

DIY Reprap Prusa 3D Printer manual.

Congratulations on your purchase of the DIY (Do It Yourself) Kit Reprap Prusa 3D Printer. Building a printer from a kit is a lot of fun and a great learning experience, however requires a bit of patience, perseverance, some tools and a little experience with electronics. We are writing this manual, and along with the build videos, we hope it will be a breeze to get started with 3D printing. Welcome aboard !

Step 1. Introduction.

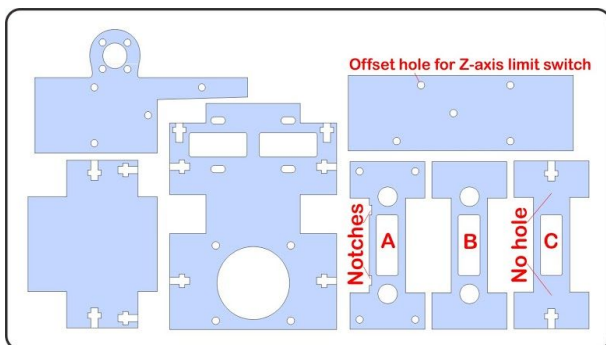
Before you even start building your 3D printer, it is important, you first see and understand what the final product will look like, and also understand the various part names and components we refer to. Read the manual before starting the build and watch our introductory Youtube videos.

Step 2. Identify the parts.

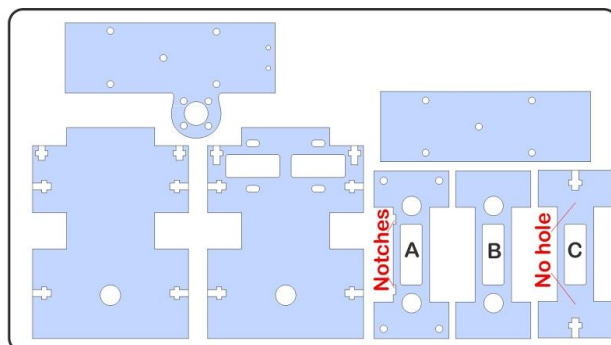
View the part list , in the appendix to identify and group each set of parts.

Remove the protective backing from the acrylic parts.

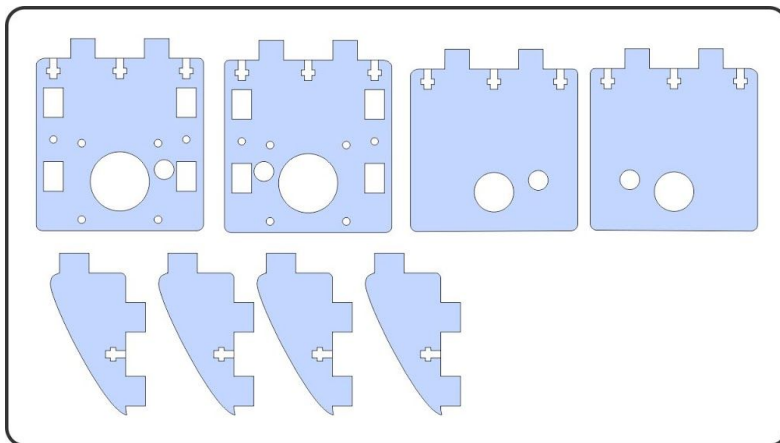
In the unlikely event of any missing / damaged parts. Stop and contact us first before proceeding.



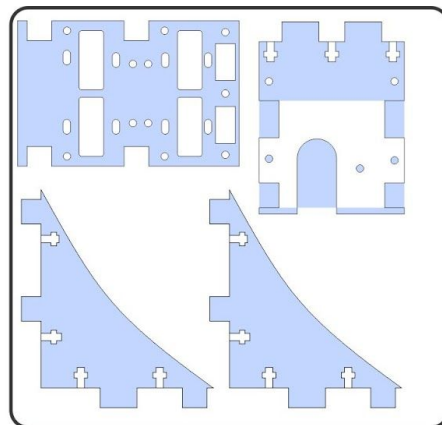
X Axis Left Side (Motor mount Side)



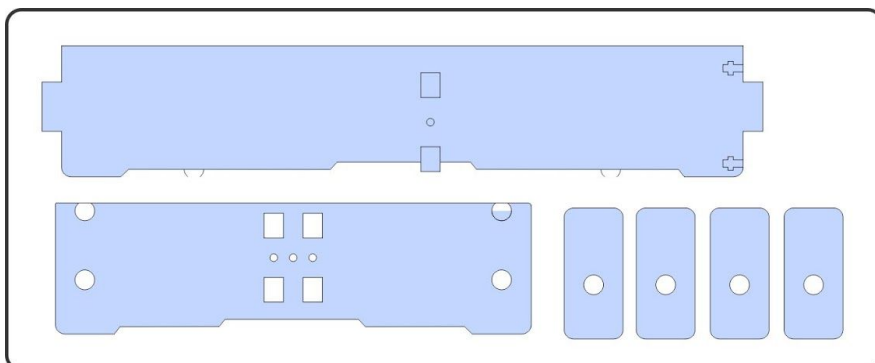
X Axis Right Side (Idler Side)



