

Prusa i3 Acrylic Box Frame Mechanical Build Document

By 3D Printer Czar

For more information, visit www.3dprinterczar.com

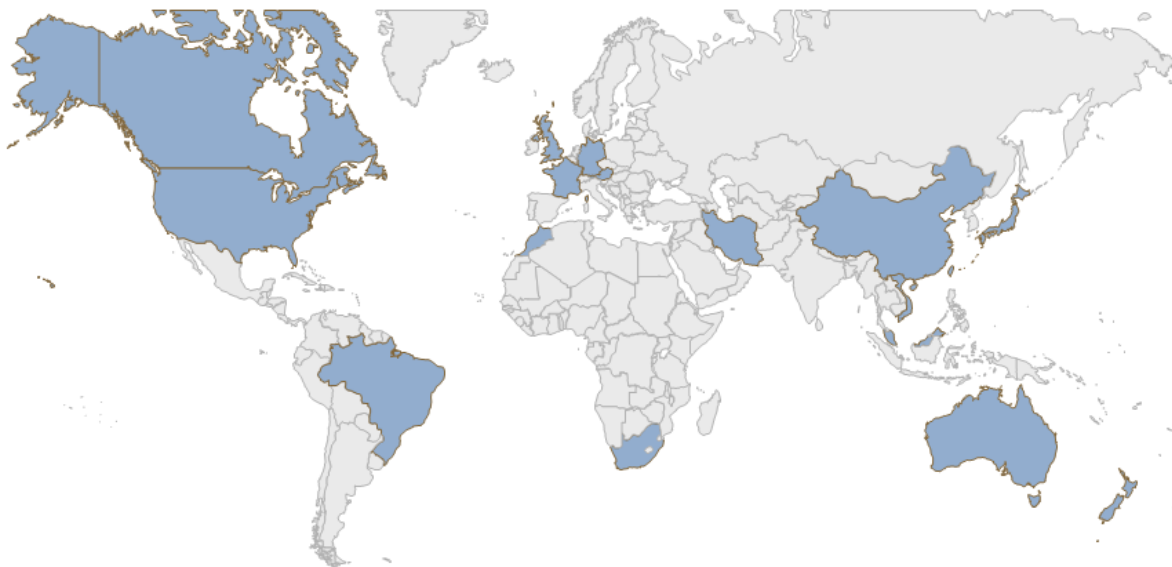
Complete Prusa i3 Acrylic kit for just \$499

<http://3dprinterczar.com/shop/3dprinters/prusa-i3/>

Free DHL express shipping to North America and Europe

Free Hong Kong Post Air shipping to Asia and Oceania

Countries where Czar's Prusa i3s are printing...



Note: data as of February 1st 2014

Table of Content

Identify the Printed Parts----- 3

Build the chassis

 Assemble the port and starboard sides of the chassis----- 4

 Assemble the Y idler-----5

 Assemble the front and back of the chassis----- 6

 The finished chassis-----7

Attach the Y Plate-----9

Build the X-Z axes-----11

Build the X-Z plate-----16

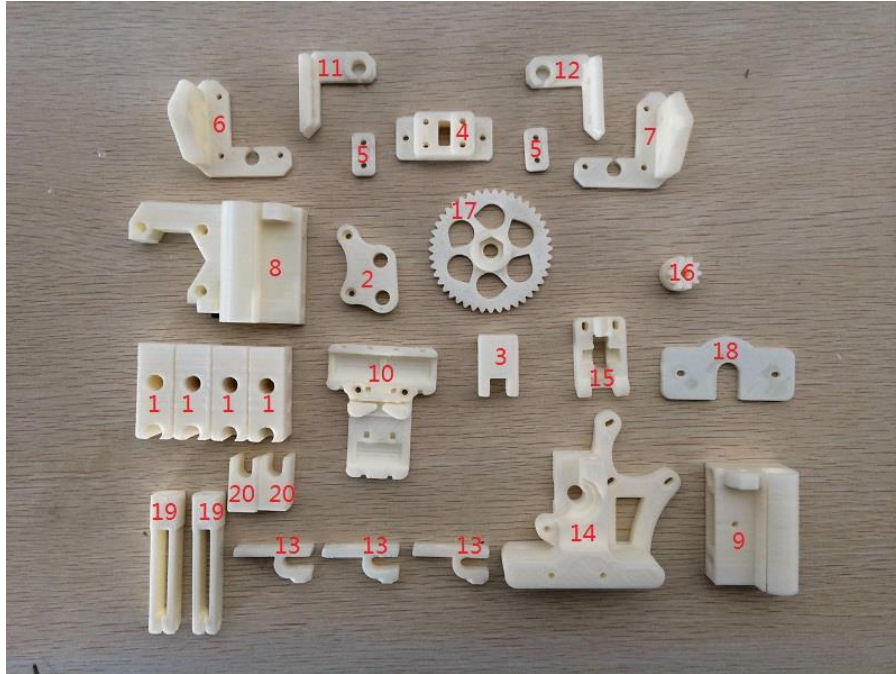
Attach the heatbed-----19

Assemble the extruder-----21

Attach the endstoppers-----24

Attach the filament mount-----27

Identify the Printed Parts



ID Number	Part Name	Number of Parts
1	Chassis corners	4
2	Y motor mount	1
3	Y idler	1
4	Y belt holder assembly	1
5	Y belt holder assembly	2
6	Z left bottom	1
7	Z right bottom	1
8	X motor mount	1
9	X idler	1
10	X carriage	1
11	Z right top	1
12	Z left top	1
13	End stopper mount	3
14	Wade's extruder body	1
15	Wade's extruder idler	1
16	Wade's extruder small gear	1
17	Wade's extruder big gear	1
18	Hotend mounting plate	1
19	Filament mount assembly 1	2
20	Filament mount assembly 2	2

