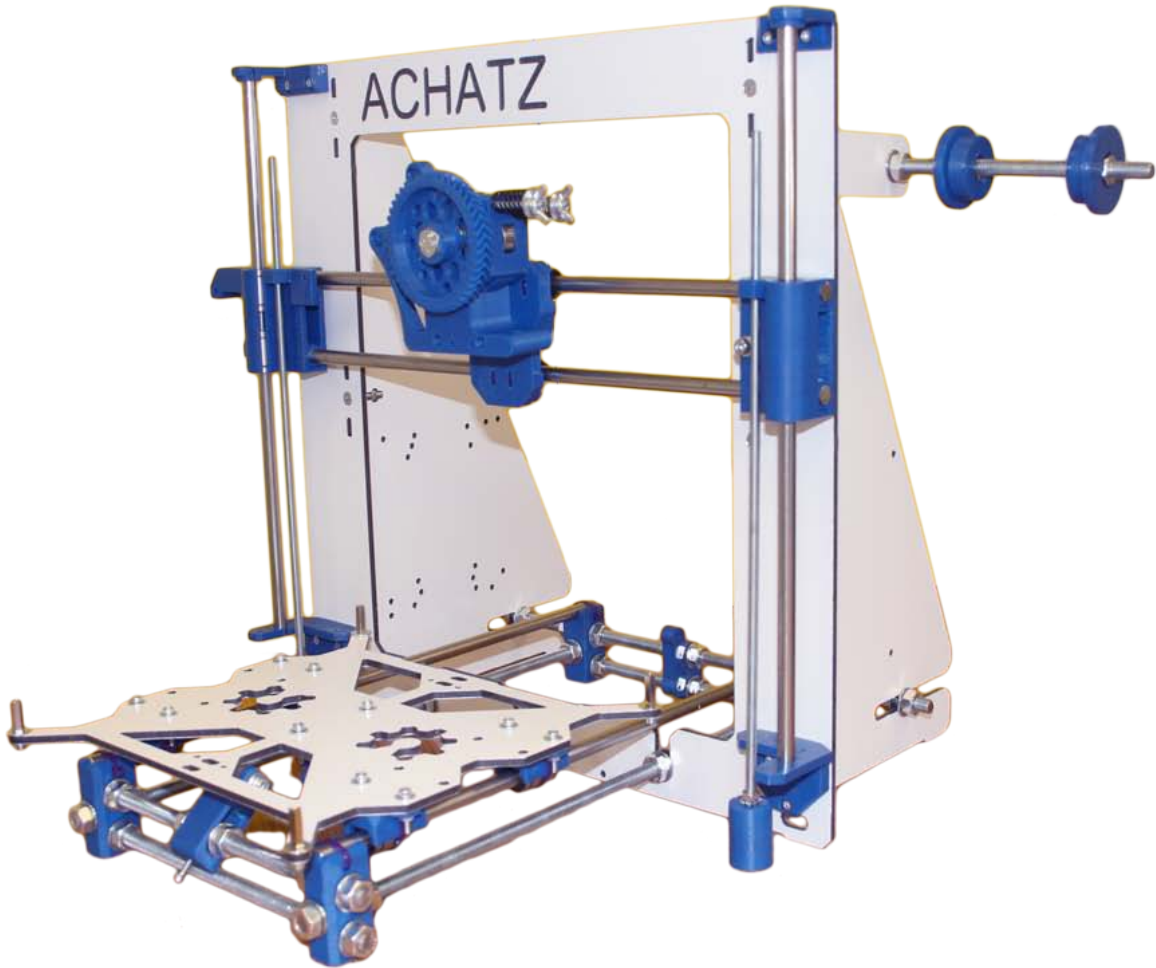


ACHATZ
Industries

Prusa i3 Achatz Edition



Build Manual Frame Kit

ReprapUniverse.com Join the 3D Printing Revolution

Publications

Introduction

Purpose:

This Build Manual provides a step-by-step guide needed to construct a Reprap Prusa i3 Achatz Edition Frame Kit

Publisher:

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Author of this Document:

Richard Achatz (richard.achatz@me.com)