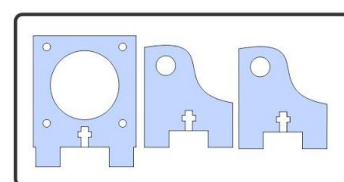
Z-Axis Motor Mounts



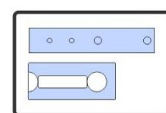
Extruder Holder



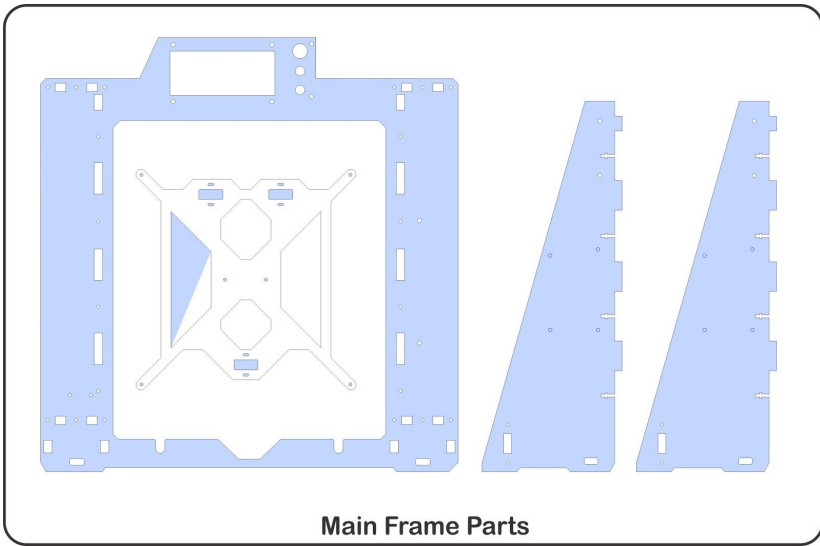
Y Axis Assembly



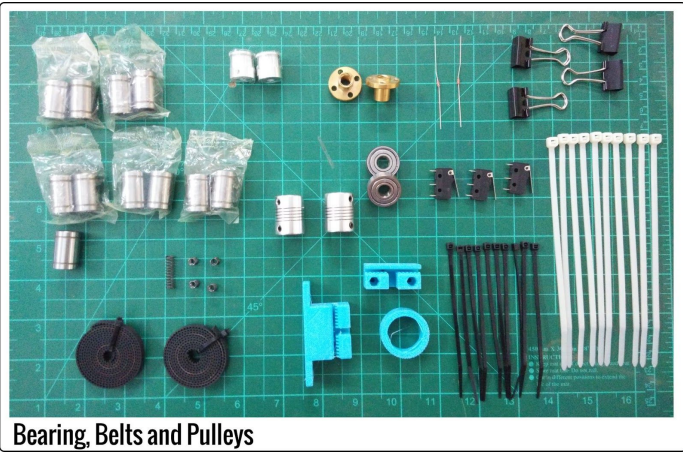
Y Axis Motor Mount / Idler



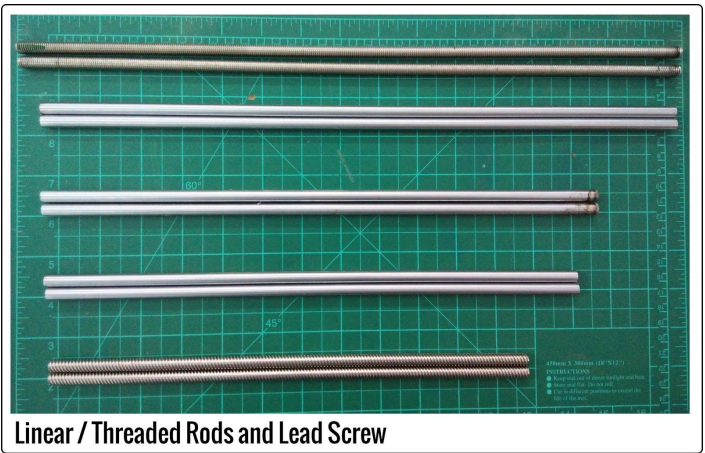
Y/Z Limit Switch



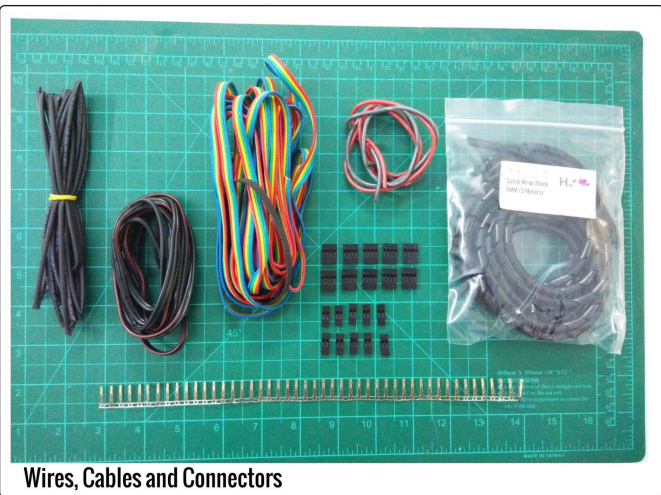
Main Frame Parts



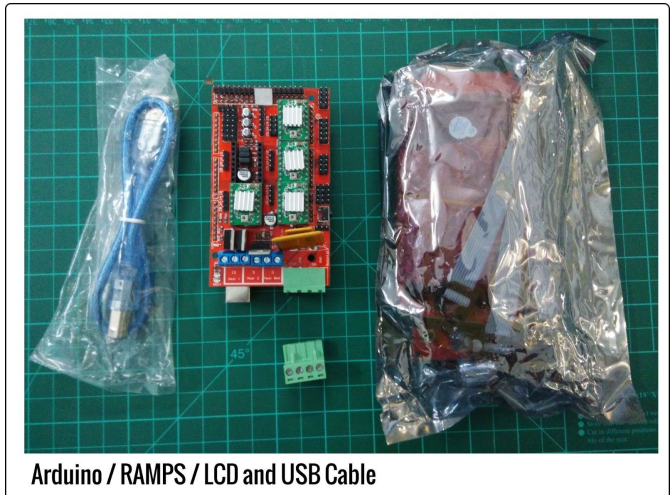
Bearing, Belts and Pulleys



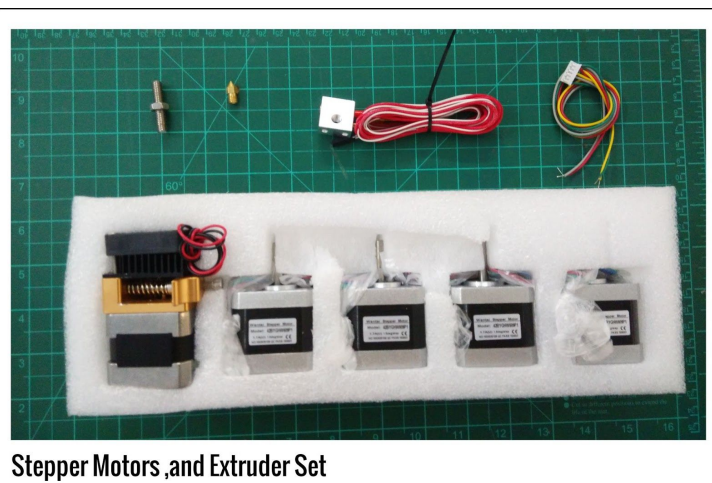
Linear / Threaded Rods and Lead Screw



Wires, Cables and Connectors



Arduino / RAMPS / LCD and USB Cable



Stepper Motors ,and Extruder Set

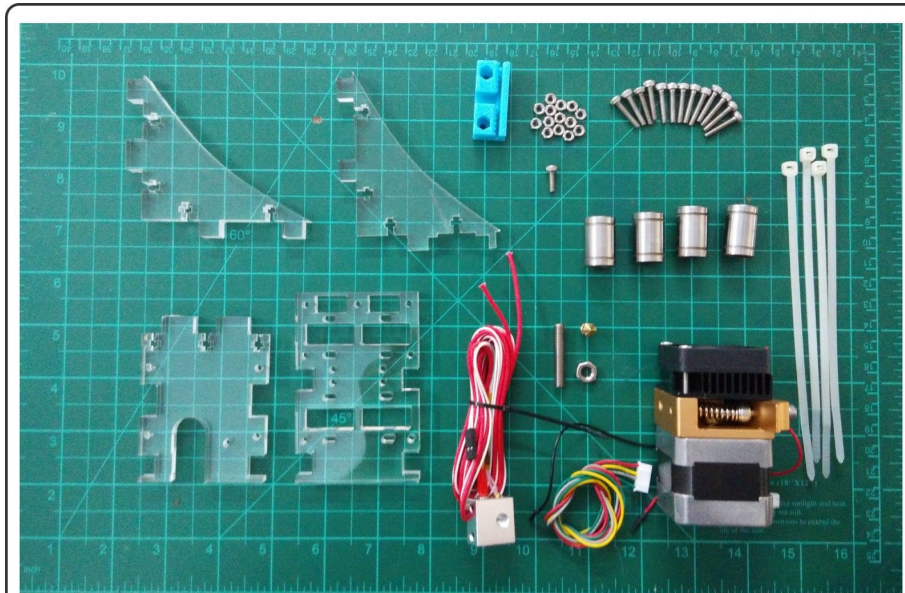


Stainless Steel Fasteners

Step 3. Assemble the Extruder and its mount.

