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# Prusa i3 Build manual

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## **ABOUT PRUSA I3**

The Prusa i3 (iteration 3) is the newest and current 3D Printer design by RepRap Core Developer Prusajr. The i3 incorporates lessons learned from the previous two Prusa designs, as well as other popular modern RepRap designs.

This manual will guide you through the required steps for assembling your Prusa kit. Although we have tried to be very thorough, last minute updates to the kit. When in doubt don't hesitate to contact us at [info@opensourcehardware.it](mailto:info@opensourcehardware.it)

## **CHANGE HISTORY**

<b>Document version</b>	<b>Changes</b>
0.1 – 11/11/2013	Initial beta release
1.0 – 01/Jul/2015	First release

## KIT DESCRIPTION

This kit includes everything to build your own Prusa I3 3D printer. This kit has the following features:

Dimensions	Aprox. 19X20x17 (depends on the precise assembly)
Electronics	Arduino / RAMPS
Type of prusa I3	Metal frame version
Extruder type	1.75mm / 0.35 J Head version
Heated bed	Included
Power supply	Included (20A)

Some improvements over the defaults I3 are included. Kit contents may change anytime without prior notification. For a complete list of items, refer to the bill of materials.

## SAFETY WARNINGS

Do not power anything until all is set-up. Also, don't disconnect or modify anything while power is on. Make sure that everything is connected correctly and fixed adequately before powering the printer.

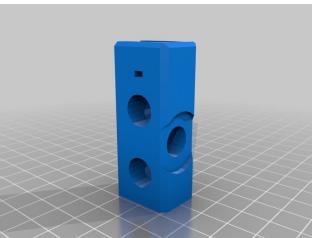
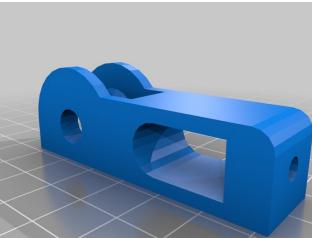
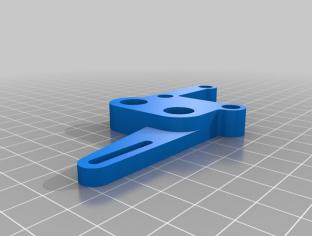
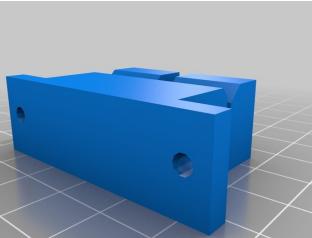
**220V connection ONLY BY qualified technicians.**

## REQUIRED TOOLS

The following list details the required tools necessary to build the printer.

Tool	Description
Screw drivers	
Soldering iron	There isn't much skill required to do the soldering, just some wires.
Pliers	
Cutter	
Drills	Use to clean out some ABS parts
M3 hex key	

## ASSEMBLING THE Y-AXIS

Item	Contents
	Y corner printed part (4x)
	Y-idler (1x)
	Y-motor mount (1x)
	Y-belt holder (1x)
	M4x25mm screw (1x) M4x20mm (1x) M3x12mm (2x)

M10 Nut (34x)  
M4 Nut (2x)



M10 Washer (34x)  
M4 Washer (4x)



LM8UU Linear Ball Bearing Slide Bush Bushing (3x)



Smooth rod 8mm, 42cm (2x)



Threaded rod M10, 44cm (2x)  
Threaded rod M10, 22cm (4x)



Bearing 624 (1x)





Prusa I3 Frame

Tie-wrap (7x)



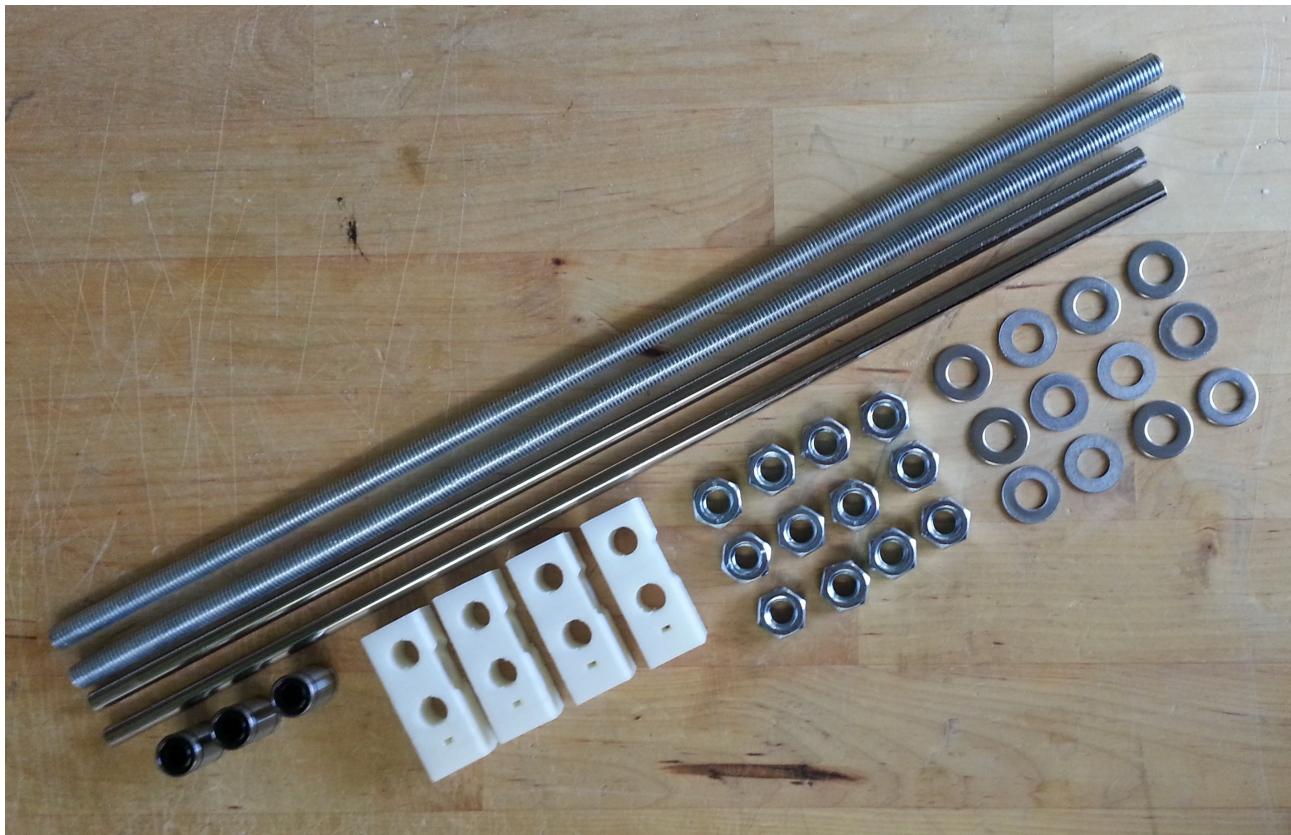
Aluminum Pulley GT2



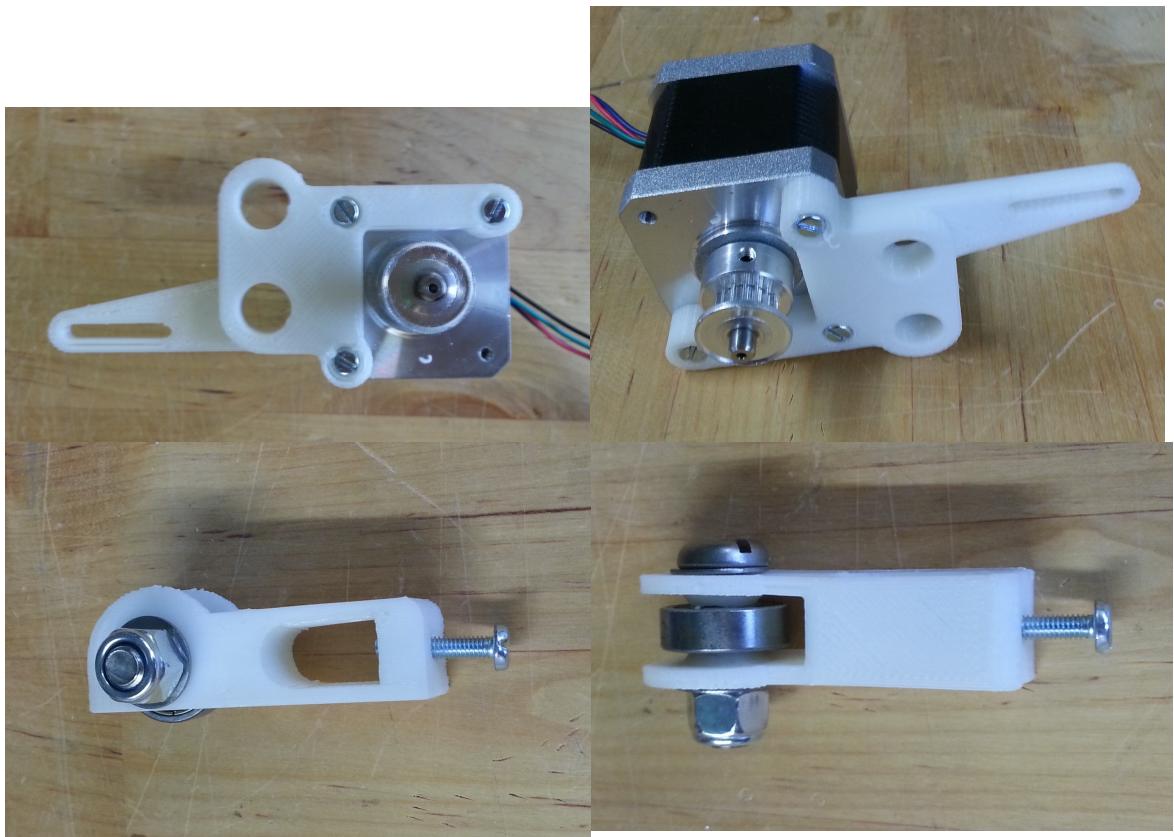
Timing belt 1m x 6mm 2mm pitch (GT2)



NEMA17 Stepper motor 1.8 degrees step / 4.8 kg/cm (1x)



Use the 44cm threaded rod and 42cm smooth rod to build the heated bed rails like this.



