



# *Michelangelo* **ASSEMBLY MANUAL**



# Read me first

***READ THIS MANUAL COMPLETELY BEFORE ASSEMBLING AND POWERING UP YOUR PRINTER!***

## **Hazards and Warnings**

The TEVO Michelangelo 3D printer has motorized and heated parts. When the printer is in operation always be aware of possible hazards.

### **Electric Shock Hazard**

Never open the electronics bay of the printer while the printer is powered on. Before removing the access door, always power down the printer and unplug the AC line cord.

### **Burn Hazard**

Never touch the extruder nozzle, or the heater block without first turning off the hotend and allowing it to completely cool down. The hotend can take up to twenty minutes to completely cool down. Also, never touch recently extruded filaments. The filament can stick to your skin and causes burn.

### **Fire Hazard**

Never place flammable materials or liquids on or near the printer when powered on or in operation. Liquid acetone and vapors are extremely flammable.

### **Pinch Hazard**

When the printer is in operation, be careful never to put your fingers in the moving parts, including the belts, pulleys, gears, wheels or leadscrews.

### **Static Charge**

Make sure to ground yourself before touching the printer, especially the electronics. Electrostatic charges can damage electronic components. To ground yourself, touch a grounded source.

### **Age Warning**

For user under the ages of 18, adult supervision is recommended. Beware of choking hazards around children.

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# Letter from TEVO

Dear Customer,

Thank you for purchasing the TEVO Michelangelo 3D printer.

This guide will step you through the assembly and the first run of the printer. If you have any problems during assembly, please go to our Facebook group:

<https://www.facebook.com/groups/TEVO.3dprinter.owners/>

If you cannot resolve your problem there, do not hesitate to contact us through the website <http://support.tevoprinter.com>

Please make sure that all screws are tight and wheels are running smoothly and snug against the extrusions.

Regards,

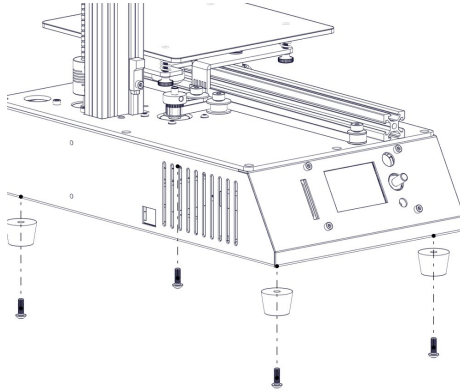
TEVO Team



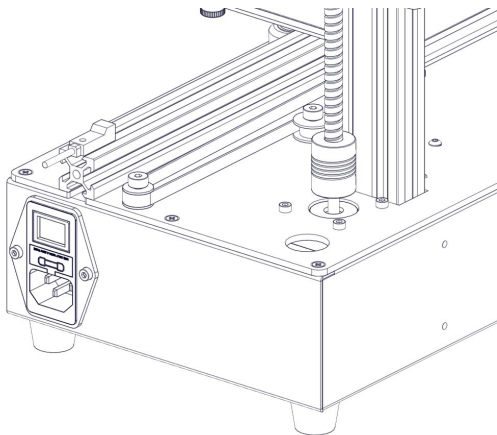
# Assembly

1. Remove the parts from the box and remove any tape and padding from the parts. Inspect the parts to make sure they were not damaged in shipment.

2. Install the 4 rubber feet at the bottom of the machine with M4 x 12 screws.

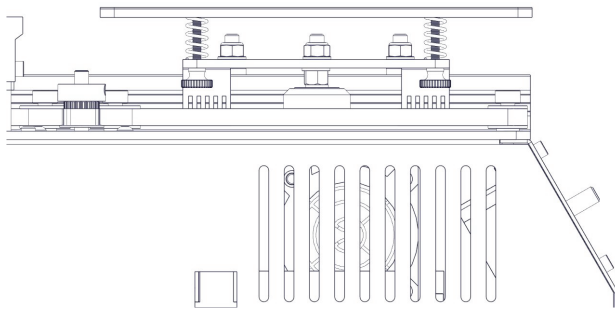


3. Connect the power cord to the back of the control box to a standard 220V/110V electrical outlet and turn the power on using the switch above.

