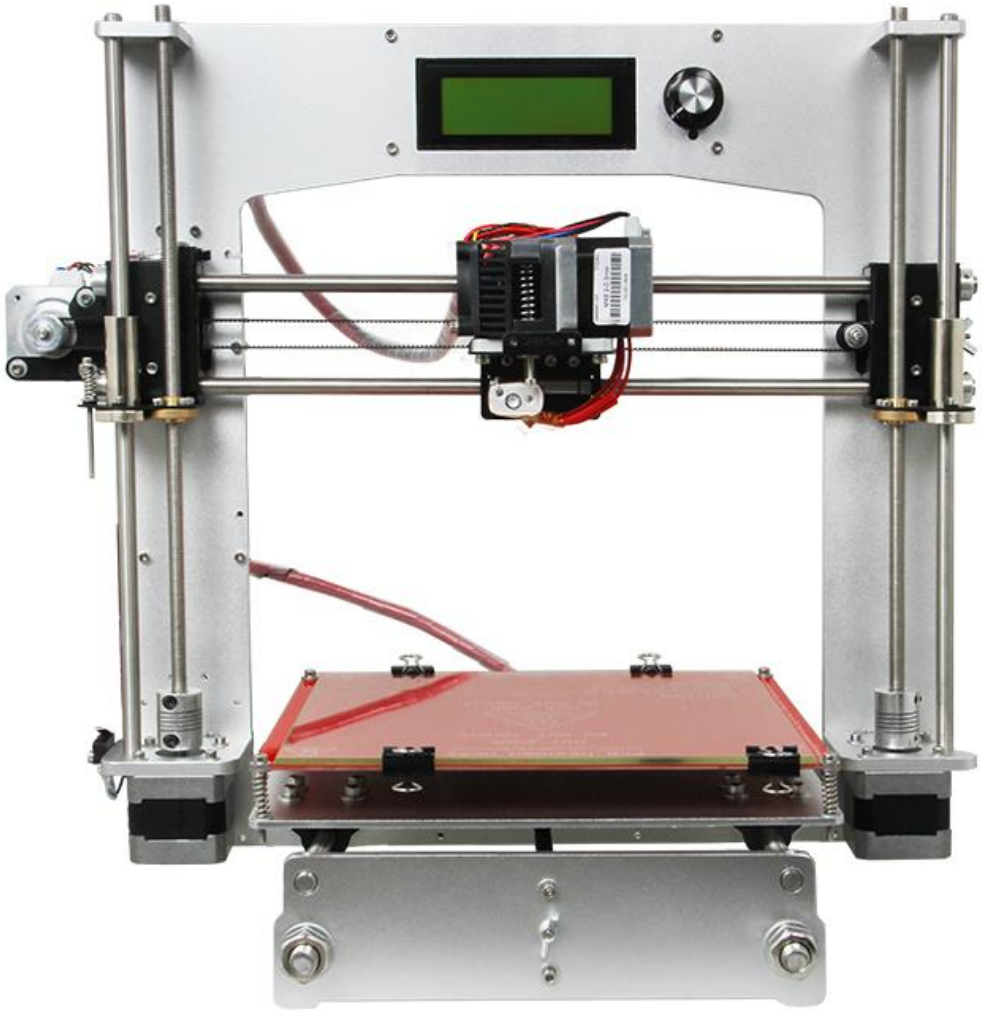
Assembly Instructions of Geeetech Aluminum Prusa I3



(Version 12-07-2016)

CONTENT

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℃, the heated bed runs 110℃ and the molten plastic extruded will initially be at around 200℃, so special care and attention should be made when handling these parts of the printer during operation.

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.

Preparation

1. Unpack the kit and check if all parts are in the box and check the condition of each part, there might be some damage during shipping. To help you with this, there is BOM in the box and each bag was labeled with part number.

2. Contact our customer service immediately by email or through the website if you find any missing or damaged parts. And on the bottom of the BOM, there is a signature of reviewer, please take a picture of it and attach the picture in your mail.

3. Read through each chapter of these instructions to gain an over-all idea of what is involved and how long it might take, before starting on the work described.

4. Before you start, you can put all the part in order to save your time especially those screws and nuts. Do not mix them up.

5. Ensure you have the necessary skills to carry out the work, or enlist the help of someone who does.

6. Work on a big firm table or bench in a clean dry well-lit area.

7. This kit contains tiny parts; please keep them away from kids under 3.

8. Ask for help if you run into any problems - our contact details are on the website and we will always do our best to resolve any problems encountered.

9. There is one difference in the video, in the video, the control board is mounted on the left back of the printer, as we re-designed the frame, the board now is mounted on the right back of the printer.

1. Unfold the box and check the package

Unfold the package and take all the parts out to check the condition of the items. As you can see, all the parts are packed very carefully.

Tips:

1. Before assembly, you are advised to put all the parts, especially the screws and nuts in order, which will save you a lot of time looking for the required parts.

2. The part ID is corresponding to the number labeled on the bag of every part. Some parts may not have label, you can refer to the pictures on the package list.

For step by step video instruction, please visit here.

2. Assemble Y axis

2.1Assemble the 2 threaded rods.

VIDEO

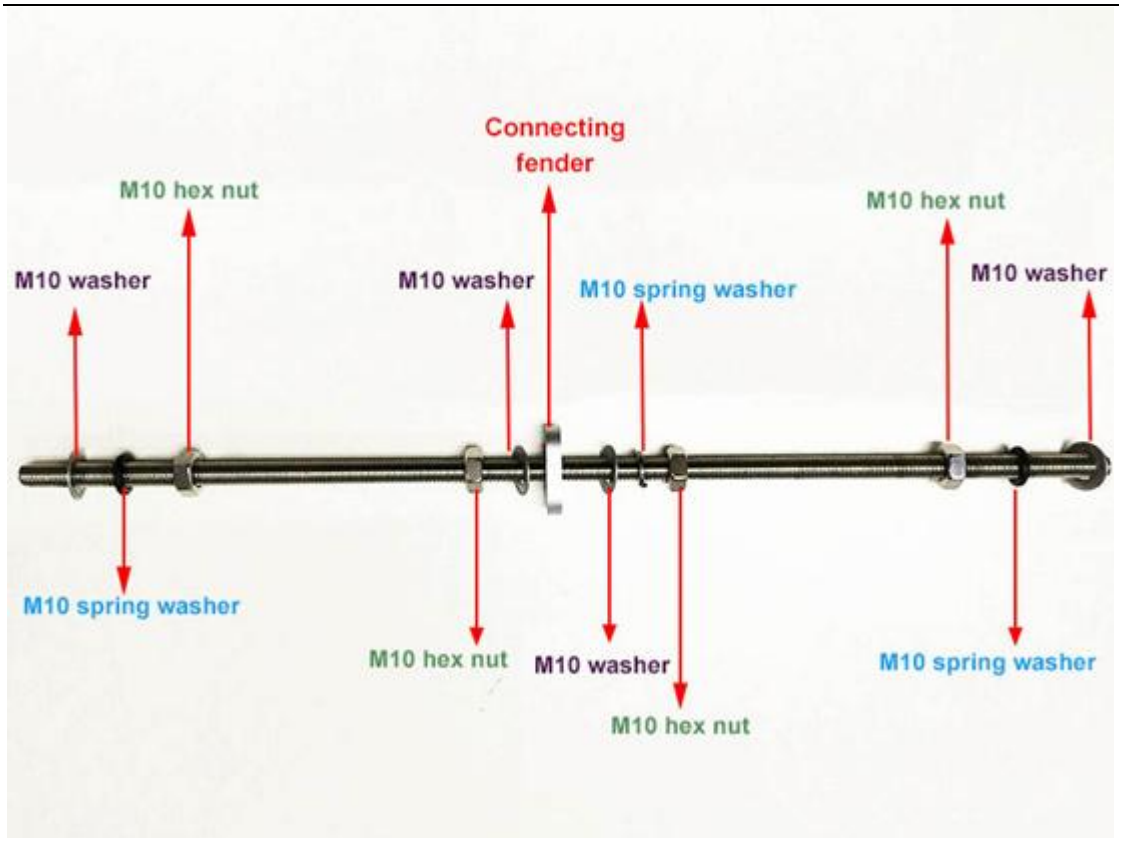
Required parts	Required number	Part ID	Pic
Y threaded rod	2	NO.5	
connecting plate	2	NO.A12	
Spring washer	6	NO.10	
M10 washer	8	NO.9	
M10 nut	8	NO.12	

Thread the nuts and washers into the two M10 threaded rods separately. The orders should be:

1) Thread the Y plate connecting plate in the middle.

2) Thread the M10 washer > spring washer >M10 nut > M10 nut > M10 washer on the left

3) Thread theM10 washer < spring washer < M10 nut < M10 nut< spring washer < M10 washer on the right



2.2Attach the front and rear side support plates of the rods.

VIDEO

Required parts	Required number	Part ID	Pic
Front Side Support	1	NO. A2	
Rear Side Support	1	NO.A3	
M10 washer	4	NO.9	
M10 nut	4	NO.12	

Slide assembled threaded rods into the side support plates. Screw up the rods and plates with 4 M10 nuts and M10 washers.

* Tips: The Y-axis must be a rectangle, that is the rods on both side should be parallel, so is the front and rear plate. Otherwise it will cause obstruction for the belt later.

2.3Assemble the Y idler

VIDEO

Note: as the driving wheel was added later, so in the video, there is some difference from what you get. But do not worry; it won't affect the whole process.

Required parts	Required number	Part ID	Pic
Ball bearing	2	NO.36	
bearing holder	1	NO.37	
Driving wheel	1	NO.38	
M4 x25 screw	1	NO.29	
M4 lock nut	1	NO.13	
Guide Block A	1	NO.A9	
Guide Block B	1	NO.A10	

M3 x 25screw	3	NO.23	
M4x25 screw	1	NO.29	
M3 wing nut	1	NO.14	
M3 washer	3	NO.7	
M3 nut	2	NO.11	
M4 washer	2	NO.8	

Step1. Amount guide block A and B onto the front support plate together, screw up it with 2 M3x25 screws, M3washers and M3 nuts.

Note: the guide block B is close to front support plate.

Step2. Thread a M3 x25screw and M3washer through the bearing holder.

Step3. Insert the two MR84zz ball bearings into both ends of the driving wheel.

We have finished this step for you before shipping.

Step4. Put the M4 x25 screw and M4 washer through the driving wheel. Lock the other end with a M4 lock nut. You may need a wrench to tighten locking nut.

*Do not screw it too tight, you should leave enough room for the wheel to turn freely.

Step5. Mount the assembled bearing holder through the guide blocks onto the front

support plates. And screw it with a wing nut.

*Please leave enough room for the belt between the ball bearing and the screw.

2.4Mount the Y motor

VODEO

Required parts	Required number	Part ID	Pic
Y motor fixed plate	1	NO. A8	
Stepper motor	1	NO.57	
pulley	1	NO.36	
M3 x 10screw	3	NO.19	
M3x16screw	2	NO.20	
M3 washer	5	NO.7	

Step1. Mount the pulley on the motor shaft, one of the screws should be screwed on the cross section of the shaft. Screw it up tightly.

Step2. Insert the motor block into the slot; you may need to use a little strength to do this. Then screw the motor on the Y motor fix plate with 3 M3 x 10 screws and M3washers

Step3. Fix the block plate with 2 M3 x 16 screws and M3 washers.

3. Build the printing platform

VIDEO

Required parts	Required number	Part ID	Pic
Y building platform	1	NO.A7	
Y belt mount	1	NO.39	
SCS8UU linear bearing	4	NO.33	
M3 x 10 screw	2	NO.20	
M4x12 screw	16	NO.28	
M3washer	18	NO.7	
M4 washer	16	NO.8	
M4 hex nut	16	NO.11A	

* Photos with PCS8UU linear bearings in this instruction is the previous version,here we use PCS8UU instead. Picture is just for reference. The mount method is the same.

PCS8UU linear bearings is a modified version of PCS8UU linear bearings, the block is made of high strength ABS, which is lighter and more flexible.

Why we changed the PCS8UU linear bearings into the PCS8UU?

To lighten the loads of the building platform and reduce the drag of Y axis so that the building platform can move more flexible therefore increase the precision of printing.

Step1. Mount the belt mount on the bottom side of the platform with 2 M3 x 10 screws and M3washers.

Step2. Mount the 4 PCS8UU linear bearing on the platform with 16 M4x12 screws and M4 nuton the same side with the belt-mount.

4. Assemble Y smooth rods

VIDEO

Required parts	Required number	Part ID	Pic
Y smooth rod	2	NO.3	
Lock screw M3x4 mm	4	NO.30	

Thread two smooth rods through: front side support [A2]> linear bearings > rear side support [A3] respectively. And screw it with 4 lock screws.

When threading the rod, please make sure the holes are aligned and do not force it, or you will break the balls in the bearings.

5. Mount the Y-axis belt

VIDEO

Required parts	**Required number**	**Part ID**	**Pic**
Timing belt	1	NO.42	

M3 x 8 screw	2	NO.19	
M3 washer	2	NO.7	

Step1. Punch a hole on one end of the belt（the hole can be as the diameter of the M3 screw, leave enough margin ）

Step2. Fix the belt on one side of the belt -mount with a M3 x 8 screw and washer.

Step3. Thread the belt around the pulley on the motor and the Y idler.

Step4. Punch a hole on the other end of the belt and fix it on the belt -mount with a M3 x 8 screw and M3 washer.

***Tips:**

1.Before you drill your second hole, make sure to pull belt tightly to make sure to find proper placement of hole for a tight belt, if it is too loose, it will hinder the move of t he print platform.

2. Loosen the Y idler wing nut when tightening belt onto the Y belt mount, in order to make securing the belt to the block easier. Be sure to tighten wing nut fully once done.