You need:

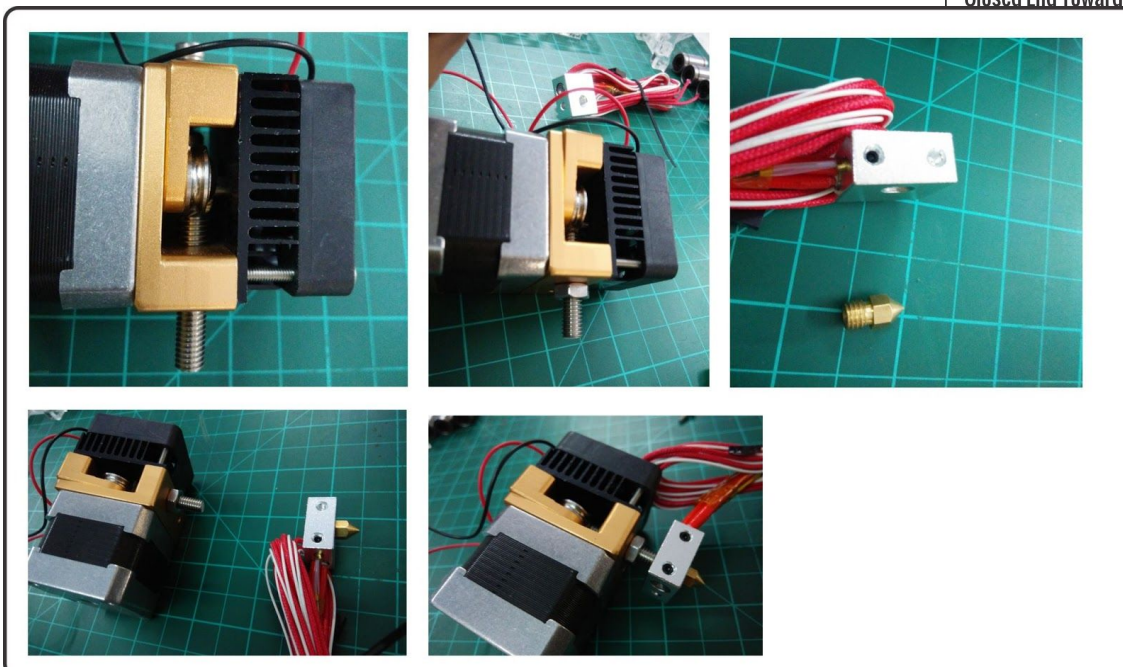
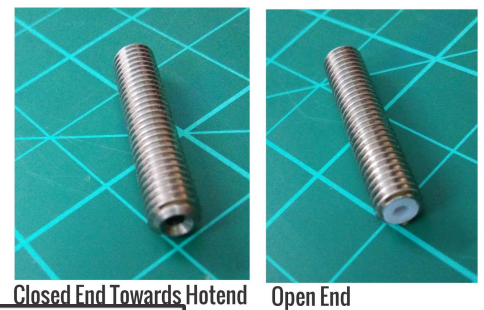
- | | |
|---|---|
| <ol style="list-style-type: none">1. Extruder with stepper motor2. Hot end with Thermistor3. 0.4MM nozzle4. Threaded rod with Teflon. and Nut5. Stepper motor lead wire.6. Acrylic Extruder holder set (4Pcs)7. 4Pcs Lm8UU Linear bearing | <ol style="list-style-type: none">8. M3 10mm 1 Pcs , 15mm 13 Pcs bolts9. M3 Nuts 13 Pcs10. Zipties. 4 Pcs11. 3D printed X-axis Belt holder |
|---|---|



Parts needed for the Extruder Assembly

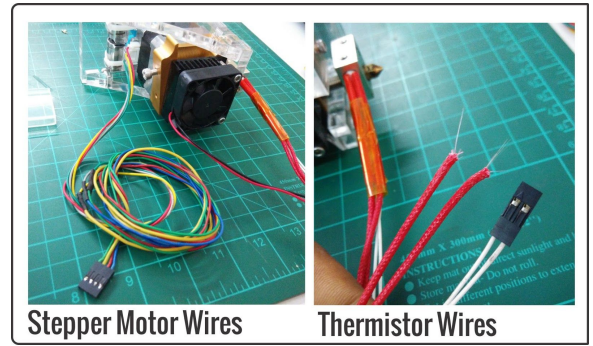
A. Assemble the Extruder.

Assemble the extruder using the threaded rod with Teflon, nut, and nozzle. Note that the threaded rod has 2 sides : one open and where the teflon tube is visible and one closed side. The open side goes towards the hotend and the closed side goes towards the stepper motor. Tighten the nut and the nozzle using a wrench lightly , but be careful and do not overtighten, as the threads can be easily stripped.



There are 4 wires from the hotend . 2 Red ones are for the heater, and the 2 white ones are for the thermistor. Crimp female Dupont connectors on to the white wires and install a 2 core housing on it.

Extend the 4 Stepper motor wires by about 60cm. And female Dupont connectors on the ends. Install a 4 core housing on it such that the stepper motor coils are A+A-B+B-configuration (Use a Multimeter to check the coils)

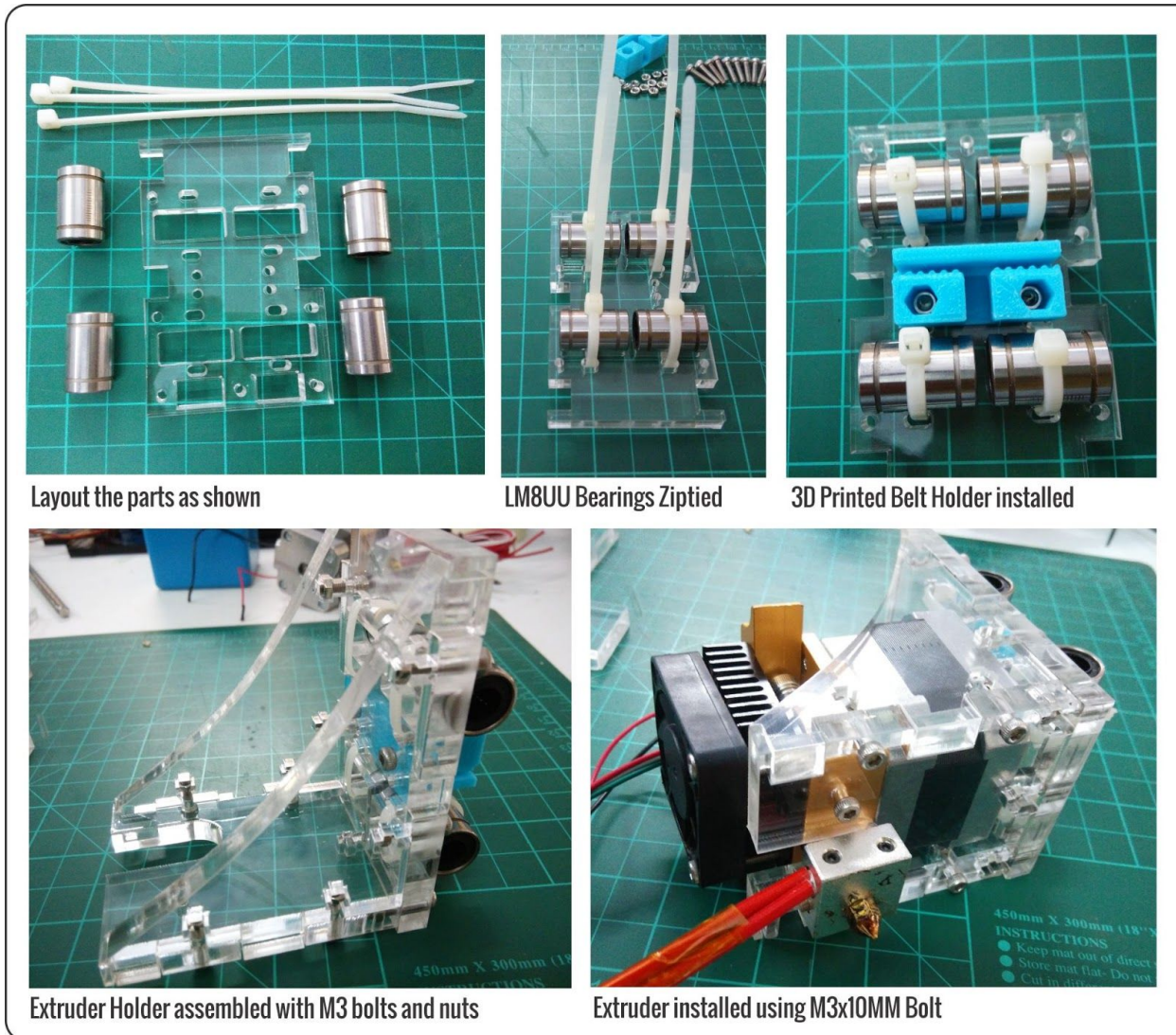


Stepper Motor Wires

Thermistor Wires

B. Assemble the Extruder holder side

1. Ziptie the 4 LM8UU bearings to the holder
2. Assemble the Extruder holder set using M3x15MM bolts and nuts. Note that the base of the extruder holder is aligned so the notch cutout is on the left side.
3. Install the Extruder to the holder using the M3x10MM bolt
4. Crimp connectors on to the white