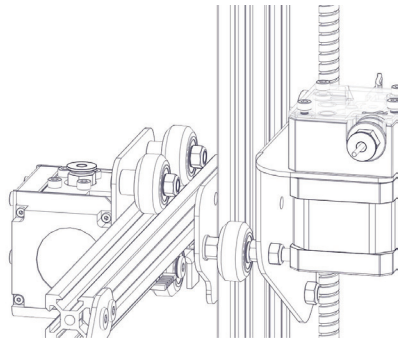


# Fine-tuning

1. Adjust the tension of the build plate wheels on the Y-axis on the base.
  - a. Check the tension of the build plate wheels. Try to turn the wheels under the build plate without forcing it. If the wheel turns freely or without much effort, then it is too loose.  
To tighten the wheels, rotate the eccentric nut that connect
  - b. to the wheel. Use the open-end wrench to rotate the nuts slightly until the wheels is snug against the Y-axis aluminum extrusion.
  - c. The build plate assembly and the belt should move forward and backward without much effort, and there should have no side-to-side wiggle or plat.

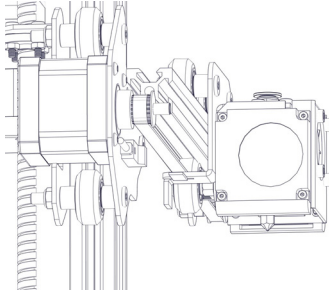


2. Adjust the tension of the Z gantry plate wheels.
  - a. Check the tension of the gantry plate wheels. Try to turn the wheels behind the plate without forcing it. If the wheel turns freely or without much effort, it is too loose.
  - b. To tighten the wheels, rotate the eccentric nut that connect to the wheel. Use the open-end wrench to rotate the nut slightly until the wheel is snug against the Z-axis.



# Fine-tuning

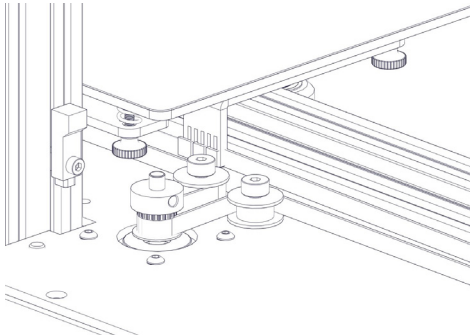
3. Adjust the tension of the X-carriage wheels.
  - a. Check the tension of the X-carriage wheels. Try to turn the wheels behind the plate without forcing it. If the wheel turns freely or without much effort, it is too loose.
  - b. To tighten the wheels, rotate the eccentric nut that connect to the wheel. Use the open-end wrench to rotate the nut slightly until the wheel is snug against the X-axis.
  - c. The hotend assembly and the belt should move left and right without much effort, and there should have no front-and-back wiggle or play.



4. Check the tension of the belt driving the Y-axis (under the build plate). The belt should be taut, with no slack or slop.

If the belt is loose:

- a. Loosen the 4 bolts.
- b. Holding the Y motor in-place.
- c. Pull the motor with pulley away from the extrusion to tighten the belt. Holding the belt taut, tight the 4 bolts.