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Changelog

V1 – 28th December 2013




- Initial Version

In case of issues with this document, suggestions or comments contact
the author: richard.achatz@me.com

List of Materials

Printed Parts


X Carriage	Y Belt Holder	Z Coupler	Z-Axis Top Left	Z-Axis Top Right	Z-Axis Bottom Left	Z-Axis Bottom Right	Y Idler	Endstop Holder Small	Y Bushing	Y Motor
										
1x	1x	2x	1x	1x	1x	1x	1x	5x	4x	1x

Y Corner	X End Idler	X End Motor
		
4x	1x	1x

Extruder

Extruder Block	Wade Big Gear	Wade Small Gear	Gidler
			
1x	1x	1x	1x




Spool Holder

Improved Spool Circle

2x









List of Materials

Non-Printed Parts














Prusa i3 Achatz Edition Dibond Aluminum Frame














Main Frame + 2 Side Panels	Heated bed Mount	Spool Holder Connection Plate
		
1x	1x	1x

Threaded Rods & Smooth Rods

Threaded Rod M5 x 300mm	Threaded Rod M8 x 150mm	Threaded Rod M8 x 205mm	Threaded Rod M8 x 320mm	Threaded Rod M8 x 380mm	Smooth Rod 8mm x 320mm	Smooth Rod 8mm x 360mm	Smooth Rod 8mm x 370mm
							
2x	1x	3x	1	2x	2x	2x	2x

Hardware

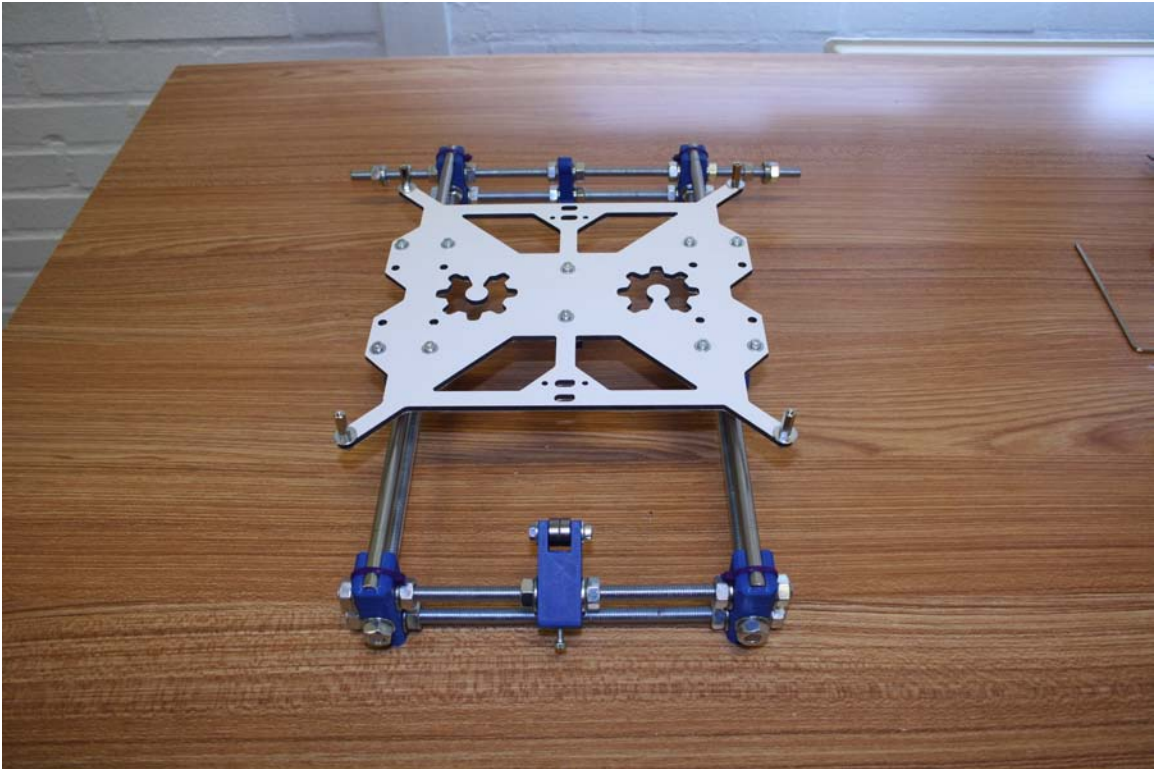
M3 Nut	M3 Washer (S)	M3 Washer (L)	M3 Set Screw	M3 Wing Nut	M3 x 10 Bolt	M3 x 16 Bolt	M3 x 25 Bolt	M3 x 35 Bolt	M3 Grub Screw 70 mm	M4 Nut	M4 Washer (S)	M4 Washer (L)
												