Layout the parts as shown

LM8UU Bearings Ziptied

3D Printed Belt Holder installed

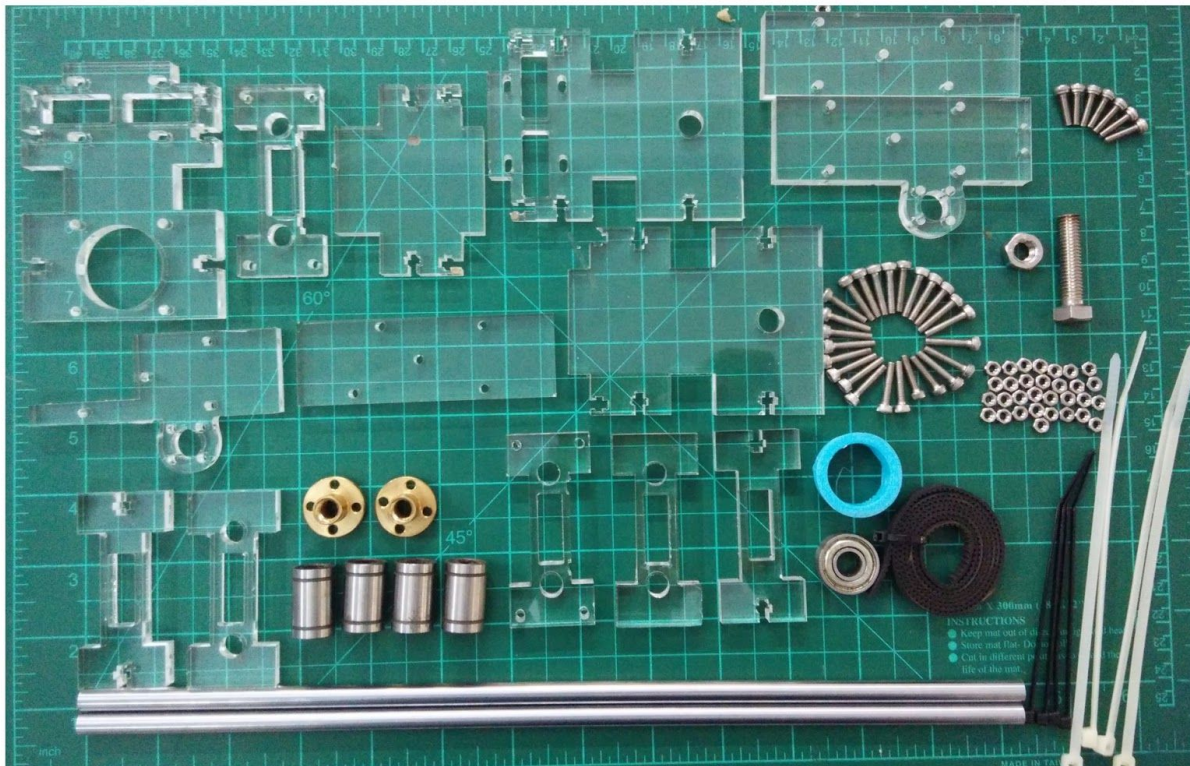
Extruder Holder assembled with M3 bolts and nuts

Extruder installed using M3x10MM Bolt

Step 4. Assemble the X Axis.

You need :

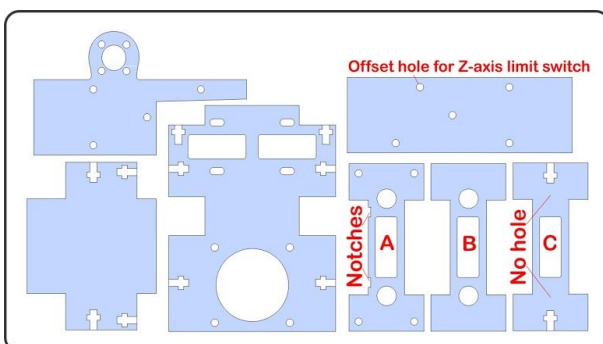
- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Acrylic part set For X-Axis Motor mount set 2. Acrylic part set For X-Axis Idler set 3. M3 12MM and 15MM Bolts and Nuts 4. 2Pcs 8MM linear rods 350MM long 5. 4Pcs LM8UU Linear Bearings 6. Zipties 7. GT2 Timing Belt (short 70cm) | <ol style="list-style-type: none"> 8. 608ZZ Radial Bearing 9. 3D printed 608ZZ bearing holder 10. M8 Bolt and nut 11. M3 30MM bolt 12. Switch spring 13. 2Pcs Copper Nut for Leadscrews 14. Stepper motor |
|--|--|



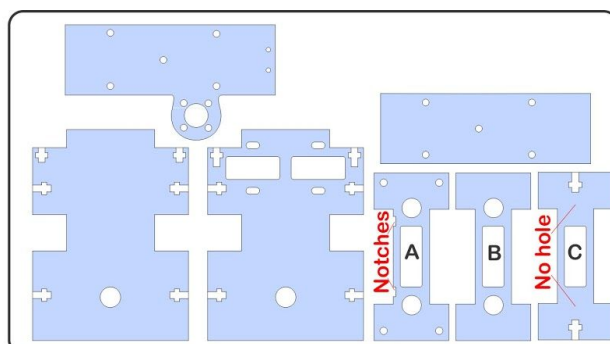
Parts needed for the X-Axis assembly

1. Assemble the X-Axis Motor Mount and idler

Use the Acrylic parts to assemble the X-Axis Motor mounts. Install the LM8UU bearings using Zipties and tighten the assembly.



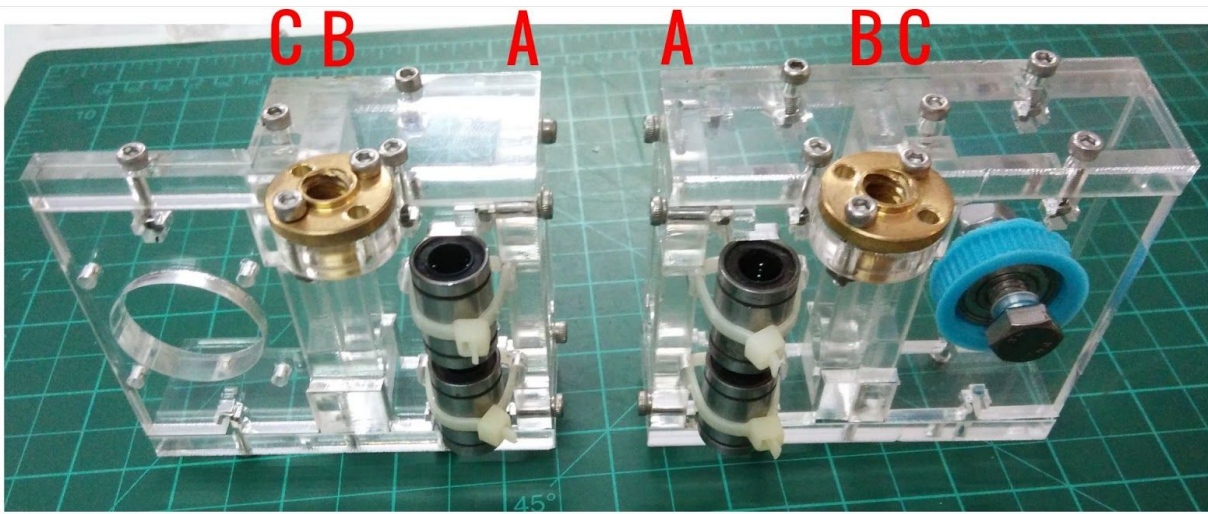
X Axis Left Side (Motor mount Side)



X Axis Right Side (Idler Side)

Part A is with the notches that match up with the zipties. Part B is with same as Part A except the notches. Part C is with No Holes but with the bolt notches on the top and bottom.

