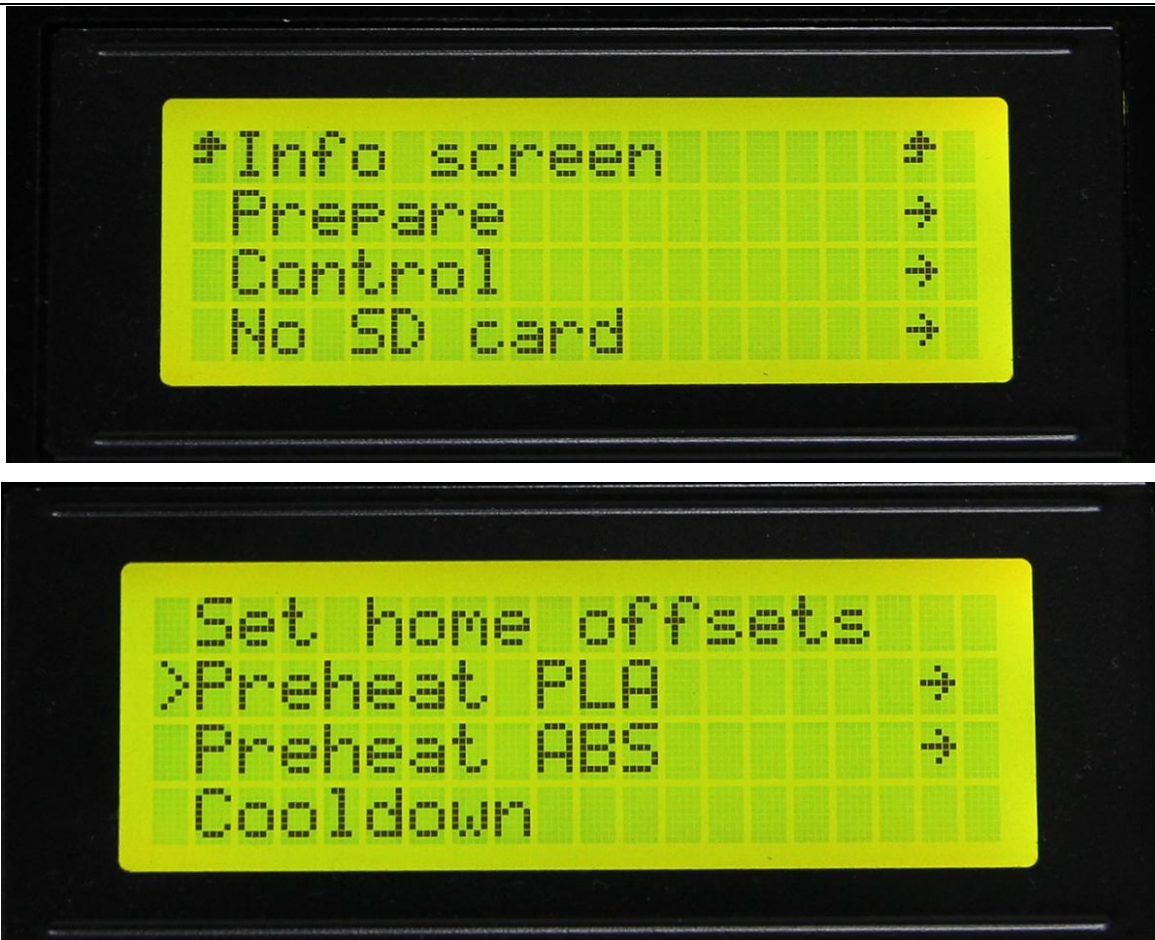
Choose temperature:



Select the temperature you want to set:



After setting, you can choose Prepare> Preheat PLA to preheat hot bed and extruder.



So far, function tests of the printer are done.

5 Hotbed Leveling

Before printing, we need to do hotbed leveling. Only after this step can quality of printed parts get improved. Otherwise the un-leveling gap between the hotbed and extrusion head will affect the filament adhering to the hotbed thus cause poor print quality or even not printing.

5.1 Homing

Home the printer.

5.2 Coarse tuning of distance between the nozzle and the hotbed

*If the nozzle is far from the surface of hotbed, loosen the M3x50mm screw to extend the bottom part.

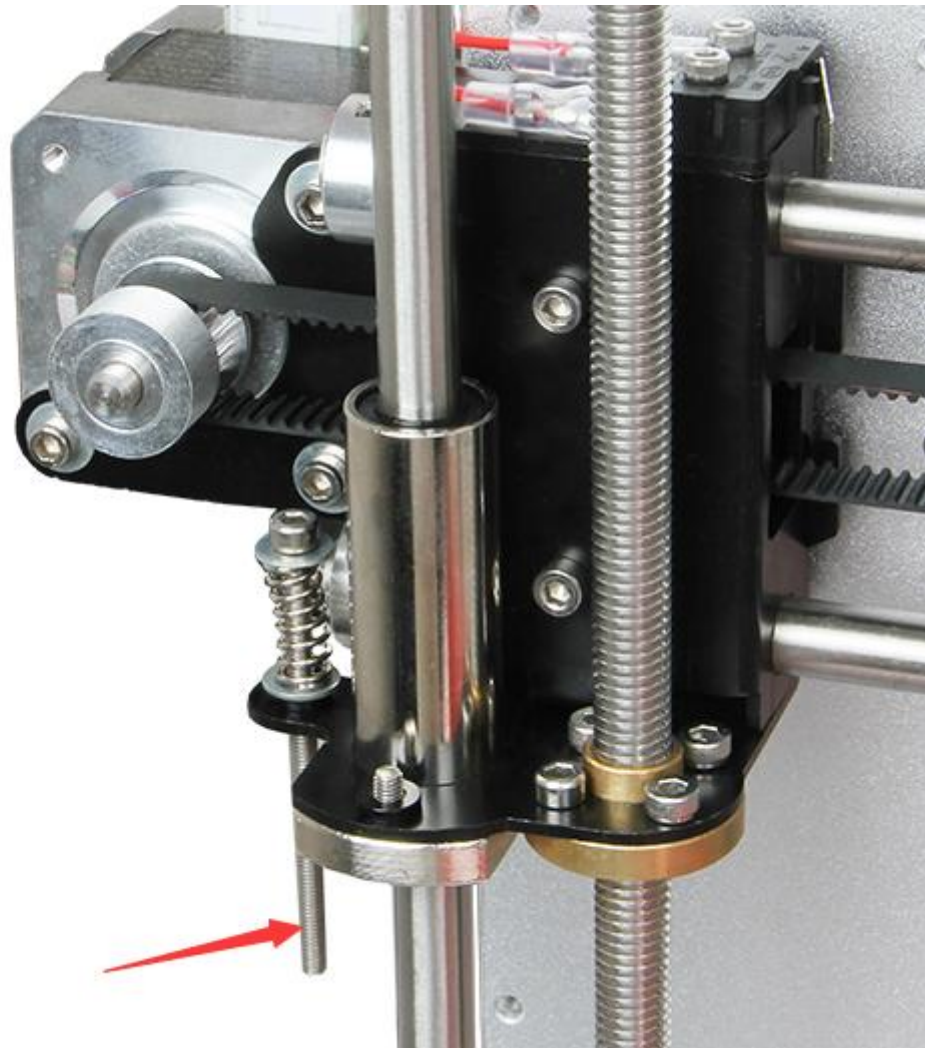
Then the printer will home at a relatively lower place, the distance between the nozzle and the hotbed will be decreased.

*If the nozzle is too close to the surface of hotbed, tighten the M3x50mm screw to shorten the bottom part.


Then the printer will home at a relatively higher place, the distance between the nozzle and the hotbed will be increased.

You may need to calibrate for many times at this step.

The recommended distance between the nozzle and the hotbed is 0.5-1mm.



5.3 Fine Tuning

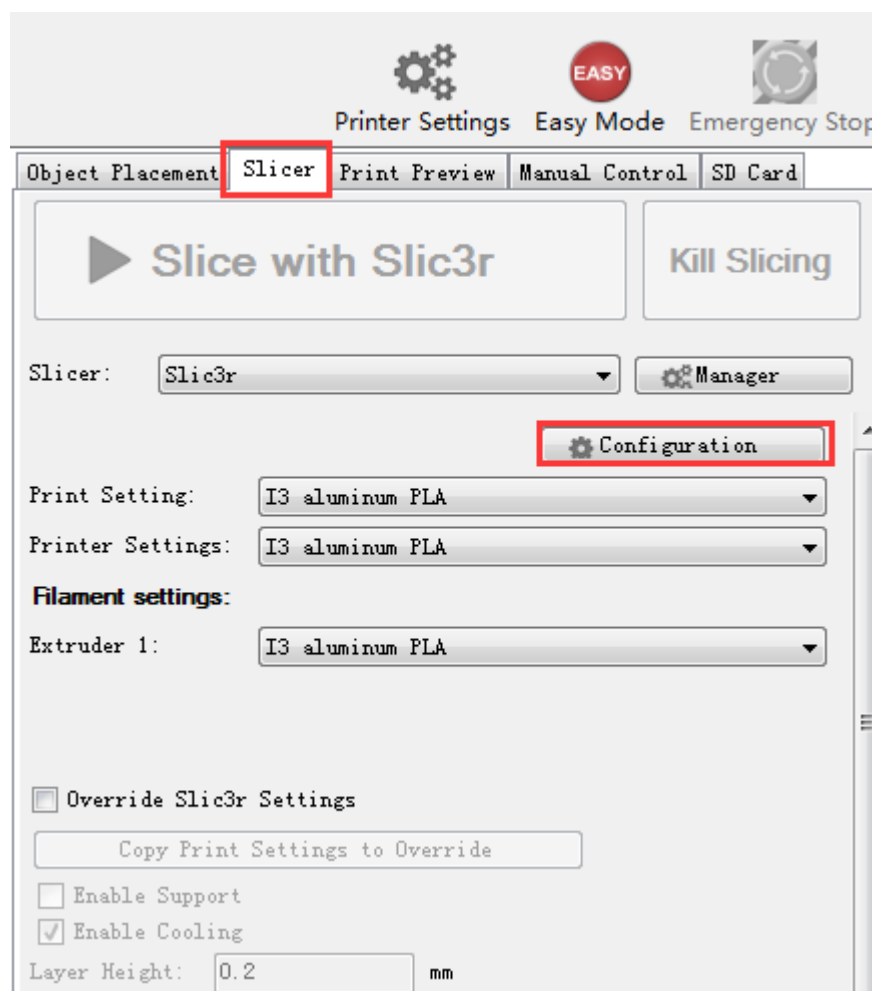
After the initial adjustment, home the printer. Disable the stepper motors() , manually move the extruder to the four corners of the hot bed and fine-tuning the wing nut at each corner to level the distances between the extrusion head and four corners. During adjustment, you can put a piece of A4 paper(half fold it) between the nozzle and hotbed. If you can feel a bit friction when you pull the paper back and forth, the distance is proper.