26x	10x	24x	1x	2x	4x	21x	1x	2x	2x	10x	4x	8x

M4 x 20 Bolt	M4 x 25 Bolt	M4 x 25 Flat Head Bolt	M5 Nut	M5 Washer (S)	M5 Washer (L)	M5 Washer (Special)	M5x16 Bolt	M8 Nut	M8 Washer	M8 Grub Screw 20 mm	Spacer DI 15 mm	Compression Spring
												
2x	2x	6x	6x	4x	2x	2x	2x	43x	43x	1x	4x	2x

Hobbed Bolt	Tie-Wraps	Ball Bearing Small	LM8UU Bearing	Ball Bearing Large	Ball Bearing Small
					
1x	14x	3x	11x	5x	4x

Step 1


Y-axis Assembly








1

Vertical Sides / Collecting all Parts



Printed Parts	
Y Corner	
	
4x	

Non-Printed Parts				
Threaded Rod M8x 380 mm	Smooth Rod 8mm x 360 mm	LM8UU Bearing	M8 Nut	M8 Washer
				
2x	2x	4x	12x	12x

1-1

Assemble Vertical Sides





Take two 380 mm Threaded Rods. Place a M8 Nut, two M8 Washers, and another M8 Nut in the middle of each Threaded Rod. Fix the Threaded Rods to the Y corners with another Nut and Washer (hand-tight) on either side. Slide two LM8UU Bearings onto the two 360 mm Smooth Rods. Push the Smooth Rods carefully on top of the Y corners.







Note: If the Threaded Rods don't slide easily through the Y corners, use an 8 mm drill to widen the gap. Be extremely careful not to crush the plastic parts.






2

Horizontal Sides / Collecting all Parts



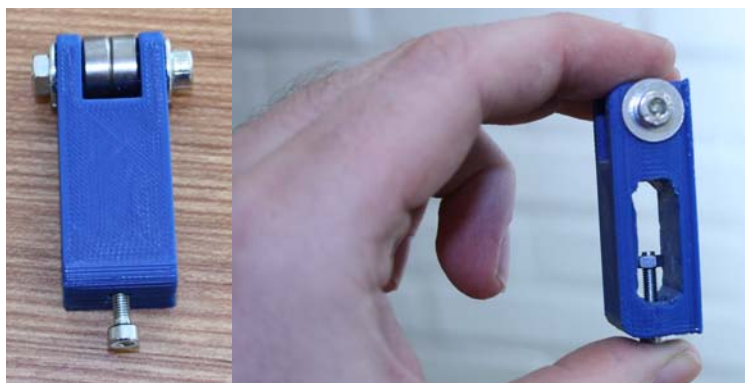
Printed Parts	
Y Motor	Y Idler
	
1x	1x

Non-Printed Parts					
Threaded Rod M8 x 205 mm	Threaded Rod M8 x 320 mm	M3 Nut	M3x16 Bolt	M4 Nut	M4 Washer (L)
					
3x	1x	1x	1x	1x	2x

M4x25 Bolt	M8 Nut	M8 Washer	Ball Bearing Small	Tie Wraps
				
1x	26x	26x	2x	4x

2-1

Assemble Y Idler



Slide an M4x25 Bolt & M4 (L) Washer through the side of the Y Idler, put two small Ball Bearings in the middle. Fix the Bolt with a Washer and Nut. Slide an M3x16 Bolt through the top of the Y Idler. Put a M3 Nut on the end of the Bolt.