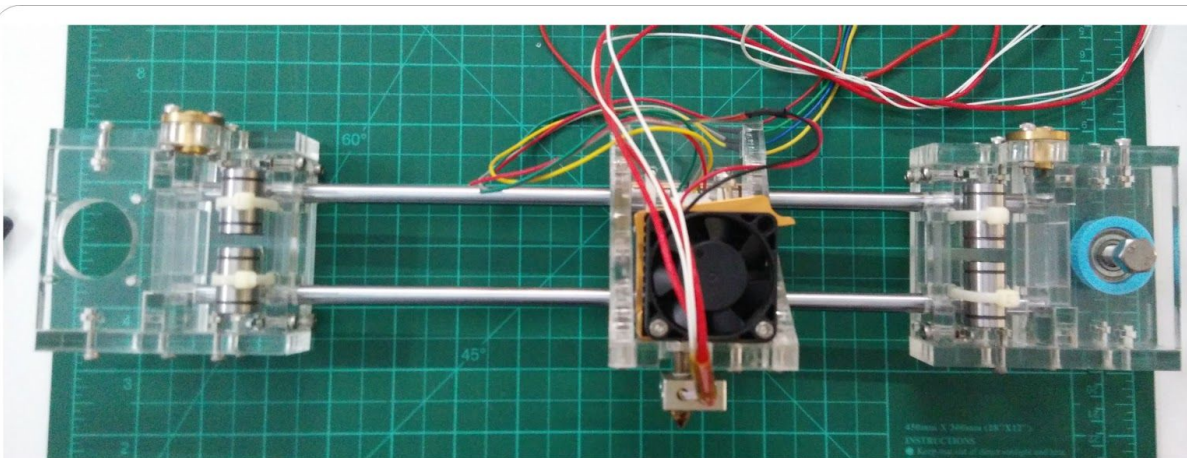
For the Motor mount, Part A goes to the right, then in the center the Part



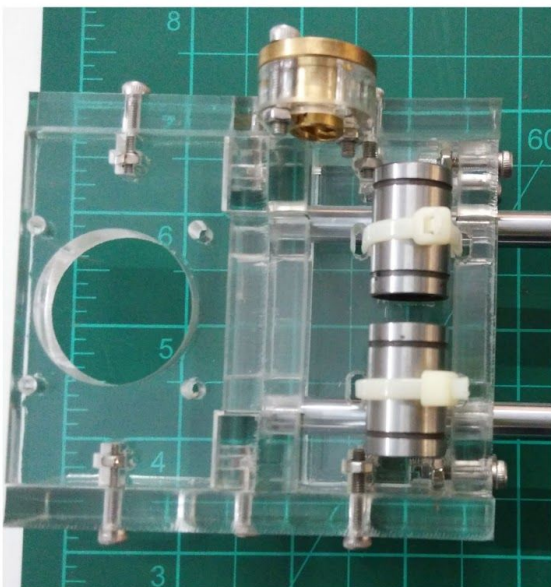
X-Axis Motor Mount

X-Axis Idler

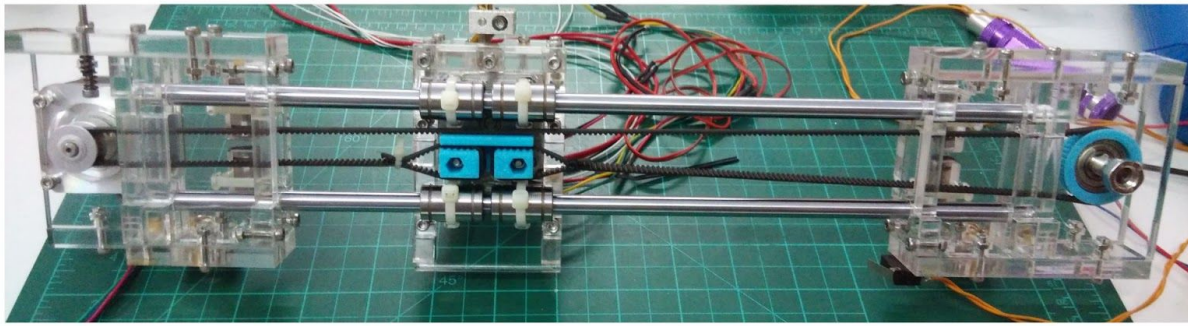
3. Install the linear rods, and Extruder



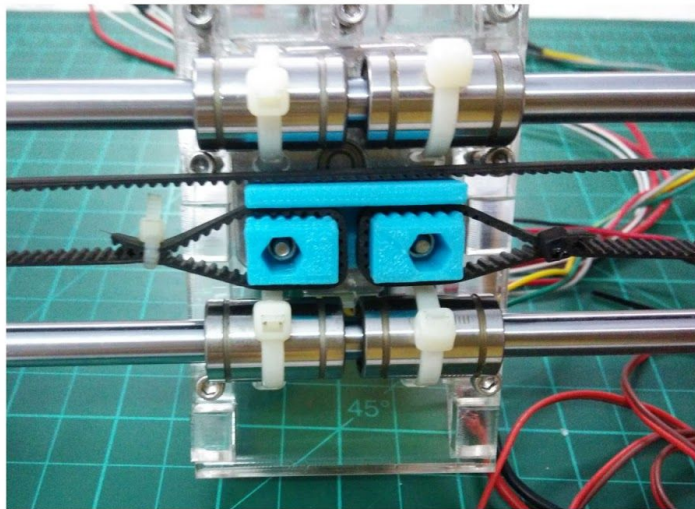
Install the Extruder and the 350MM Linear Rods



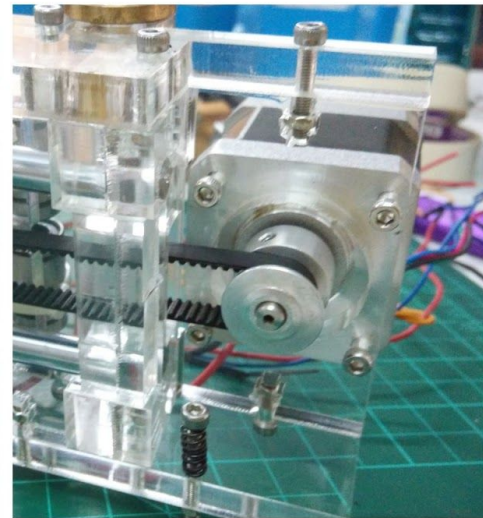
Linear Rods go through Part A and B on both the X-Axis motor mount and Idler



GT2 6MM Timing Belt installed for the X-Axis



Belt tightened and zip tied over the belt holder



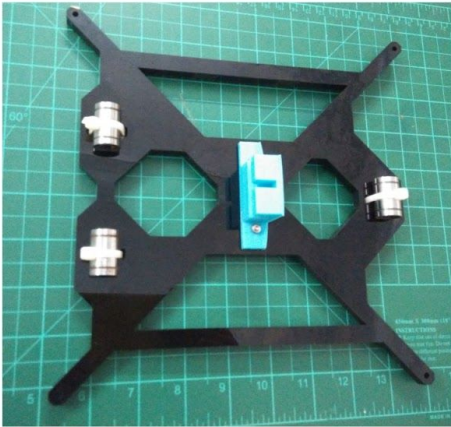
Motor with the pulley

Install the Stepper Motor, with the Pulley and Timing Belt.