Build the chassis

1. Assemble the port and starboard sides of the chassis

Required parts	Number
printed chassis corners (no. 1)	4
380mm M8 threaded rod	2
350mm 8mm precision rod	2
fender washer	4
LM8UU bearing	3
m8 nut	12
M8 washer	8

1. Hold the printed chassis corners with the semi-circular opening facing upward and inward
2. Put **2 LM8UU** bearings on one 350mm precision rod on the **port side**, and **1 LM8UU** on the **starboard side**.
3. Slide the precision rods into the semi-circular slots of the printed chassis corners. This step might require some force. Make sure the precision rods are meeting the ends of the slot. An optional step is to apply zip ties through the holes on the plastic corners to hold down the precision rods.
4. Slide the 380mm threaded rods through the chassis corners right beneath the precision rods. Put m8 nuts, m8 washer, and m8 fender washers on the threaded rods in the following order:
m8 nut – m8 washer – chassis corner – m8 washer – m8 nut – m8 nut – m8 fender washer – m8 fender washer – m8 nut – m8 nut- m8 washer – chassis corner – m8 washer – m8 nut (see pictures below for a visual illustration)
5. Tighten the nuts



Note: the top assembly is on the port side, and the bottom assembly goes to the starboard side.

2. Assemble the Y idler

Required parts	Number
623ZZ bearing	2
Printed Y idler (ID no. 3)	1
M3-25 screw	1
M3 nut	1

1. Put the M3-25 screw thru the printed Y idler piece, with two 623ZZ bearings in between. Lock the other end of a M3 nut.



3. Assemble the front and back of the chassis

Required parts	Number
205mm M8 threaded rod	3
310mm M8 threaded rod	1
Printed Y motor mount (no. 2)	1
Assembled Y idler	1
M8 nut	26
M8 washer	22
M8 fender washer	4

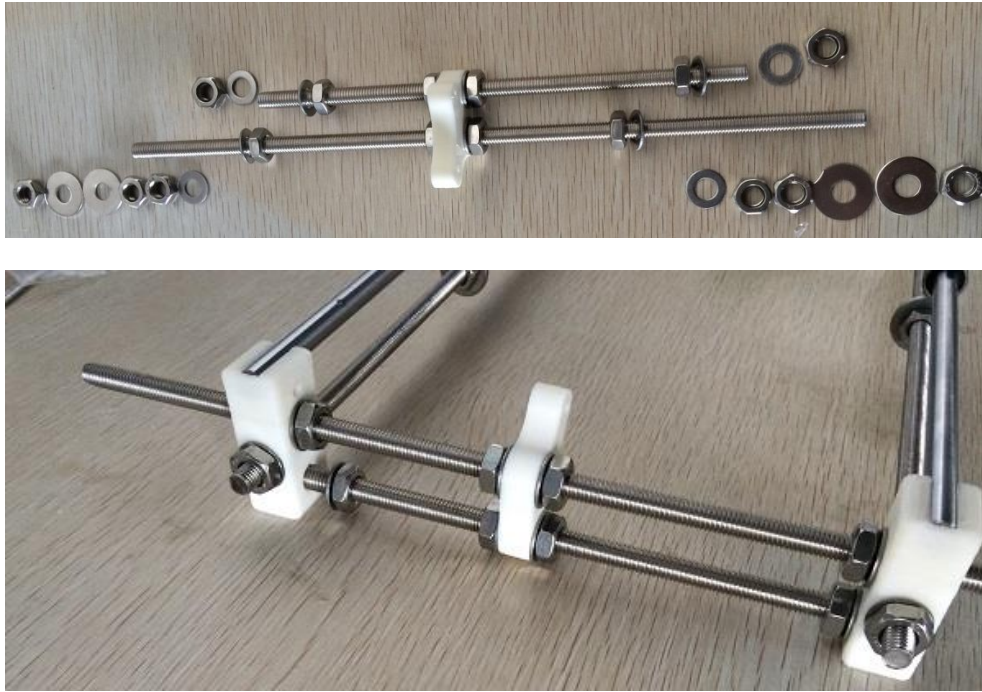
Note: the easier way to put on these nuts and washers is to put one the inside ones first, then sandwich the rod between two chassis corners, and then put on the outside nuts and washers.

1. Put m8 nuts, washers, and assembled Y idler on a 205mm m8 threaded rod. Slide this rod thru the top holes of the front chassis corners. The order is: **nut – washer – chassis corner – washer – nut – nut – washer – assembled Y idler – washer – nut – nut – washer – chassis corner – washer – nut**. Do not tighten yet.
2. Repeat the previous step without the Y idler, and fix the rod on the bottom holes of the chassis corner. The order is: **nut – washer – chassis corner – washer – nut – nut – washer – chassis corner – washer – nut**. Do not tighten yet.