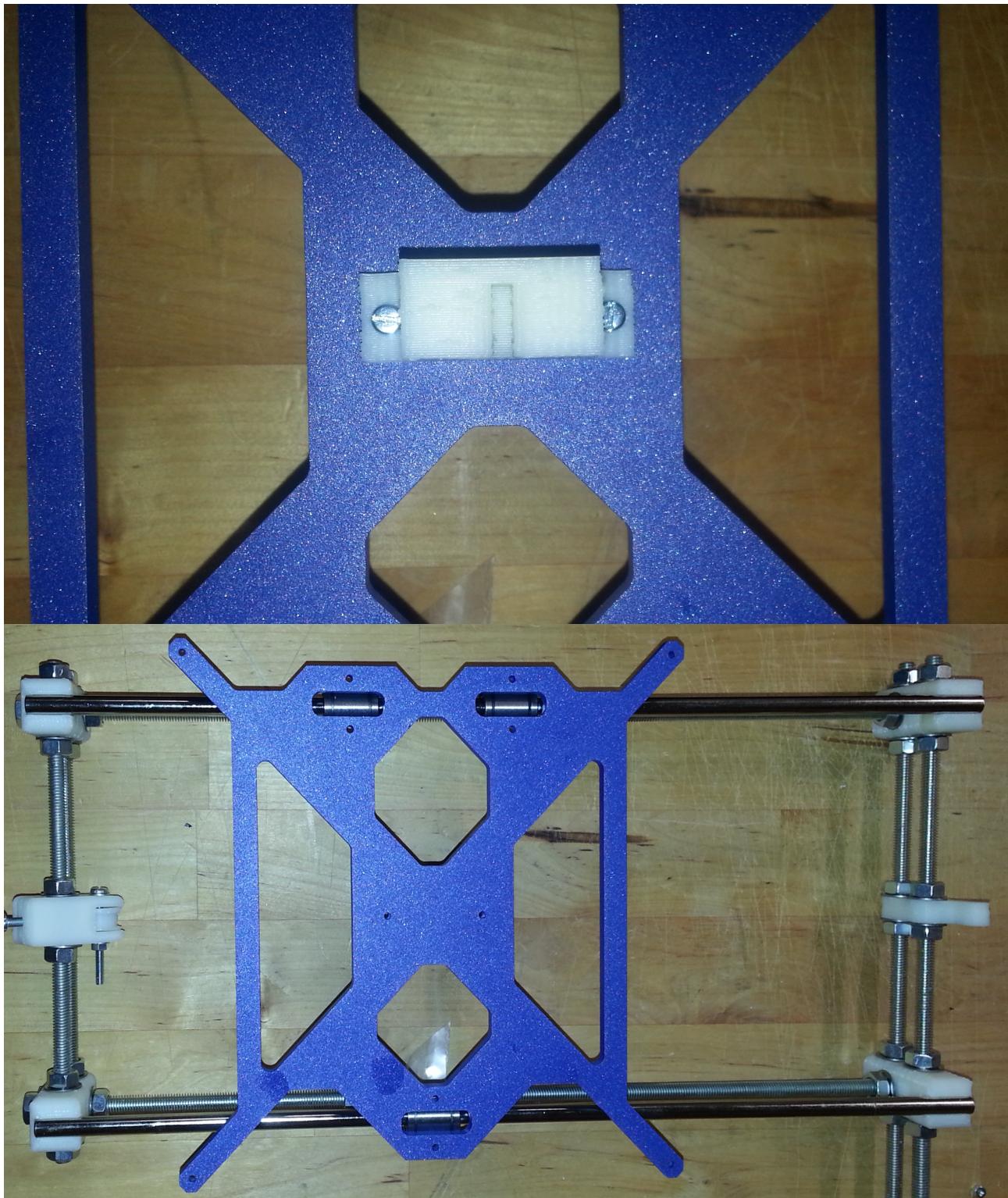
Use the hex key to put the pulley onto the motor. Put the motor and the motor holder together using M3x10 screws. Use the M8x30, 2x M8 washer and the nylon lock M8 nut to hold the 608 bearing into the Y axis idler. Mount both pieces on the M20x22cm threaded rods



Put the heat bed rails and 22CM rods together



The distance between the rails should be about 16.2cm

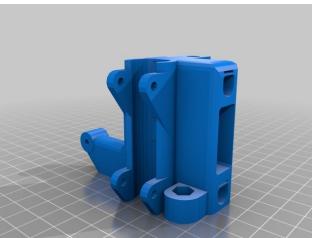
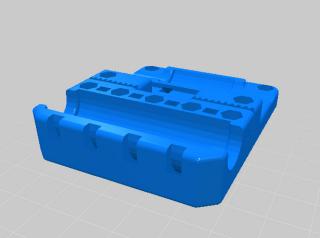


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Put the y-belt-holder and the Y fame together using m3x10 screws. Place the frame on the LM8uu bearings and tighten the frog to the rails using tie wraps.

## ASSEMBLING THE X-AXIS

Item	Contents
	X-motor mount (1x)
	Extruder support for Prusa i3 (1x)
	X-end (1x)
	X-idler (1x) LM8UU Linear Ball Bearing Slide Bush Bushing (8x)



M4 Nut (5x)  
M5 Nut (2x)  
M3 Nut (2x)



M4 Washer (2x)



M3x14mm(3x)  
M3x10mm(12x)  
M4x20mm (5x)  
M3x10mm (2x)

lcd:  
M3x25mm(2x)

extra for idler:  
M3x10mm (2x)

Bearing 624 (1x)



Z-axis Motor coupling M5 (2x)



Smooth rod 8mm, 34cm (2x)  
Smooth rod 8mm, 38cm (2x)



Threaded rod M5, 31cm (2x)



Aluminum Pulley GT2

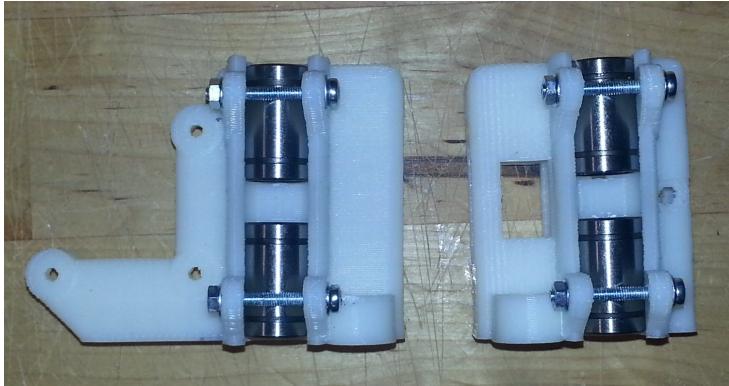


Timing belt 1m x 6mm 2mm pitch (GT2)

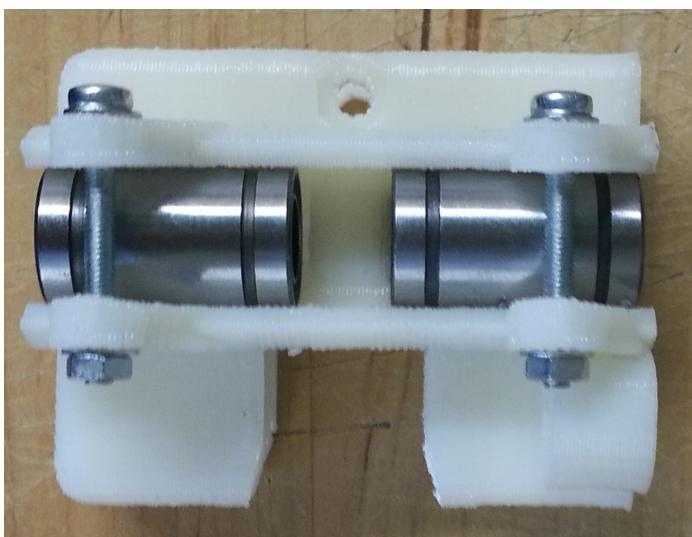


Tie-wraps (8x)