After finishing the adjustment of four corners, the entire leveling process is done. You can also

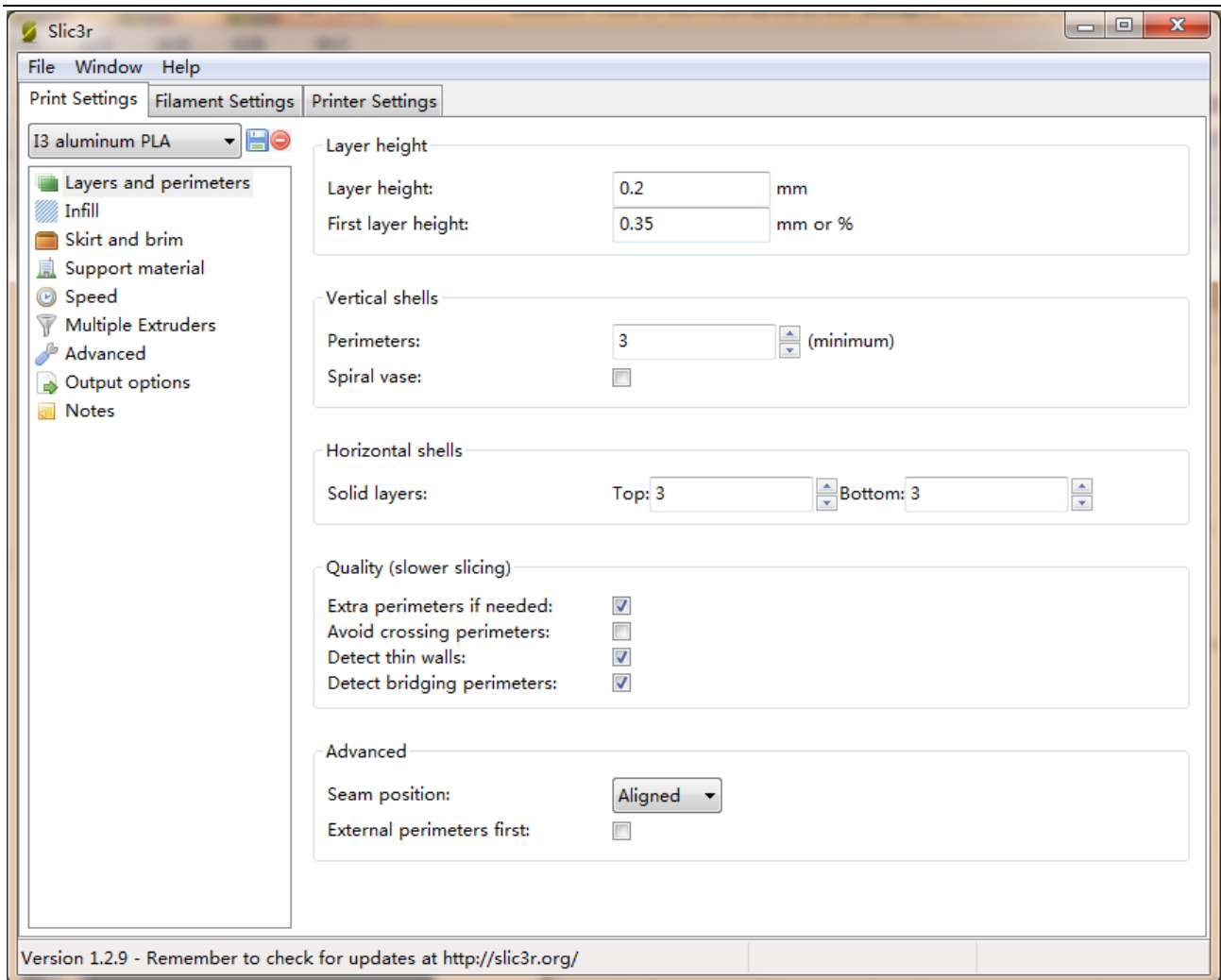
move the extrusion head to the center of hotbed to verify leveling outcome.

6 Slice Settings

With one more step, we can start printing, set the slice parameters such as print material diameter, the speed, the layer height, etc. to achieve better print quality. Open slic3r, which is a slice software coming with Repetier host. As shown below:

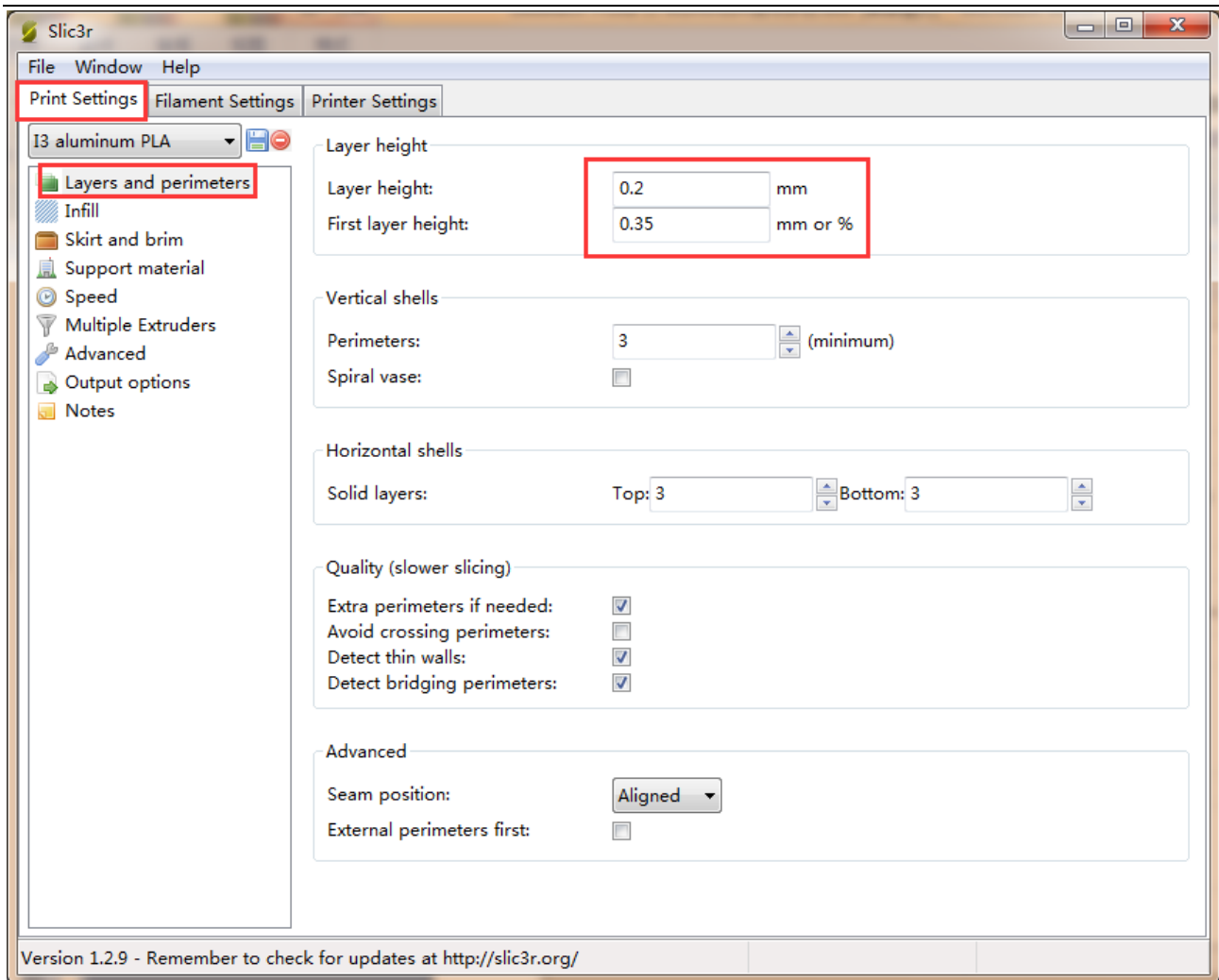


You will be presented with the following interface:



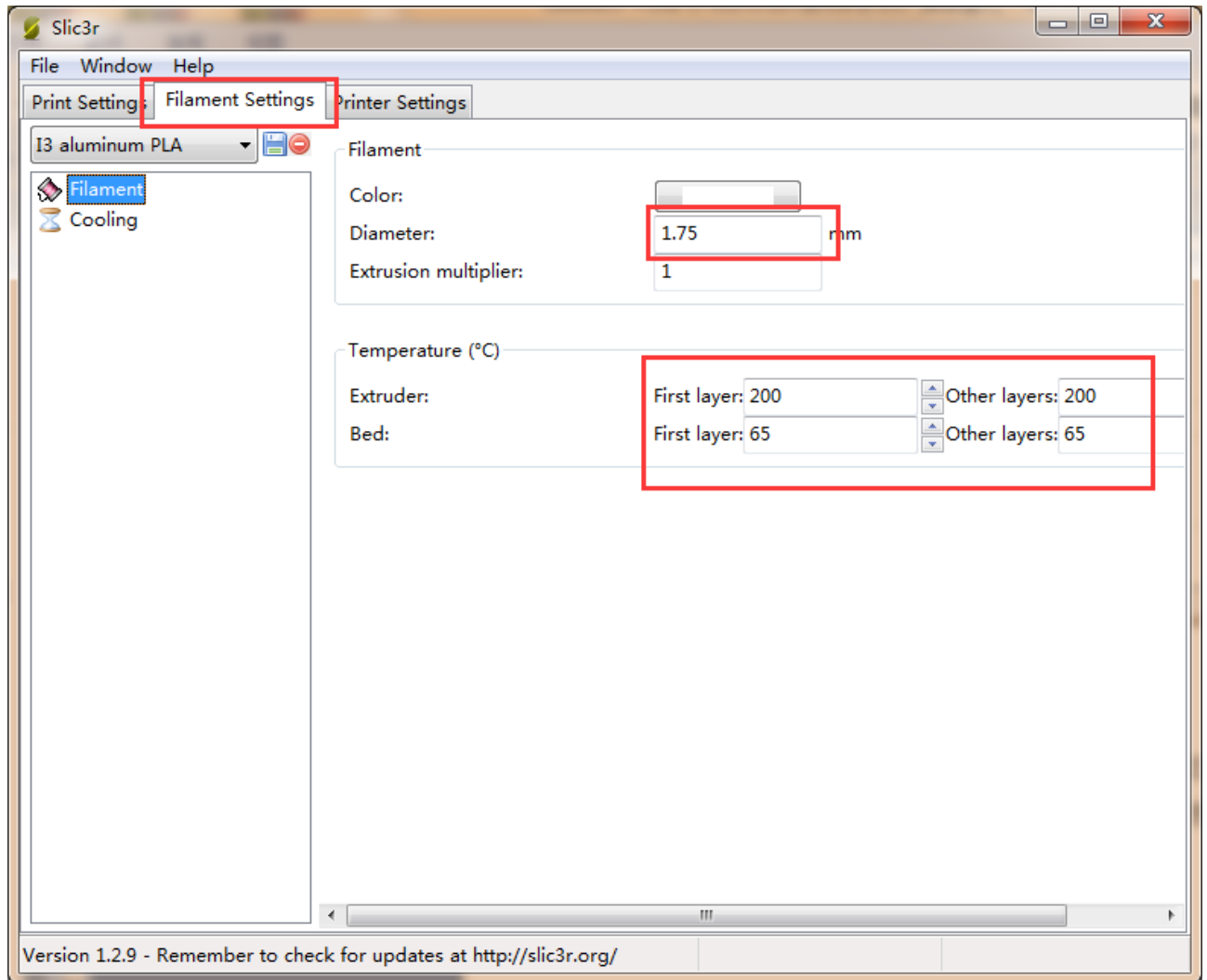
6.1 Printing Setting

Set layer height and the first layer height in the Print setting tab. Generally speaking, layer height can be set as 0.1-0.3mm. Considering of accuracy and speed, 0.2mm is the most appropriate layer height. The layer height is set as 0.35mm by default.



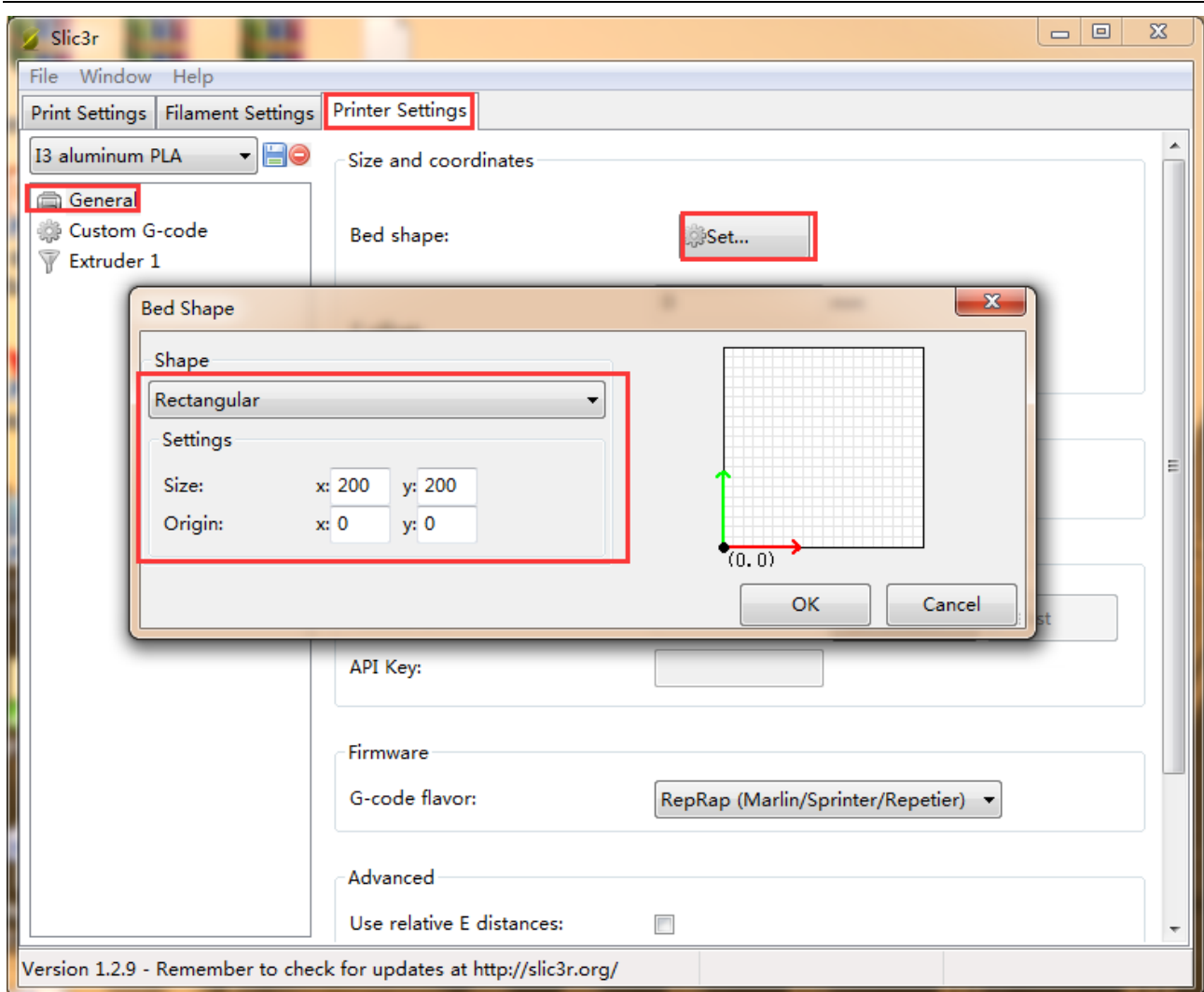
6.2 Filament Setting

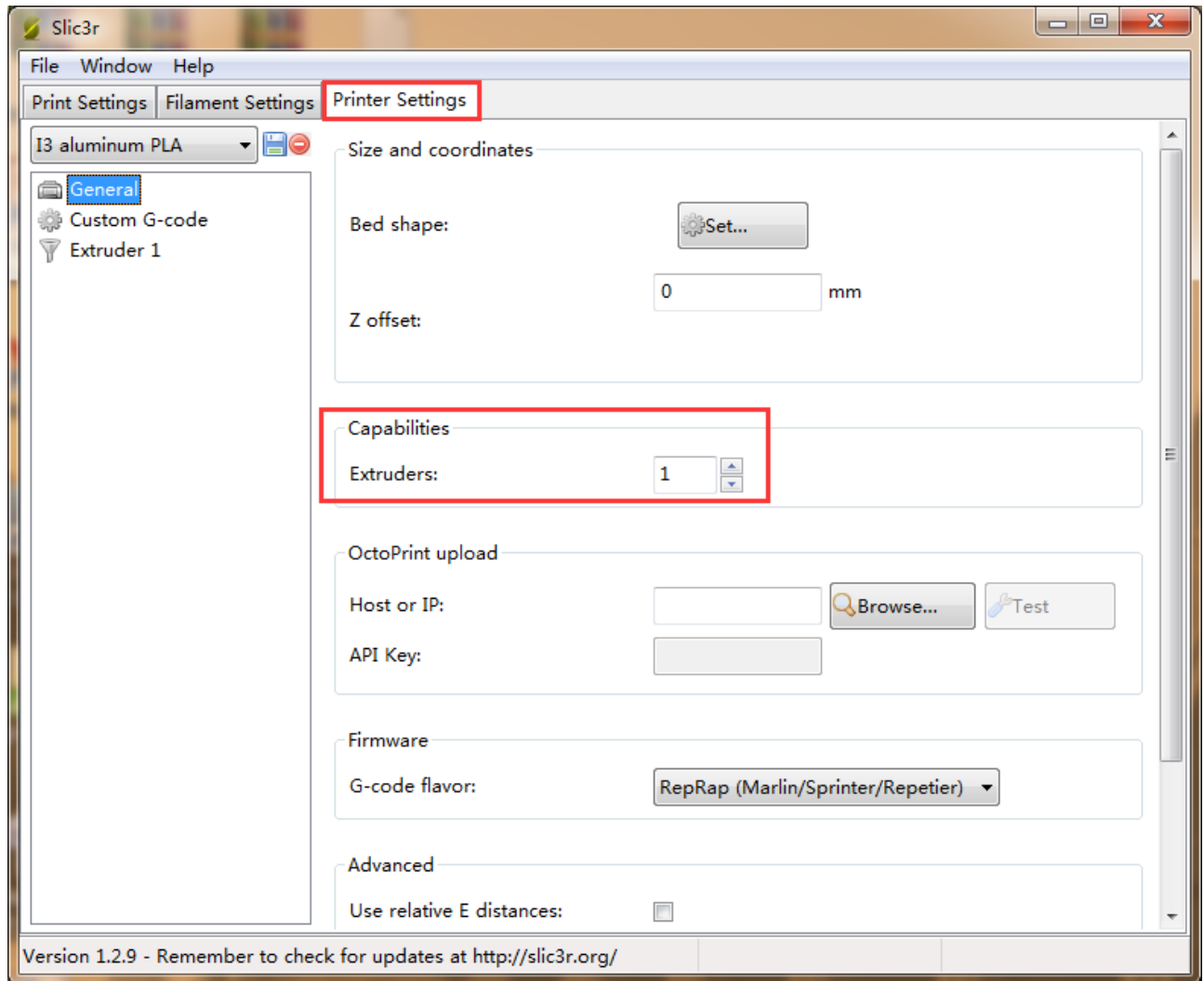
Set filament diameter and print temperature in the Filament setting tab. Filament we use here is 1.75mm PLA. Usually the temperature of the extrusion head is 195-210°C, and the temperature of hotbed is 60-70°C. Here we separately set them as 200°C and 65°C.