Pictures for step 1 and 2

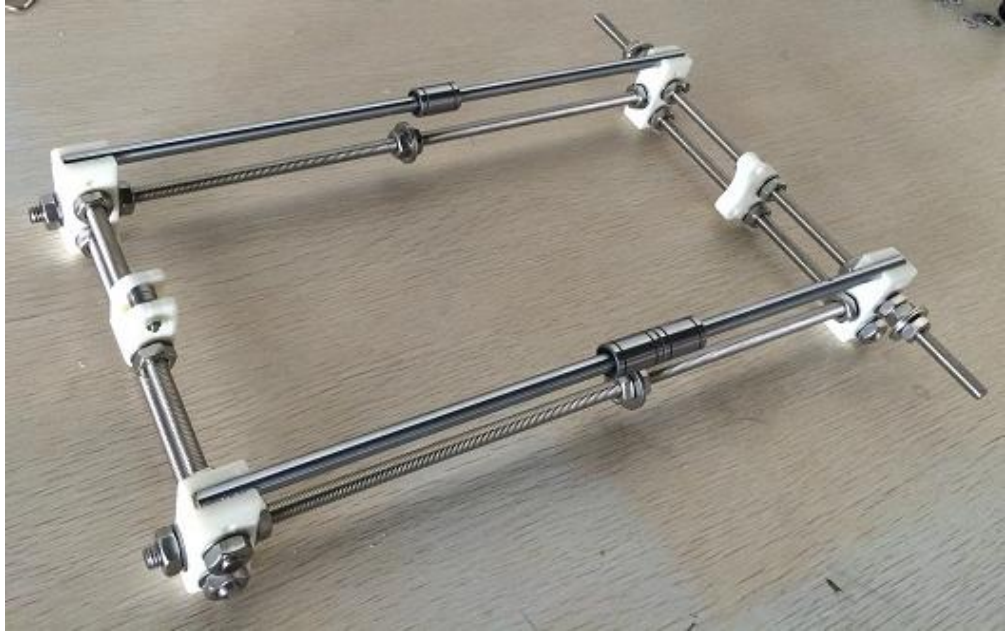
3. Put the 310mm and 205mm rods through the printed Y motor mount, with orientation shown in the picture above. The 310mm should be going through the top holes in the chassis corners. The order of washers and nuts on the 310mm rod is: **nut – fender washer – fender washer – nut – nut – washer – chassis corner – washer – nut – nut – washer – Y motor mount – washer – nut – nut – washer – chassis corner – washer – nut – nut – fender washer – fender washer – nut**. The order of nuts and washers on the 205mm rod is: **nut – washer – chassis corner – washer – nut – nut – washer – Y motor mount – washer – nut – nut – washer – chassis corner – washer – nut**. Do not tighten yet.
4. Align the rods and tighten all nuts so the chassis will not fall apart. You might need to adjust the chassis later when mounting the Y plate.



Pictures for step 3 and 4

4. Finished Chassis

Congratulations, now you have the chassis made. It should look like what's in the picture below.



Attach the Y Plate

Required parts	Number
Acrylic bed	1
M3-16 screw	6
M3 nut	6
Y belt holder assembly 1 (no.4)	1
Y belt holder assembly 2(no. 5)	2
M3-10 screw	2
Zip ties	3
GT-2 timing belt	~70cm
Nema-17 motor	1
GT-2 20 teeth pulley	1

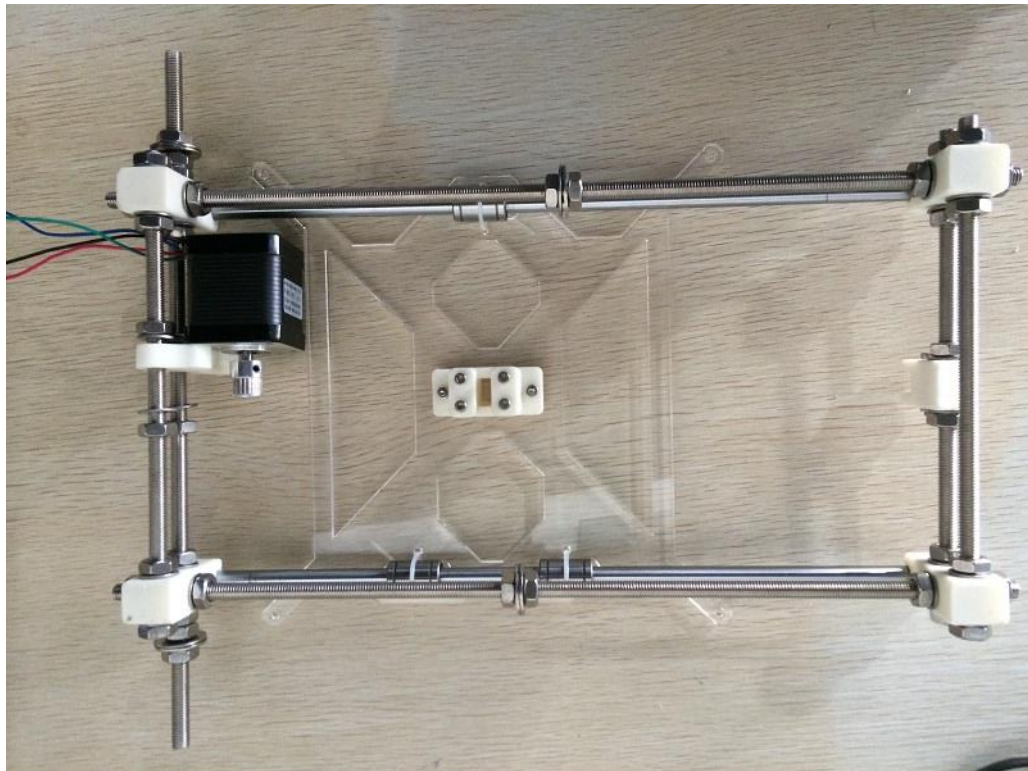
1. Insert four M3 nuts into the hexagonal slots in the Y belt holder assembly 1.