6. Assemble the Z-axis stepper motor, bottom mount and couplings

VIDEO

Required parts	Required number	Part ID	Pic
X-Z frame	**1**	NO.A1	
Z Motor fixed plate	2	NO. A5	

Stepper Motor	2	NO.61	
Coupling	2	NO.40	
M3 x 16screw	4	NO.21	
M3x10 screw	8	NO.20	
M3 washer	12	NO.7	

Step1. It would be easier to mount the motor on plates first, screw it with 8 M3x10screws and M3 washers

Step2. Thread the wires of the motors through the hole. Mount the assembled motor to the X-Z frame (A1), and screw the X-Z frame with 4 M3 x 16screws and M3washers.

Step3. Mount the coupling on the motor shaft, one of the screws should be screwed on the cross section of the shaft. Screw the small screw tightly.

7. Assemble Y - Z axis

VIDEO

Required parts	Required number	Part ID	Pic
M3 x 16 screw	4	NO.21	
M3 washer	4	NO.7	

Step1. Held upright the X-Z frame on the threaded rods (Right after the Y connecting plate)

Step2. Screw up the main frame to the Y connecting plate with 4 M3 x16 screws and

M3 washers.

8. Attach the heated bed.

VIDEO

Required parts	Required number	Part ID	Pic
Heat bed	1	NO.48	
Borosilicate glass	1	NO.44	
Spring	4	NO.31	
M3 washer	4	NO.7	
M3 x30 screw	4	NO.24	
clamp	4	NO.45	

Mount the heat bed on the platform with 4 M3 x30 screws and wing nuts with springs in between. Clamp the heat bed and the glass sheet.

*Note

The heating wire is pre-soldered on the bed and the thermometry wire is attached on the bed. The soldered side is better to be attached downwards.

9. Mount the fan

VIDEO

Required parts	Required number	Part ID	Pic
Fan	1	NO.47	
M3 x 25screw	2	NO.23	
Fan mount	1	NO.A4	
M3washer	4	NO.7	
M3 x 16screw	2	NO.21	

Step1. Fix the fan on the fan mount with 2 M3 x 25 screws and M3washers.

Step2. Mount the fixed block on the main frame with 2 M3x16 screws and M3 washers.

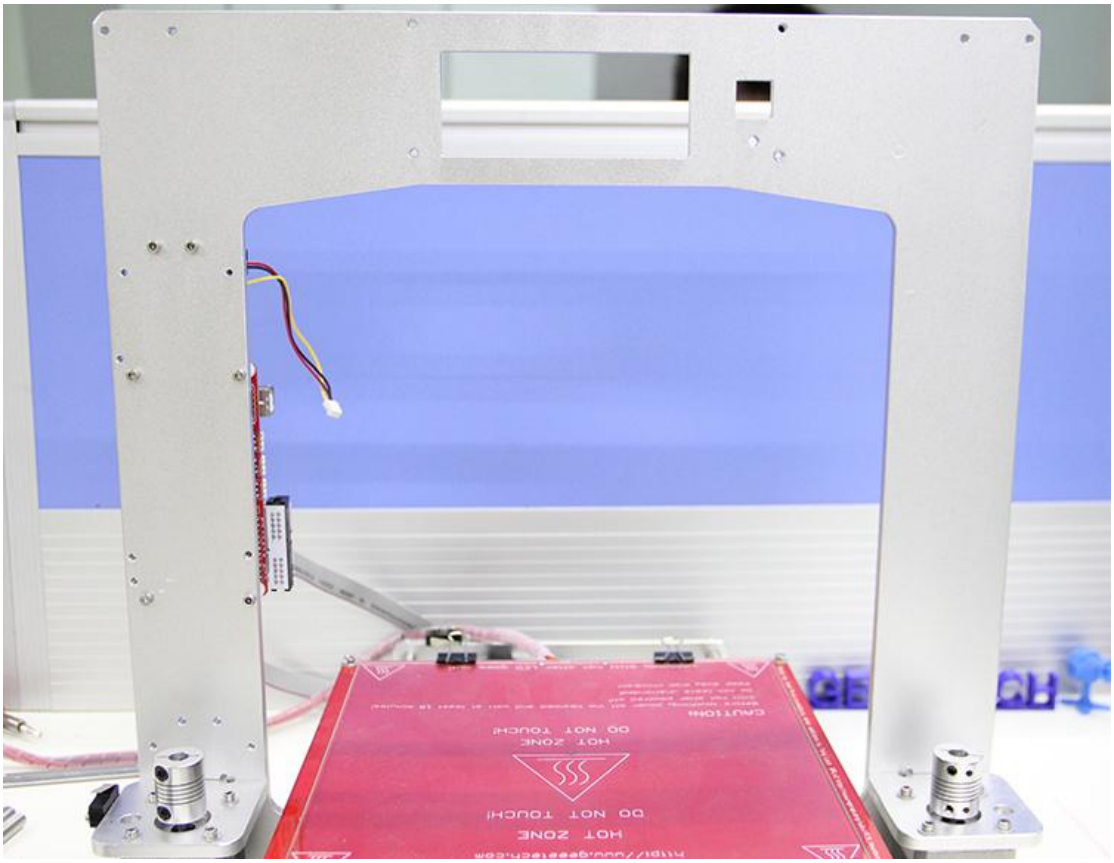
*Mind the direction of the fan; it is blowing towards the board.

10. Mount the board on the left side panel of the printer

VIDEO

Required parts	Required number	Part ID	Pic
Control board	1	NO.60	
M3 x 20screw	4	NO.22	
Spacer	4	NO.44	
M3washer	4	NO.7	
M3 nut	4	NO.11	

Mount control board onto the back of X-Z frame, and screw up it with M3x20screws, M3washers and M3 nuts.



*Attention:

The four A4988 stepper motor driver board is plugged on the board before shipping.

The four spacers should between X-Z frame and control board. And please stick the heatsink on each A4988 stepper motor driver board.

11. Assemble the left end of the X axis（motor end)

VIDEO

11. 1. Mount the Z-axis nut, linear bearing

Part name	Part ID	Required number	pic
Z-axis nut	No.15	1	

X-axis motor end	No.M1	1	
Linear Bearing LMH8LUU	No. 35	1	
M3 x 50 screw	No.26	1	
M3 x 6mm screw	No. 18	8	
M3 washer	No. 7	2	
Spring	No. 32	1	

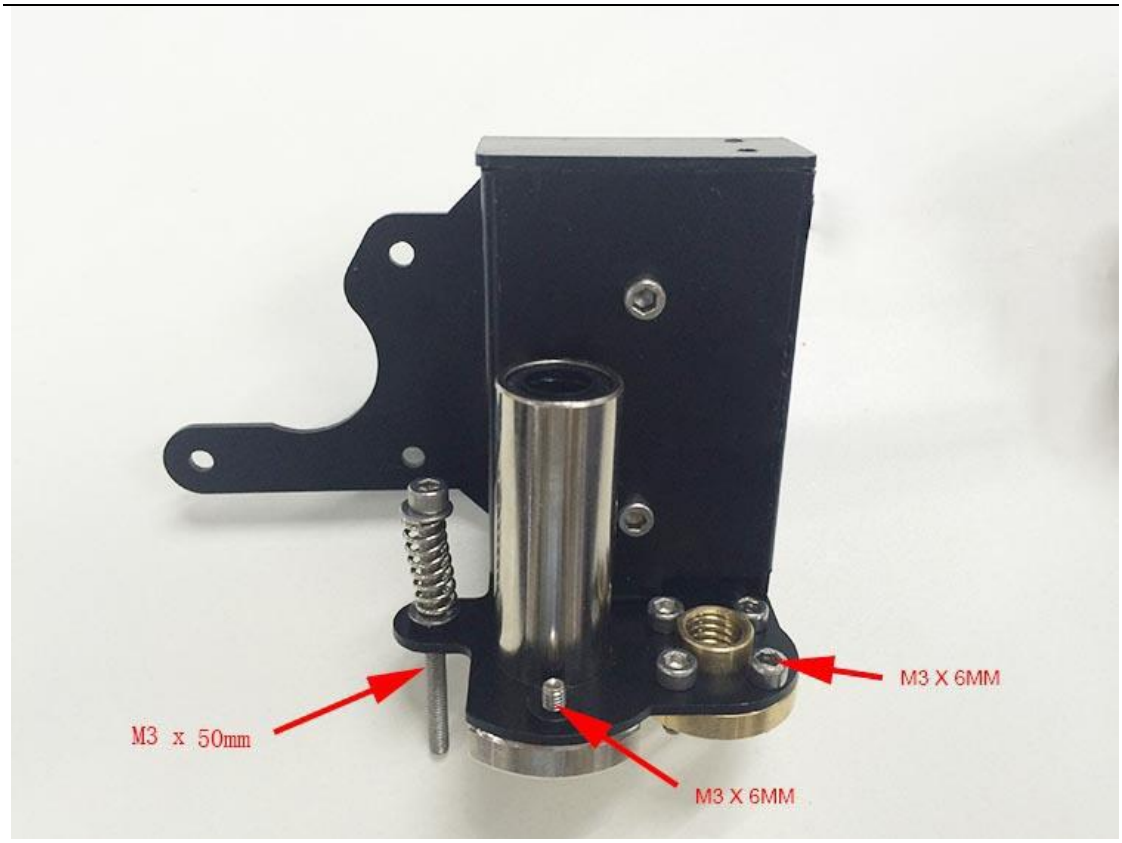
Step1. Mount the Z nut on the X-axis left end from bottom to up, fix with M3 x 6mm screws.

Step2. Mount the linear bearing on X-axis motor end from bottom to up. Fix it up with M3 x 6mm screws.

11.2 Mount the endstop trigger.

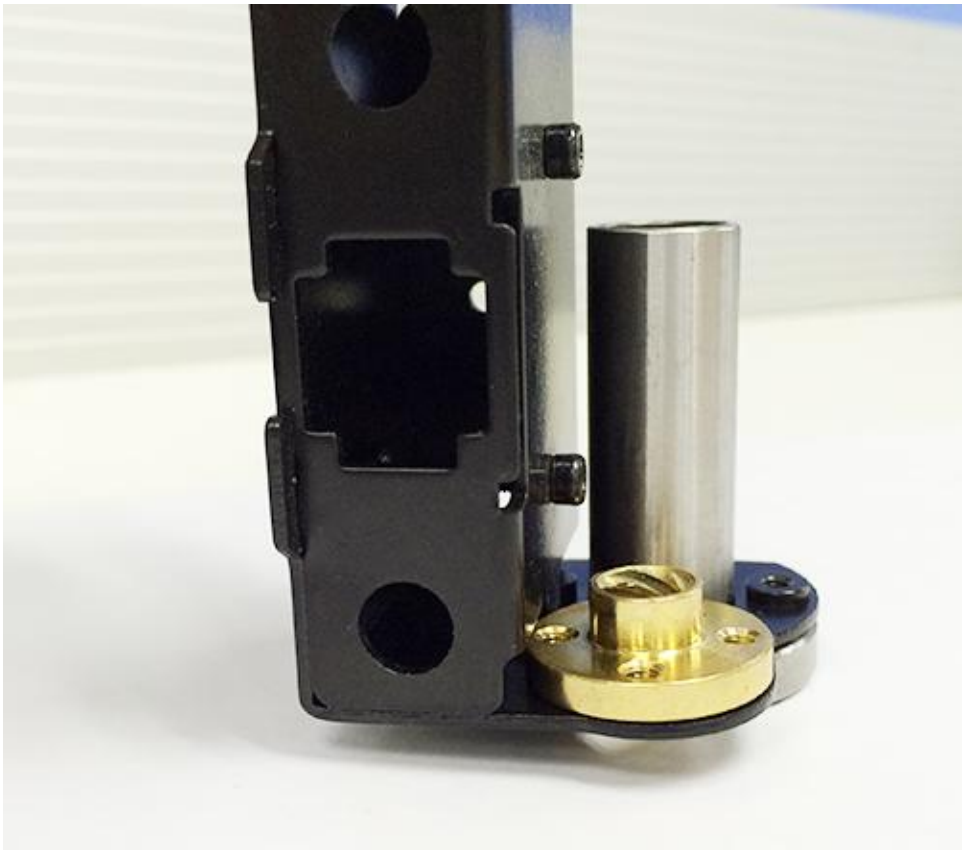
1. Thread a M3 washer> spring>M3 washer in order to the M3x50mm screw.