2-2

Assemble Horizontal Sides



Slide a 205 & 320 mm Threaded Rod through the Y Motor mount and one 205 mm Threaded Rod through the Y Idler. Fix the Y Motor and Y Idler in the middle with an M8 Washer and Nut on either side. Take another 205 mm Threaded Rod. Thread a Nut and Washer on all ends of all four Rods (as pictured).

2-3

Connect Horizontal / Vertical Sides

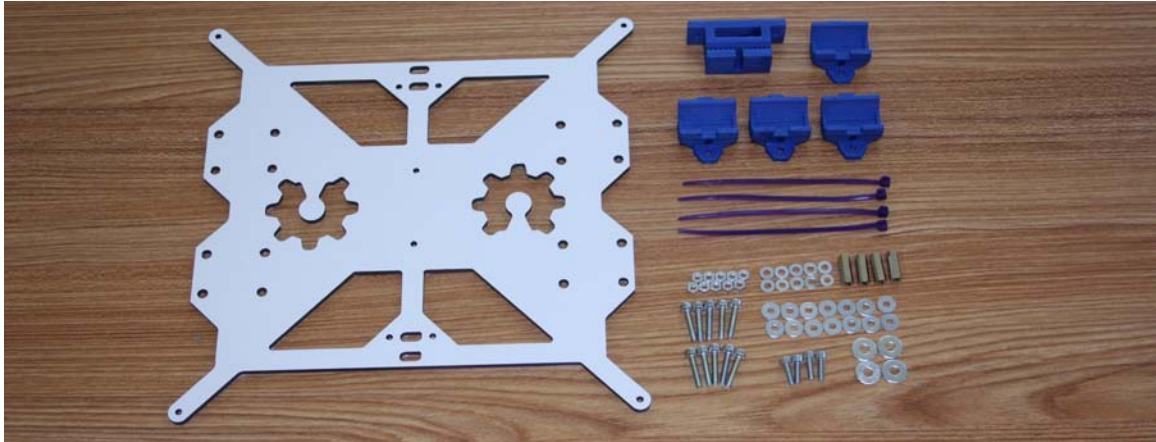




Slide all the ends through the Y corners of the vertical sides. Fix them with a Washer and a Nut (hand-tight). Fasten the Smooth Rods with Tie-wraps. On the ends of the 320 mm Rod, thread a Nut, two Washers and end with a Nut again.

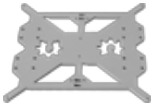




Note: Do not tighten the outer Nuts with a wrench yet. We need some flexibility for the next steps.





3

Y-carriage / Collecting all Parts



Printed Parts	
Y Belt Holder	Y Bushing
	
1x	4x

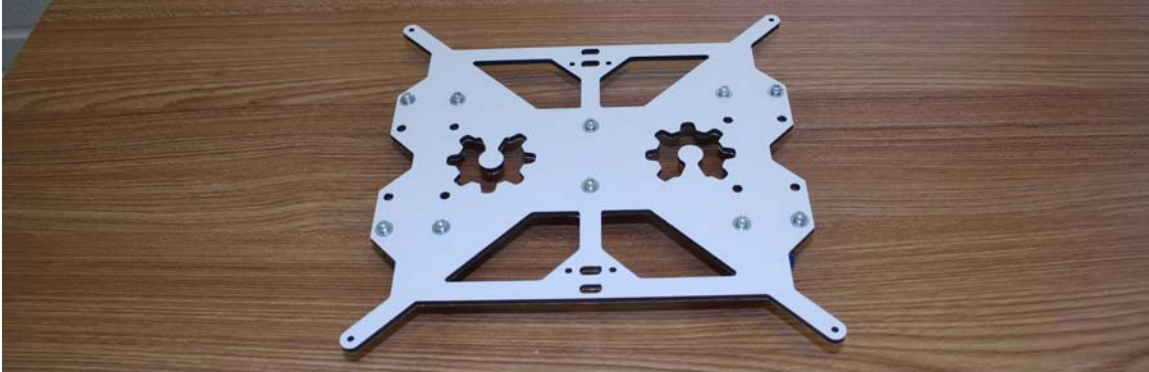
Non-Printed Parts				
Prusa i3 Achatz Edition Heated bed Mount	M3 Nut	M3 Washer (S)	M3 Washer (L)	M3x10 Bolt
				