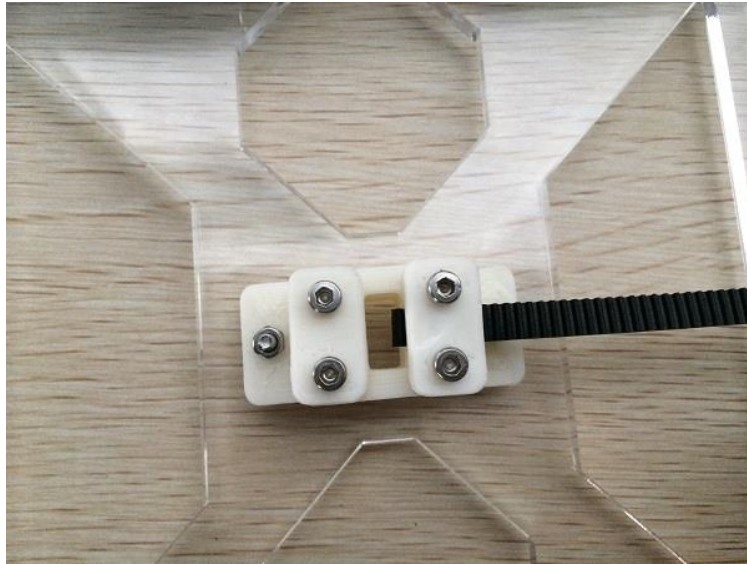
2. Loosely attach the two rectangular pieces to the main piece using four m3-16 screws. Make sure the flat surface is facing outward.



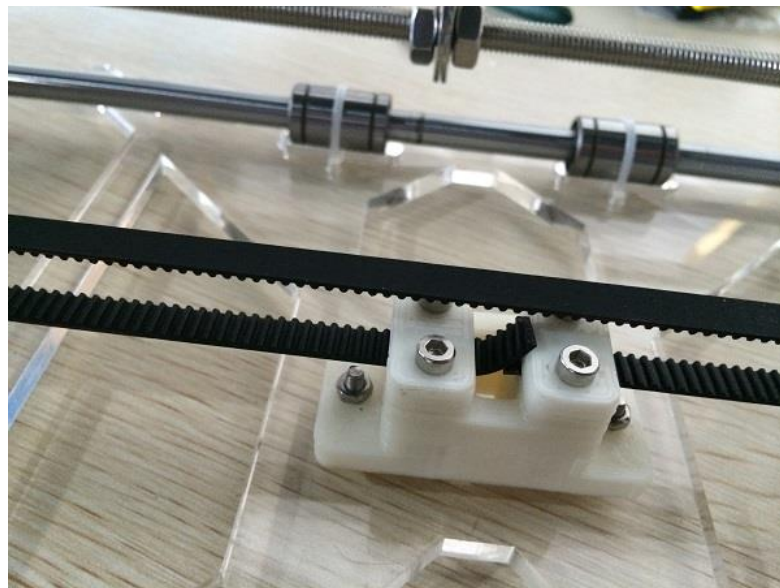
3. Attach the acrylic Y bed to the chassis using 3 zip ties. Make sure the bed slide freely on the chassis. Also attach a Nema 17 motor to the Y motor holder using two M3-10 screws, and attach a GT2 20 teeth pulley on the motor's shaft.



4. Attach the Y belt assembly to the acrylic bed using two m3-16 screws and two m3 nuts. Take 70cm of GT2 timing belt and insert one end into the Y belt holder. Tighten the two m3-16 screws to hold down the belt.



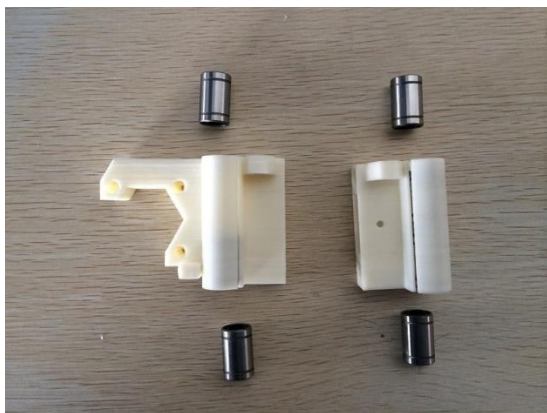
5. Wrap the GT2 timing belt around the Y motor's aluminum pulley, and around the 623zz bearings. Insert the other end of the GT2 timing belt into the Y belt holder and tighten the m3-16 screws. The belt should be tight with tension. As the bed moves on the chasis, there should be no skipping.



Build the X-Z axes

Required parts	Number
Printed x idler (no. 9)	1
Printed x motor holder (no.8)	1
Printed x carriage (no. 10)	1
370mm 8mm precision rod	2
LM8UU bearings	7
M5 nut	2
Zip ties	8
Nema-17 motor	1
GT20 20 teeth pulley	1
M3-16 screw	3
GT-2 20 teeth pulley	1
GT-2 timing belt	90cm
M3-20 screw	1
623zz bearing	2
M3 nut	1
300mm M5 threaded rod	2
320mm 8mm precision rod	2

1. Insert two LM8UU bearings into the x idler and the x motor holder. A little force is required to push the bearings in.



2. Insert the M5 nuts into the hexagonal slots on the X idler and the X motor holder. These two nuts must be tightly situated in the slots for proper z movement. If you find the two nuts falling out of place during z movement, heat the nuts on fire (do this carefully, of course) and insert hot M5 nuts into the hexagonal slots. The heat will melt the ABS a bit and provide a tight fit.