2. Thread half of the M3x50mm screw into the screw hole.



Tips here:

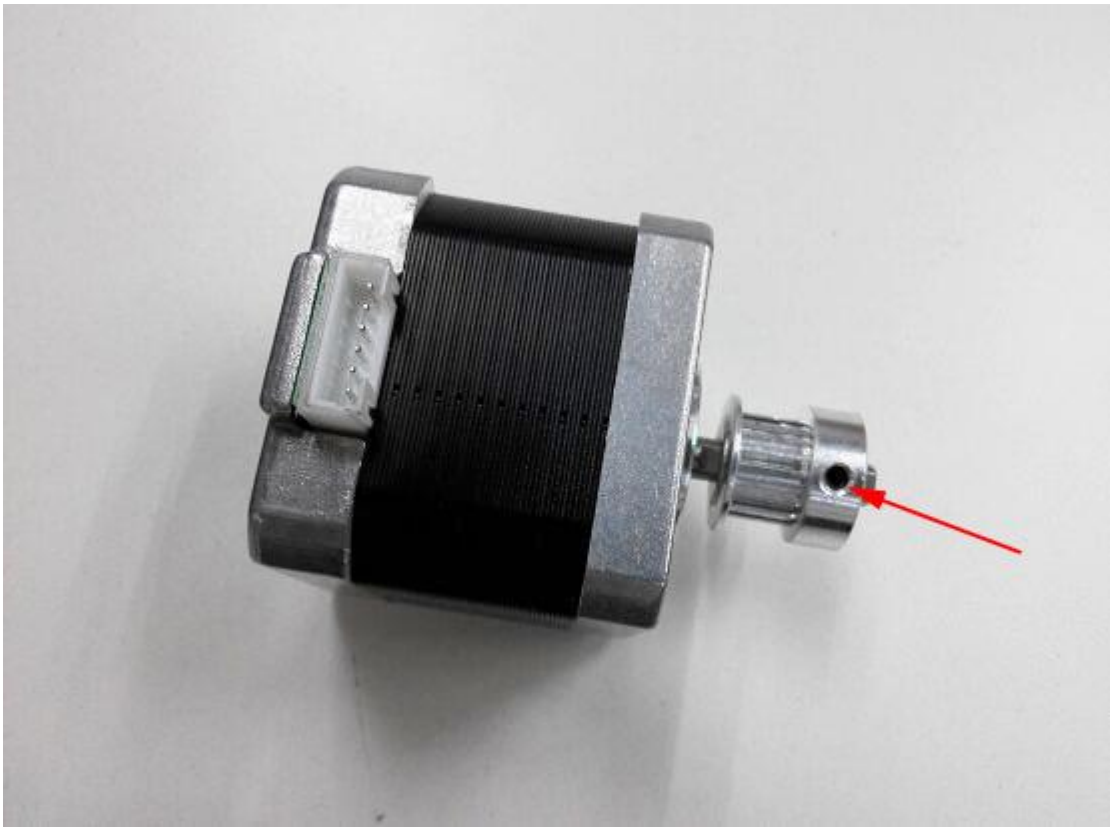
But if there is no enough room for both the Z nut and the linear bearing, you can move the Z nut upwards, as shown in the following picture:



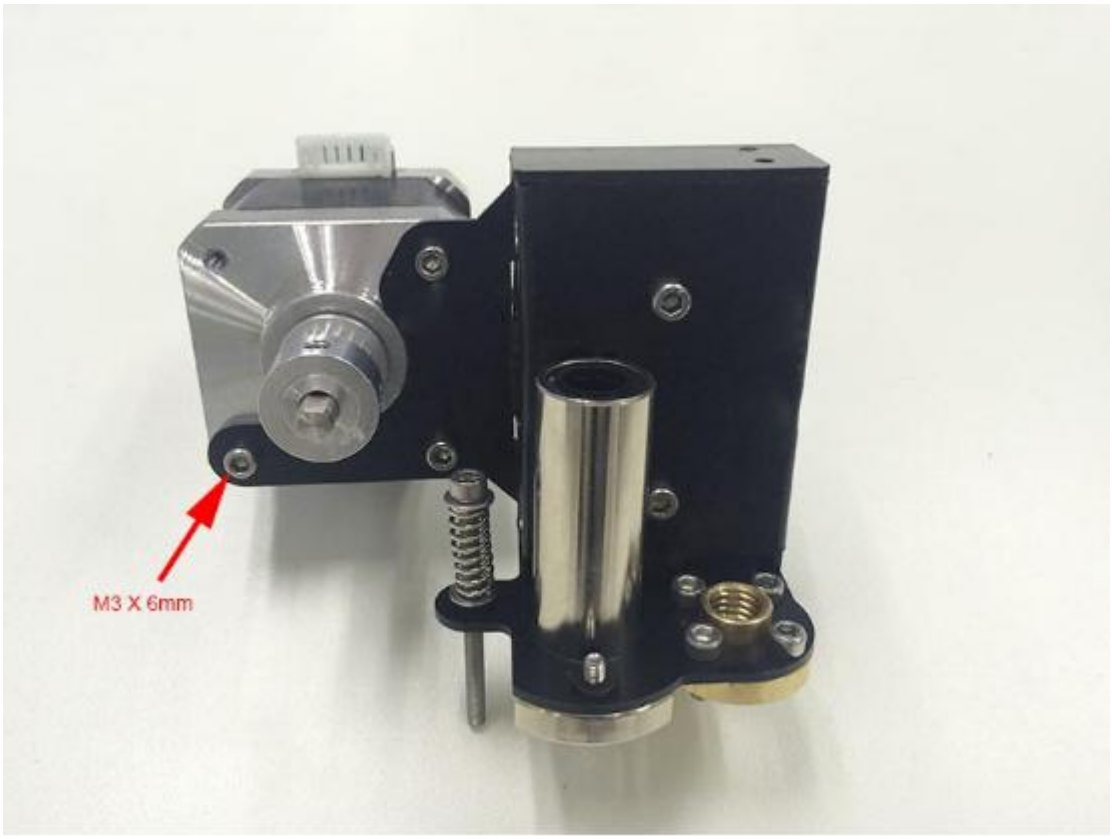
11. 3 mount the X motor.

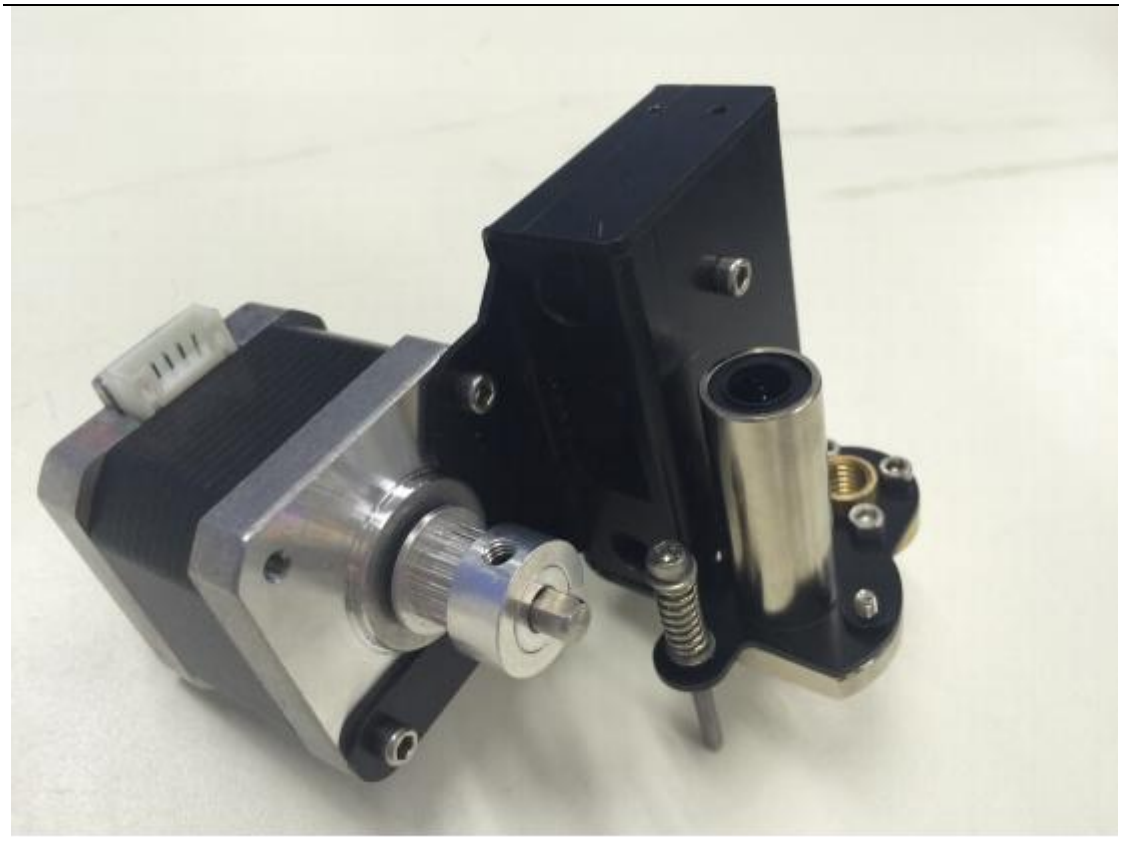
Part name	Part ID	Required number	pic
M3 x 6 mm screw	No. 18	3	
Stepper motor	No.61	1	
Pulley	No.41	1	

Step1. Mount the pulley on the motor shaft. Screw it on the flat side.



Step 2.Mount the stepper motor on the motor end with 3 M3 x 6 mm screw.





11.4 Mount the endstop

Part name	Part ID	Required number	pic
M2.5 x 8 mm screw	No. 17	2	
End stop	No.46	1	

Mount the endstop on the top of X-axis motor end with 2 M2.5 x 8mm screws

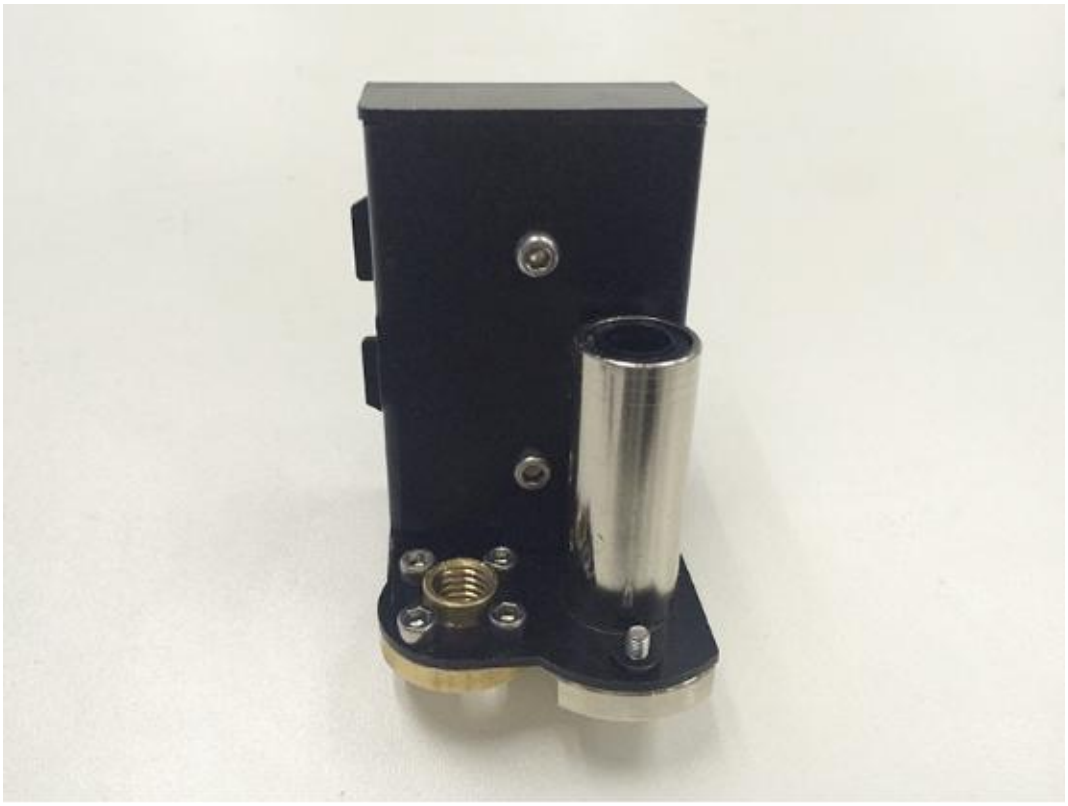
12. Assemble the right end of the X axis. (X idler end)

VIDEO

Part name	Part ID	Required number	pic
Z-axis nut	No.15	1	
X-axis idle end	No.M2	1	
Linear Bearing LMH8LUU	No. 35	1	
M3 x 6mm screw	No.18	8	

Step1.Mount the Z axis nut on the bottom of X-axis right end with 4 M3 x6mm screws.

Step2. Mount the linear bearing on X-axis motor end from bottom to up. Fix it up with M3 x 6mm screws

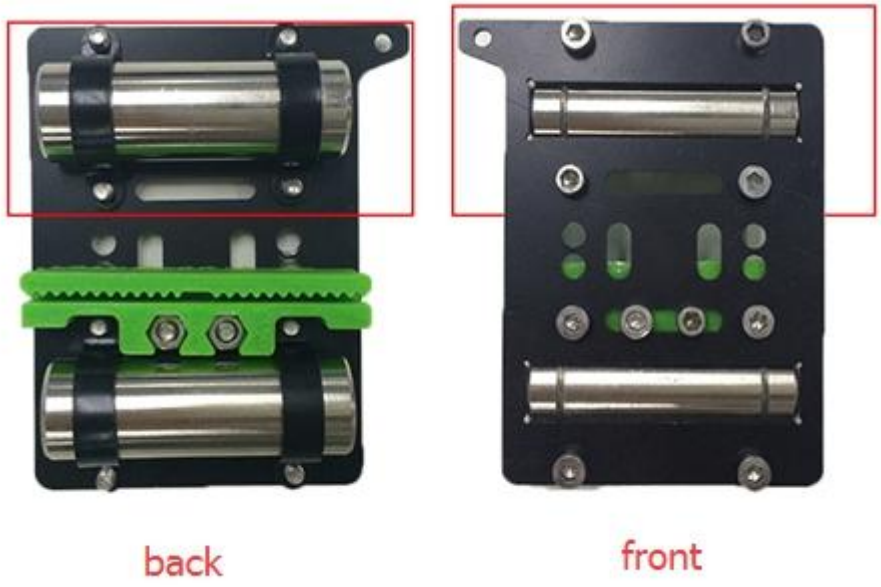


13. Assembly of the extruder carriage

VIDEO

Part name	Part ID	Required number	pic
X Carriage	No.M3	1	
Bearing Bracket	No.M4	4	
Extruder holder	No.M5	1	
Linear Bearing LM8LUU	No.34	2	
Belt bracket	No.43	1	
M3x6mm screw	No. 18	8	
M3x10mm screw	No. 20	2	
M4x6mm screw	No. 27	2	
M3 nut	No.11	2	

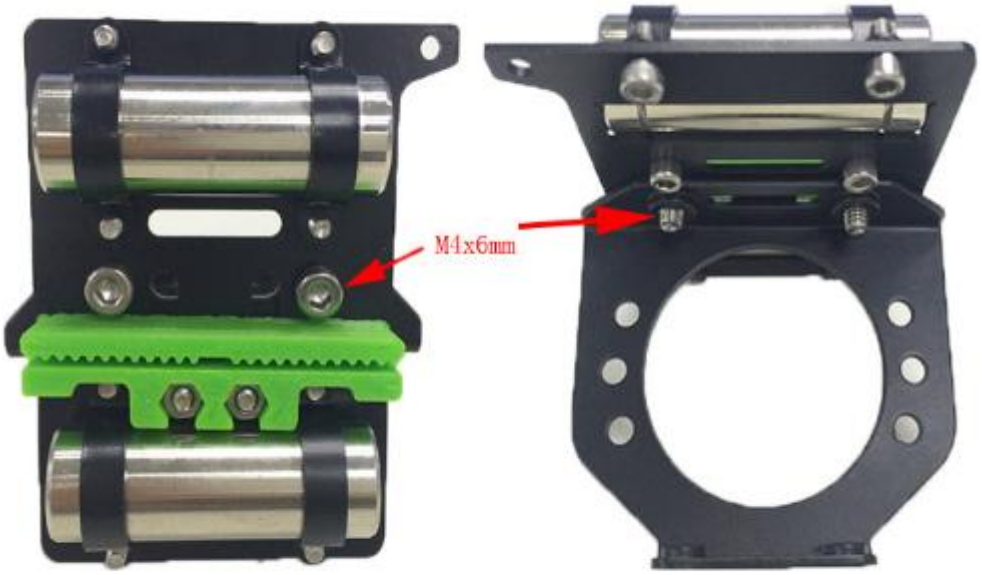
Step1. Fix the 4 Bearing Brackets on the back of the X Carriage loosely with M3x6mm screws. Insert the linear bearing into the slot and screw the bracket tightly.