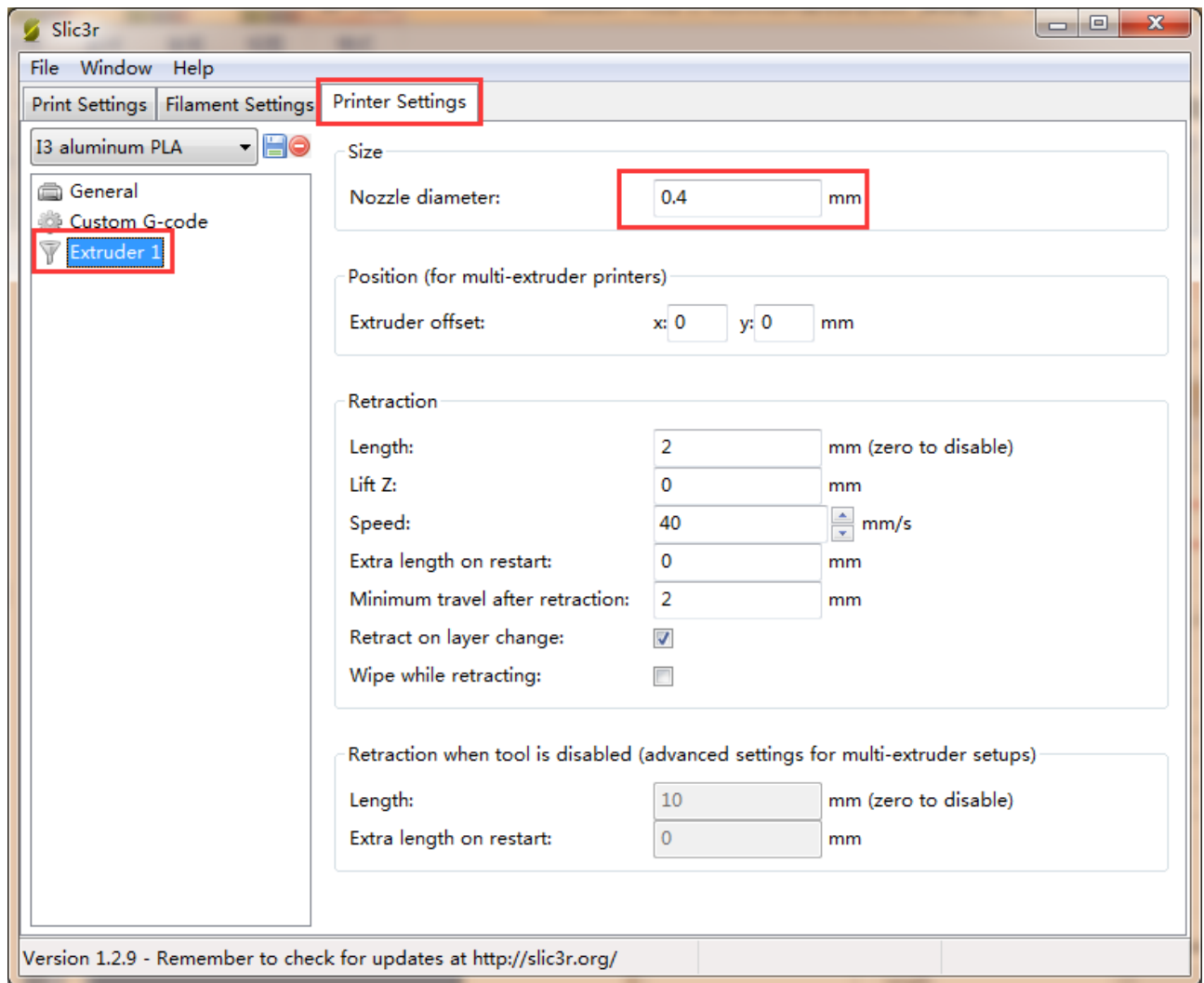
6.3 Printer Setting

Set the shape and size of hotbed and the number of extruders in the Printer setting> General tab.





Meanwhile set the extrusion head diameter as 0.4mm (input the actual diameter of your own printer):

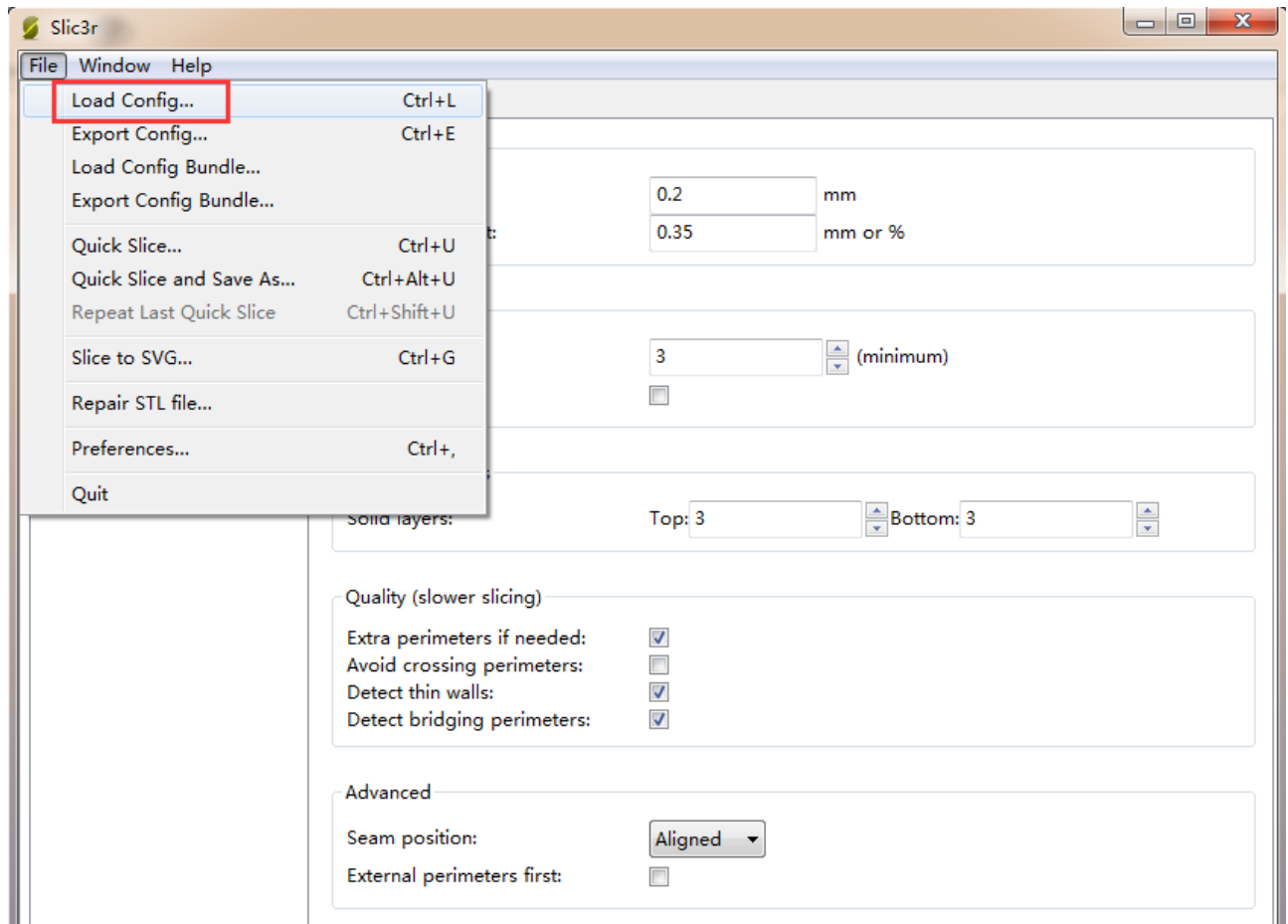


6.4 Other Settings

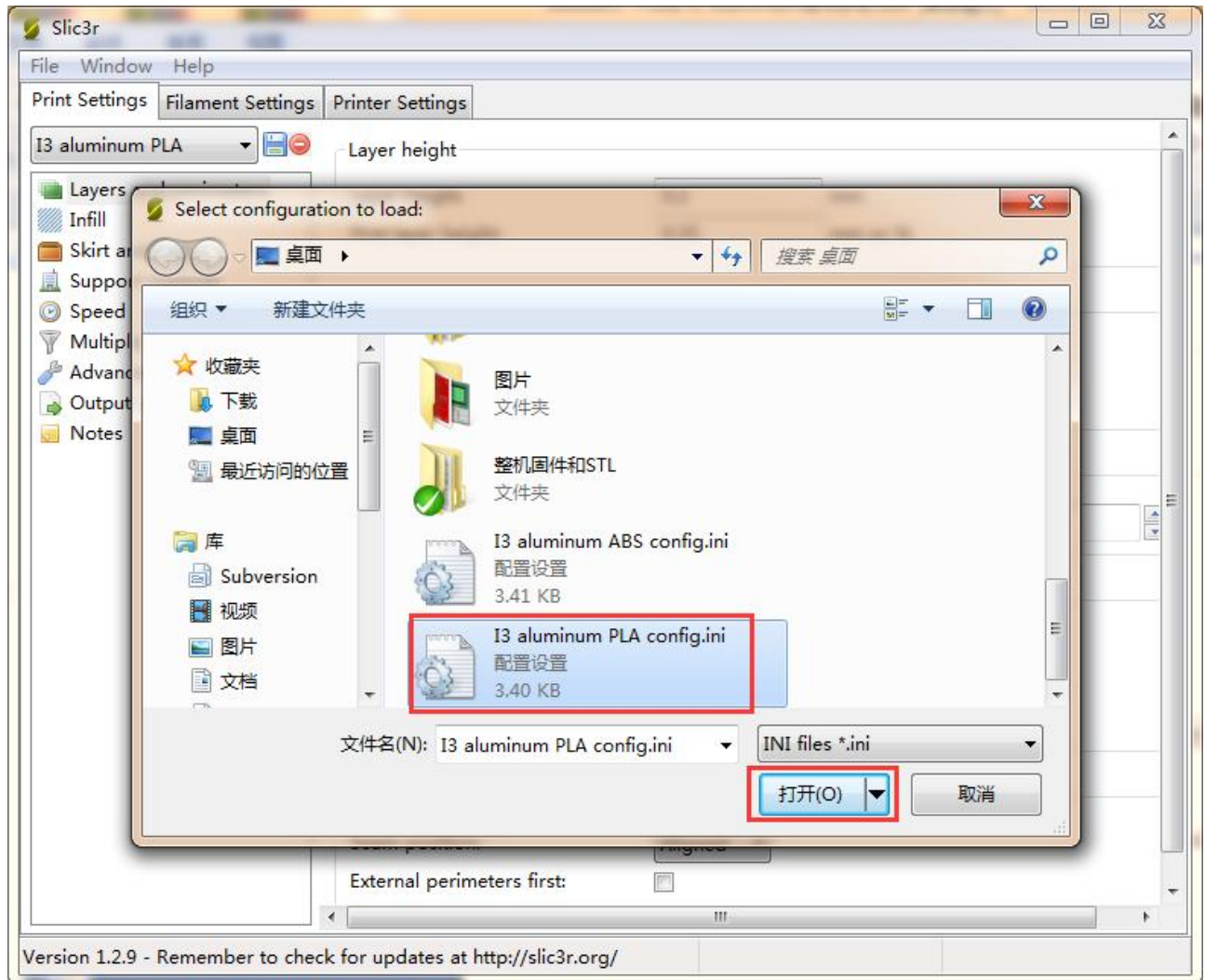
In addition to the above parameter settings, parameters like the speed of the printer are also very important to print quality. It requires user's long-term using experience and exploration.

Here we'd like to give you a setting for reference, please download the attachment [config.ini](#). You can import it into slic3r to view it through the following steps.