3. Use the M3-20 screw and nut to attach two 623zz bearing to the X idler.



4. Attach the two 300mm M5 threaded rod through the M5 nuts.



5. Attach the two 370mm 8mm precision rods with three LM8UU bearings.



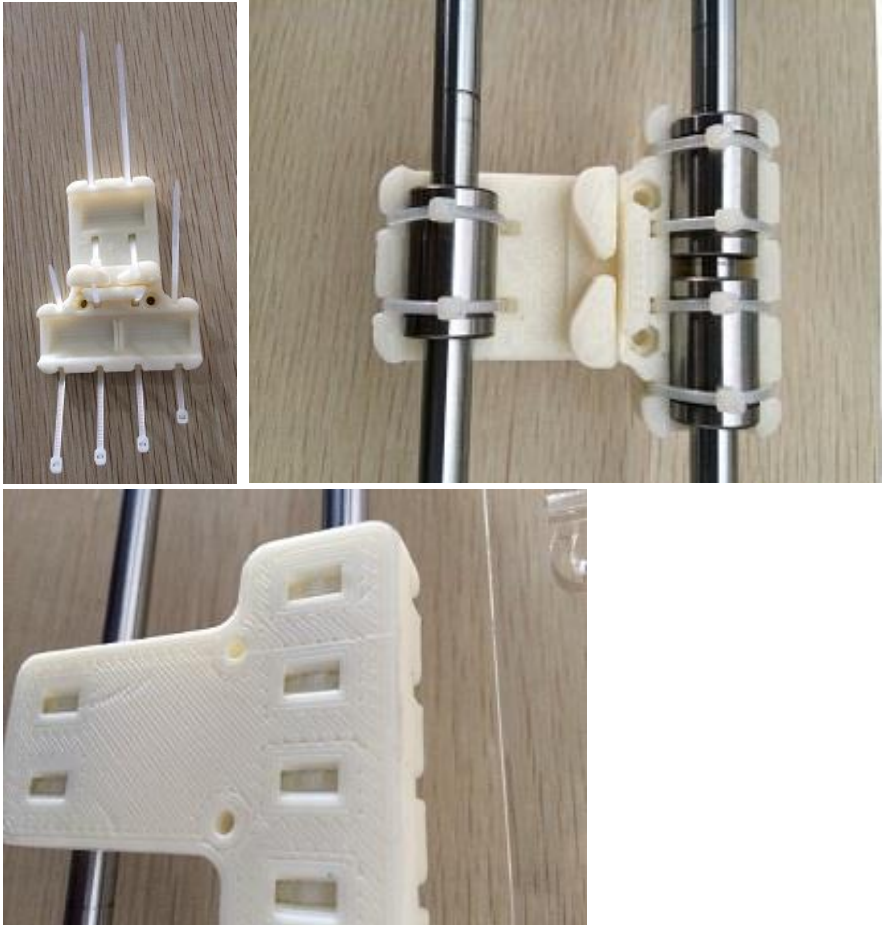
6. Attach the two 320mm 8mm precision rods through the LM8UU bearings.



7. Attach the Nema 17 motor to the printed X motor holder using three M3-16 screws. Attach a GT20 aluminum pulley to the motor's shaft.



8. Attach the X carriage to the x axis using 6 zip ties. The X carriage should sit tightly on the LM8UU bearings.



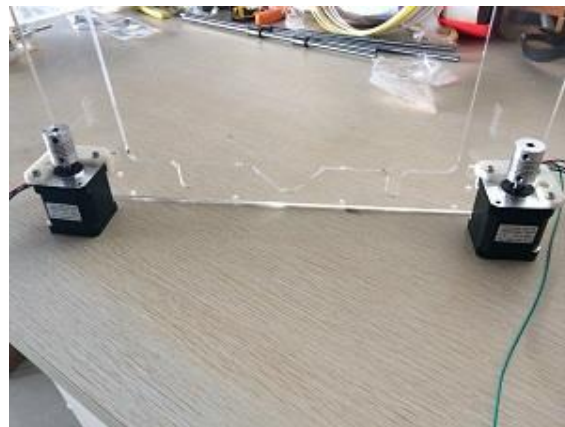
9. Wrap the GT20 timing belt around the X motor and the 623zz bearings. Tie both ends to the X carriage using zip ties. Make sure the belt is tight and there is no skipping when the carriage moves.



Build the X-Z plate

Required parts	Number
Acrylic main frame	1
Acrylic side panels	2
Nema 17 motor	2
Z left top (no. 12)	1
Z right top (no. 11)	1
Z left bottom (no. 6)	1
Z right bottom (no. 7)	1
M3-16 screw	10
M3 nut	16
M3-10 screw	6
Motor coupler	2
M3-25	6