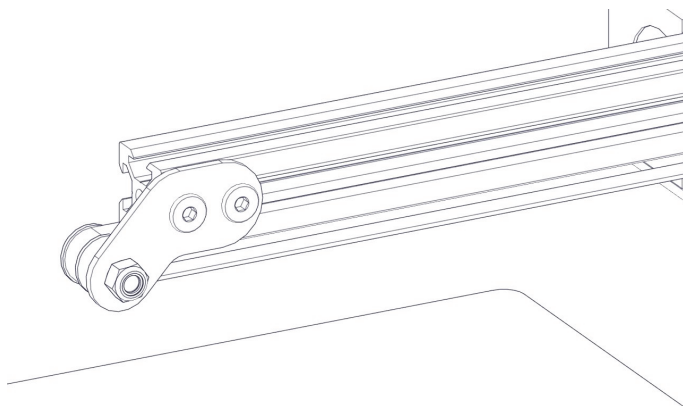


# Fine-tuning

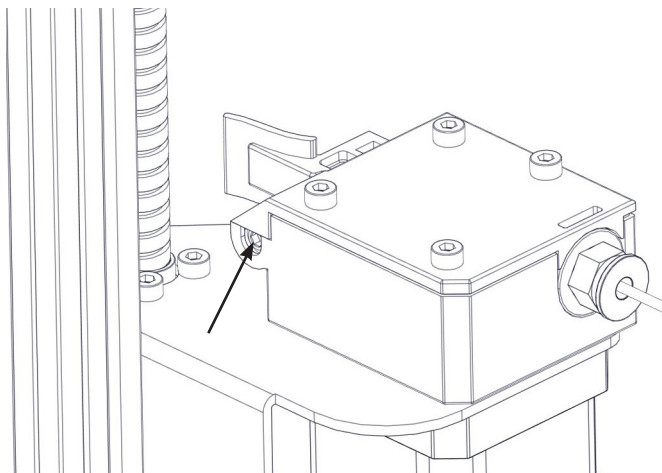
5. Check the tension of the belt driving the X-carriage. The belt should be taut, with no slack or slop.

If the belt is loose:

- a. Loosen the 2 bolts on the idler plate at the end of X-axis.
- b. Pull the plate to tighten the belt. Holding the belt taut, tight the 2 bolts.



6. Adjust the tension on the Titan Extruder with the screw shown in the picture below if the filament doesn't come out smoothly during print.



# Adjusting the build plate

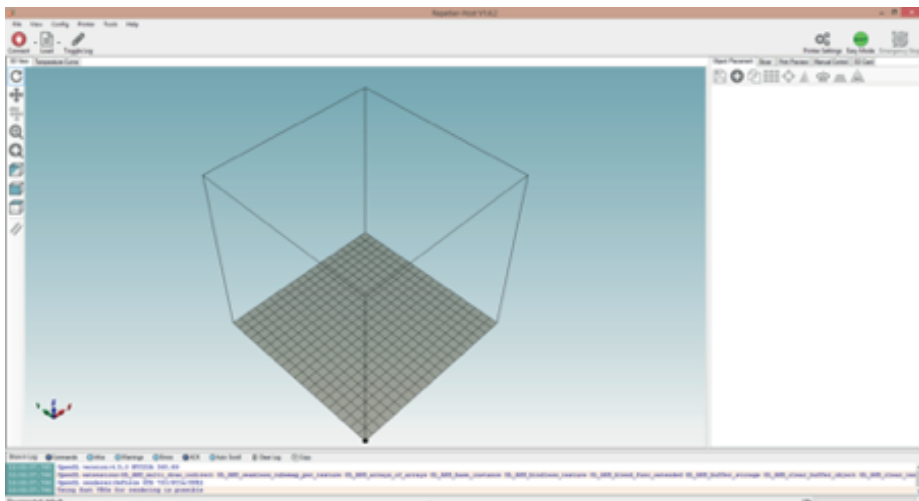
To build good parts, the build plate needs to be the same distance away from the nozzle in all locations (approx.. 1mm). This is about the thickness of a single piece of A4 paper. You want to adjust the height of the build plate so that you can barely slide the paper between the nozzle and the build plate with only a little resistance.

1. Select Prepare -> Auto Home. This will move the nozzle to the home position at the front left corner of the build plate.
2. Select Prepare -> Disable Steppers. This will allow you to move the X-carriage and build plate by hand.
3. Tips: The Z-axis stepper motor is also disabled, and you don't want it to move at all. You should handle the printer gently during the adjusting process. Keep it flat and move the X-carriage carefully.
4. Slide a piece of paper between the nozzle and the build plate.
5. Adjust each of the four thumbscrews under the bed until the piece of paper slides, with just a bit of drag, in all locations on the build plate.
6. Repeat the same process at least twice, because adjustment in one corner will affect others.
7. You may need to make fine adjustments to the bed level when you start printing. The first layer of the print will show whether the distance between the nozzle and the build plate is correct. You want it to be pushed into the build surface slightly to maximize surface area contact while still allowing good extrusion flow.
  - a. You can try to carefully adjust the thumbscrews during the first layer of the print while the plate is moving until the distance between the nozzle and the build plate is producing smooth extruded lines.
  - b. After you have fine-tuned the bed height during the first layer, you may want to stop the print, clear the build plate, and restart the print.