Assemble the X motor end and x end

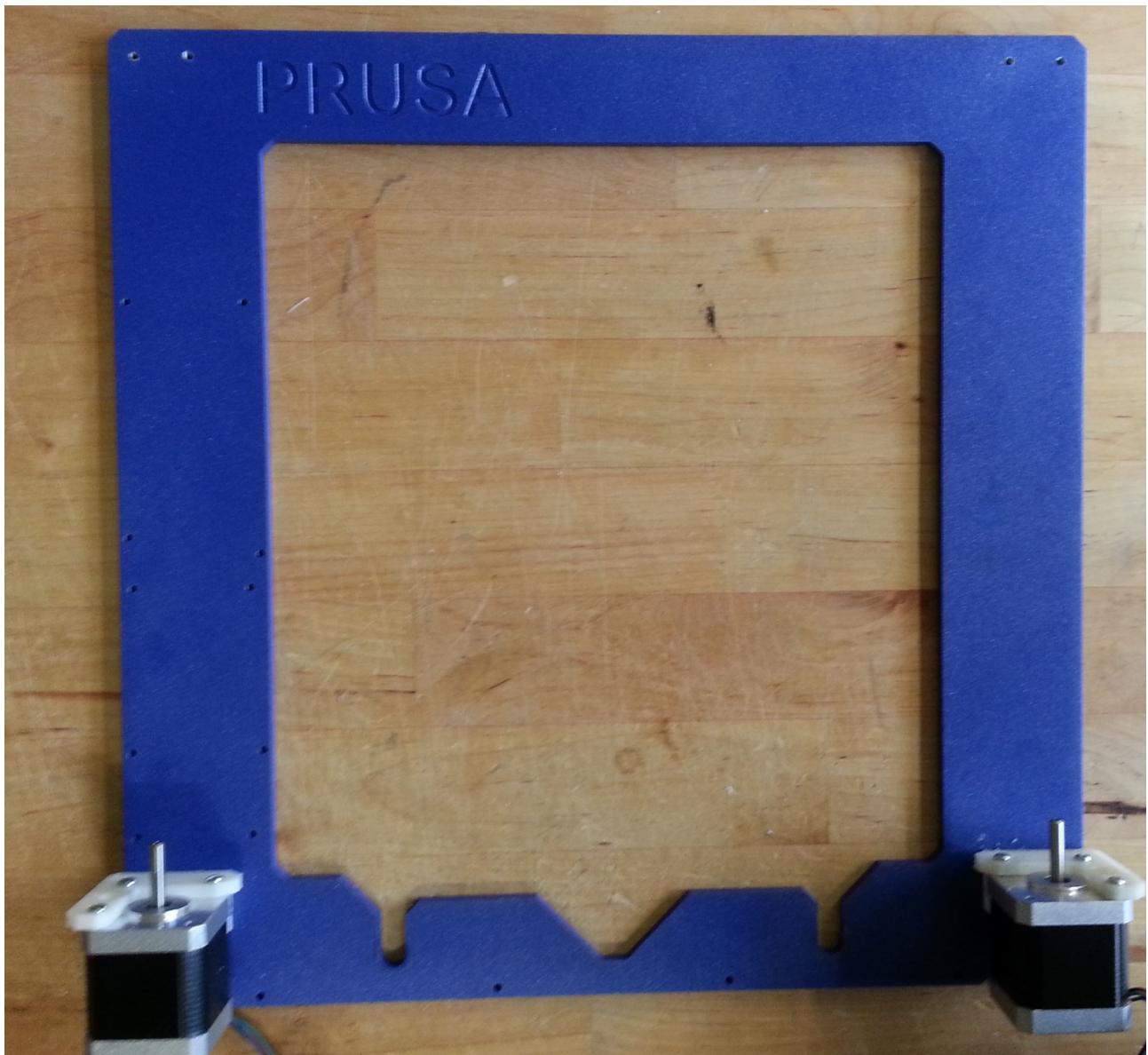


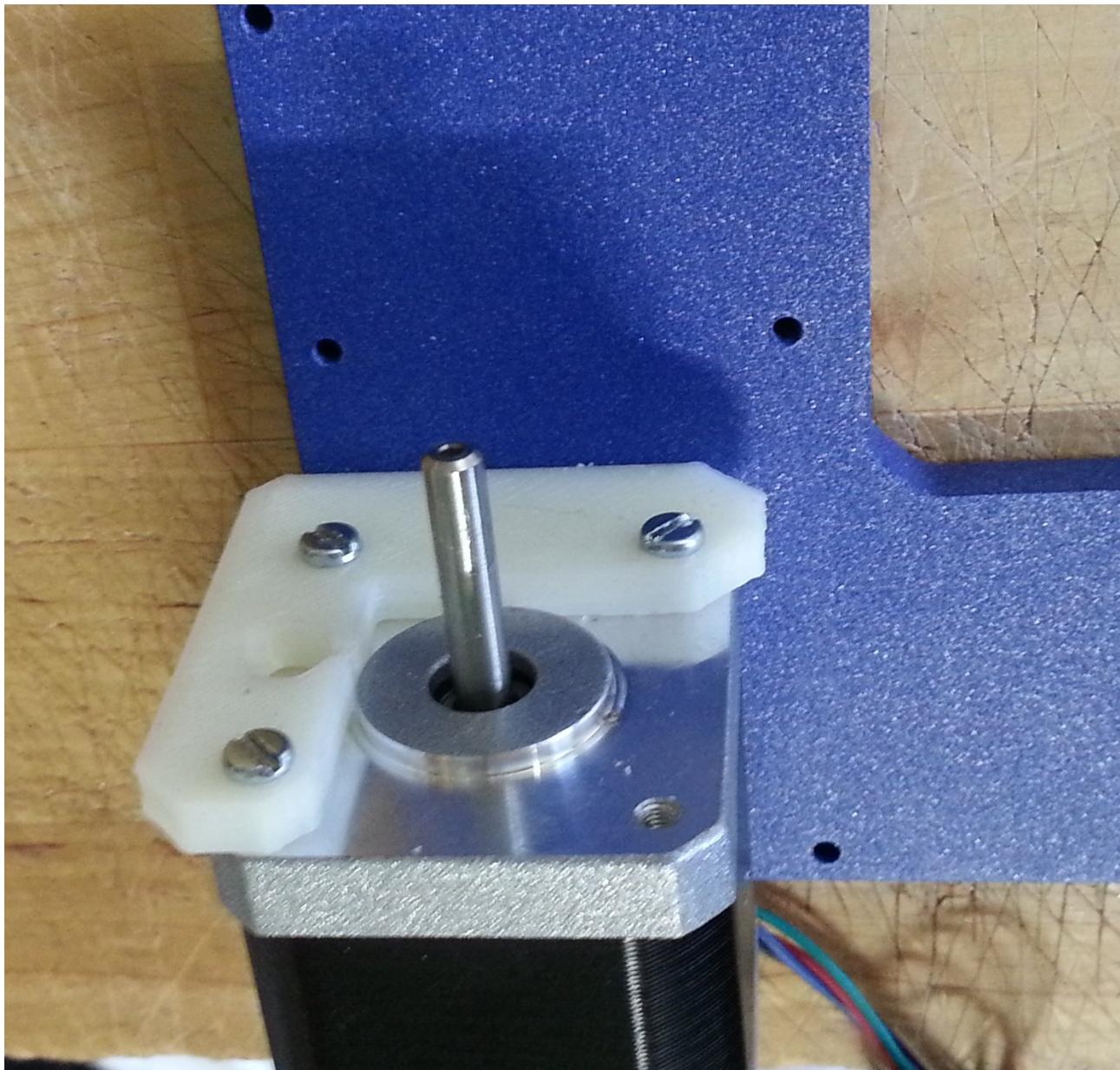
Remove the support from the x end.



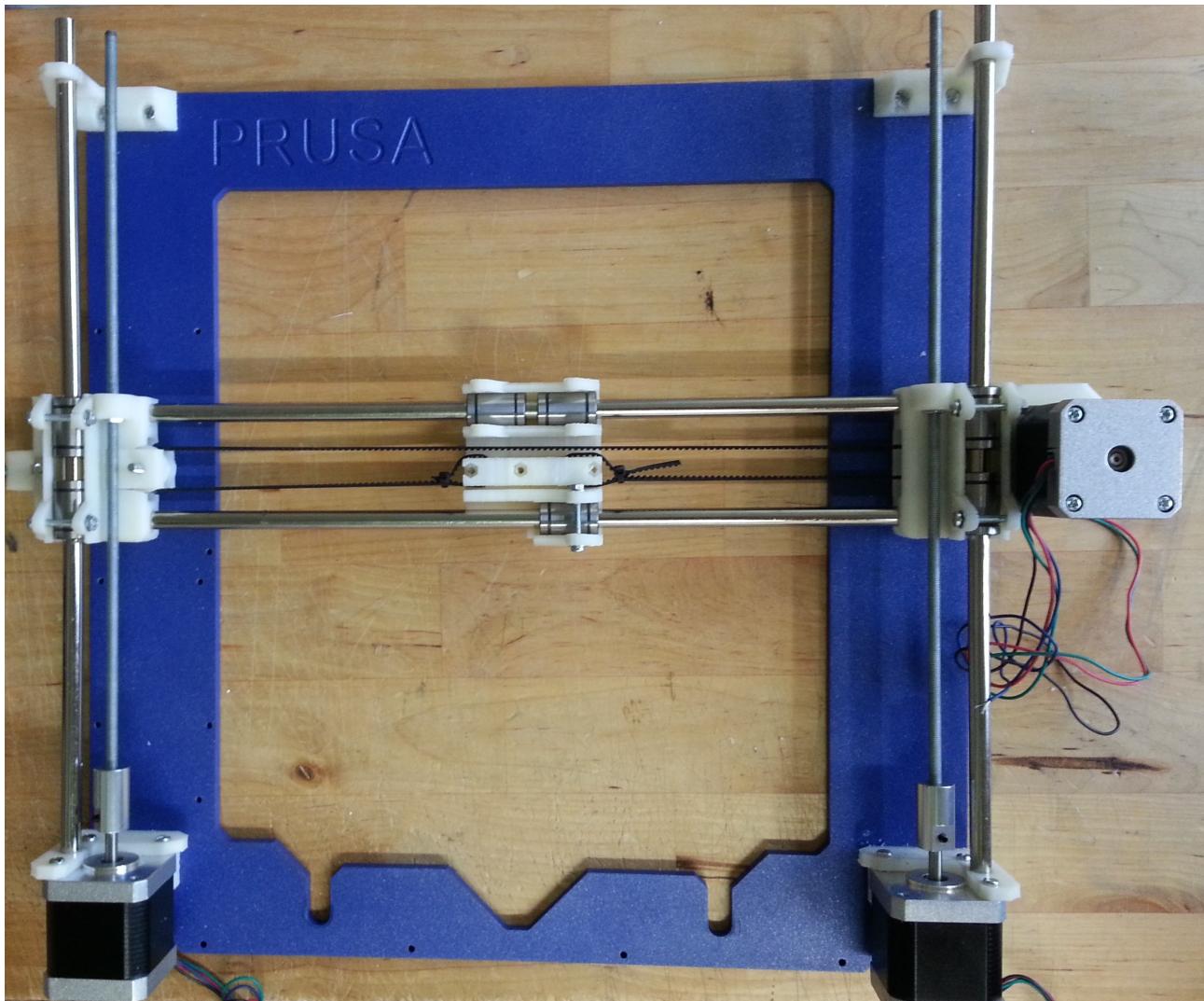
Place the 624 bearing into the idler, and both into the idler holder using a m4x20 screw with nylon lock nut.