1x	10x	10x	14x	4x

M3x16 Bolt	M4 Washer (L)	Spacer DI 15 mm	Tie-wraps
			
10x	4x	4x	4x

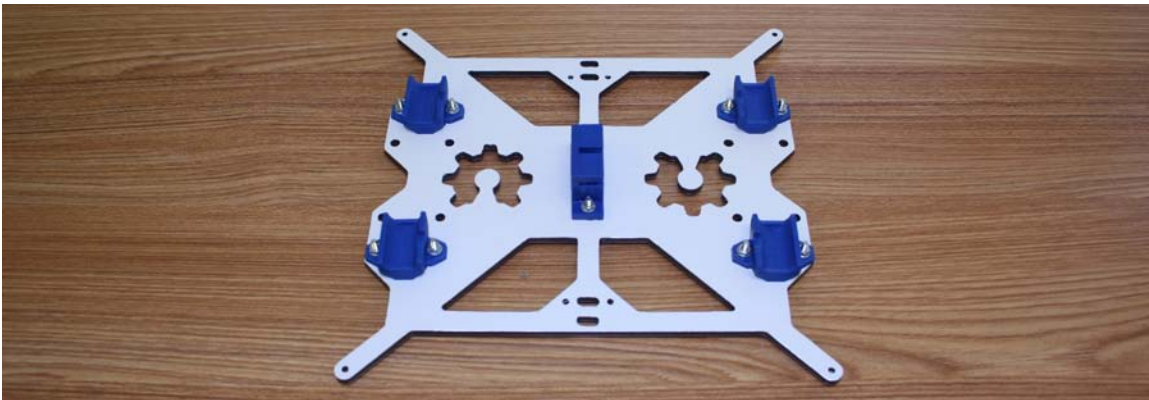
3-1

Assemble Y-carriage

Y-carriage Front View



Y-carriage Back view

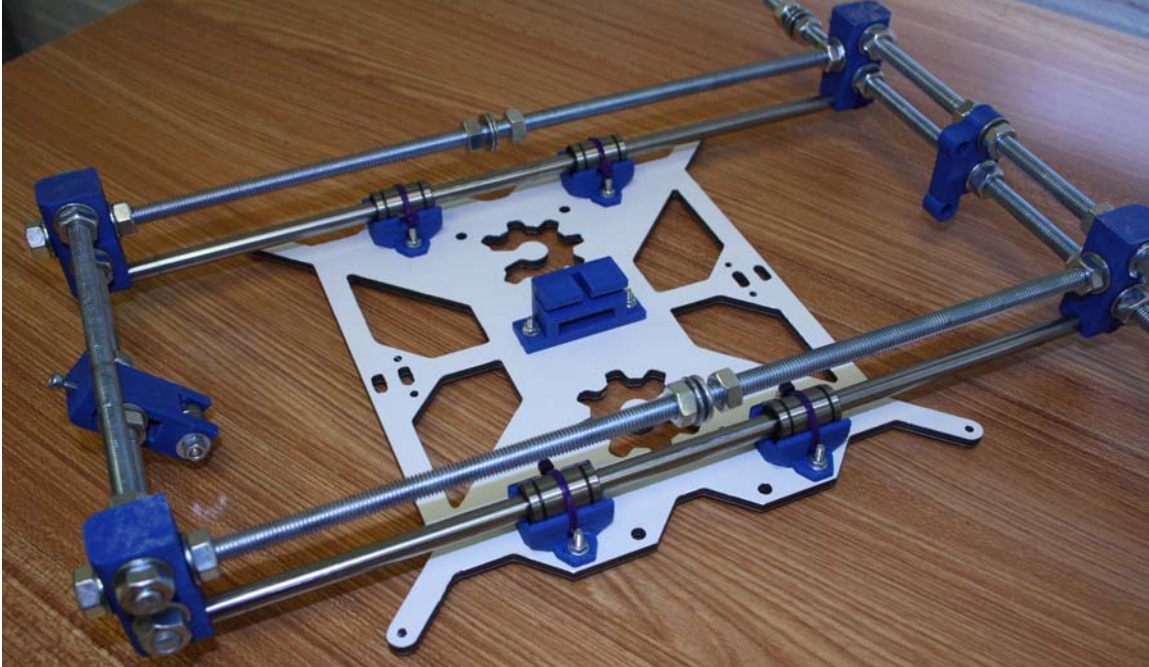


Mount (hand-tight) the four Y Bushings to the Heated bed Mount with eight M3x16 bolts. Use 8 M3 Washers (L) on front and 8 M3 Washers (S) on the back. Fix the Y Bushings with a M3 Nut. Use the same principle to position the Y Belt Holder on the middle of the Heated bed Mount.