# Preparing slicing software

This printer works with most slicing/printing software like Simplify3D, Cura, Repetier-Host, etc. But we will go in details for Repetier-Host software and tell you how to set it up so that you can make your first print. First, you can download the software from our website at: <http://www.tevo.cn/software-download.php>

After installation is done and you start the software, you should get the following screen:



Now we have to setup our printer in the settings so that Repetier-Host can connect to it and will know what size of the build area our printer use. Open the Printer Settings window (click Config -> Printer Settings).

First set Port to whatever port your mainboard use (if you are going to print with USB connection, and you have to connect your printer to your PC first.) Set Baud Rate to 250000 and DO NOT touch any other settings in this tab.

# Preparing slicing software

Printer Settings

Printer: **TORNADO**

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

Connector: Serial Connection

Port: COM20

Baud Rate: 250000

Transfer Protocol: Autodetect

Reset on Emergency: Send emergency command and reconnect

Receive Cache Size: 63

Communication Timeout: 40 [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

Click on Printer Shape tab, change the flowing values:

X Max - 150

Y Max - 150

Print Area Width - 150

Print Area Depth - 150

Print Area Height - 150

# Preparing slicing software

Printer Settings

Printer: Michelangelo

Connection

Printer

Extruder

Printer Shape

Scripts

Advanced

Printer Type: Classic Printer

Home X: 0

Home Y: 0

Home Z: 0

X Min 0

X Max 150

Bed Left: 0

Y Min 0

Y Max 150

Bed Front: 0

Print Area Width: 150 mm

Print Area Depth: 150 mm

Print Area Height: 150 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.

Y Max

D

E

C

OK

Apply

Cancel



# Preparing slicing software

Printer Settings

Printer: Michelangelo

Connection Printer Extruder Printer Shape Scripts Advanced

Travel Feed Rate: 30000 [mm/min]

Z-Axis Feed Rate: 3600 [mm/min]

Manual Extrusion Speed: 3 25 [mm/s]

Manual Retraction Speed: 150 [mm/s]

Default Extruder Temperature: 210 °C

Default Heated Bed Temperature: 80 °C

☒ Check Extruder & Bed Temperature

☐ Remove temperature requests from Log

Check every 3 seconds. [Slider]

Park Position: X: 0 Y: 0 Z min: 300 [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 [%]