Please notice the front and back of the plate.

Step2.fix the belt mounts on the back of the carriage with 2 M3x 10mm screws and M3 hex nuts.

Step3. Fix the extruder holder on the front side of the X carriage using M4x6mm screws.



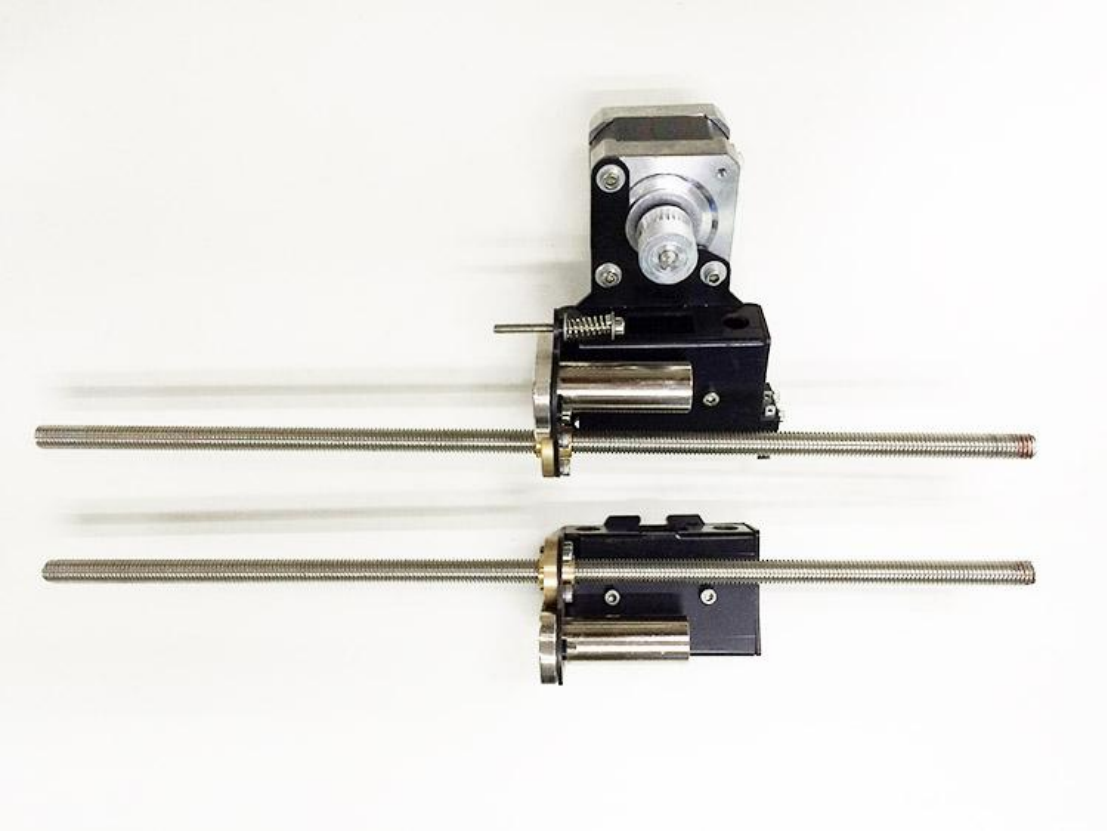
14. Assemble the X&Z axis

VIDEO

Part name	Part ID	Required number	pic
L300mm lead screw	No.4	2	
L320mm smooth rod	No.1	2	
L390 mm smooth rod	No.2	2	
locking ring	No.31	4	

Step1. Thread the lead screw to the nut of both end of X axis.

Keep both end of X axis at the same place of the rod, you are advised to measure the distance of the both side so that they are at the same level when you put them up.



Step2. Plug the lead screw on the X motor end to the left coupling on the left bottom of the Z axis. Then thread the 320mm smooth rod into the linear bearing.

Step3. Thread the L390mm smooth rod into the X motor end >> thread the extruder carriage on the two rods

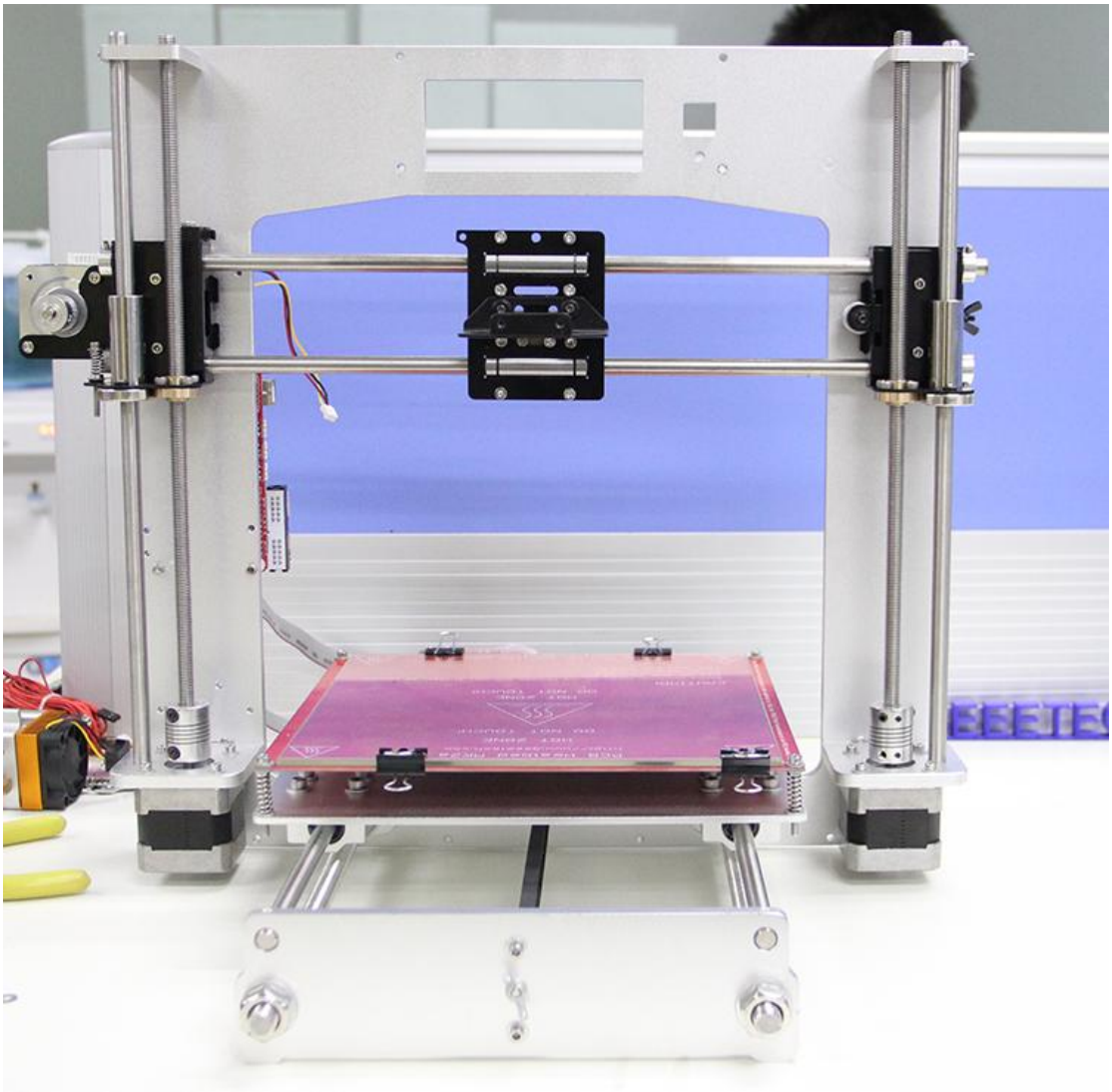
Step4. Thread the two X axis smooth rods into the hole of X idler end.

Step5. Plug the vertical lead screw into the coupling on the right bottom of the Z axis. Then thread the 320mm smooth rod into the linear bearing.

Step6. Thread 4 locking rings on the 2 rods separately. Screw up the 4 locking rings.

Note: the smooth rods and the lead screw of Z axis are vertical and the X axis is

horizontal, which is very important, or it will hinder the move of the Z axis.



Tips:

If the you feel it is difficult to thread the rods into the holes on both end, it is caused by the black spray paint on the surface, you can use the file to trim it.

15. Assemble the Z axis top mount

Part name	Part ID	Required number	pic
Z top mount	No.A6	2	

M3 x 16mm screw	No.21	4	
Lock screw	No.30	4	

Step1. Add the Z top mount (No.A6) to the top of A1. Slowly rotate the rods into the holes, or add some lubricants on the rods. Do not force it, or u will break the acrylic piece.

Step2. Screw it up with M3 x 16mm screw.

Step3. Screw up the lock screw on both top and bottom of the smooth rods.

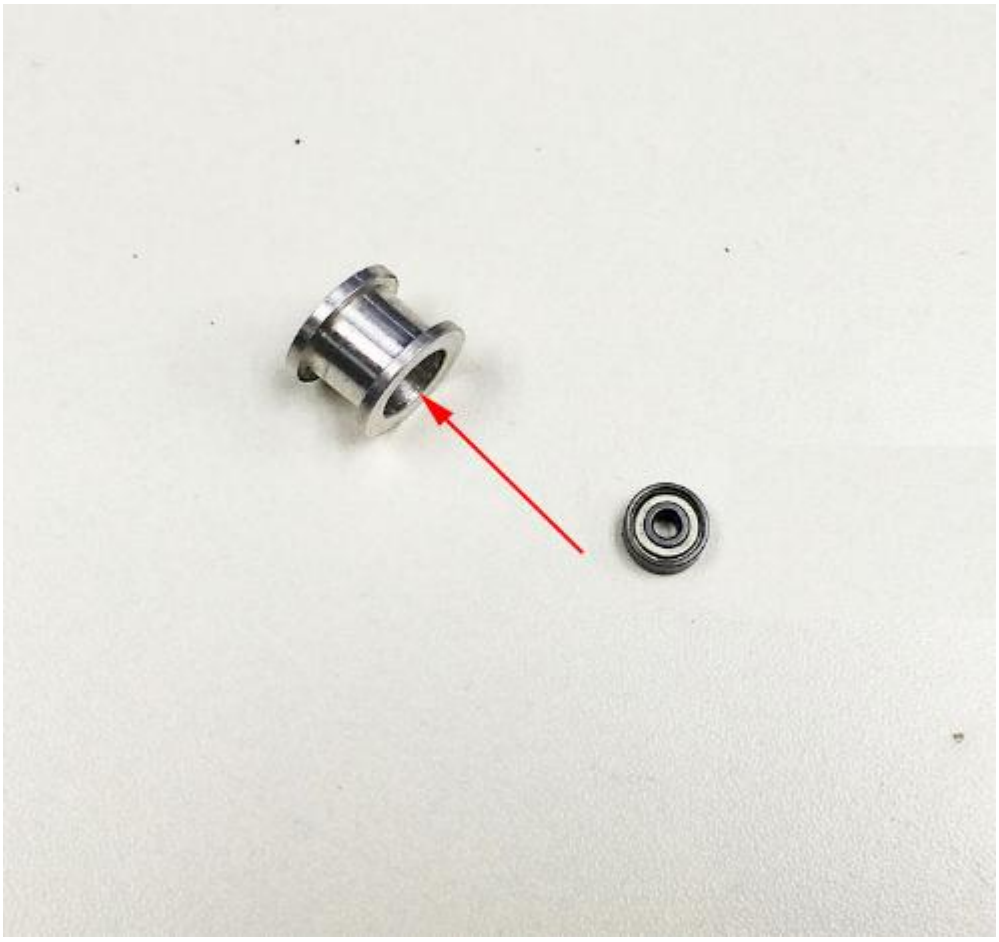
16. X belt driving wheel

Part name	Part ID	Required number	pic
Driven wheel holder	No.37	1	
Driven wheel	No.38	1	
MR84zz Ball Bearing	No.36	2	
M3 x40mm screw	No.25	1	
M4 x 25mm screw	No.29	1	
M3 washer	No.7	1	
M4 washer	No.8	1	
M4 lock nut	No.13	1	

wing nut	No.14	1	

Step1. Thread the M3 x 40 screw and M3 washer through the Driven wheel holder.

Step2. Insert the two MR84zz ball bearings into both ends of the driving wheel.



Step3. Put the M4 x25 screw and M4 washer through the driving wheel. Lock the other end with a M4 lock nut. You may need a wrench to tighten locking nut.

*Do not screw it too tight, you should leave enough room for the wheel to turn freely.