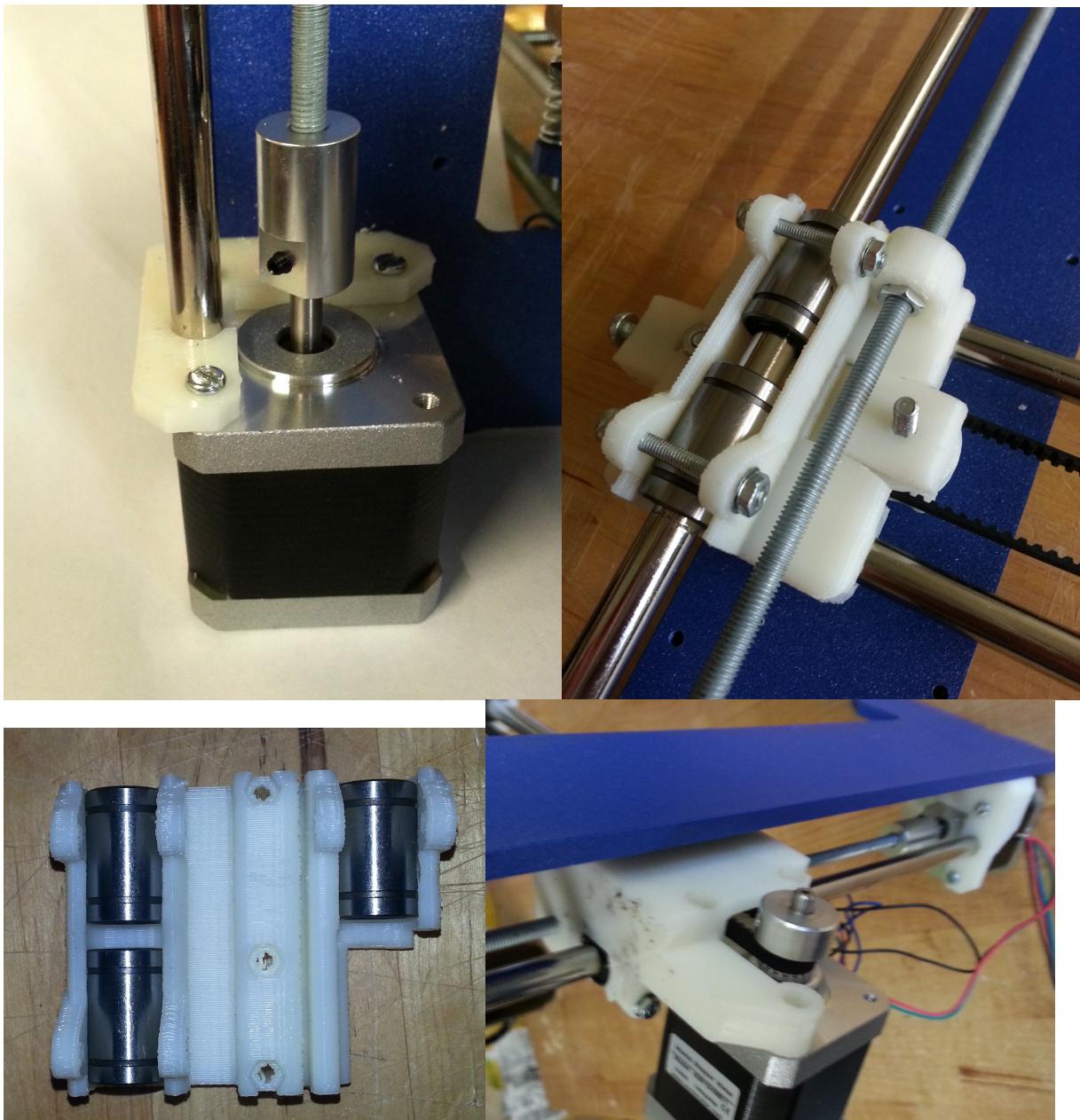




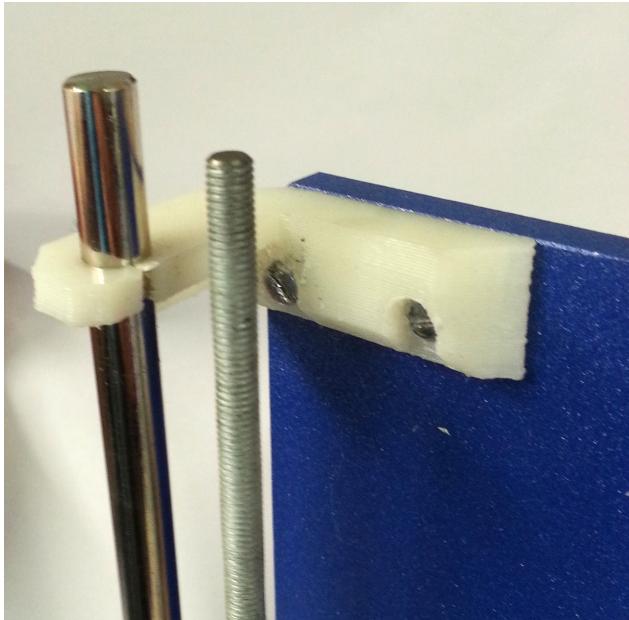


Mount the Z axis stepper motors onto the frame using M3x10 screws (12x).

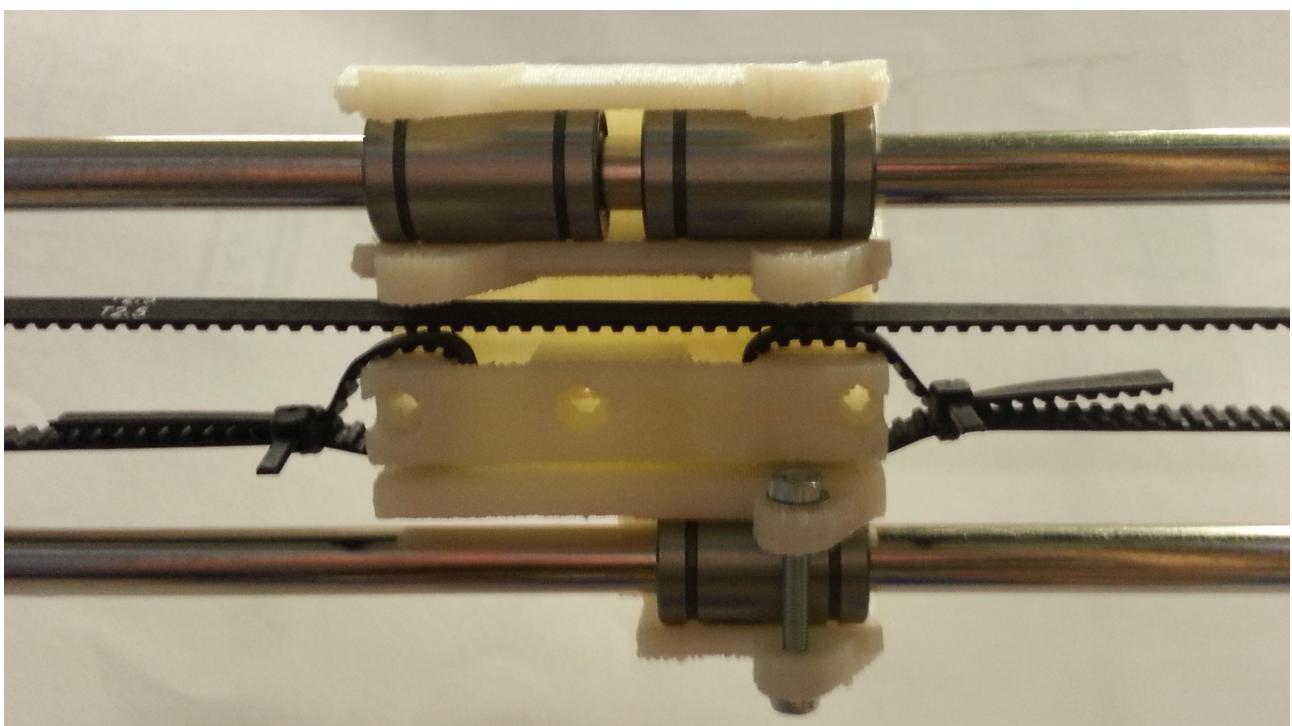




Put the motor coupling on the stepper motor and fix the hex screws. Insert the M5 threaded rod into the coupling and tighten very much. Use the 38cm smooth rods to make the x axis with the x end, x motor mount and x carriage. Assemble the Z axis using the 34cm smooth rods. Place the X axis over the Z axis with a M5 nut, make sure that the M5 fits in the x end and x motor mount. If not, heat the screw and force it into the abs piece.