Step 4. Assemble the Y Axis.

You need:

- | | |
|---|---|
| <ol style="list-style-type: none">1. Threaded Rods 2Pcs2. M8 Nuts and washers3. Y axis Acrylic supports and parts4. Y Axis limit switch Acrylic part5. Y axis acrylic motor mount and idler | <ol style="list-style-type: none">6. 608ZZ Radial bearing7. GT2 Timing belt (long)8. 3D printed Y axis belt holder9. 2 Pcs 8MM Linear rods 400MM long10. Acrylic base for heat bed. |
|---|---|



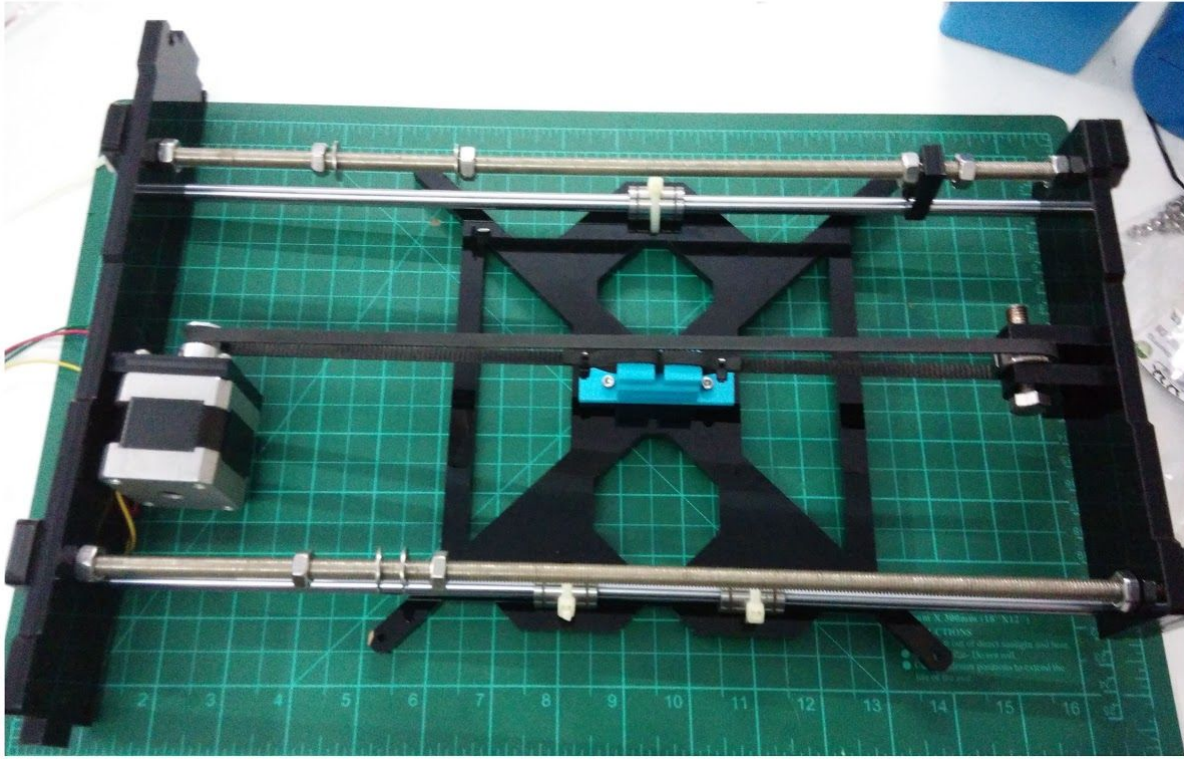
Hot bed base plate



Threaded Rods with M8 nuts, washers and limit switch holder in place



Y-Axis Assembly



Timing belt installed on the Y-Axis