Note: The holes of the Y Bushings might be a little too small. Use an 3 mm drill to widen the gap. Be extremely careful not to crush the plastic parts.

3-2

Connect Y-carriage / Y-axis

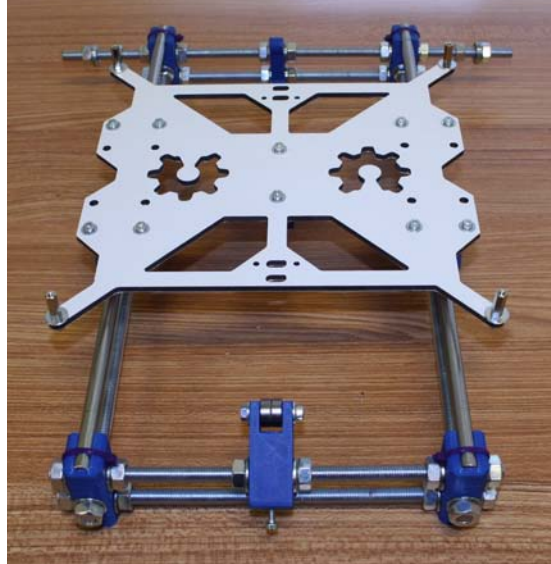


Connect the Y-carriage to the Y-axis frame. Carefully place the LM8UU Bearings in the Y bushings and fix them with four tie-wraps.

Note: You might have to loosen the outer Nuts of the Y-axis frame.