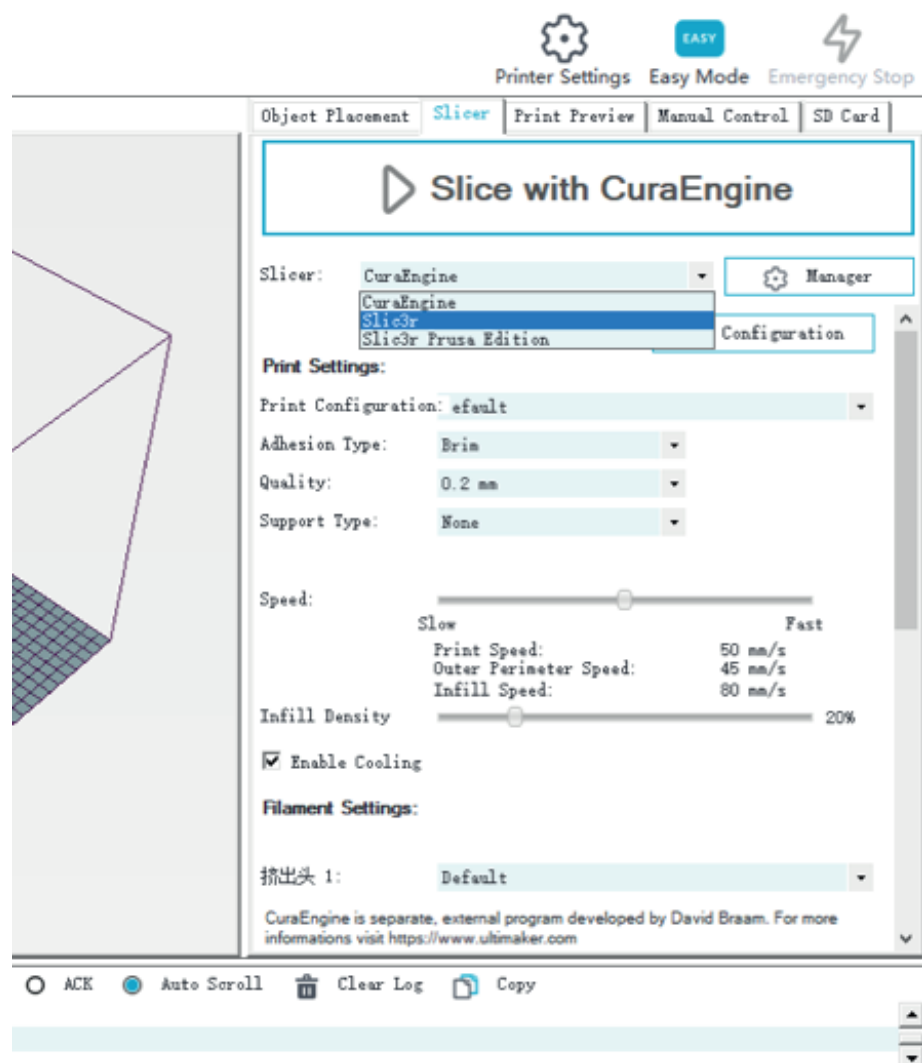
Invert Direction in Controls for ☐ X-Axis ☐ Y-Axis ☐ Z-Axis ☐ Flip X and Y

OK Apply Cancel

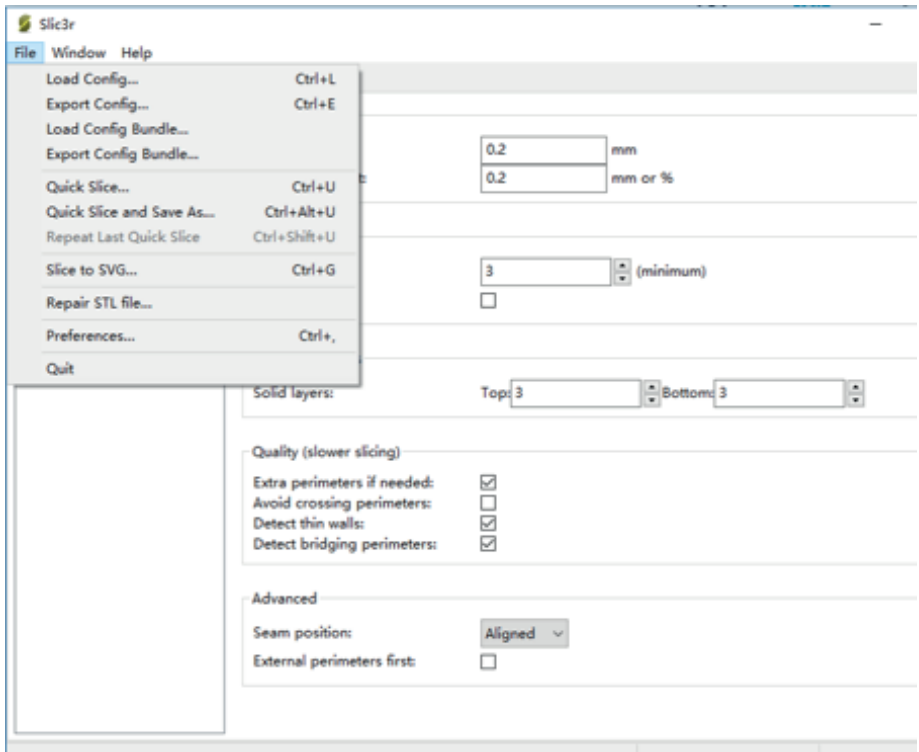
Go to Printer tab, change the value according to the picture on the left.