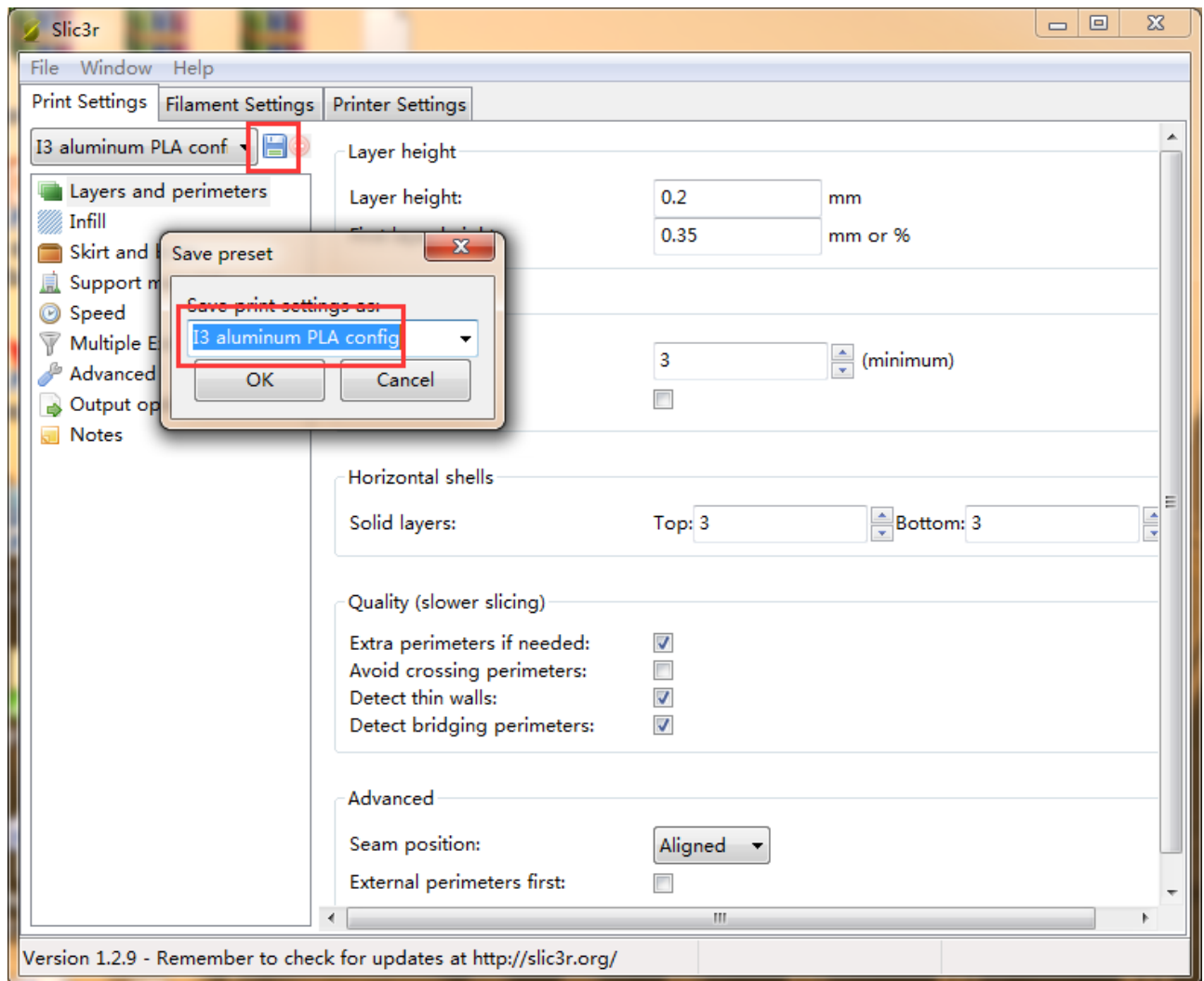
Open slic3r>File>Load Config:



Find “13 aluminum PLA config.ini” file in the dialog box and open it.



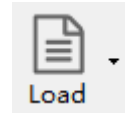
Then you can successfully import the config.ini file. Click the Save button to rename and save it.



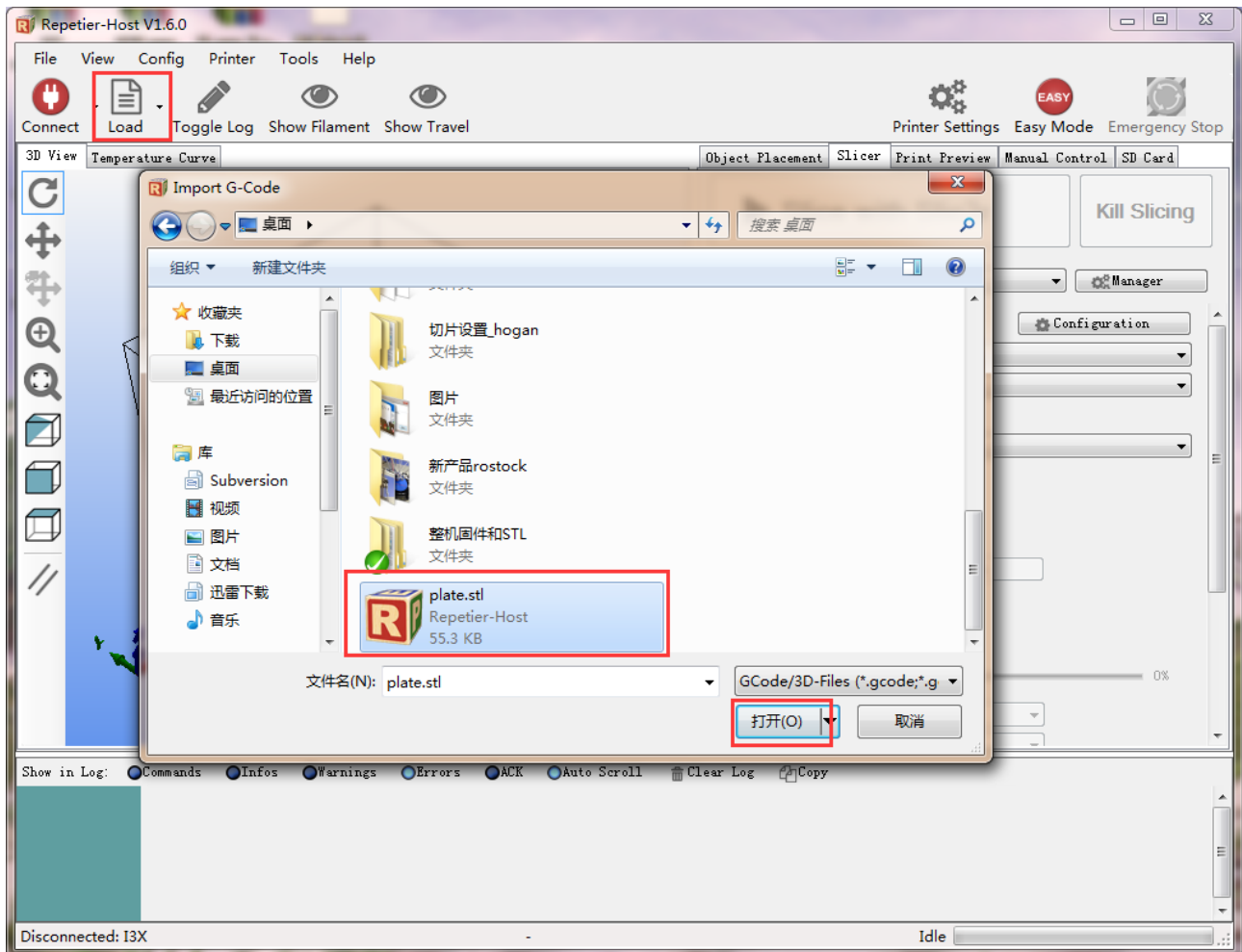
7 Begin Printing

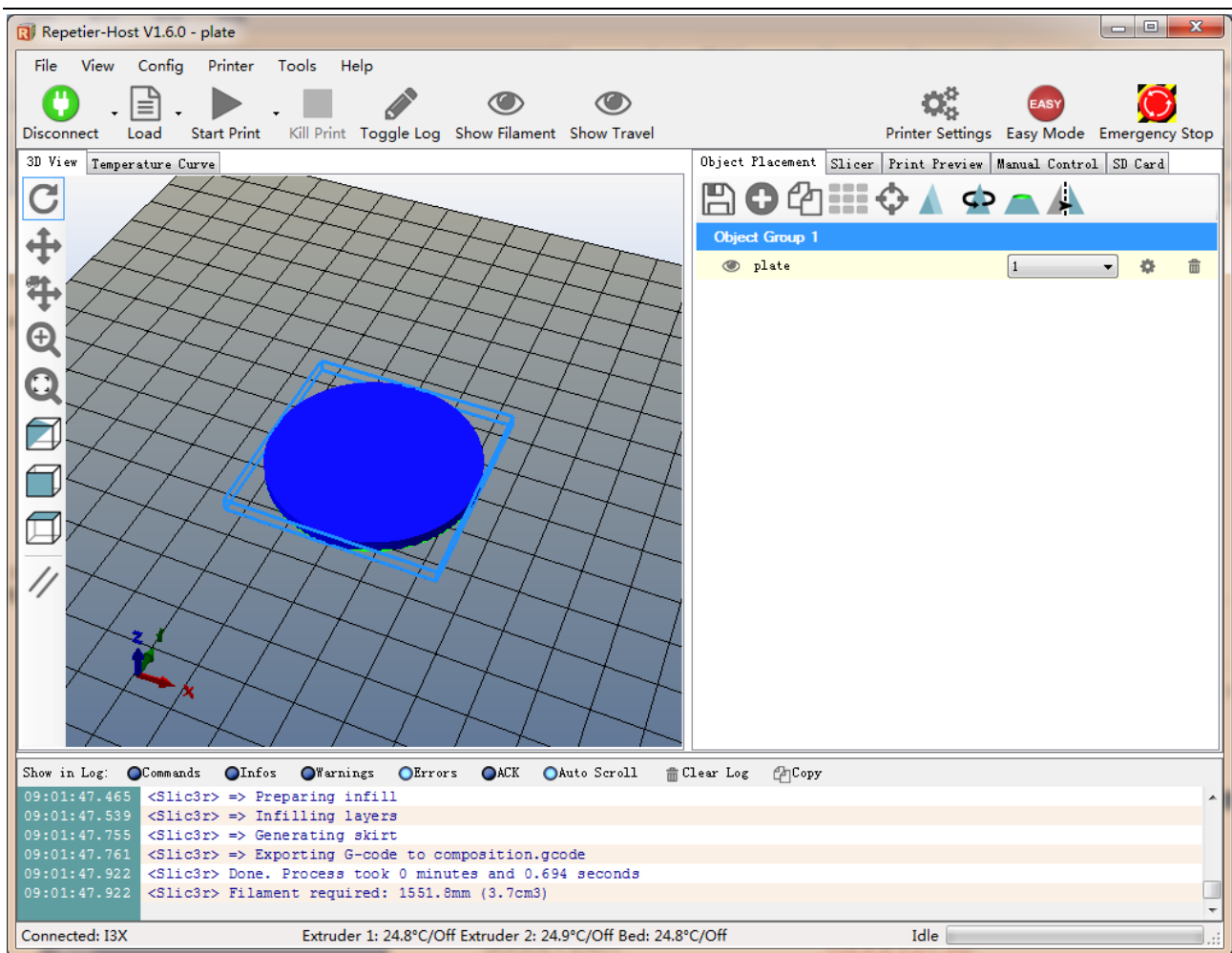
So far, all the preparatory work is completed. The next step is to import the model file for slicing and printing. For 3D printer, the file format of the model is generally .stl file. We can download for free and print those models which are shared online , and you can also design your own creative objects for printing. Here we print a simple **plate**. You can download the model file here: [plate.stl](#).