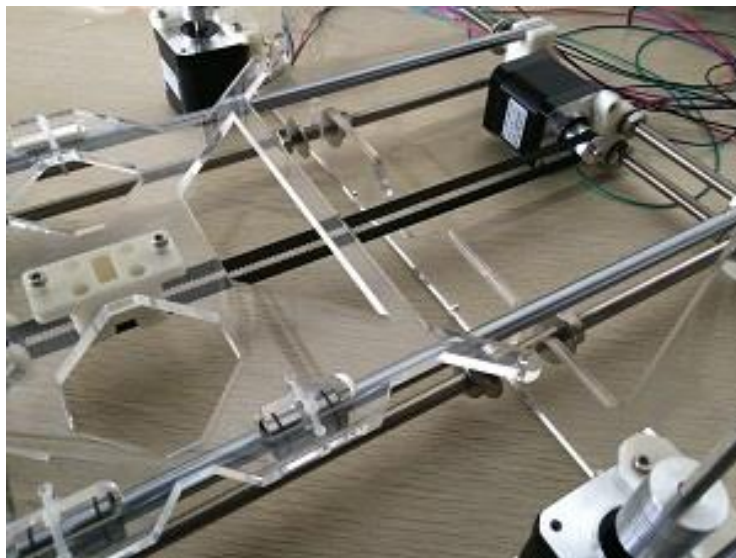
1. Attach the z left bottom and z right bottom pieces to the acrylic plate with three m3-16 screws each. Then attach two Nema 17 motors to the z left and z right pieces with three m3-19 screws each. Attach a motor coupler to each motor. Make sure the wires from the Nema 17 motors go through the bottom openings on the acrylic plate. Do not attach the top z pieces yet.



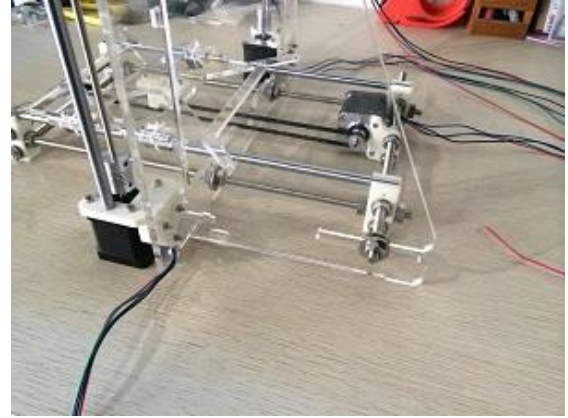
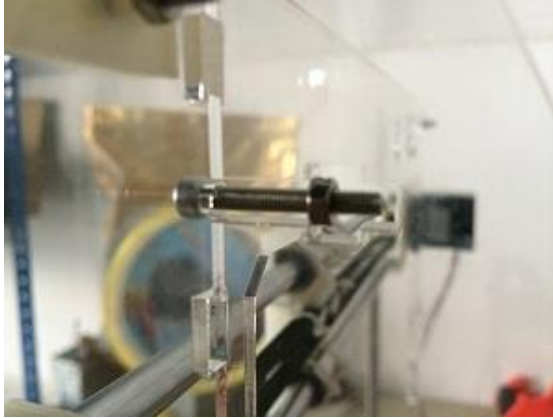
2. Attach the X-Z system assembled in the previous section to the Z plate. The precision rods of the X-Z system should fit into the circular openings on the z bottom pieces. The precision rods then sit right on top of the z motors (you might need to gently hammer the rods for them to go all the way in). The threaded rods should fit into the motor coupler. Slide the X printed pieces on the precision rods to make this fit happen.
3. Attach the z top pieces to the acrylic plate with two m3-16 screws and nuts on each side.



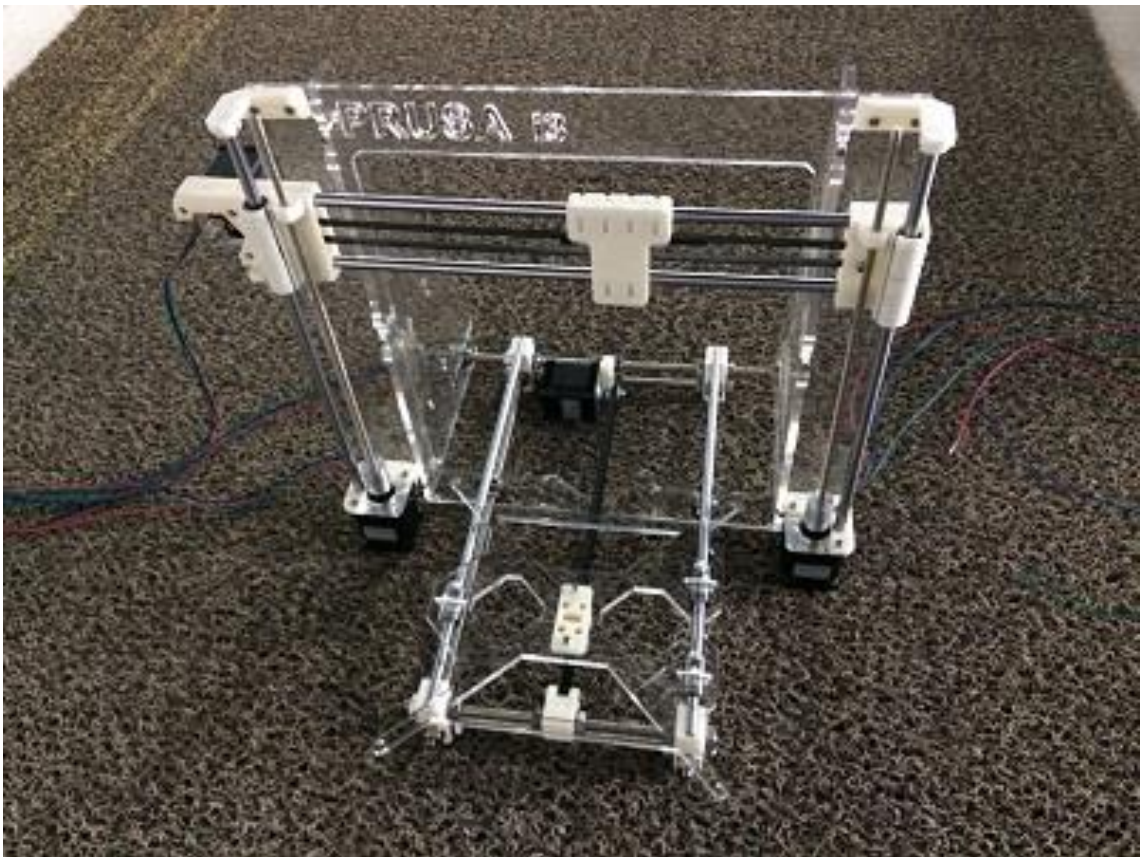
4. Attach the finished XZ plate to the chassis. The XZ plate should be sitting between the two fender washers on the chassis. Do not tighten the nuts yet.