Go to slicer tab, select Slic3r as slicer and click on Configuration.

# Preparing slicing software



# Preparing slicing software



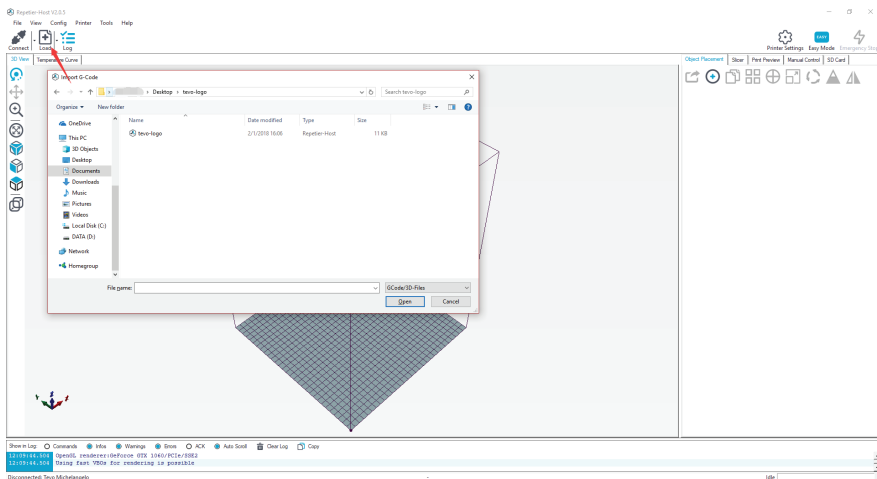
On Slic3r window, go to File -> Load Config. (Loaded setting is for general PLA filament printing).

Select and load Michelangelo.ini from SD card.

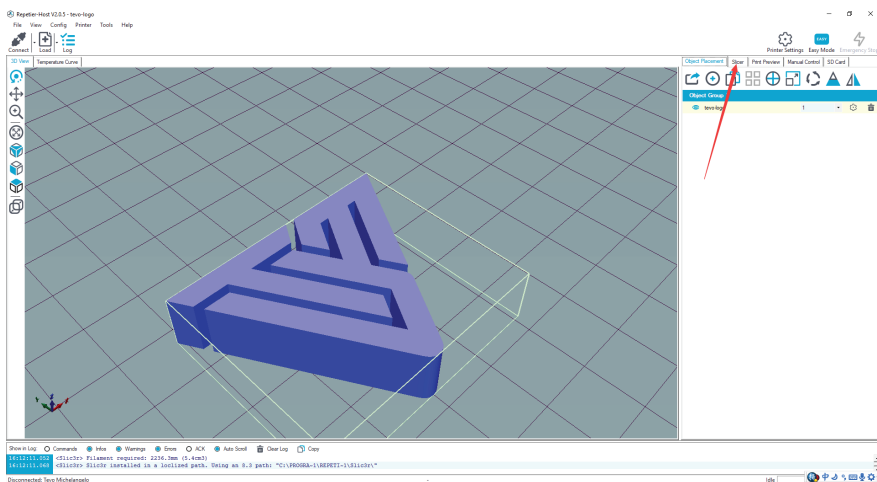
Rename print setting, filament, printer to Michelangelo and save.

# How to slice 3D object for SD print

Check the tension of the belt driving the X-carriage. The belt should  
Click on Load, browse to location of the file, then choose Open. (or you can just drag-and-drop the STL file onto Repeter-Host.)