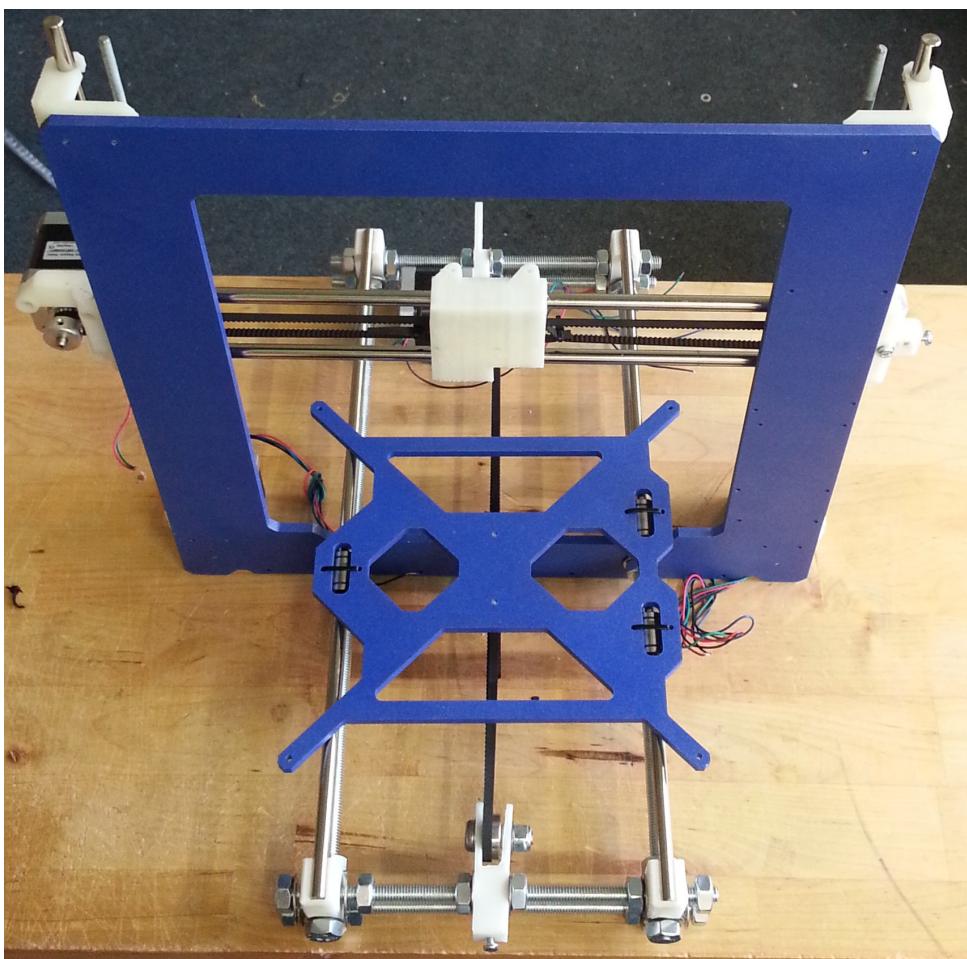
Fix the right top of the Z axis using 2x M3x10 screws.  
Use M3x25(2x) with nut to fix the left top (LCD SIDE)



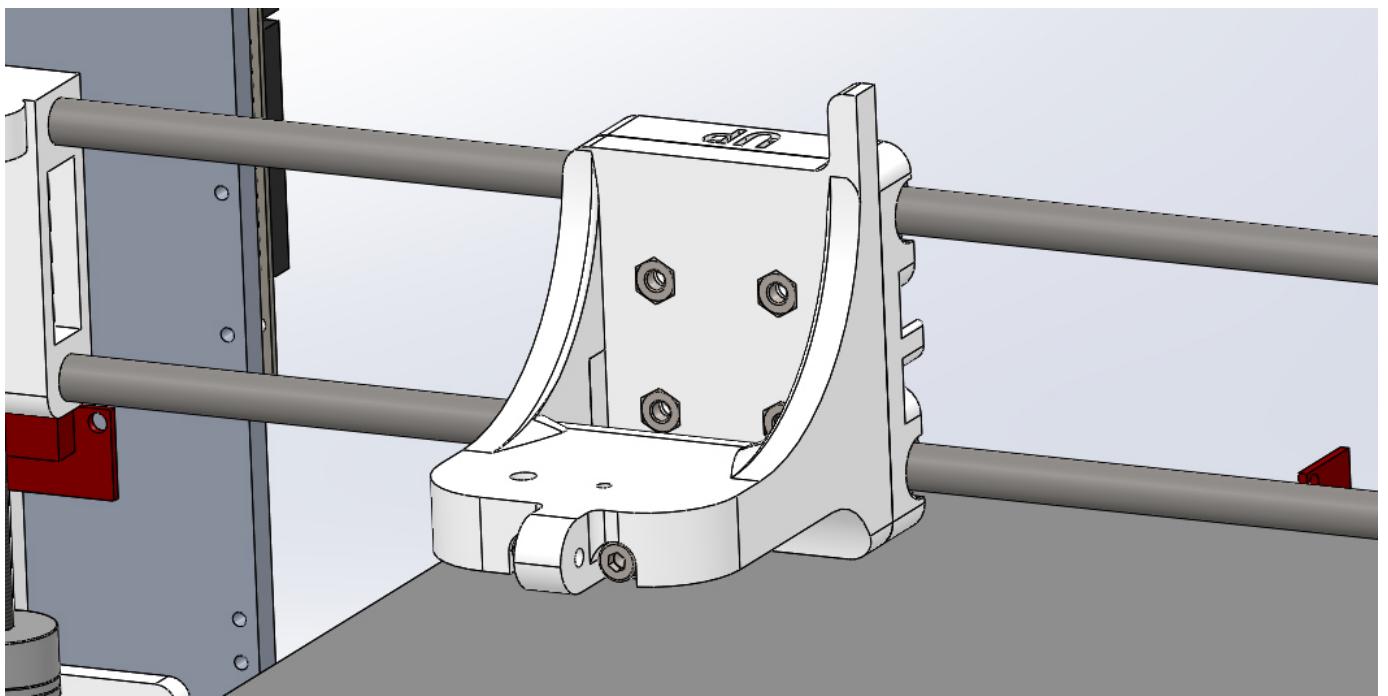
Put the timing belt onto the X axis and fix using tie wraps. Tighten the belt using the belt tensioner. The belt should make a high pitched sound when touched.



Fix the heated bed rail using a tie wrap on each of the four corners.

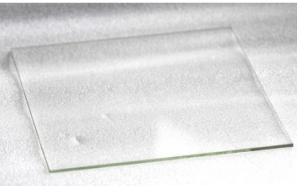


The machine should look like this by now.



Put the extruder mount onto the carriage using 4x M4x20mm screws and nuts.

## INSTALLING THE HEATED BED

Item	Contents
 A red printed circuit board (PCB) with a warning label. The label features several triangular warning symbols and text: "PCB HEATING ZONE", "HOT ZONE", "DO NOT TOUCH", "HOT ZONE", "DO NOT TOUCH", and "CAUTION". Below the text, it says "Warning: Risk of fire when LCD screen is hot".	Heated bed PCB
 Four metal compression springs coiled together.	Compression springs (4x)
 A rectangular sheet of clear borosilicate glass.	Heated Bed glass (Borosilicate) 200x200x3mm (1x)
 A black insulated electrical wire with a multi-stranded end.	Heater wire 18A (2m)

M3 (8x)