5. Attach the side panels to the main acrylic frame using three M3-25 and three M3 nuts on each side (first picture). Place the side panel with holes on the starboard side (the side with X motor). Place the bottom slot of the side panel between the fender washers on the longer rear threaded rod (second picture).



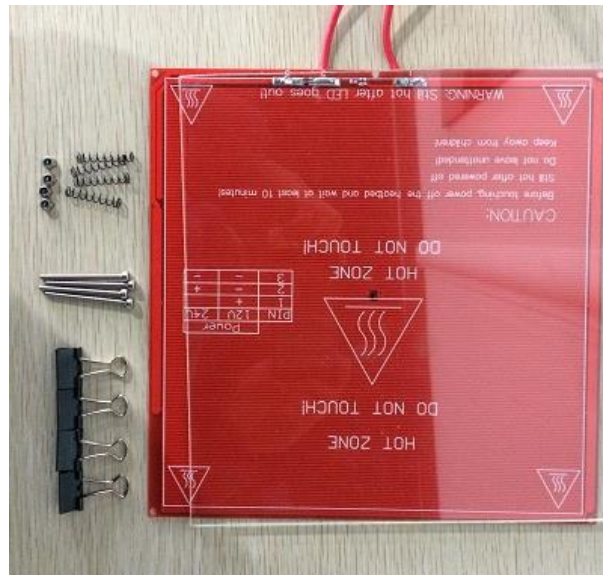
You should have your Prusa i3 looking like the one shown below. Tighten all nuts to have a sturdy frame.



Attach the heatbed

Required parts	Number
MK2A heatbed	1
Borosilicate glass	1
Spring	4
M3 locking nut	4
Paper clip	4
M3-30 screws	4

1. Attach the borosilicate glass to the MK2A heatbed with paper clips



2. Attach the heatbed to the acrylic bed using m3-25 screws, springs, and m3 locking nuts. The order is: m3-25 screw – heatbed – spring- acrylic bed – m3 locking nut. Repeat this for all four corners.



Assemble the Wade's Extruder

Required parts	Number
Printed extruder main body(no.14)	1
Printed extruder idler (no. 15)	1
Printed big gear (no. 16)	1
Printed small gear (no. 17)	1
Printed mounting plate (no. 18)	1
608zz bearing	3
M3-40 screw	2
M3-50 screw	2
M8 hobbed bolt	1
M8 locking nut	1
M3 nut	8
M3-25 screw	2
M3 thumb screw	1
M3-30 screw	1
M8 washer	5
Nema 17 motor	1
M8 threaded rod 2cm	1

1. Attach one 608zz bearing to the idler using the M8 2cm threaded rod. To insert the rod, you need to give it a gentle push, which could be accomplished with a pair of pliers.



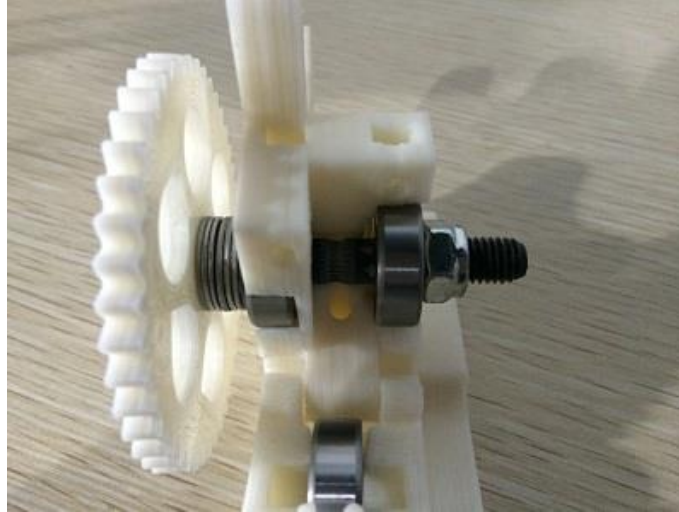
2. Insert the M8 hobbed bolt to the big bear.



3. Attach two 608zz bearings to the extruder's main body.



4. Attached the big gear with hobbed bolt to the extruder's main body. Insert M8 washers to make the teeth on the hobbed bolt right above the filament opening. Lock the M8 hobbed bolt on the other side with a M8 locking nut. Attach the idler to the main body using M3-30 screw and M3 nut.



5. Insert one M3 nut into the small gear. Put the small gear on the motor's shaft, and lock with a M3 thumbscrew (take one of the x motor's aluminum pulley, and make sure the other thumbscrew on the pulley sit directly on the flat side of the motor's shaft). Attach the motor to the extruder's main body using 3 M3-10 screws.



6. Attach the finished extruder assembly to the X carriage using two M3-50 screws. Insert two M3 nuts on the back of the X carriage.