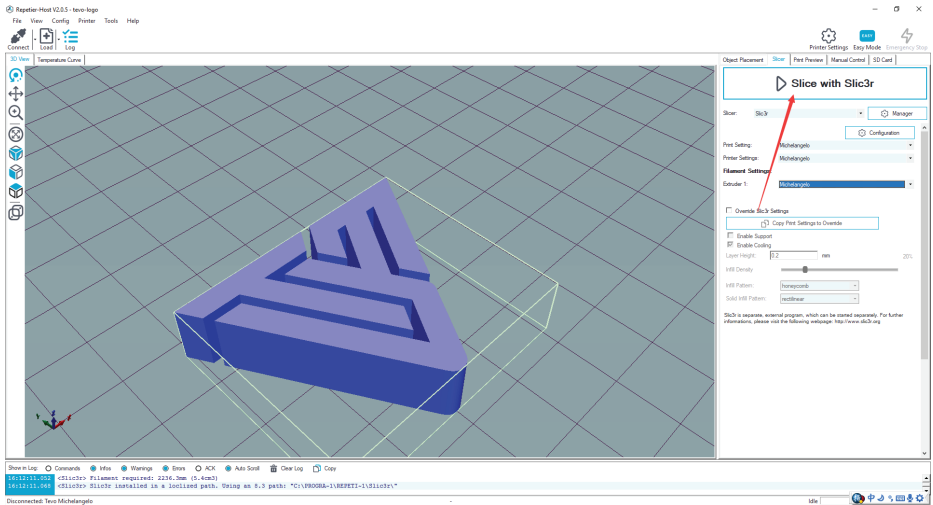


After the file is open up in 3D view, click on Slicer tab to go into slicing page.

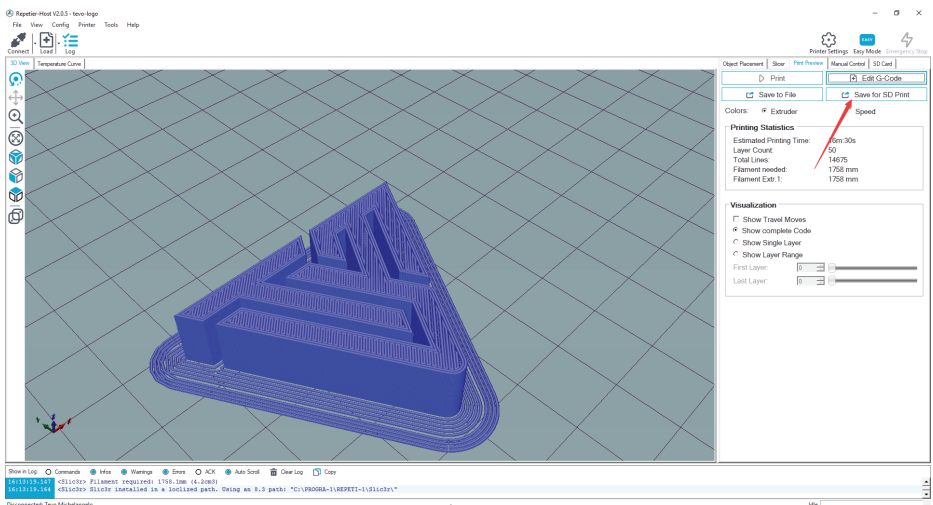


# How to slice 3D object for SD print

Select the correct Print Setting, Printer Settings, and Extruder type, then click on Slice with Slic3r



After slicing, click on Save for SD Print to save the G-code file to the SD card with file name of your choice. Then you can insert the card to your printer and choose Print from SD to start printing.



# How to flash firmware

To install firmware on your printer, you'll need to download the following:

1. Arduino IDE (<http://www.tevo.cn/software-download.php>)
2. Firmware Source Code (You can get it from many ways, e.g. our Facebook Page Files section, our Customer Service, or from Marlin and Repetier directly.)

In this chapter, we're going to use Marlin for demonstration.

## Configuration

Firmware downloaded from our Facebook page or from our customer service are pre-configured, you can use it without any modification.

To configure, you'll need to edit two files: `configuration.h` and `configuration_adv.h`. You can visit their website for explanations of the configuration file format and a synopsis of most of the options in these files.