7.1 Load print model



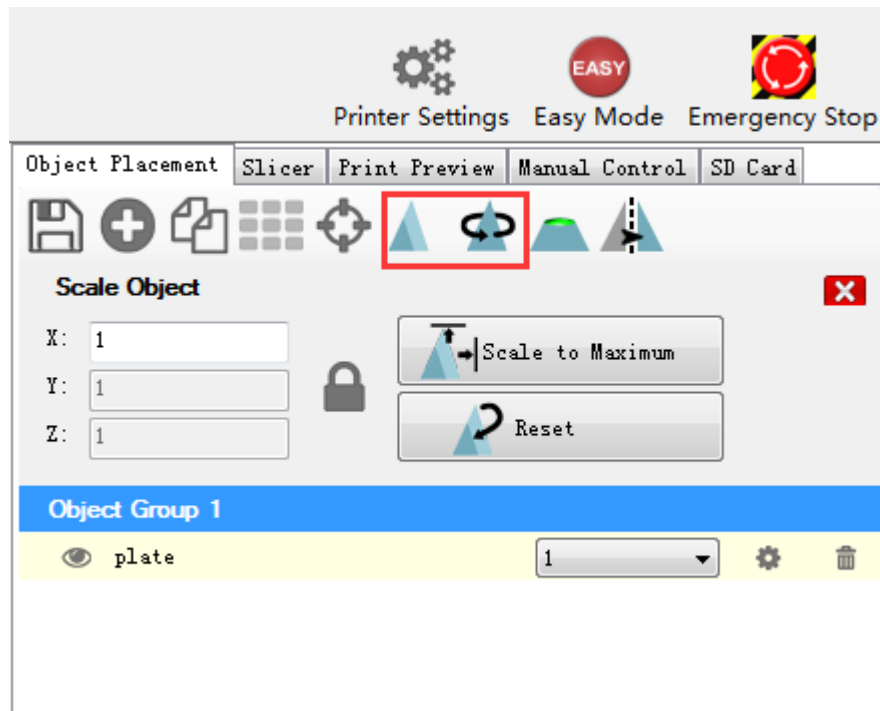
In the main interface of Repetier host, click the Load button. Choose the file you have downloaded and open it.



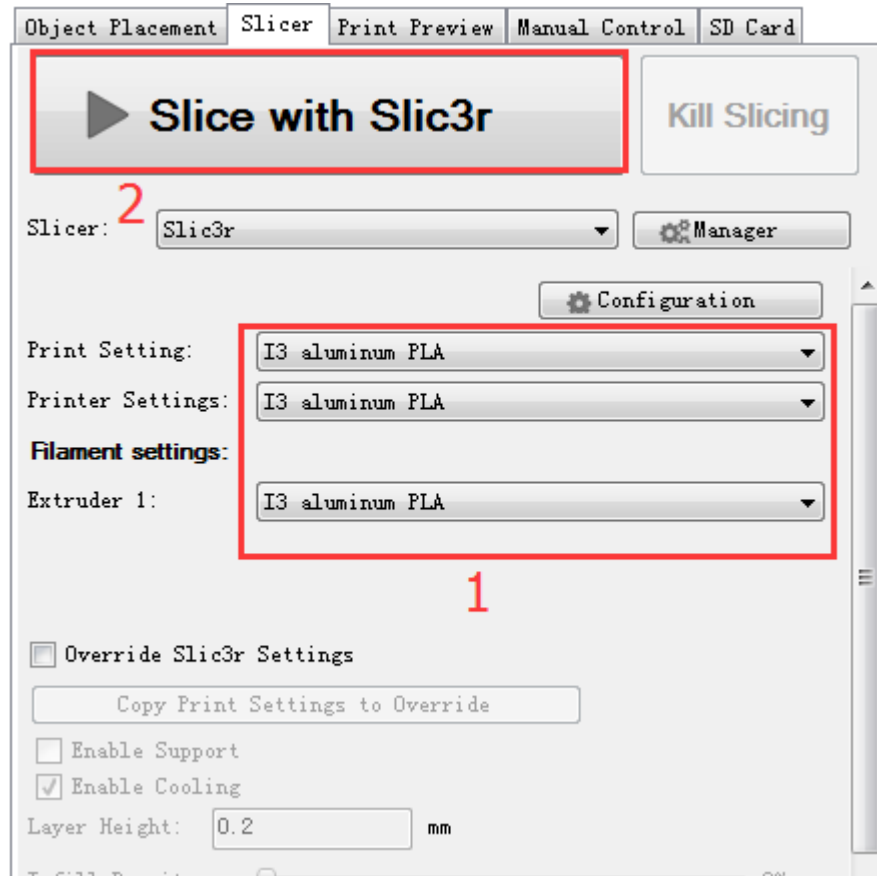


7.2 Model Slicing

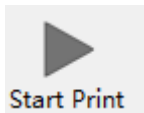
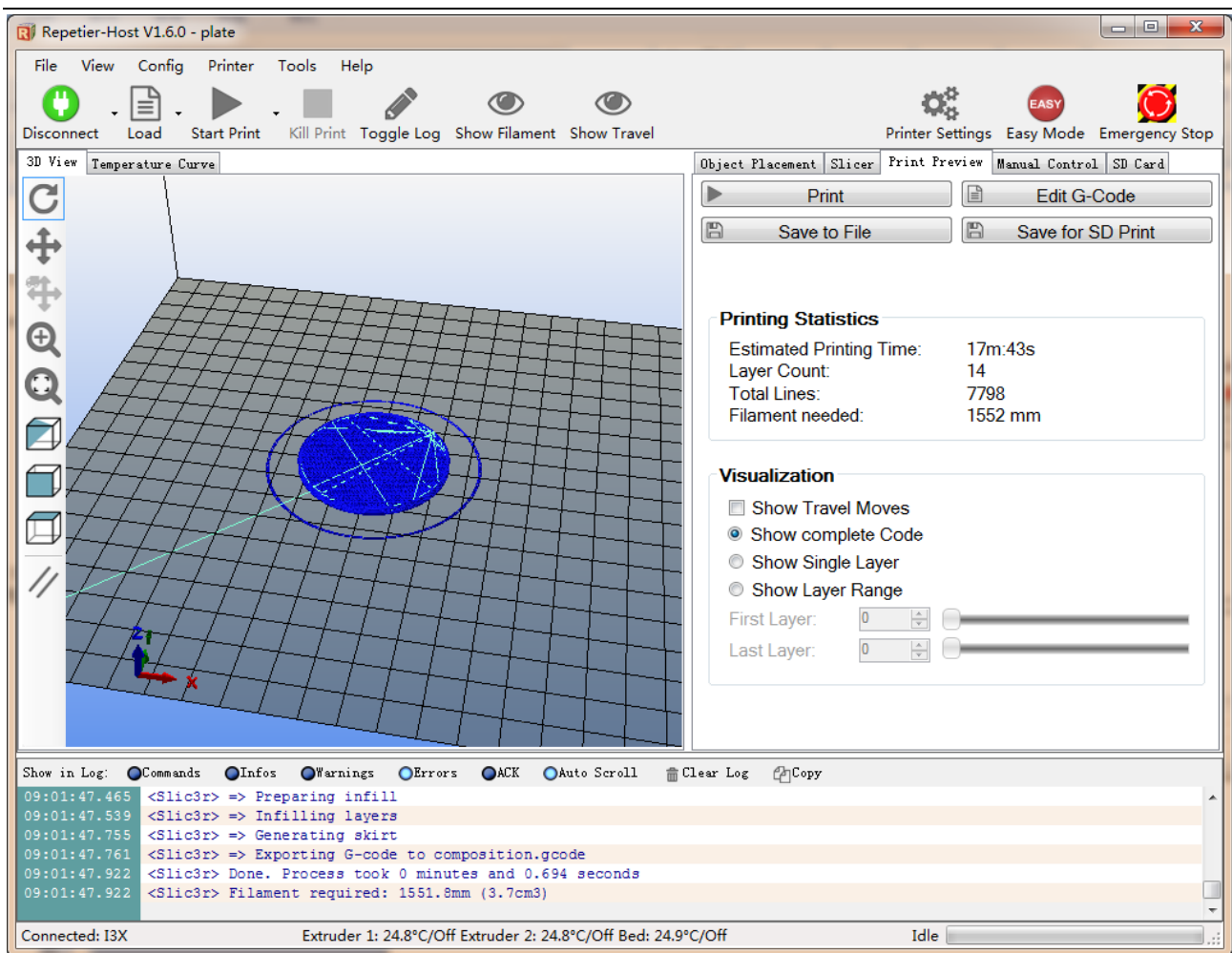
After the file is loaded, you can use the following buttons to enlarge, shrink or rotate it.