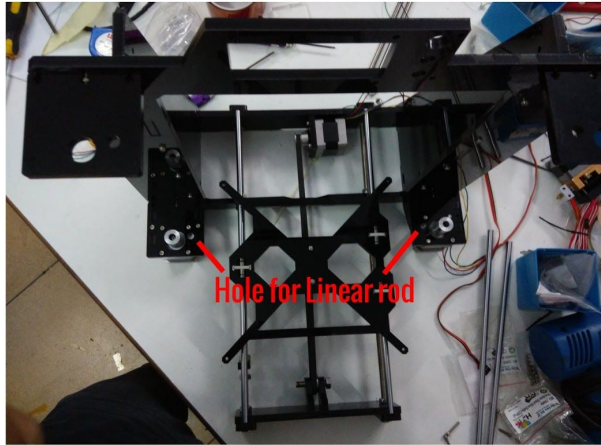


Completed Y-Axis assembly

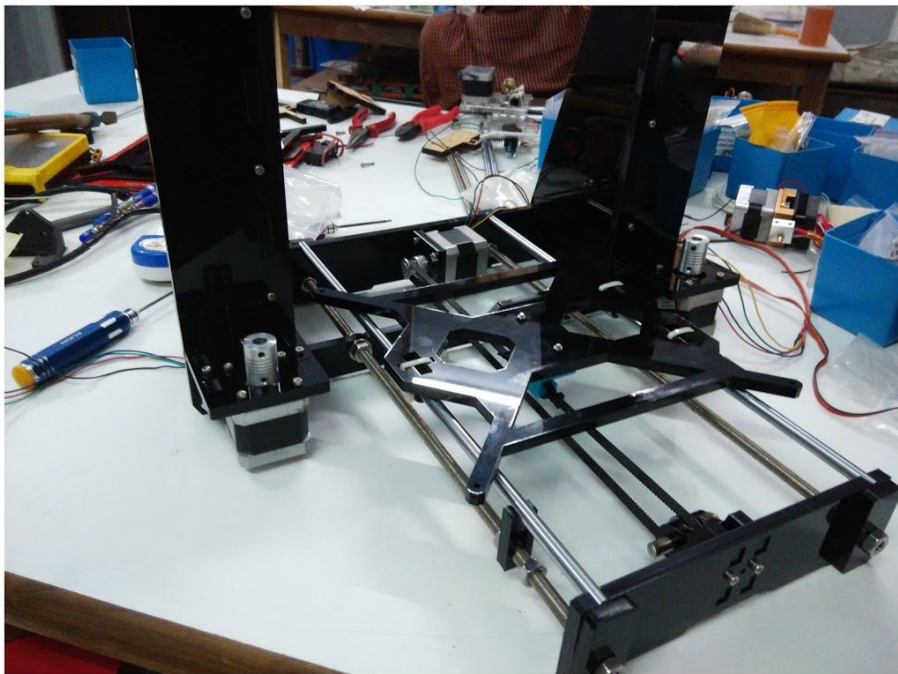
Step 5 . Assemble the Frame



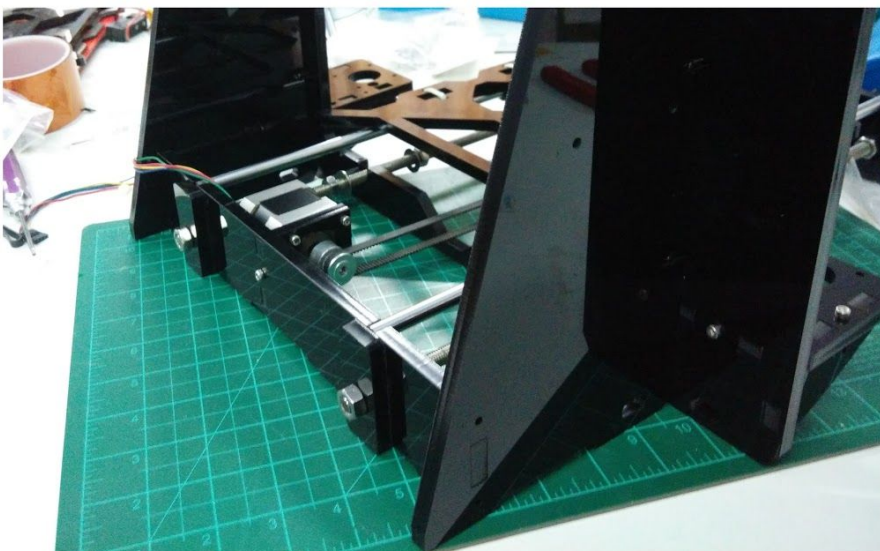
Assemble the frame



The 2 Z-axis motors and the Y-assembly

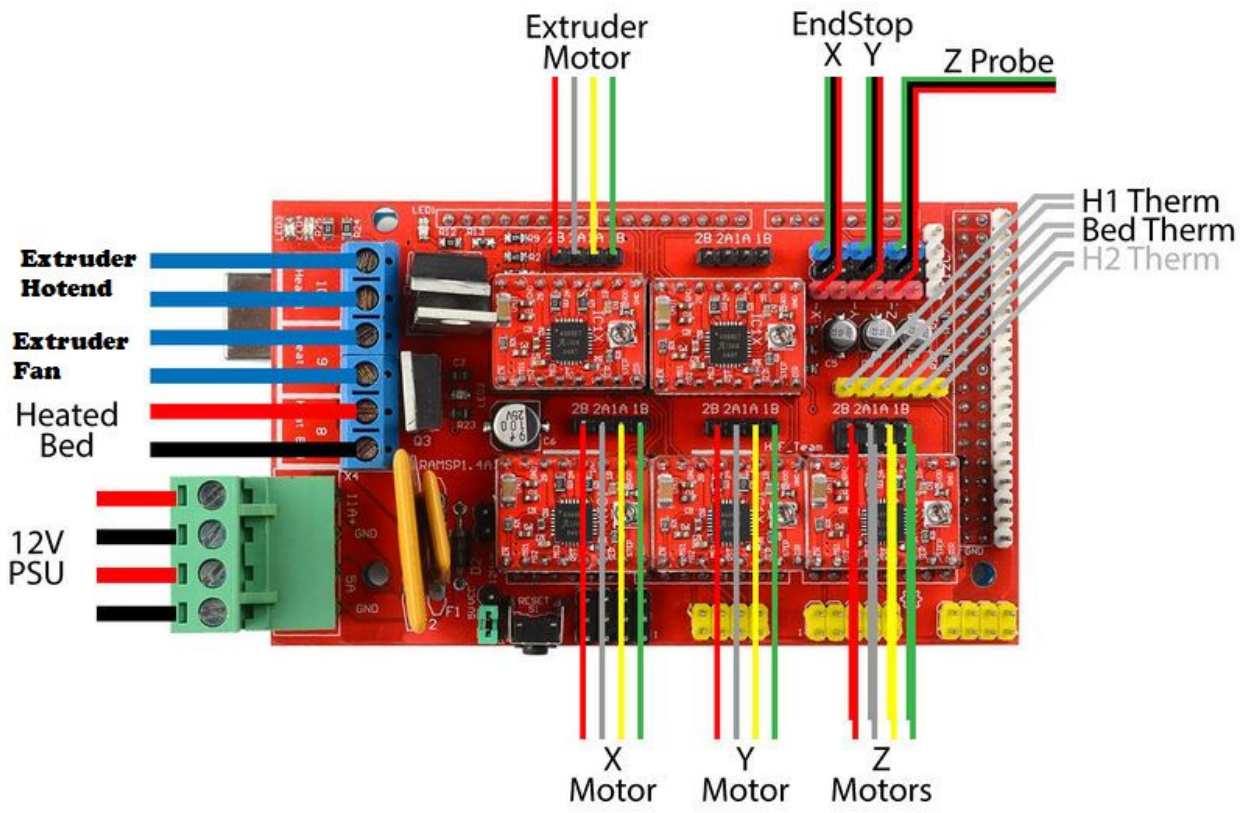


Frame assembly complete



Another view of the assembly

Step 6. Wiring and Crimping



Step 8. Software configuration and loading the Firmware.

1. Install the following softwares :
 - a. Arduino : <https://www.arduino.cc/en/Main/Software>
 - b. Pronterface: <http://koti.kapsi.fi/~kliment/printrun/>
 - c. Slicr : <http://slic3r.org/download>

Additionally download :