17. Add the belt

VIDEO

Part name	Part ID	Required number	pic
Timing belt	No.42	1	
Belt bracket	No.43	1	

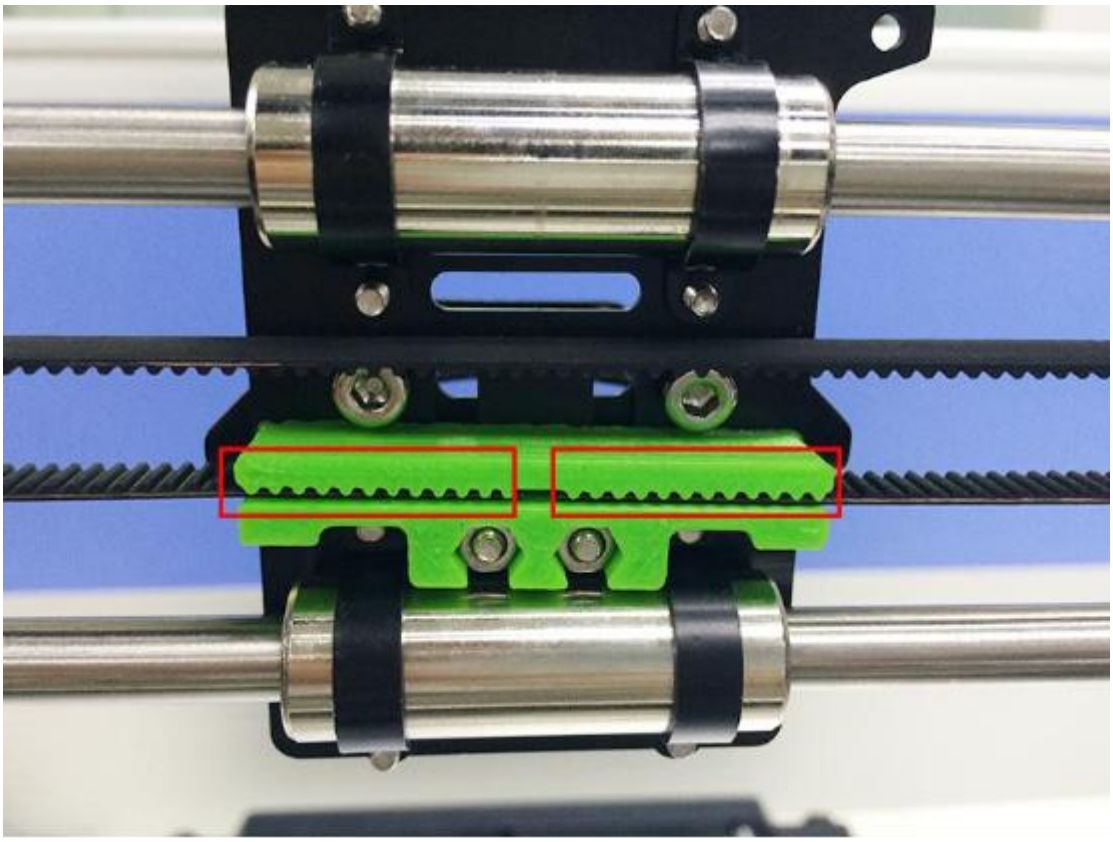
Step1. Insert one end of the belt in the groove. Pay attention to the tooth mesh of the belt and the groove.

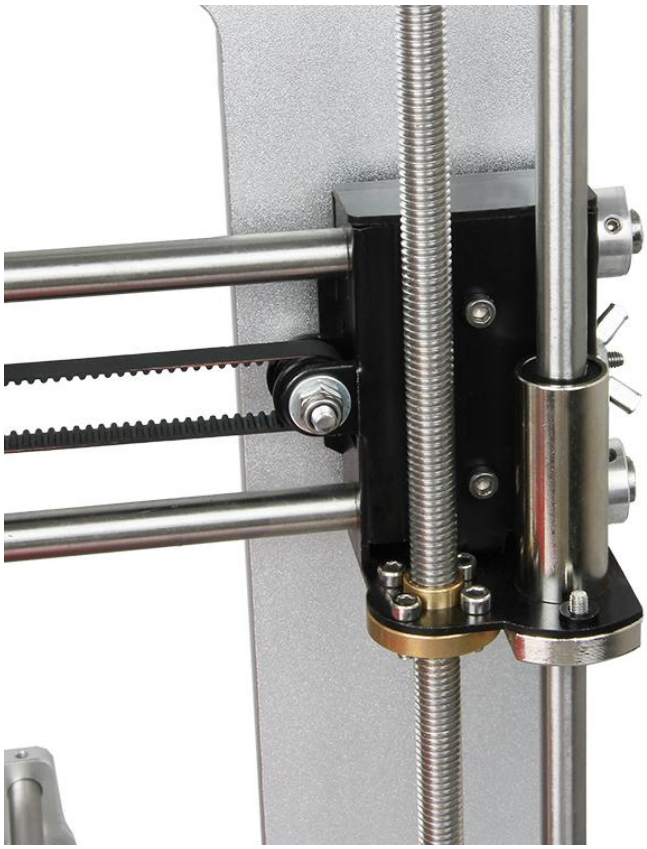
Step2. Thread another end of the belt through the X motor end around the pulley.

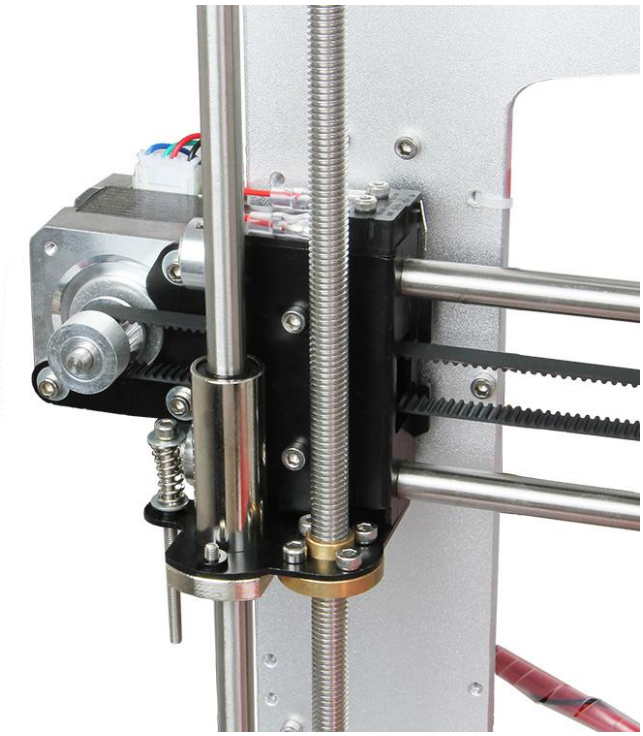
Step3. Threaded the belt through the belt driving wheel and put the driving wheel into the X idler end, lock it with a wing nut.

Step4. Insert another end of the belt into the groove. Cut the spare part. Be sure of the length of the belt.

Step5. Taut the belt and tighten the wing nut on the idle end.





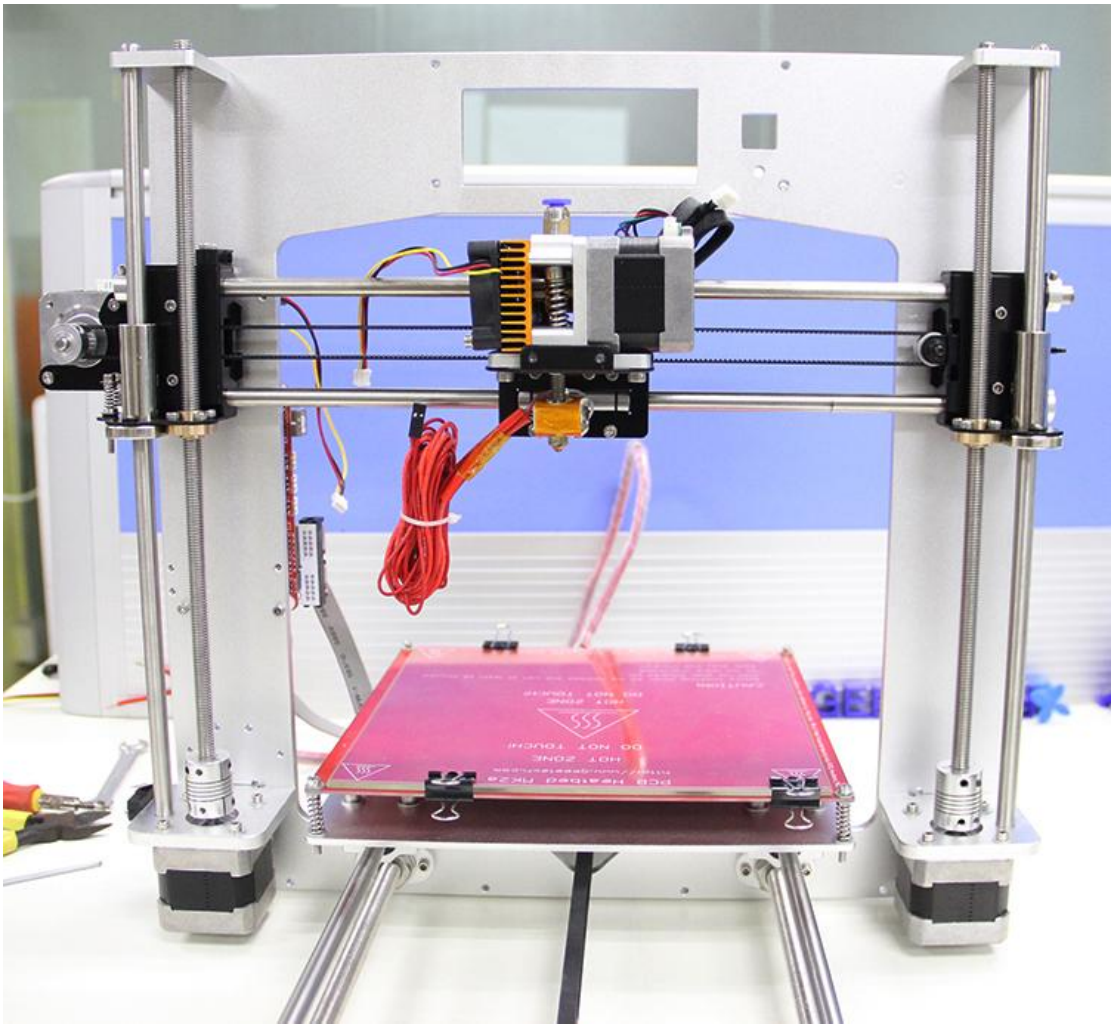


18. Mount the extruder

VIDEO

Part name	Part ID	Required number	pic
Hotend	No.59	1	
M4x6mm screw	No. 27	2	
M4 washer	No.8	1	

Mount the hot end on the extruder holder plate from bottom to up with 2 M4x6mm screws and M4 washers



19. Mount the LCD panel

VIDEO

Required parts	Required number	Part ID	Pic
LCD 2004	1	NO.62	
Spacer	4	NO.44	
knob	1	NO.51	

M3washer	4	NO.7	
M3 x 20 screw	4	NO.22	
M3 nut	4	NO.11	

Mount the LCD into the top of main frame from back to front; screw it up with 4M3x16 screws, M3 washers and M3 nuts.

*Note: Four spacers should between LCD and frame.

20. Mount the endstop of Y and Z axis

VIDEO

Step1. End stop of Y-axis

Required parts	Required number	Part ID	Pic
End stop	1	NO.46	
M2.5 x 12 screw	2	NO.17	
M2.5 washer	2	NO.6	

Mount Y-axis end stop on the rear side support. Screw it up with M2.5x12 screws and M2.5 washers.

Note: there is no “+” and “-” for endstop, so there is no difference for the wires.

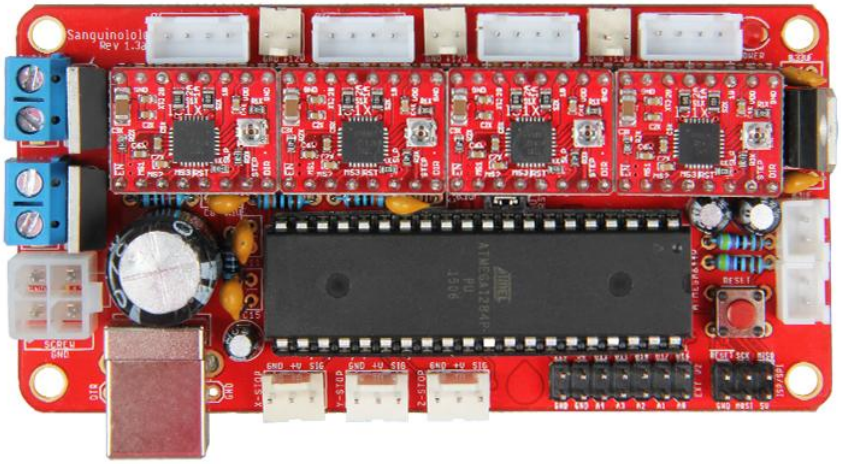
Step2. End stop of Z-axis

Required parts	Required number	Part ID	Pic

End stop	1	NO.46	
M 2.5x 12 screw	2	NO.17	
M2.5 washer	2	NO.6	

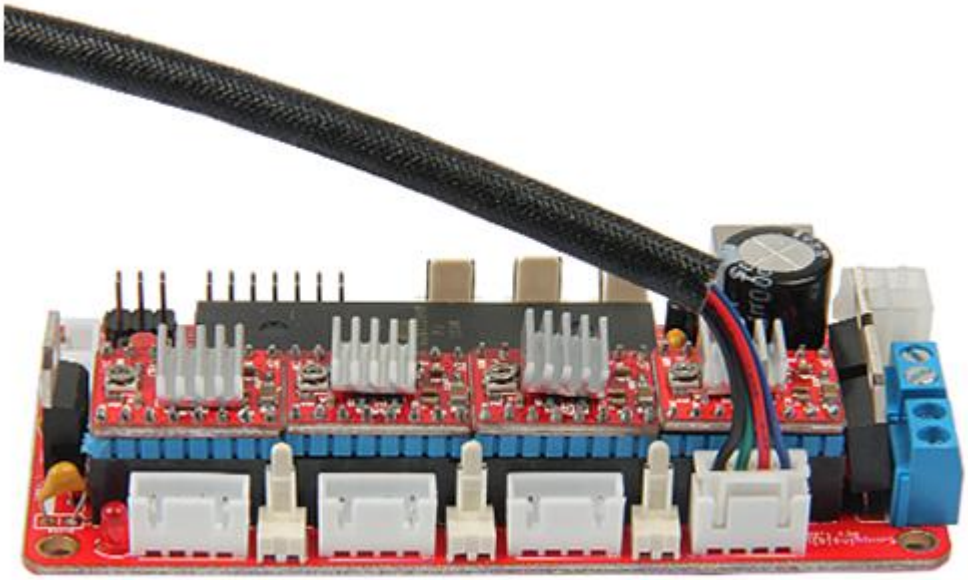
Mount Z-axis end stop on the left Z motor block. Screw up it with M2.5x12 screws and M2.5 washers.