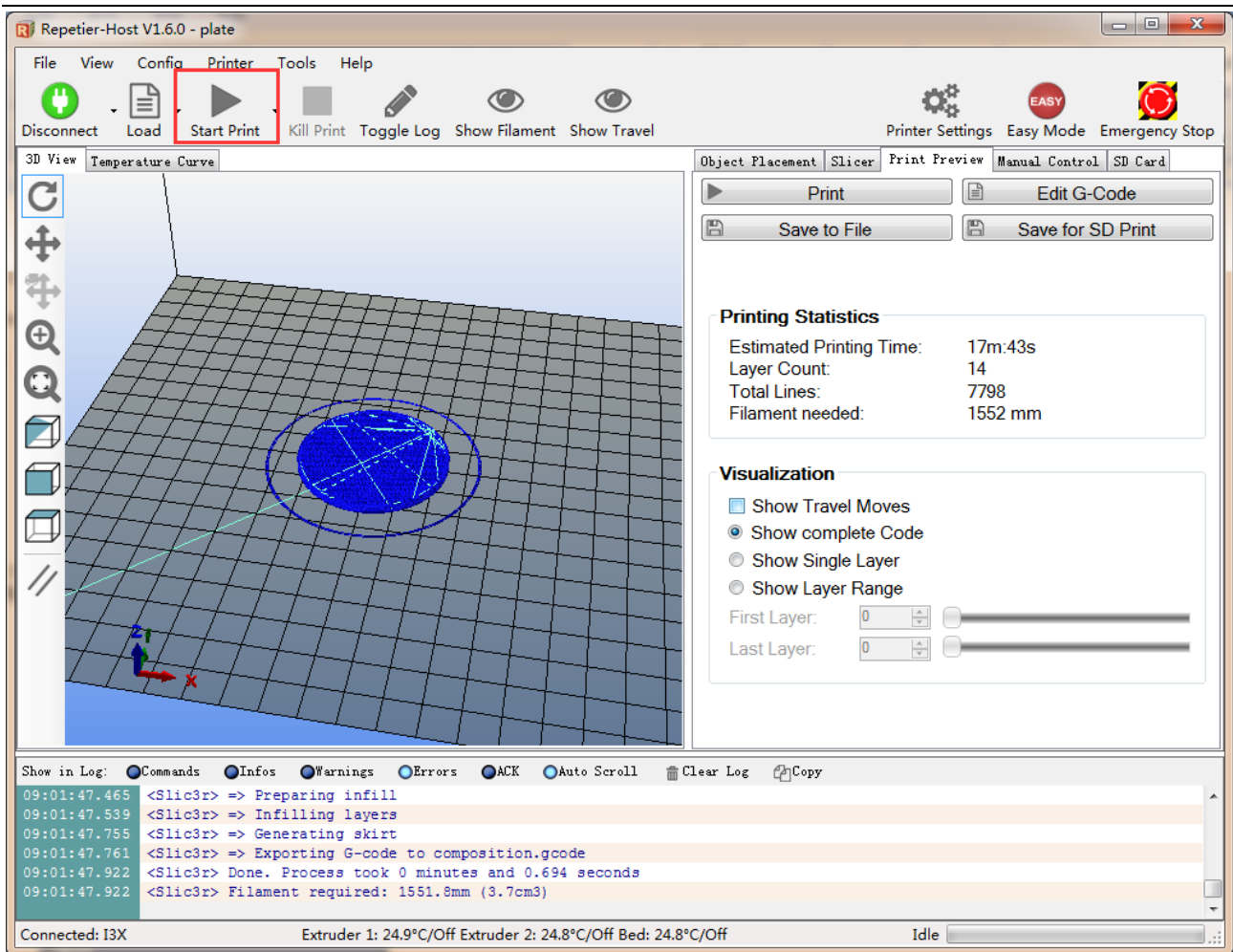
After the size setting, choose the slicing parameters which were imported previously in the drop-down menu, and click **slice with slic3r**.



In this way, .gcode file which can be recognized by the printer is generated.



Last step, click **Start Print** button to print.



7.3 Stand-alone print with SD Card

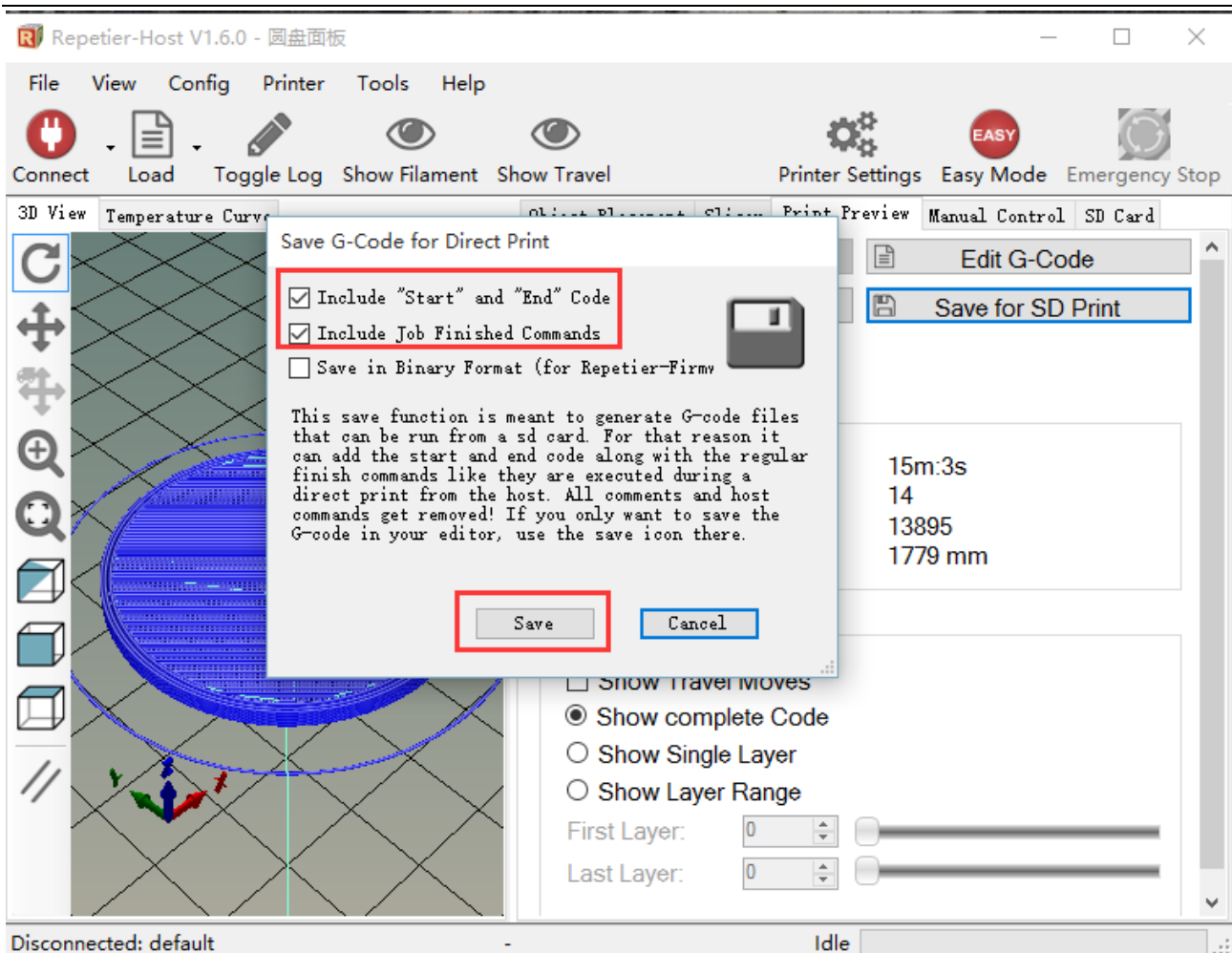
If you want to print Stand-alone , you can save the .gcode file in SD card for printing.

Note: The printer only recognizes .gcode file in the SD card, and the file can not be placed in any folder!

Steps are as follows:

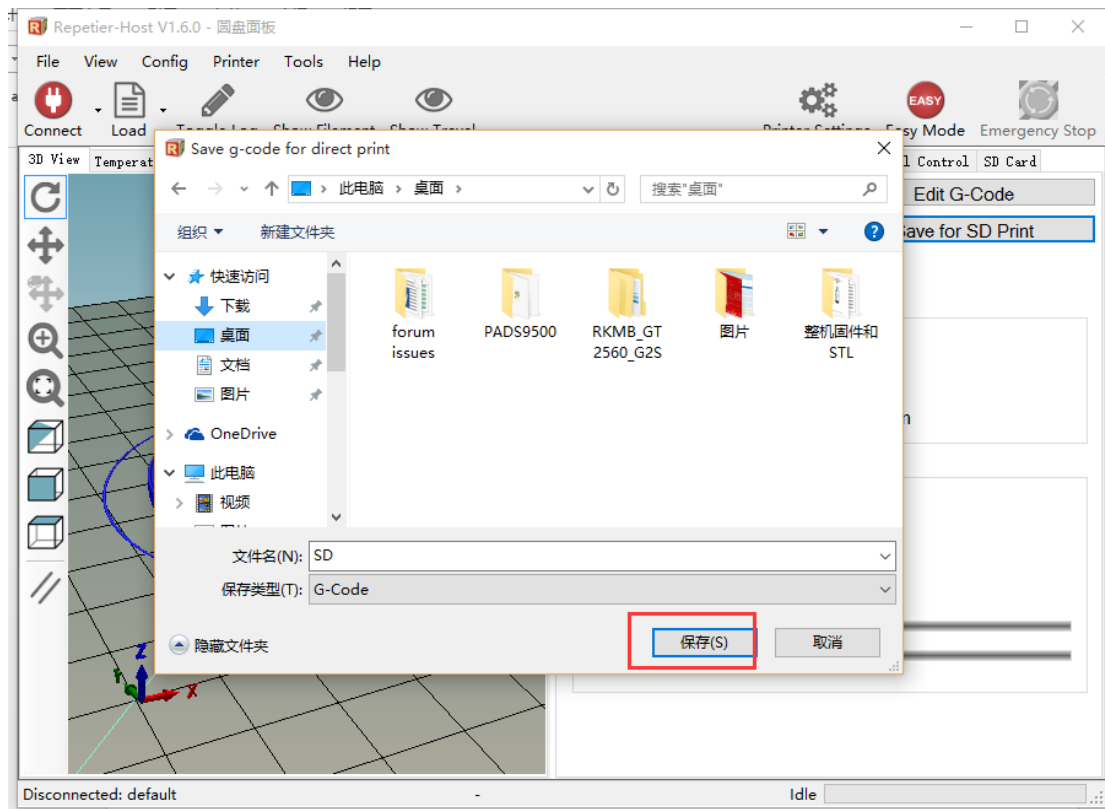
7.3.1 Save

Click Save for SD Print, and select the save button in the dialog box.



7.3.2 Generate file

Choose a save path to save the generated .gcode file which can be used for SD card printing.



7.3.3 Print

Insert the SD card into the SD card slot at the back of the LCD control panel, and choose the corresponding .gcode to print.