## Verify / Compile

To start the process, do the following steps:

1. Double-click `Marlin.ino` file to open it in Arduino IDE.
2. Select Arduino/Genuino Mega or Mega 2560 from Tools -> Boards menu.
3. Select the serial (USB) port that your board is connected to in Tools -> Serial Port menu.
4. Click the Verify/Compile button at the top of the window to make sure there are no configuration errors. (Or you can click on Upload button next to Verify/Compile if you're using Marlin from our Facebook page or our customer service).
5. Once all errors are fixed, proceed with the upload by clicking Upload button. A blue or green LED on the board will flash rapidly during this process.

## Flash Your Board

To flash your board, do the following steps:

1. Ensure `Marlin.ino` is open in the Arduino IDE.
2. Select Arduino/Genuino Mega or Mega 2560 from Tools -> Boards menu.
3. Select the serial (USB) port that your board is connected to in Tools -> Serial Port menu.
4. Click on Upload button to begin flashing your controller board. A blue or green LED on the board will flash rapidly during this process.

**That's it! Now you've flashed firmware to your board, enjoy printing!**

# TEVO After-Sales

Dear Customer,

Thank you for purchasing TEVO 3D printer. We are dedicated to producing low price, high quality 3D printers and hope you have as much fun using it as we did creating it!

If you have any issue/questions regarding the contents in the kit, please fill out a Service Ticket on our Support page.

<http://support.tevoprinter.com>

Creating a Service Ticket will serve as your official requests for TEVO support. Our Customer Support Team will contact you within **48 hours**.

## SERVICE INFORMATION:

### 1. REPLACEMENT PARTS

- 1.1. TEVO products are covered under a Replacement Part Program for a period of **12 months** from the date of purchase.
- 1.2. Missing/Damaged/Defective Parts
  - 1.2.1. **Within 7 days** of the delivery date, TEVO will replace any parts free of charge including shipping fees.
  - 1.2.2. **After 7 days** of the delivery date, TEVO will replace any parts free of charge BUT the customer will be responsible for shipping fees.
- 1.3. Customer Damaged Parts
  - 1.3.1. The customer shall pay for the cost of the parts and the shipping fees.

### 2. CARRIER LOSS, MISSING, DAMAGED, AND DEFECTIVE PARTS

- 2.1. Claims for lost or damaged shipments must be reported to the carrier within the carrier's claim window, the customer needs to inform TEVO within **7 days** of the delivery date.
  - 2.1.1. For any parts lost or damaged during shipping, the customer shall take photos or video and submit them when filling out a Service Ticket. If a claim number was issued by the carrier, please include the claim number when creating

# TEVO After-Sales

your Service Ticket (**Report a Problem / Carrier Lost Parts.**)

2.1.2. Once the Carrier dispute is resolved, please provide TEVO with all communications with the carrier. It is the customer's responsibility to keep TEVO up to date with ALL communication with the carrier.

2.1.3. TEVO will work with the customer on replacing the parts in the claim.

2.2. For Missing Parts, refer to section 1.2, the customer shall fill out a Service Ticket (**Report a Problem / Missing Parts.**)

2.3. For Damaged Hardware Parts, refer to section 1.2, the customer shall take photos or video and submit them when filling out a Service Ticket (**Report a Problem / Damaged Hardware Parts.**)

2.4. For Defective Electronic Parts, refer to section 1.2, the customer shall take photos or video and submit them when filling out a Service Ticket (**Report a Problem / Defective Electronic Parts.**)

2.4.1. If the part is the LCD Panel, Power Supply or Mainboard, the customer shall ship the part back to TEVO and TEVO will send a new part.

2.5. For parts damaged by the customer, refer to section 1.3, submit a Service Ticket (**Report a Problem / Customer Damaged Parts.**)

## 3. GENERAL SUPPORT

For information and support on building and operating your TEVO Michelangelo 3D printer, please visit the TEVO Michelangelo Owners Group.

<https://www.facebook.com/groups/TEVO.Michelangelo.Owners/>



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TEVO 3D Electronic Co., Ltd.