21. Wiring

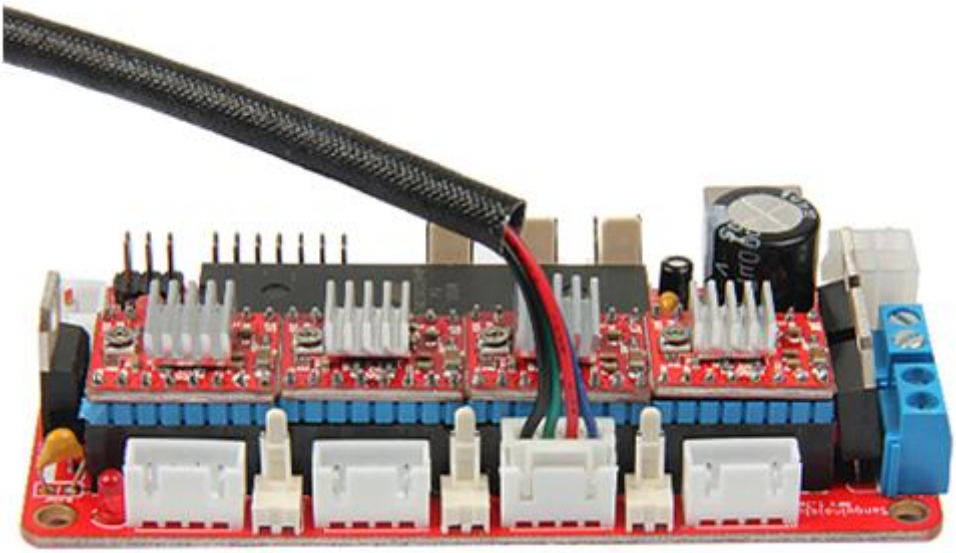


Step1. Connect wires for motors.

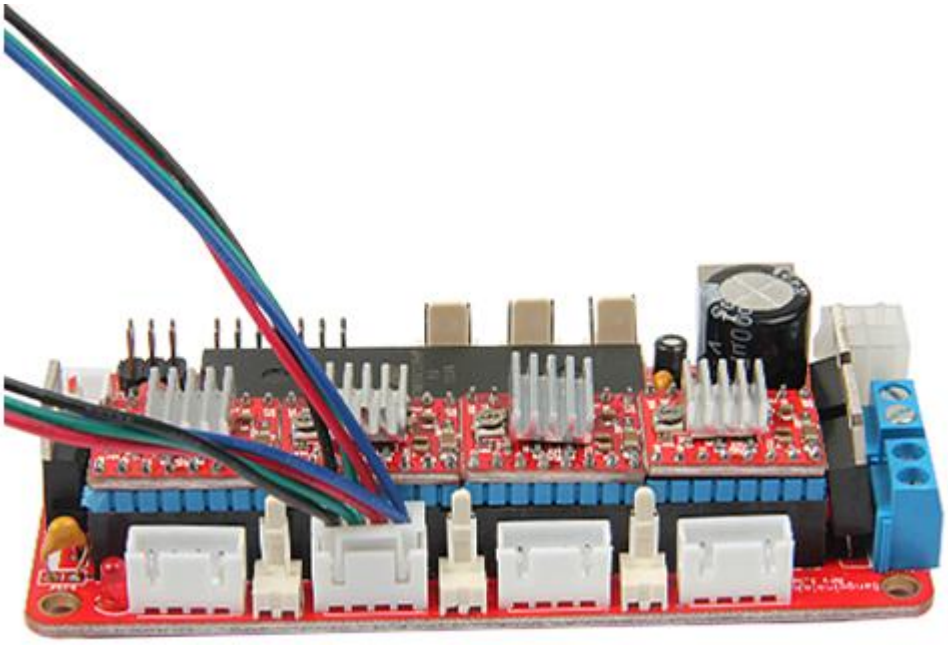
1) Connect wires for X-axis motor.



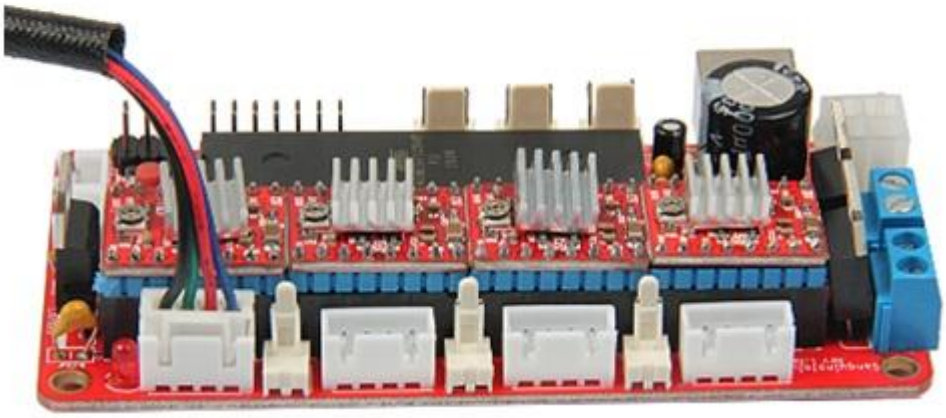
2) Connect wires for Y-axis motor.



3) Connect wires for the 2 Z-axis motors. Here you need to use the NO.50 wire.



4) Connect Extruder motors

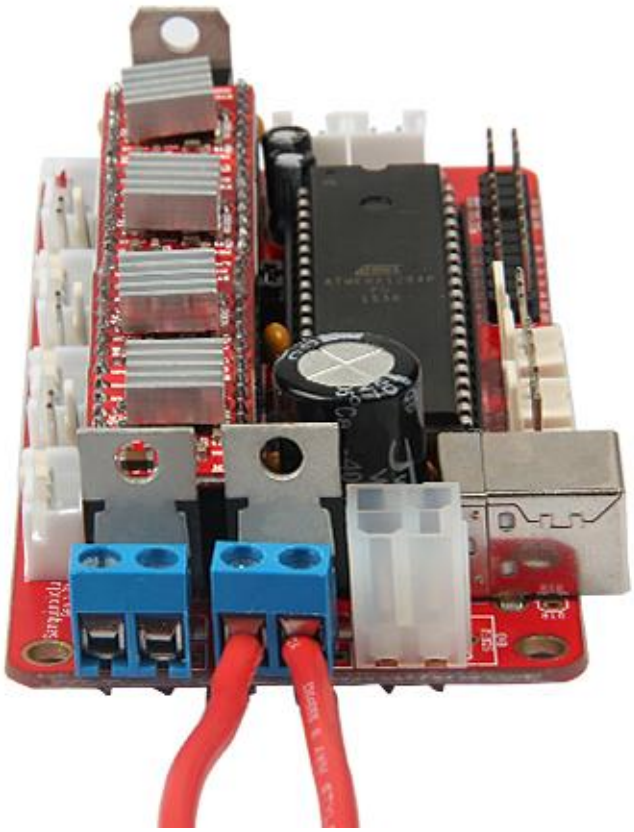


Step2. Connect heating wires.

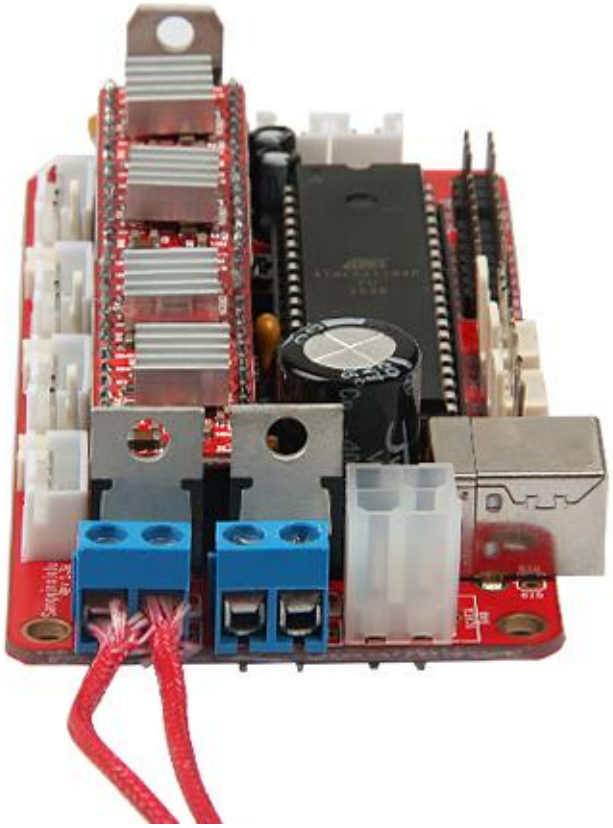
Loosed the screws in the blue terminal and put the red wires into the slot and screw it up.

* There is no “+” and “-“polarity for heating wires

1) Connect heating wires for heatbed.

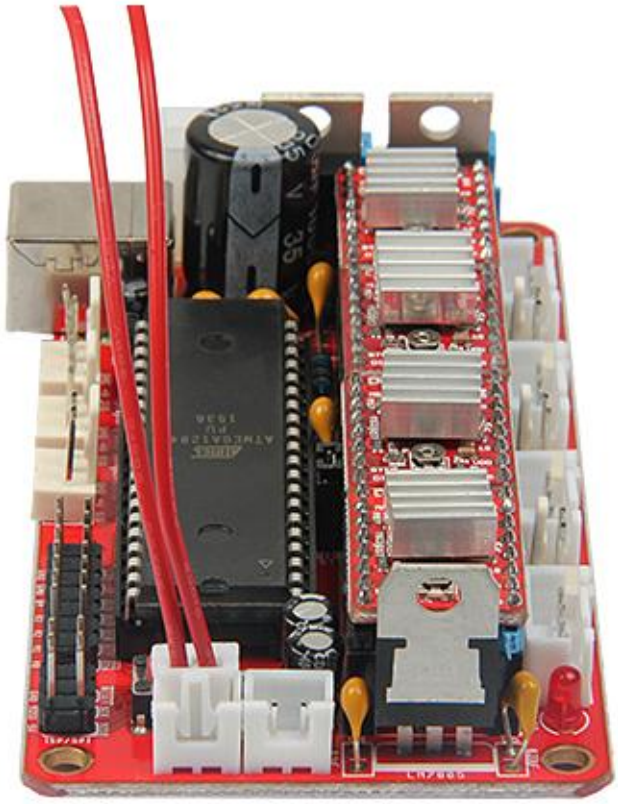


2) Connect heating wires for extruder.

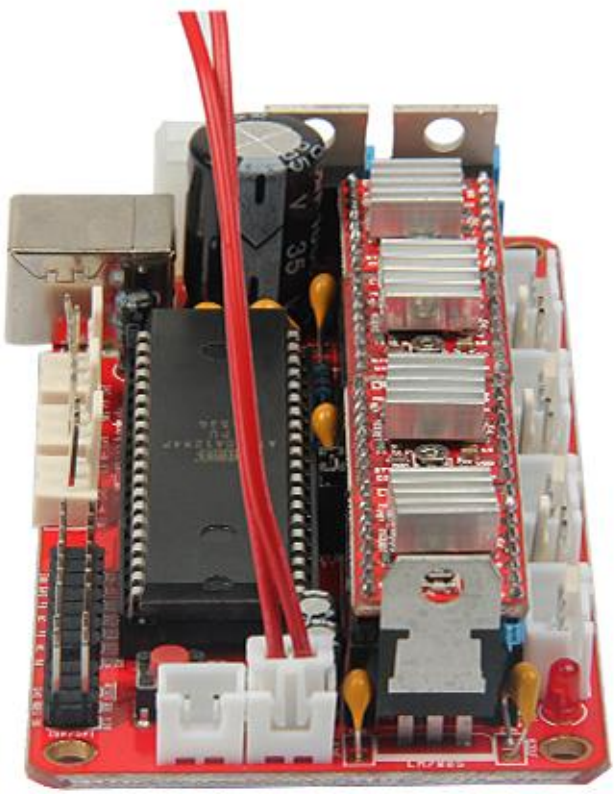


Step3. Connect wires for thermistor.

1) Connect wires for thermistor of heatbed.