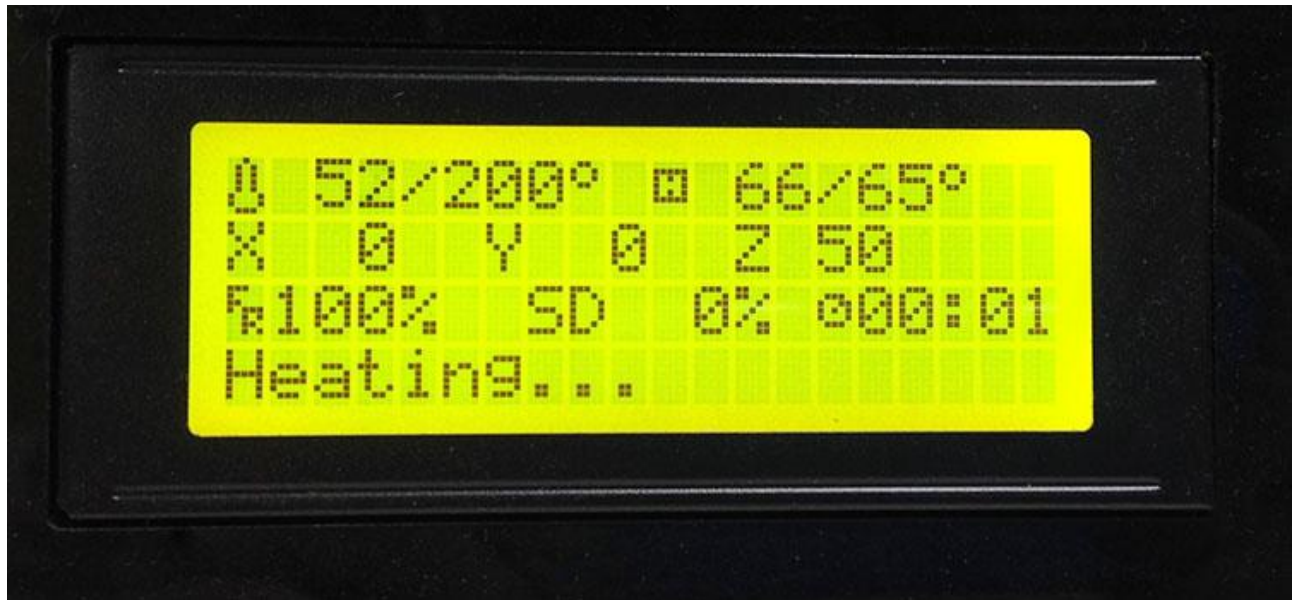
Press the knob on LCD, rotate the knob to enter the main menu and choose Print from SD option.



Choose corresponding .gcode file to begin printing.



Heating



When heating is completed, it begins printing automatically.



8 FAQ

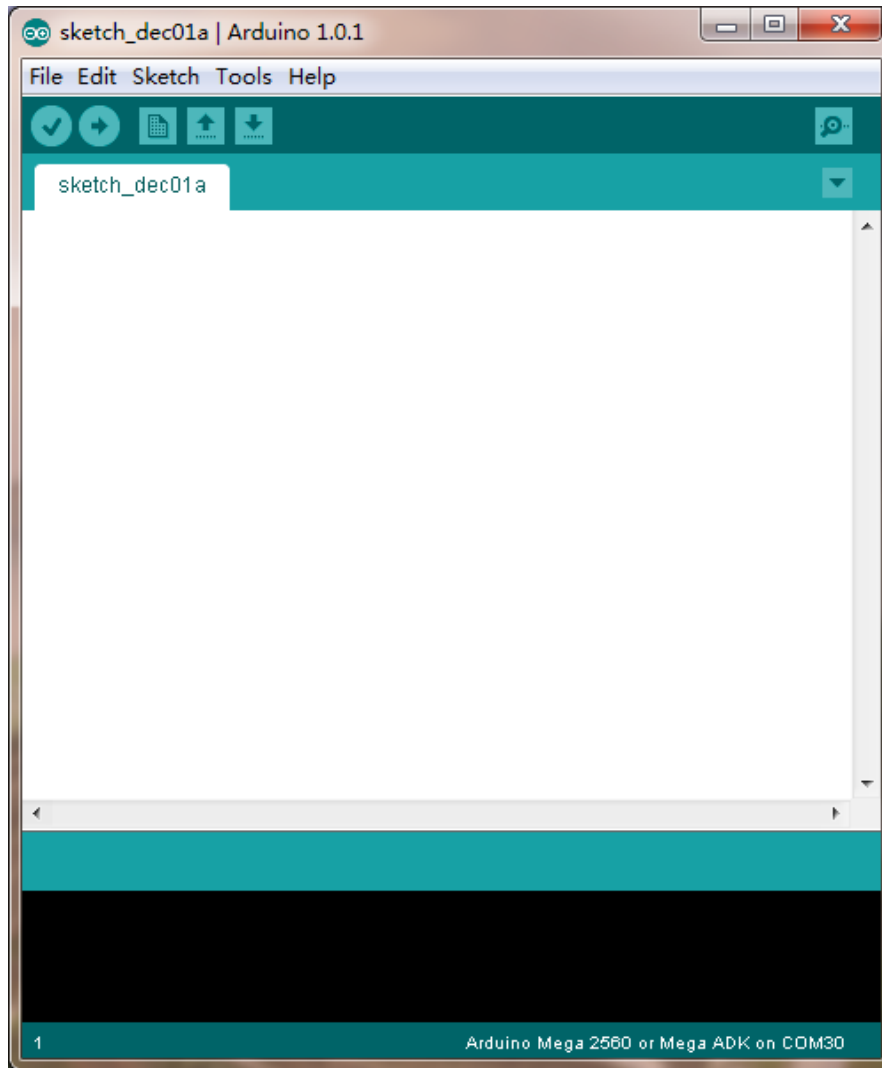
If you encounter any problems during use, you can come to our forum:

<http://www.geeetech.com/forum/>, and there are detailed solutions answer in the forum. Common problems are as follows:

8.1 How to upload firmware?

The motherboard of the printer is already burned with firmware when it leaves the factory. If you have firmware problem when you are using the product and need to upload firmware, you need to use the Arduino IDE to burn. Arduino1.0.1 is recommended, and the download address is:

<https://www.arduino.cc/en/Main/OldSoftwareReleases#1.0.x>



The way of uploading firmware, please refer to:

<http://www.geeetech.com/forum/viewtopic.php?f=13&t=17181>

Firmware download address, please refer to:

<http://www.geeetech.com/forum/viewtopic.php?f=10&t=17046>

Common parameters settings of firmware, please refer to:

<http://www.geeetech.com/forum/viewtopic.php?f=13&t=17194>

8.2 How to change the motor direction in firmware?

In the configuration.h tab of firmware, find the following codes. Change the true of corresponding axis into false or false into true, and save the firmware and burn into the printer. (Because you don't

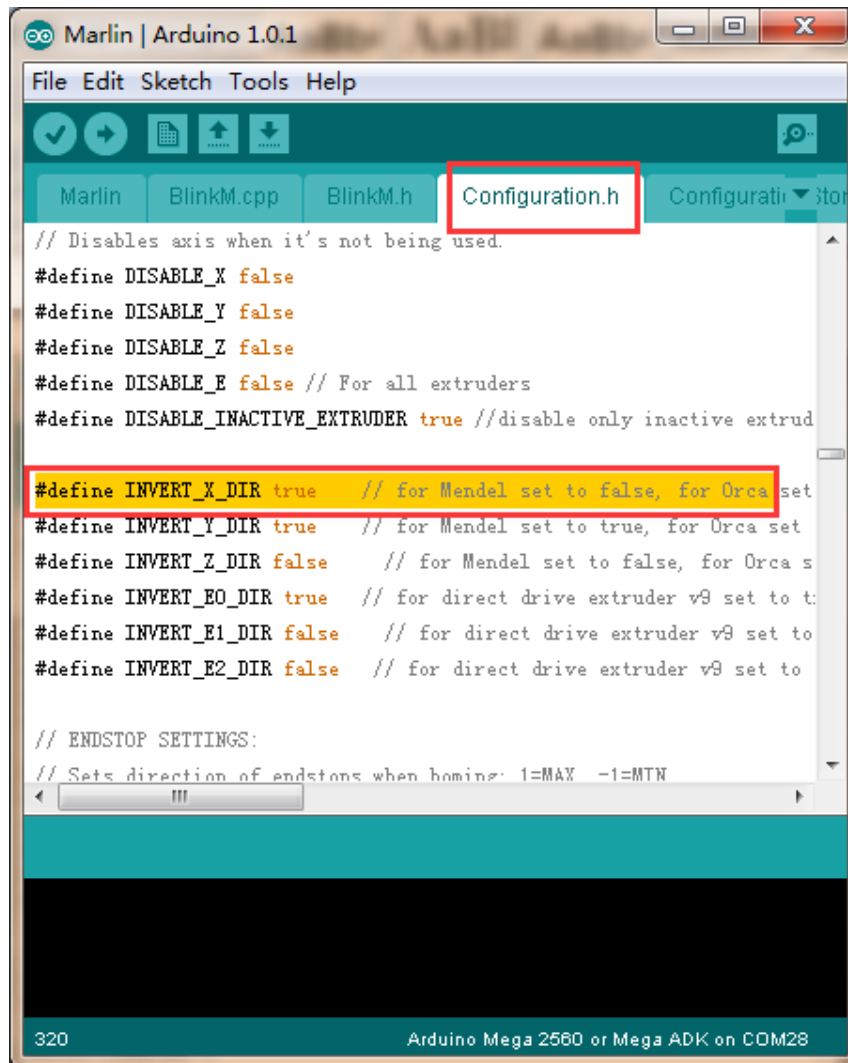
know the firmware which has been burned by mother board is true or false, it may be necessary to burn both of the two parameters.)

```
#define INVERT_X_DIR true
```

```
#define INVERT_Y_DIR false
```

```
#define INVERT_Z_DIR true
```

```
#define INVERT_E0_DIR false
```



8.3 User manual of Repetier Host

For detailed user manual of Repetier Host, please refer to Wiki:

<http://www.geeetech.com/wiki/index.php/Repetier-Host>

8.4 Possible causes for motor' s non-action

<http://www.geeetech.com/forum/viewtopic.php?f=13&t=17038>

8.5 Extruder does not work normally

<http://www.geeetech.com/forum/viewtopic.php?f=13&t=17097>

8.6 The hotbed or extruder can not be heated

<http://www.geeetech.com/forum/viewtopic.php?f=13&t=17117>

8.7 LCD error: MAX/MIN TEMP error

<http://www.geeetech.com/forum/viewtopic.php?f=13&t=17030>

8.8 No information or displaying black square on LCD

<http://www.geeetech.com/forum/viewtopic.php?f=13&t=17040>

8.9 Time.h/endstop hit or other abnormalities

<http://www.geeetech.com/forum/viewtopic.php?f=13&t=17037>