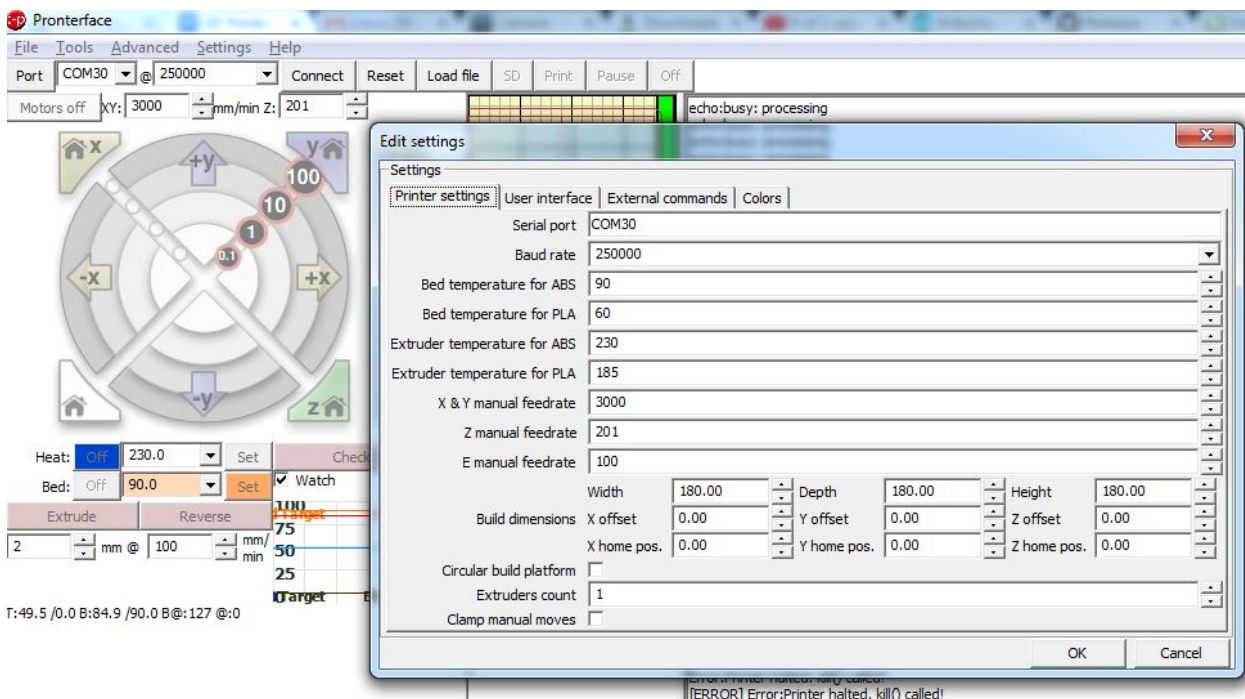
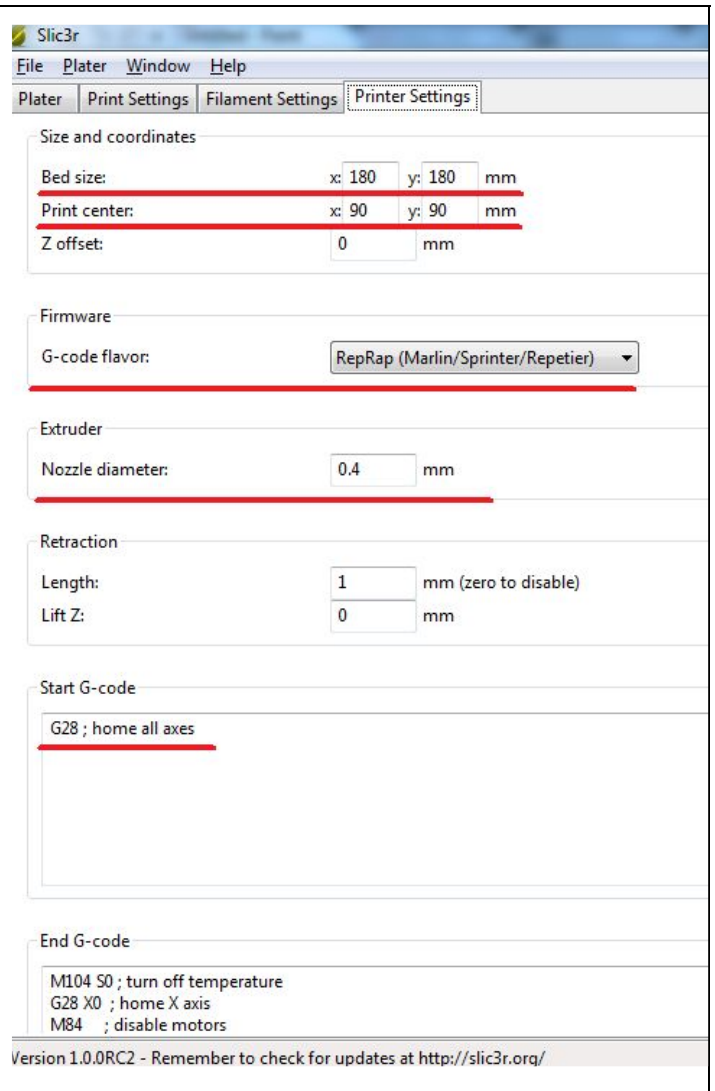
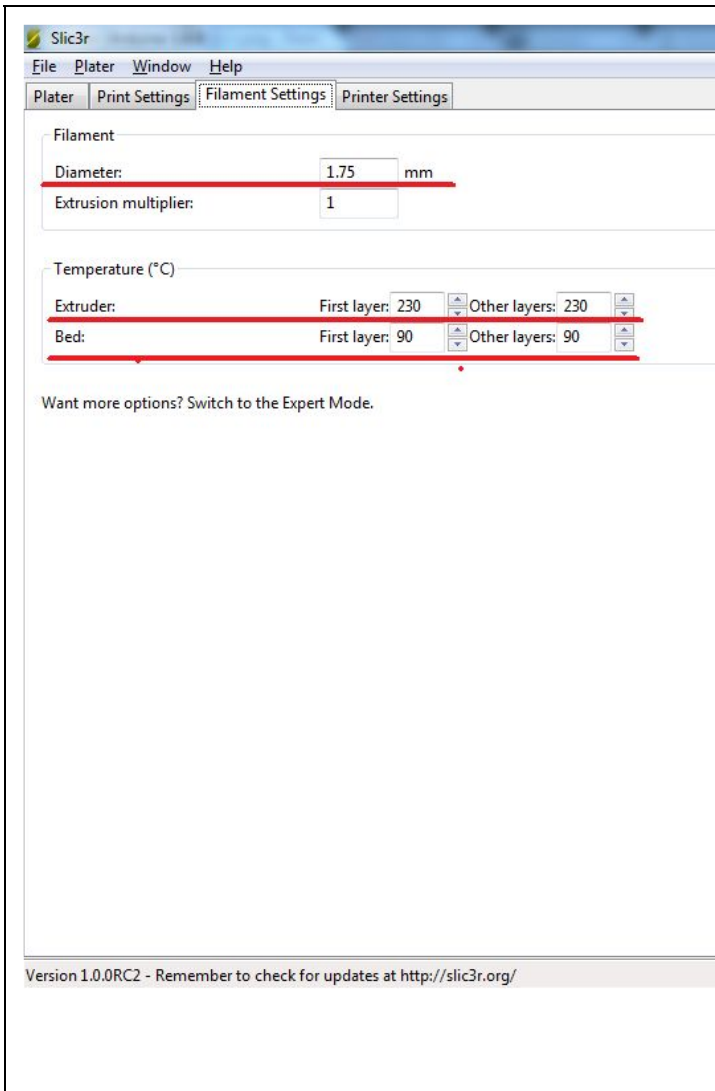
- a. Customized Marlin Firmware: <http://vortex-rc.com/3DPrinter/Marlin-RC.zip>
- b. First print Test GCode - 20MM cube. <http://vortex-rc.com/3DPrinter/20mm-box.gcode>

Using the Arduino software , open, compile and upload the Firmware to the Arduino / Boards.

Make sure Mega2560 is selected and that the right PORT is selected. Ensure the Compile and Upload is Successful

Configure the Slic3r and Pronterface per the screenshots below :

The image displays two screenshots side-by-side. The left screenshot shows the Arduino IDE interface with the 'Tools' menu open. The 'Board' is set to 'Arduino/Genuino Mega or Mega 2560', the 'Processor' is 'ATmega2560 (Mega 2560)', and the 'Port' is 'COM3'. The right screenshot shows the Slic3r software interface with the 'Printer Settings' tab selected. The settings are as follows: General: Layer height: 0.3 mm, Perimeters (minimum): 2, Solid layers: Top: 3, Bottom: 3; Infill: Fill density: .3, Fill pattern: honeycomb; Support material: Generate support material: unchecked, Pattern spacing: 3.5 mm, Raft layers: 0; Speed: Perimeters: 20 mm/s, Infill: 20 mm/s, Travel: 50 mm/s; Brim: Brim width: 0 mm; Sequential printing: Complete individual objects: unchecked, Extruder clearance (mm): Radius: 20, Height: 20. The version is 1.0.0RC2.



Step 8 . Initial checks

- a. Motor directions for X,Y,Z and Extruder
Make sure that each of the axes move in the correct direction . For the extruder, heat up to 230C and then give the extrude 2MM command. Correct any axis if reversed.
- b. Endstops for X,Y & Z axis
Check that each of the axes activate the home switches when moving to Home position. For the Z-Axis adjust the M3 bolt so that the switch is activated when the nozzle is at the correct height over the bed
- c. Bed height calibration and Z- axis endstop tuning.
Watch our video to adjust the heat bed height at the 4 corners so that the bed is leveled properly

Step 9. Getting the first print.

- a. Load the given GCode onto pronterface that would print a 20MM cube. Give the print command, which should be:
 - i. First heat up the bed to 90C
 - ii. Home the axes
 - iii. Heat the Extruder to 230C
 - iv. Start printing

Troubleshooting and common problems.

1. **Arduino / Pronterface does not connect**
Check the port settings or the driver (under Device manager. Make sure the correct Com port is selected.
2. **X-axis Or Y-Axis or Z-axis motors turn in the reverse direction**
Switch off the printer, and reverse the 4 core Stepper motor wire that plugs into RAMPS. .
3. **When homing, instead of moving towards the limit switch the axis moves about 1MM positive and stops**
Most likely this is because the limit switch is not setup properly. Ensure that the switch is plugged into the correct port and that the switch itself is wired up correctly.
4. **The 3D print is not sticking to the heat bed properly**
Check the bed leveling . 99.99% that is the issue. Make sure the bed is clean, free from fingerprints or anything that may prevent the filament from sticking.
5. **The extruder seems to be jammed.**
Cool the extruder, and disassemble the hotend. Clean the brass nozzle with acetone. Do not use any sharp instrument to clean the nozzle as that may scratch and damage the assembly.