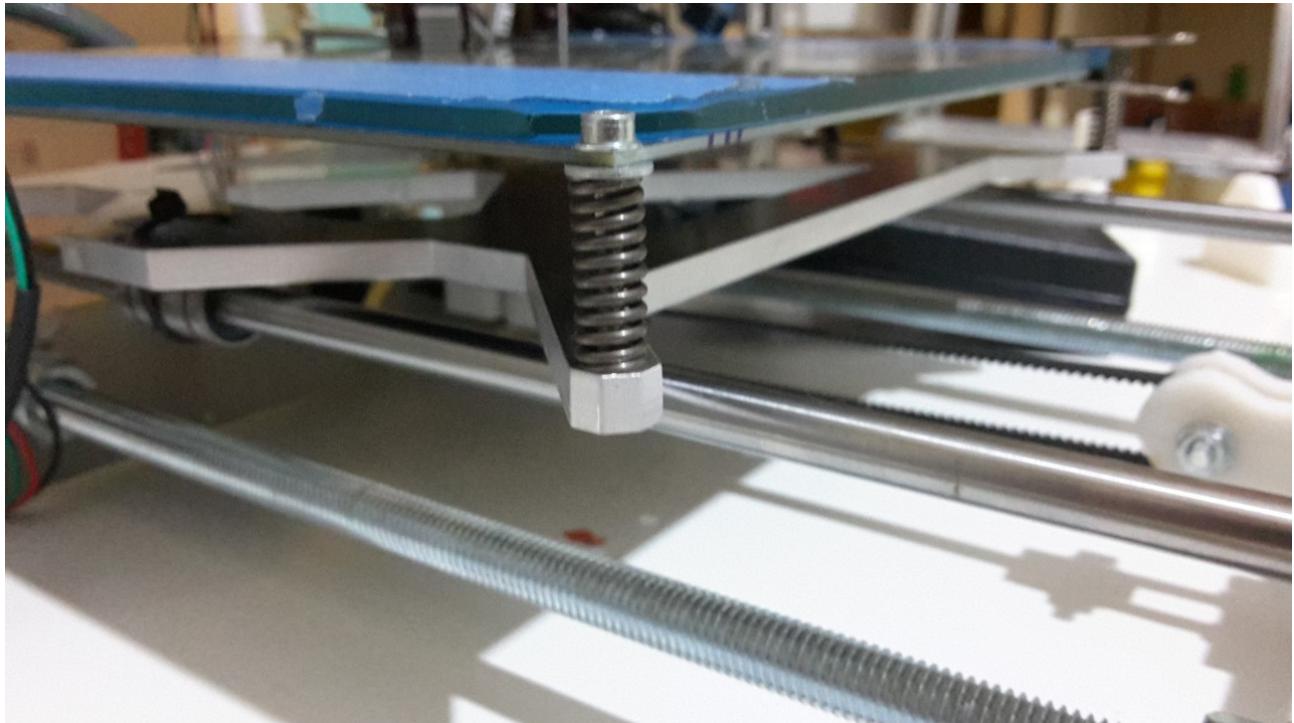
M3x30mm (4x)



Heated bed clip (4x)



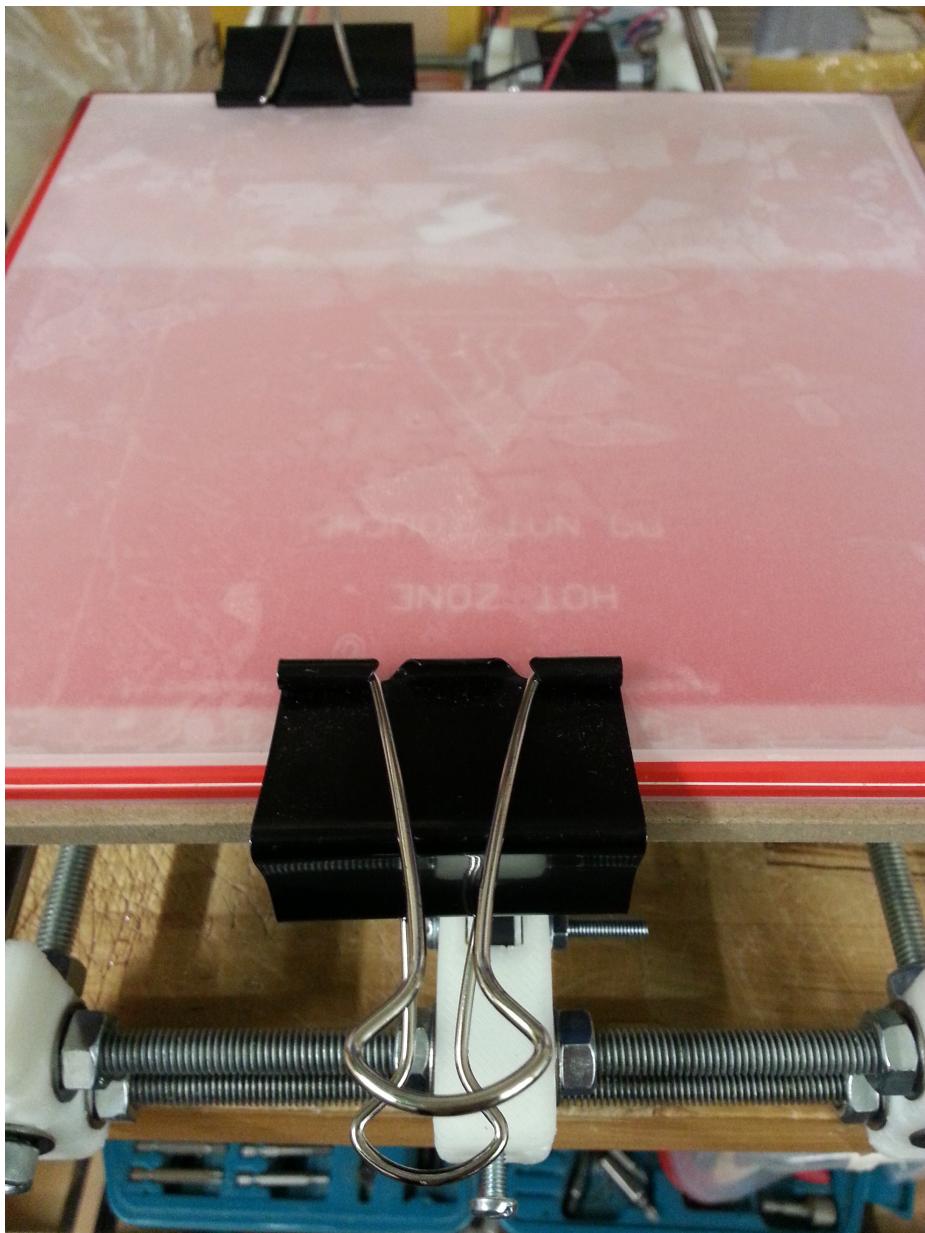
Take about a meter of the 18A wire (the fat ones) and strip a bit of the insulation. Then solder the end of the wire. Then put a bit of solder on the pad of the heated bed and solder the 18A Wire to the heated bed. Make sure to use enough solder.



Assemble the heated bed on all four corners like this.

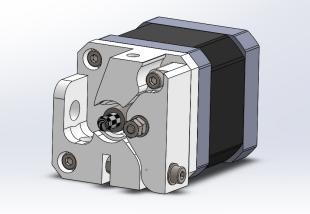


Put the printing sticker on the glass plate like this (3M2090 for PLA, use kapton for ABS). Lay out the printing sticker onto the table. Put the glass perpendicular to the printing sticker. Carefully lay down the glass, onto the sticker. then check for large bubbles which you may be able to rub out.



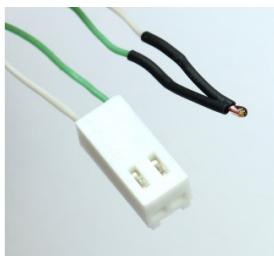
Put the glass onto the heated PCB and clamb them with the

## ASSEMBLING THE EXTRUDER

Item	Contents
	DD1-Extruder (1x)
	J Head Compatible Nozzle Holder (1x)
	J Head Compatible Nozzle 0.5mm (3mm filament)
	J Head Hollow Socket Screw
	PTFE tubing, 3.18inner/6outer diameter (10cm)



Ceramic Heater Cartridge 12V/40W



Thermistor 100K pre-crimped wire (1m)  
or GT2-104 Semitech



MK8 DRIVE GEAR

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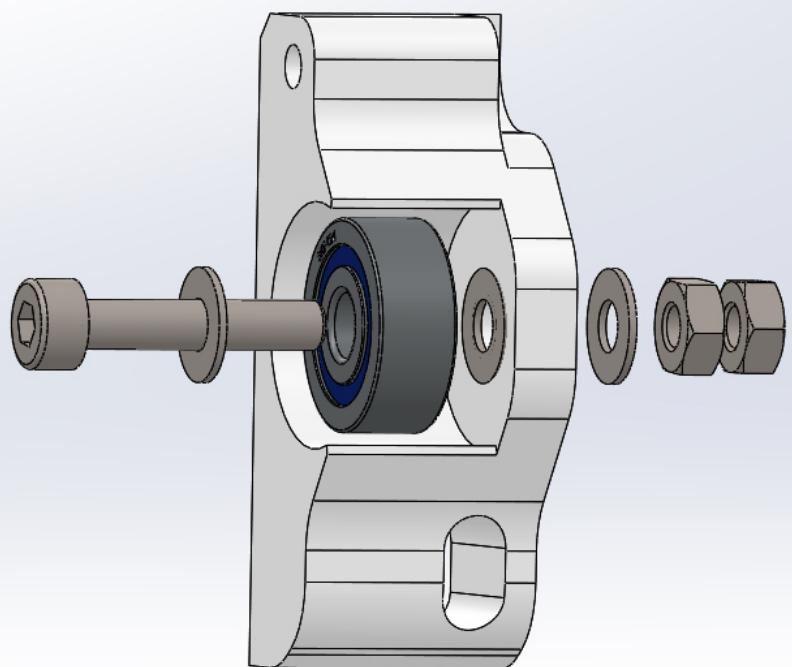
Bearing 624 (1x)