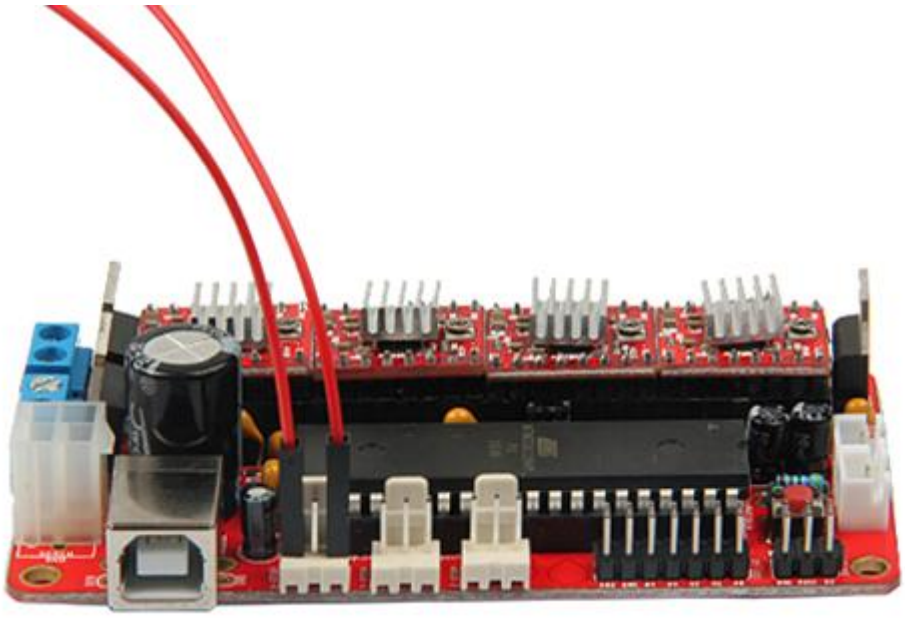
2) Connect wires for thermistor of extruder



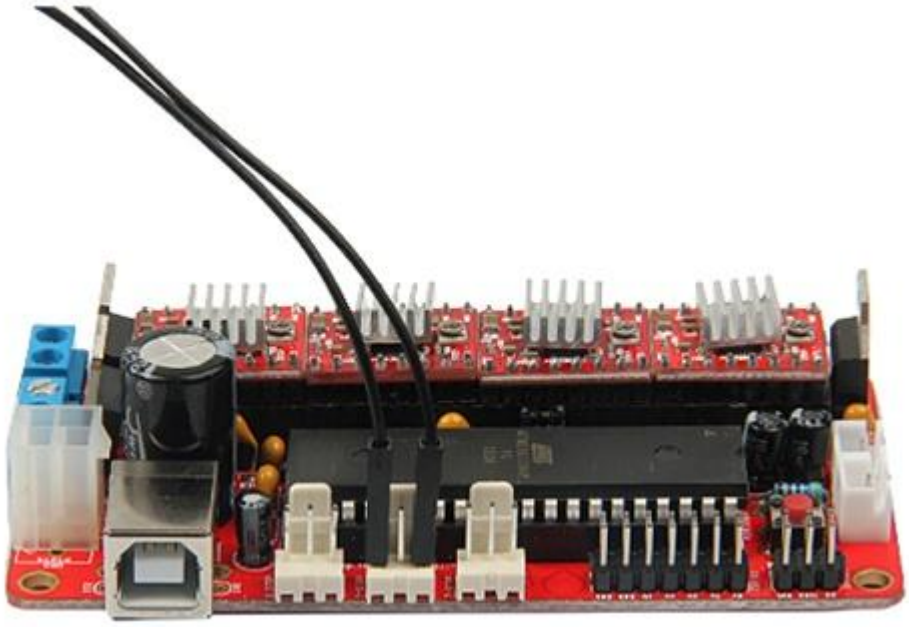
Step4. Connect wires for endstop.

* There is no “+” and “-“polarity for endstop

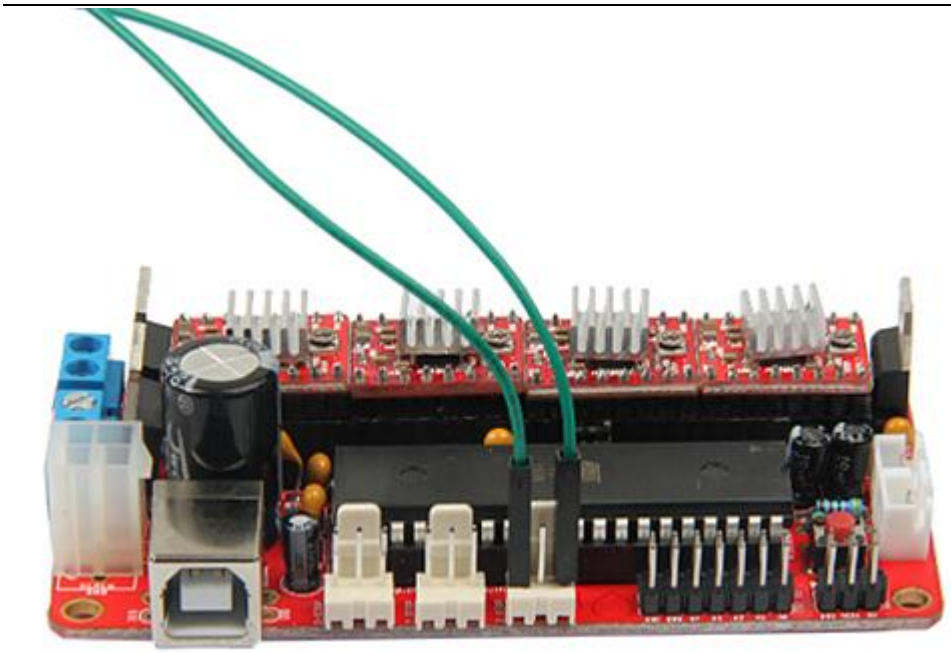
1) Connect wires for endstop of X-axis.



2) Connect wires for endstop of Y-axis.



3) Connect wires for endstop of Z-axis.



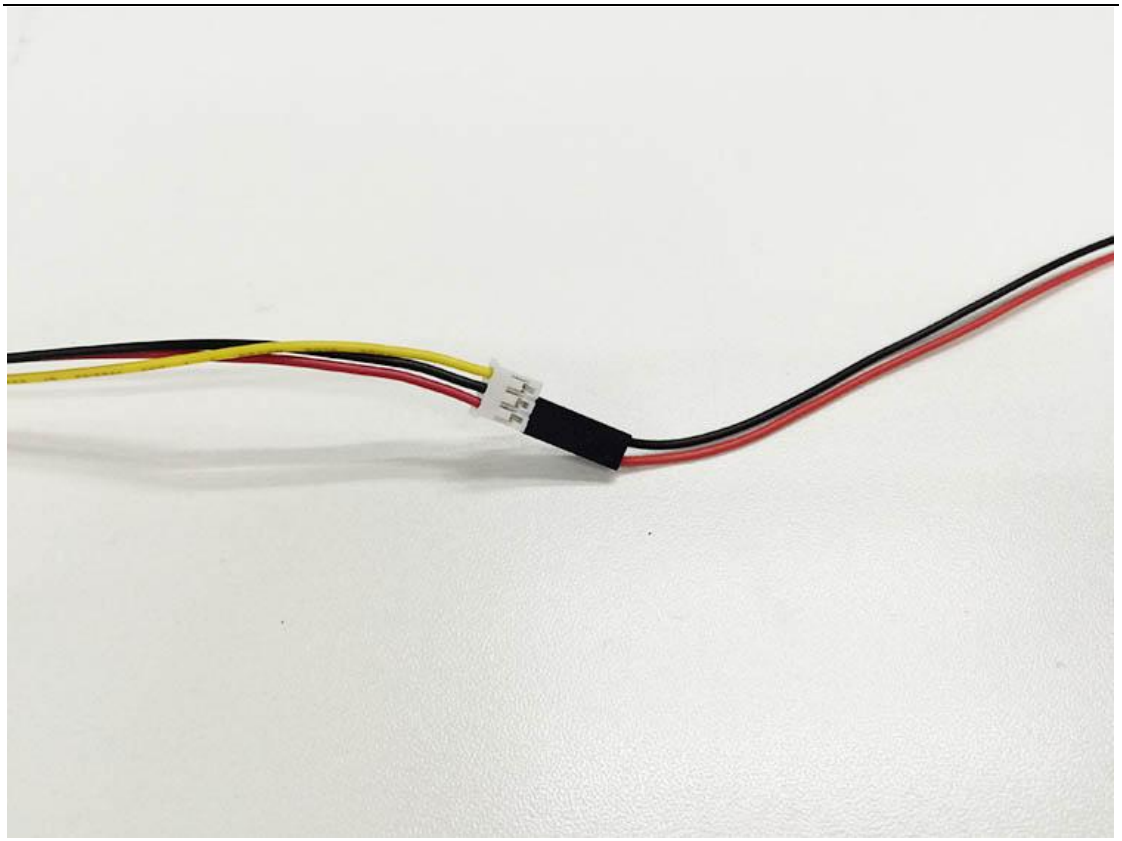
Step5. Connect wires for Fan.

Note the “+” and “-“polarity for fan

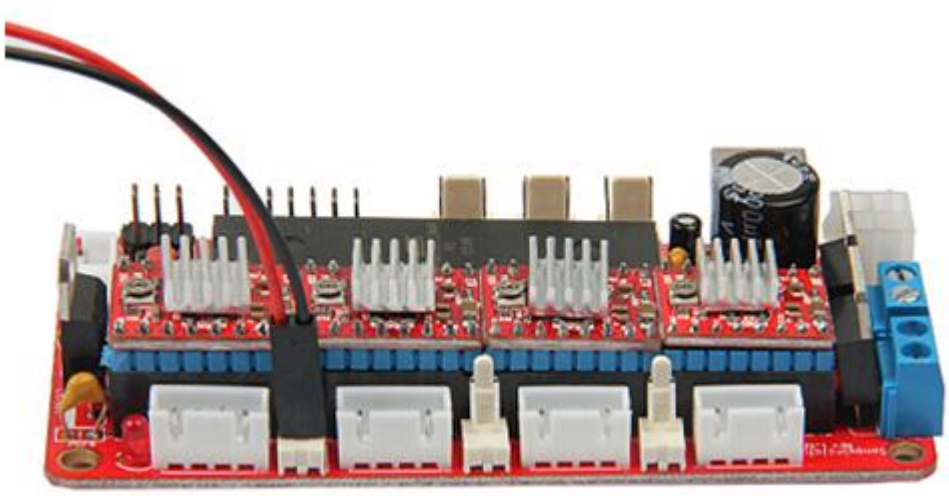
Red: +

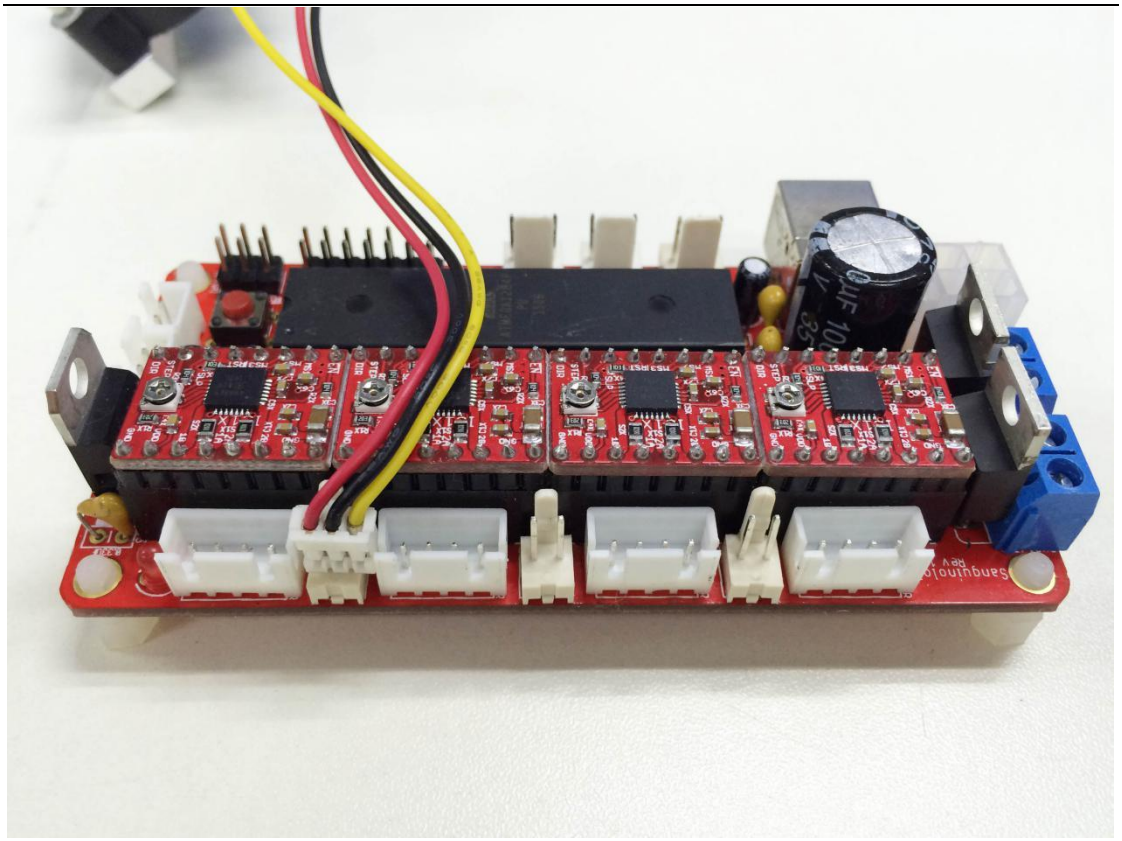
Black: -

Here you will need the 2-pin F-M extension wire for the fan. Connect the black and red wires to the connector of the fan wire. Leave the yellow wires alone. If your extension wire is 3-pin, it doesn’t matter; just connect the black and red pins.