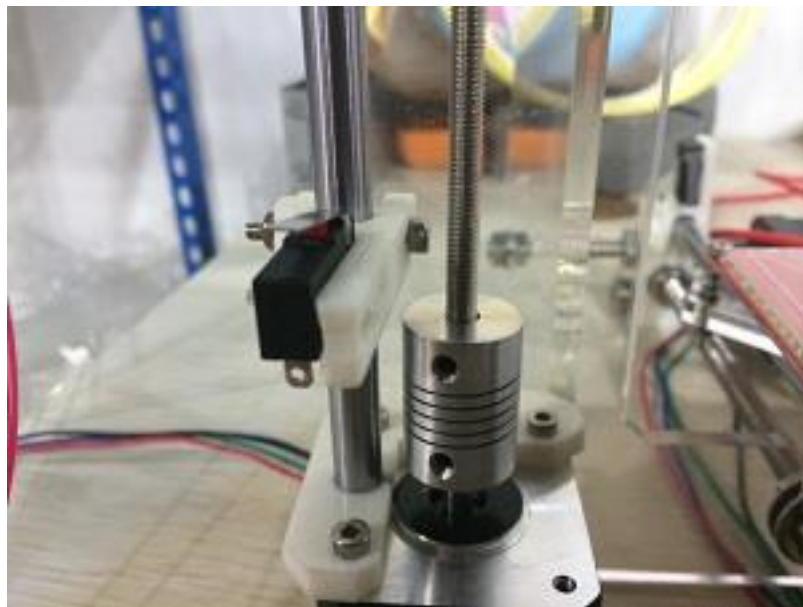
7. If you are using the J-head or a compatible hotend, use the printed mounting plate (no. 18) and two M3-16 screws and two M3 nuts to mount the hotend.

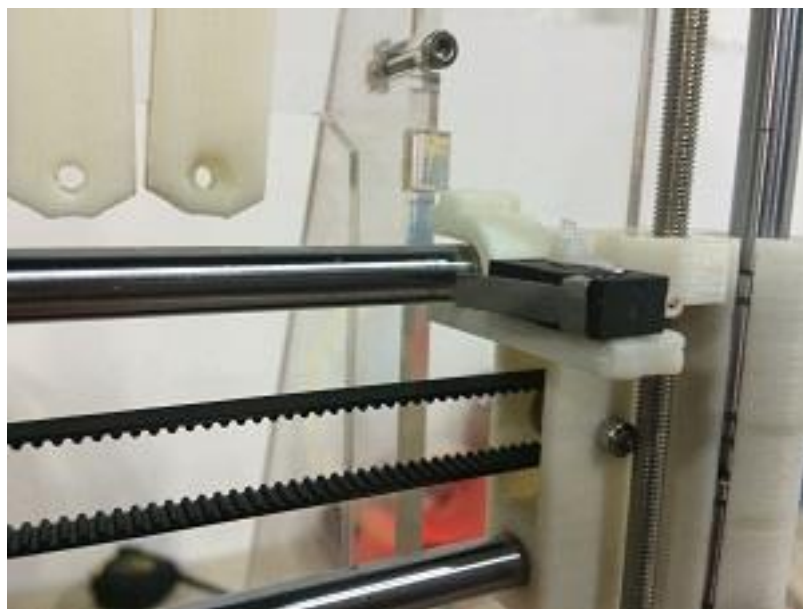
Attach the End Stoppers

Required parts	Number
Printed end stopper mount (no. 13)	3
End stopper	3
Zip ties	3(6)
M3-25 screw (Optional)	3
M3 nut (Optional)	3



1. Attach the end stoppers to the end stopper mounts using zip ties. Wrap zip-ties around the two holes on the end stopper mount and the two holes on the end stopper.
2. Attach the end stopper mounts to the starboard side of the Z precision rod, to the x precision rod near the X idler, and to the starboard side of the Y precision rod towards the back. **Tighten each end stopper with a M3-25 screw and a M3 nut. If you find this hard to achieve, simply use zip ties to attach the endstopper holder to the 8mm precision rods.**

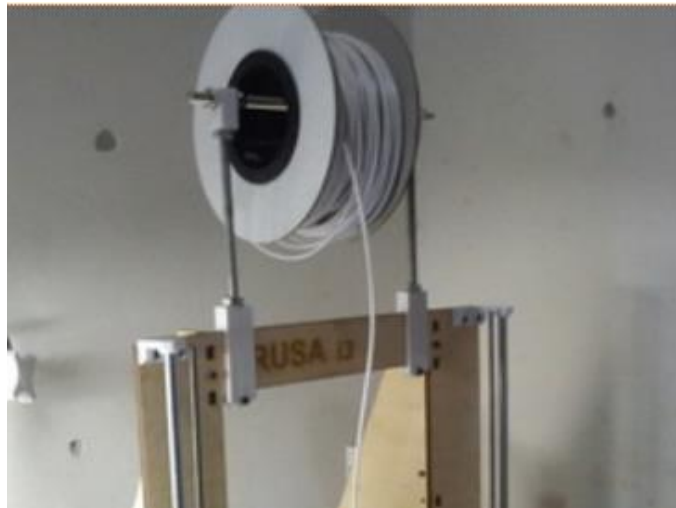




Attach the filament mount

Note: the acrylic frame is not designed to withstand the force of a heavy filament sitting on top. We do not recommend installing this stand. If you really would like to experiemnt, refer to the following picture and buy threaded rods yourself.

Required parts	Number
Filament mount assembly 1	2
Filament mount assembly 2	2
M8 nut	12
M8 washer	12
M8 threaded rod	3



Congratulations, now you have your Prusa i3's mechanical frame fully built!