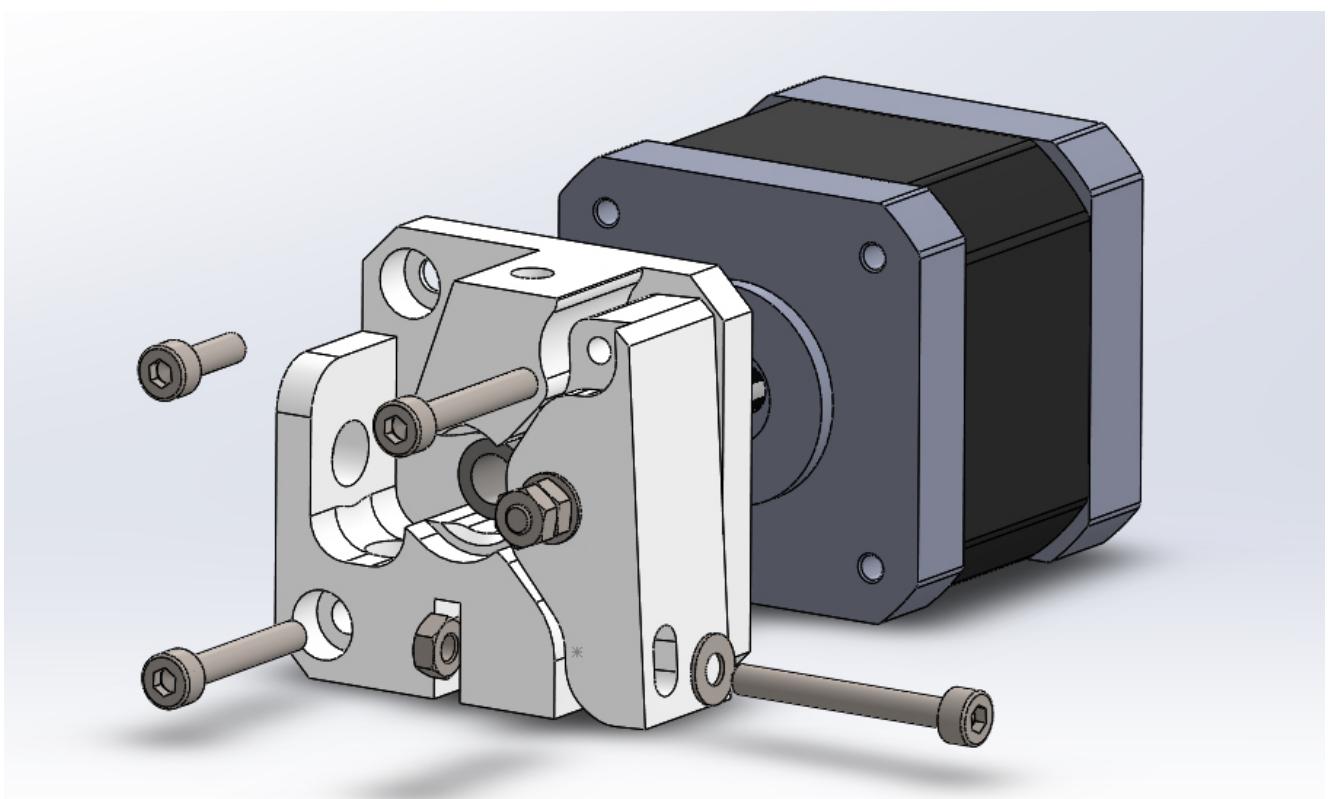


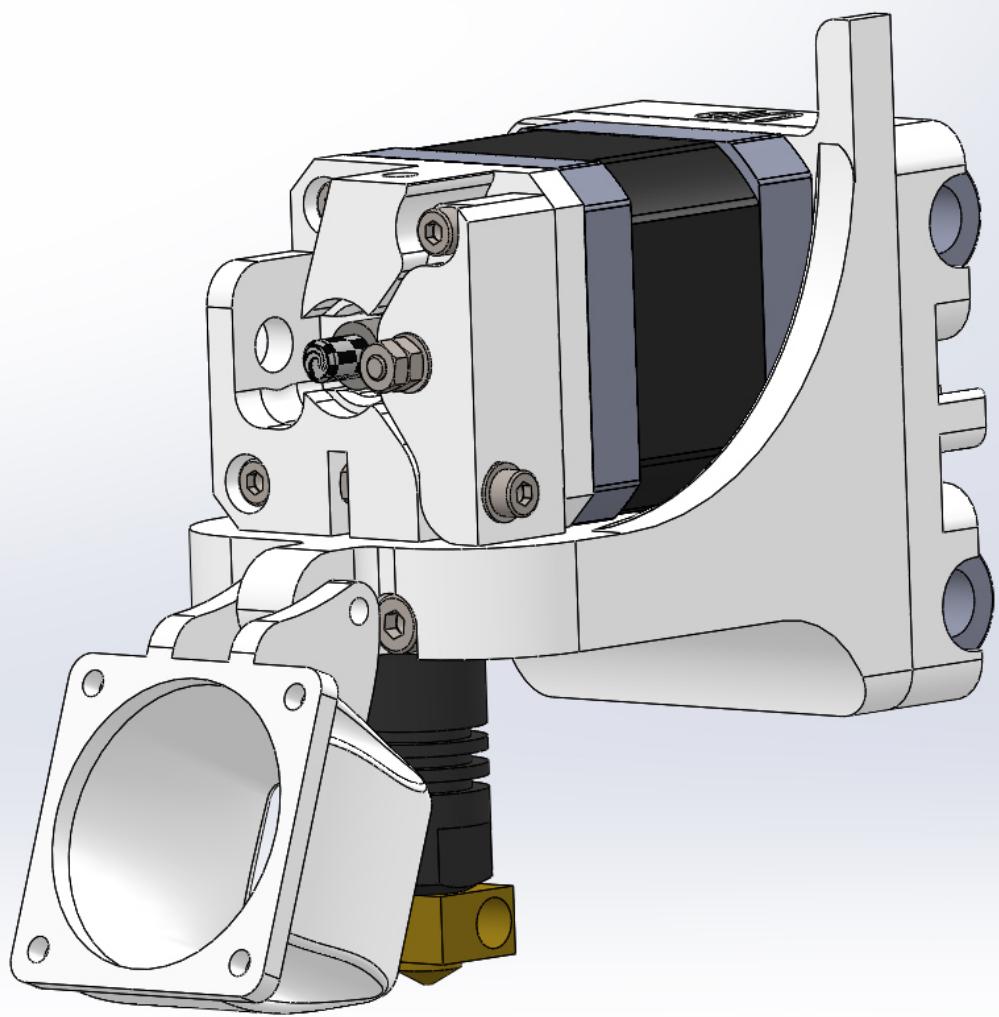
Screw the nozzle into the nozzle holder. Tighten pretty hard by hand. Cut the inline PTFE to about 2.3cm.



Place the inline ptfe into the nozzle holder and tighter very hard using the hollow socket screw. Place the heater and thermistor into the heater block. Fix everything using kapton tape.