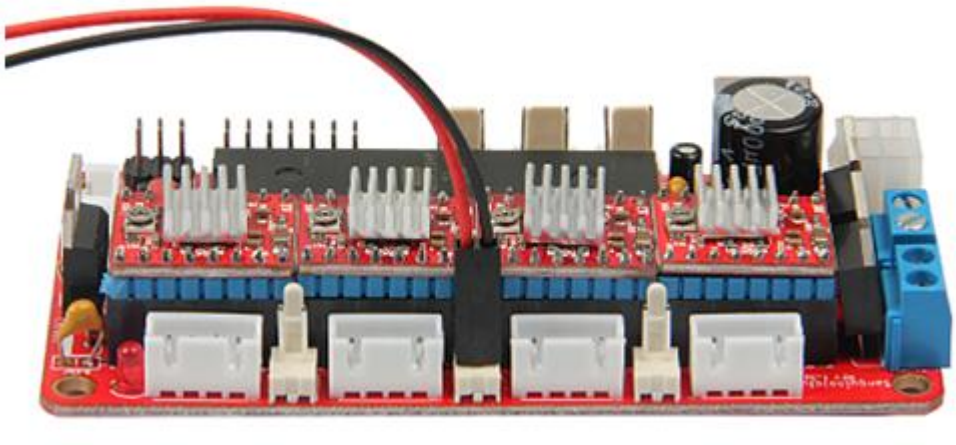


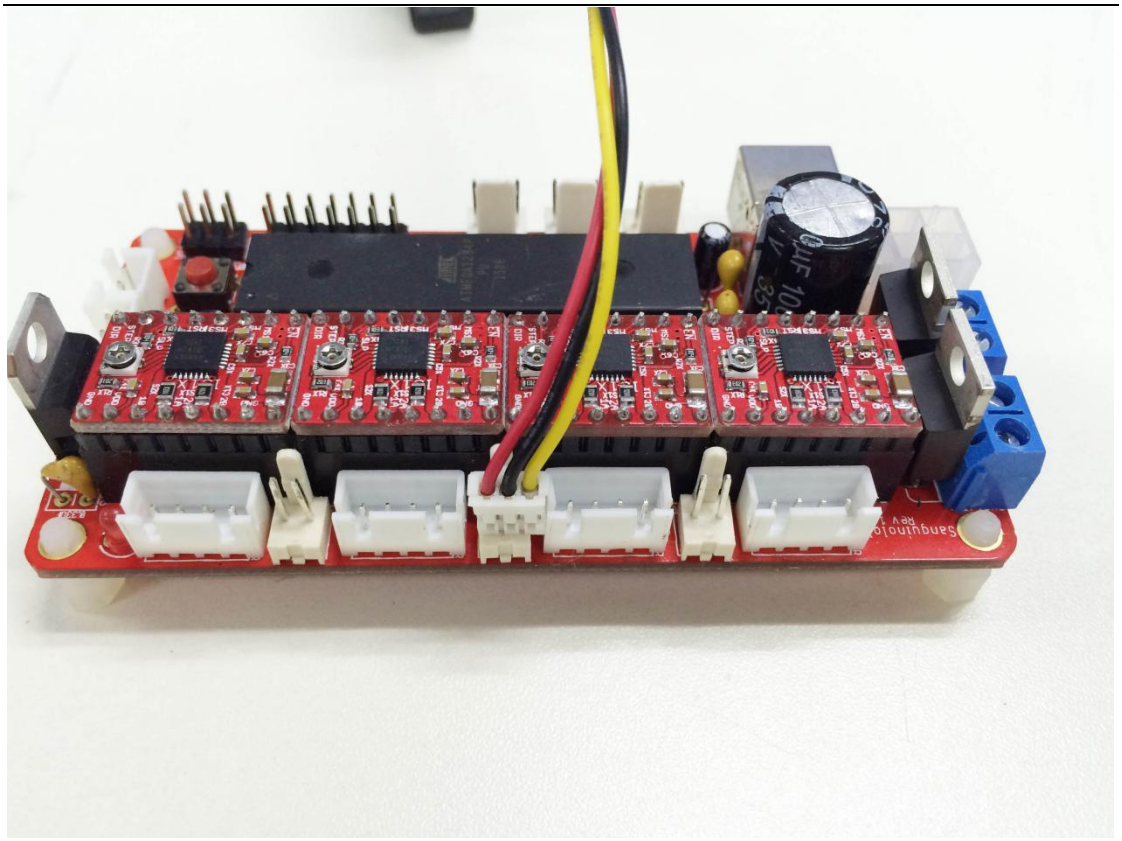
1) Connect fan for control board.



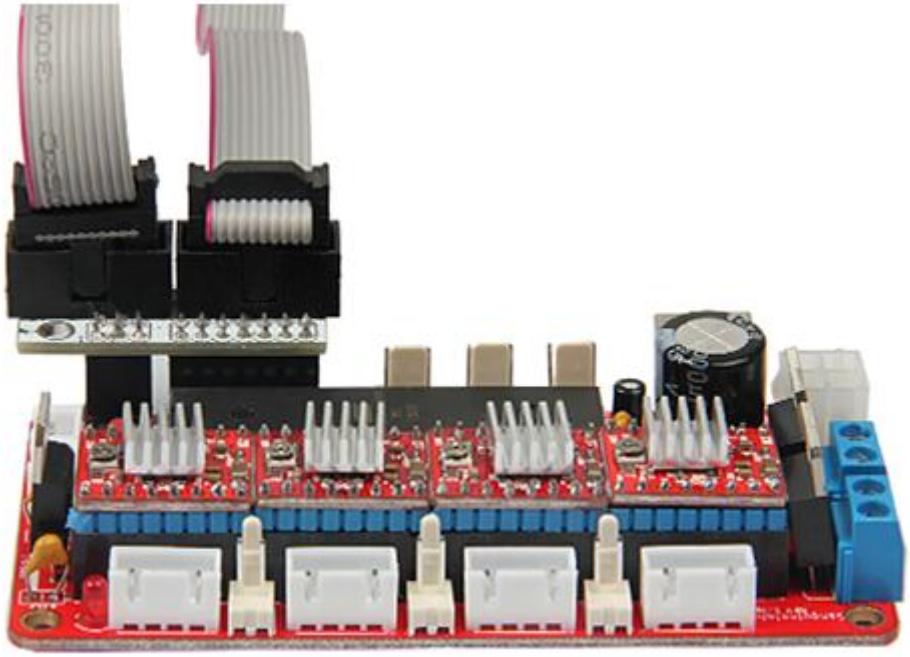


2) Connect fan for extruder.





Step6. Connect wires for LCD panel.

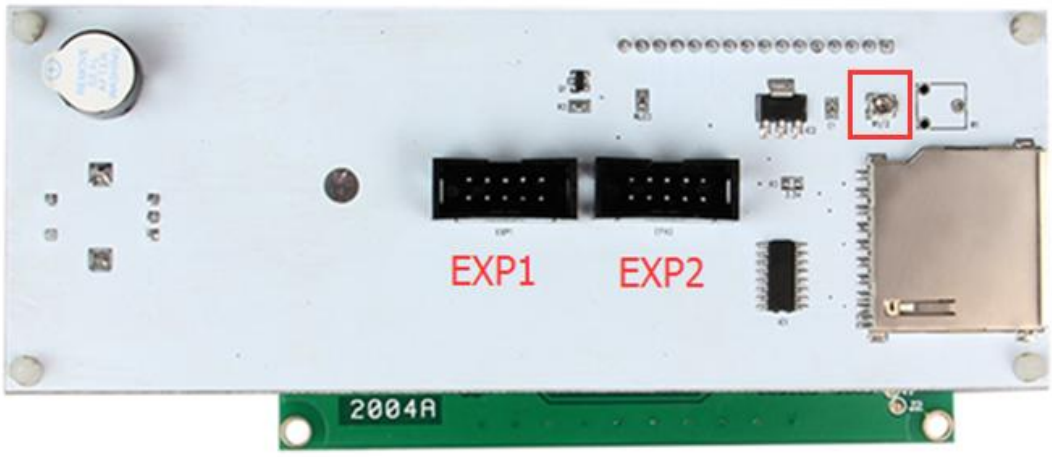


There are two cables, one is for LCD encoder, and the other is for SD card.

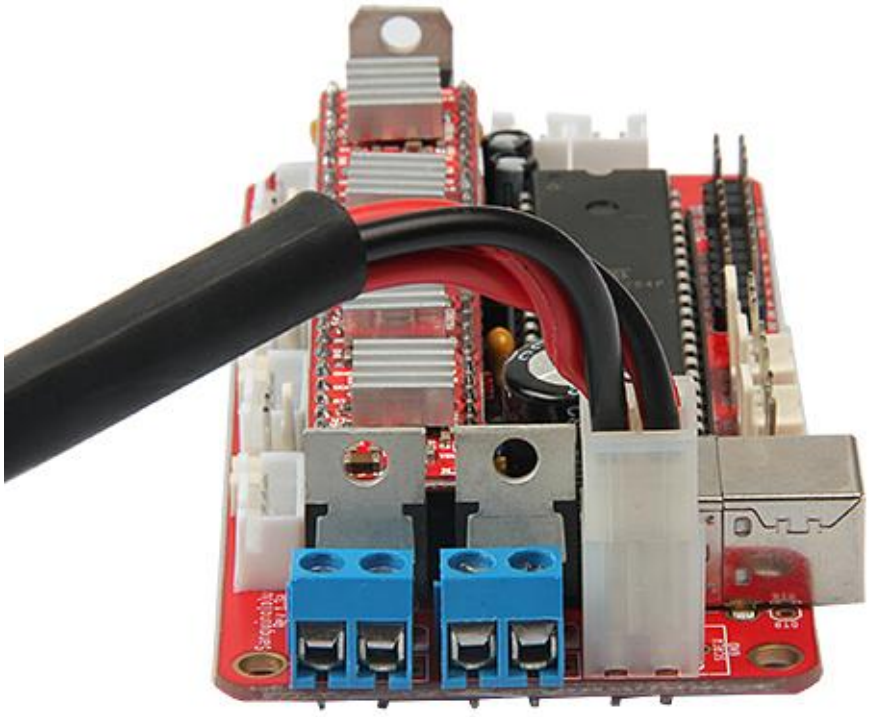
EXP1 to LCD

EXP2 to SD card

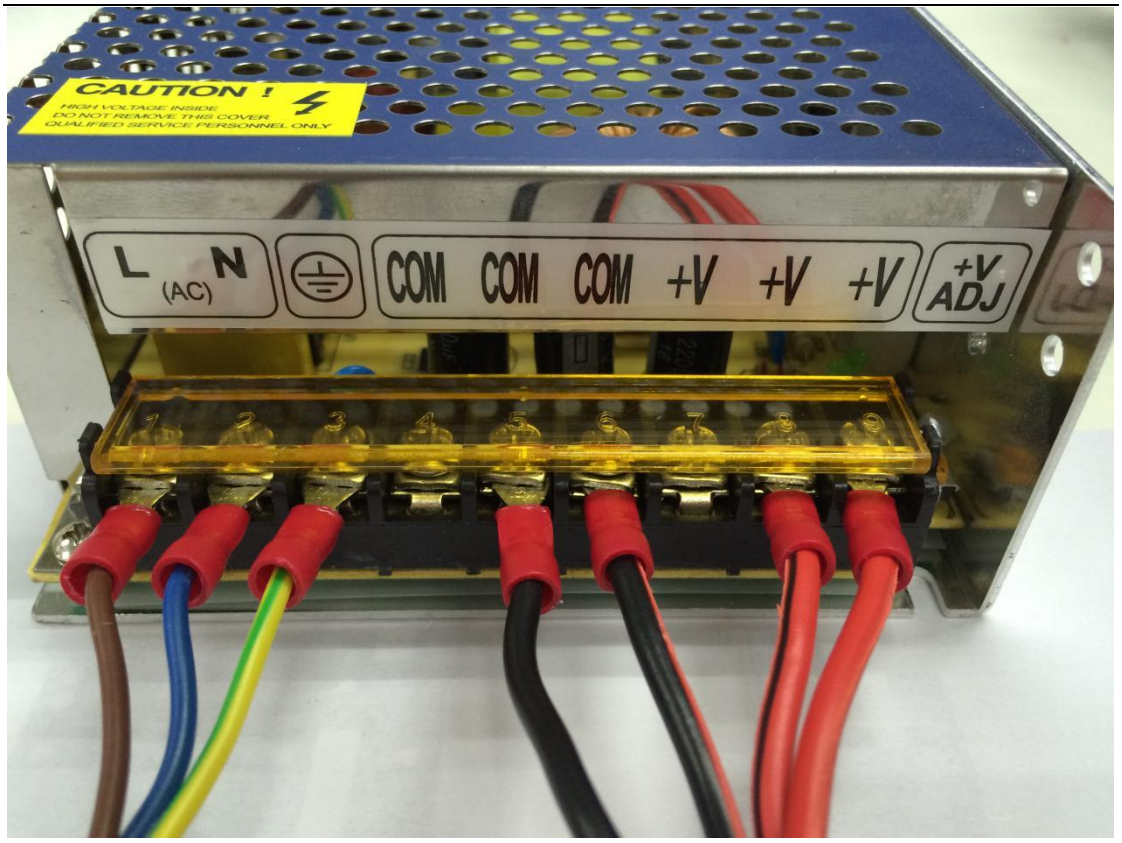
BTW, do you see the small screw above the SD card reader, if the text in of the LCD phases in an out or there is only blocks on the screen, you can adjust this screw to recovery it.



Step7. Connect wires for power input.



Step8. Connect the wires to the PSU.



Note the correspondence between the color of wires and the connector.

Brown------L

Blue ------N

Yellow------GND

Red ------ + V

Black------COM

22. Mount the filament spool.

Part name	Part ID	Required number	pic
M3 x 16mm screw	No.23	6	
M3 Hex nut	No.11	6	

M3 washer	No.7	6	
Spool base plate		1	
Spool side pane		2	
PVC tube		1	
PVC tube		2	

So far, the whole printer is built up, you can tidy up the wires with the zip ties and the coil wire.

23. Arrange the wires and tidy them up with the coil.

The whole printer assembly work is already done.

Hope you enjoy the whole process.

So far, the whole printer is built up, you can tidy up the wires with the zip ties and the coil wire.

24. Tips

Before even attempting the first print it is vital that the printer is correctly calibrated. Skipping or rushing this step will result in frustration and failed prints later, so it is important to take the time to make sure the machine is correctly set up.

Each machine may have its own calibration procedure and this manual will not attempt to cover all the variations. Instead here is a list of key points that should be addressed.

- Frame is stable and correctly aligned.
- Belts are taut.
- Bed is level in relation to the path of the extruder.
- Filament rolls freely from the spool, without causing too much tension on the extruder.
- Current for stepper motors is set to the correct level.

Firmware settings are correct including: axis movement speeds and acceleration; temperature control; end-stops; motor directions.

Extruder is calibrated in the firmware with the correct steps per mm of filament.

The point regarding the extruder step rate is vital. Slic3r expects that the machine will accurately produce a set amount of filament when told to do so. Too much will result in blobs and other imperfections in the print, too little will result in gaps and poor inter-layer adhesion.