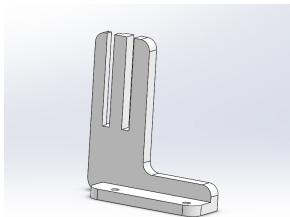


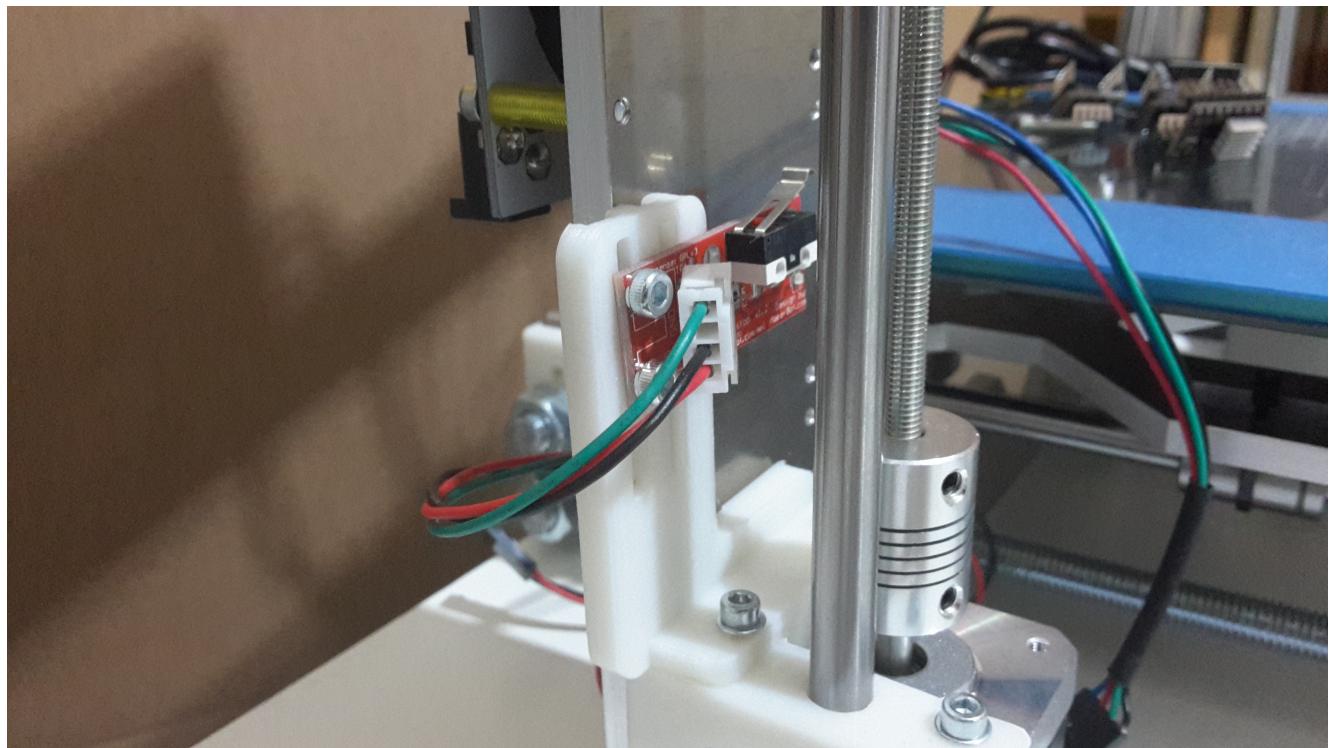
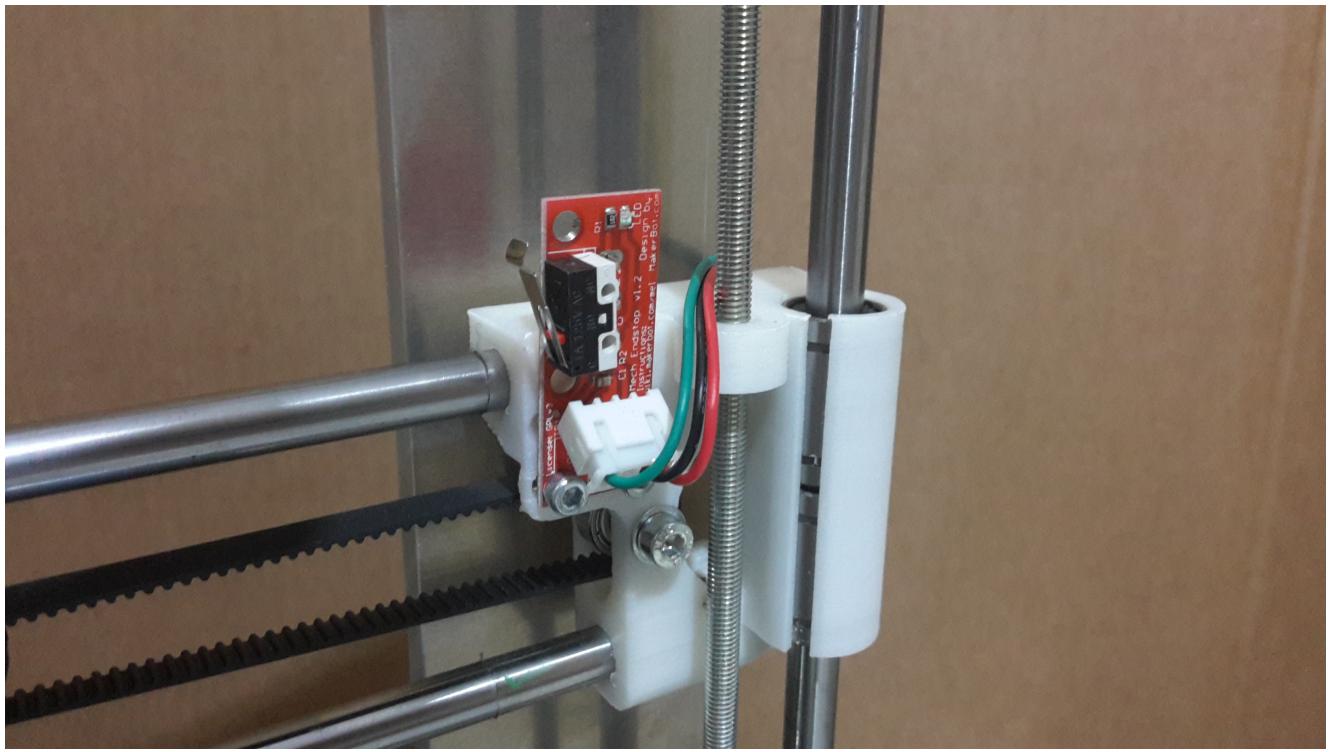


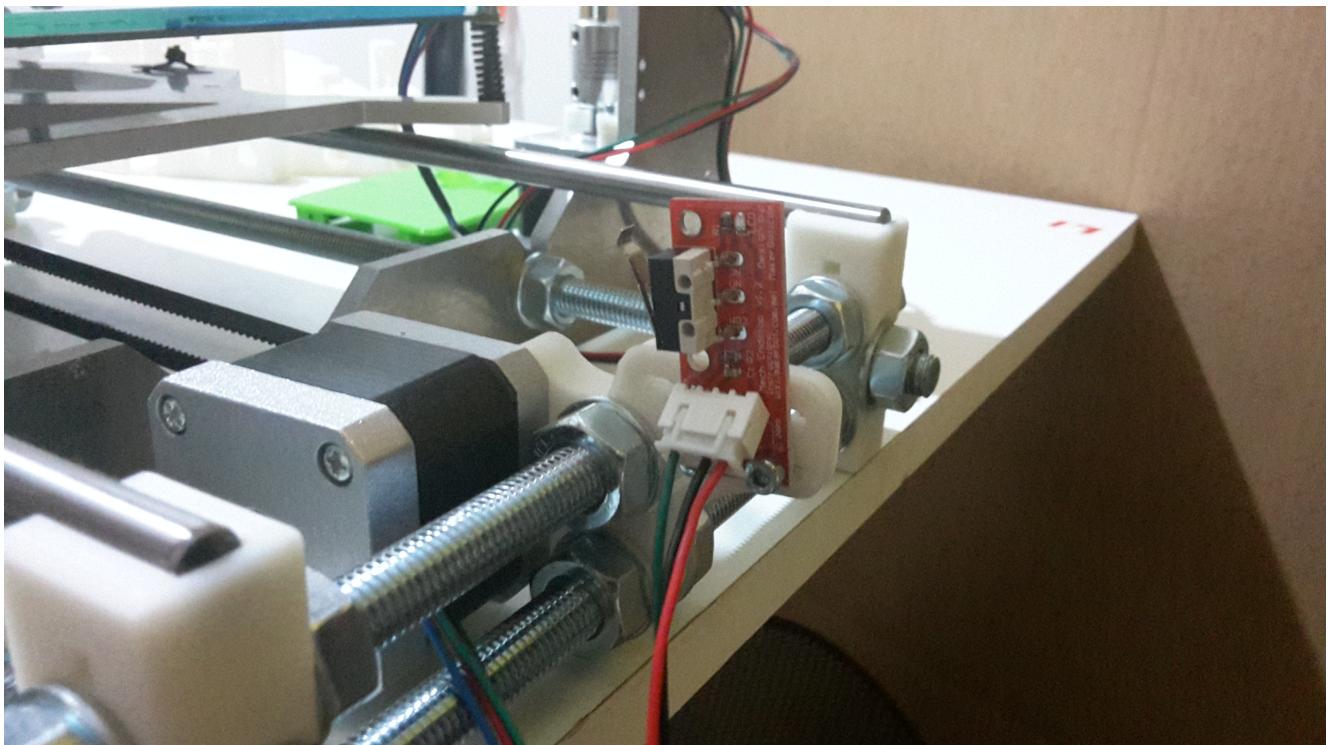




## CONNECTING END STOPS

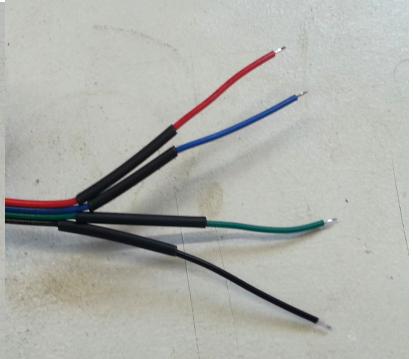
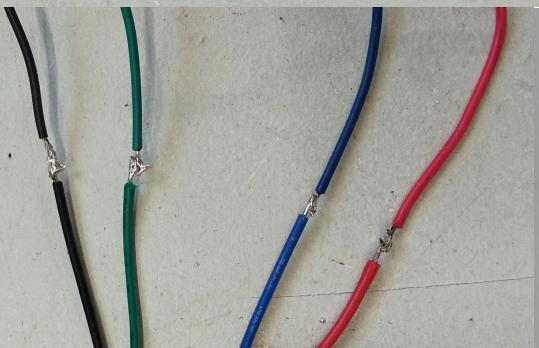
Item	Contents
	End stop holder
	2-wire
	Tie-wrap
	Mechanical end stop







## WIRING THE STEPPER MOTORS

Item	Contents
	4-wire cable, Red Blue Green Black (1m) (5x)
	
	Heatshrink Black 20cm, 1.5mm bore, 0.5mm shrunken (2x)
	
	
	

Put the heatshrink on the wires. Just far enough from the end to avoid shrinking when you are soldering the wires. Solder the wire together, by color. Make sure they are connected properly, you don't want the wire to get loose while the electronics are running. Put the heatshrink over the solder and heat them a bit. You can use a lighter for example, just hold it low enough to not let the wires catch fire.

## WIRING THE ELECTRONICS