3-3

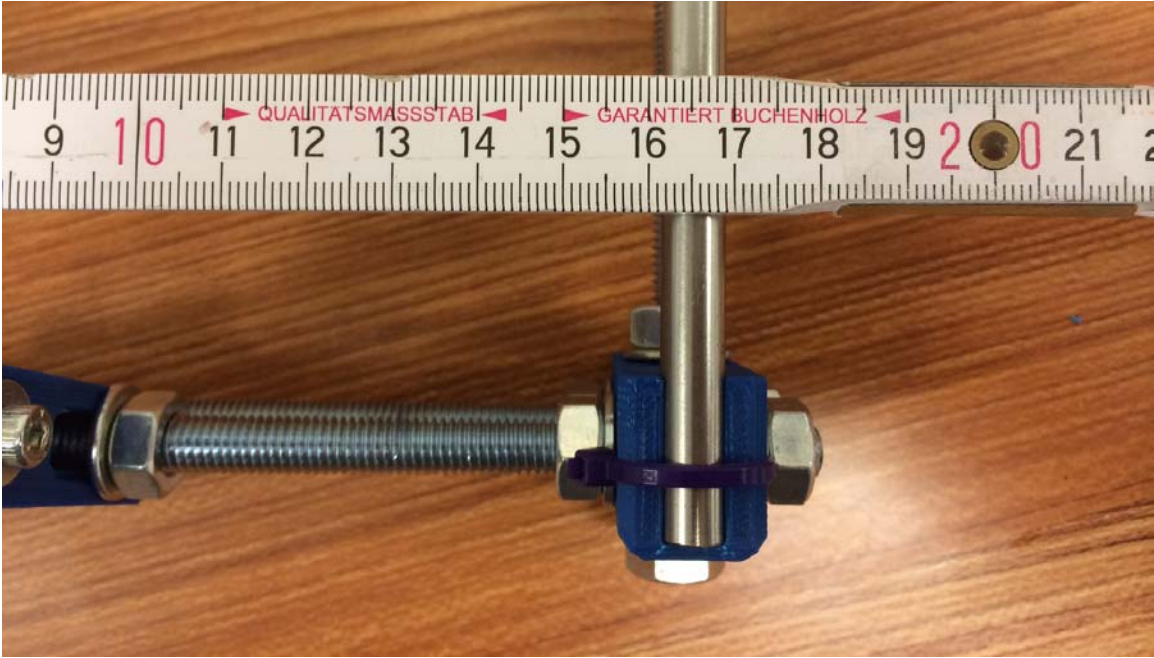
Place Spacers for Heated Bed



Fix four DI 15 mm Spacers on the edges of the Heated Bed Mount with a M3x10 Bolt. Use a M3 Washer (S) on the backside and a M4 Washer (L) on the front side.

3-4

Adjusting the Y-axis frame

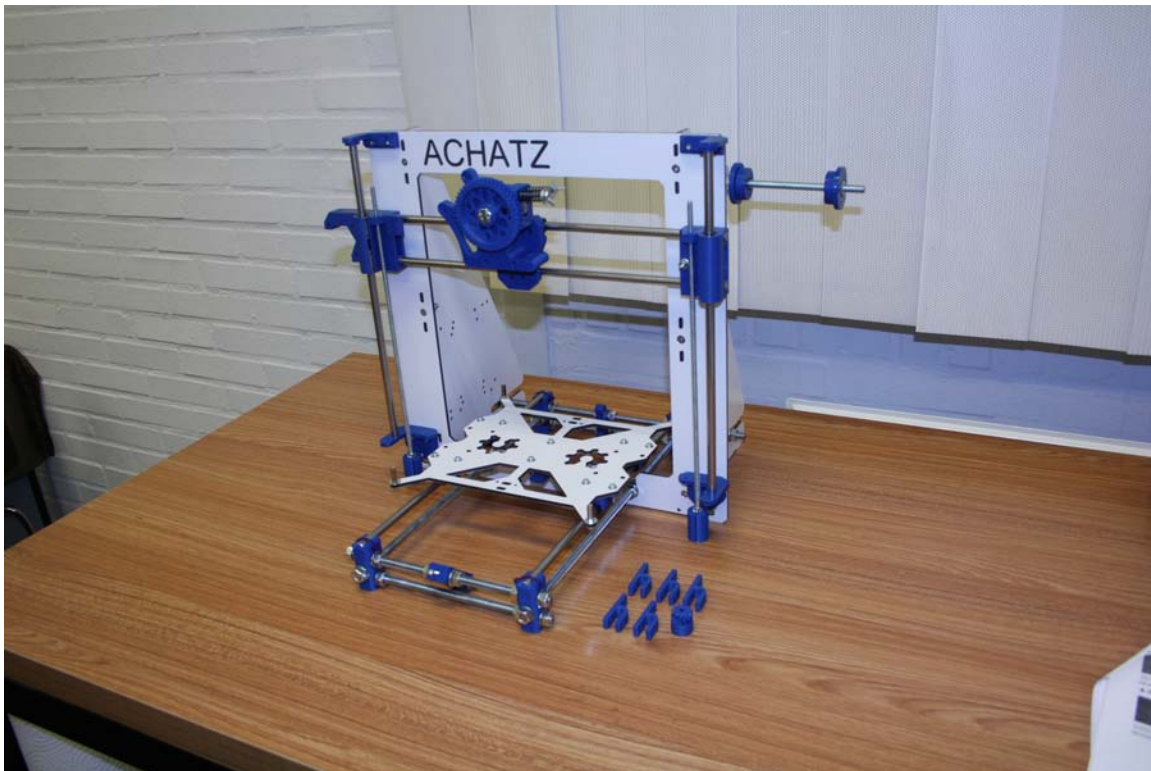


Measure the distance between the Smooth Rods. It should be at approximately 16,2 cm. Make sure the Y-carriage runs smoothly up and down. Tighten the outer Nuts with a wrench and the Y Bushings of the Y-carriage with a screwdriver.

Note: Tighten with care until firmly attached and unable to move. Do not crush the plastic parts!

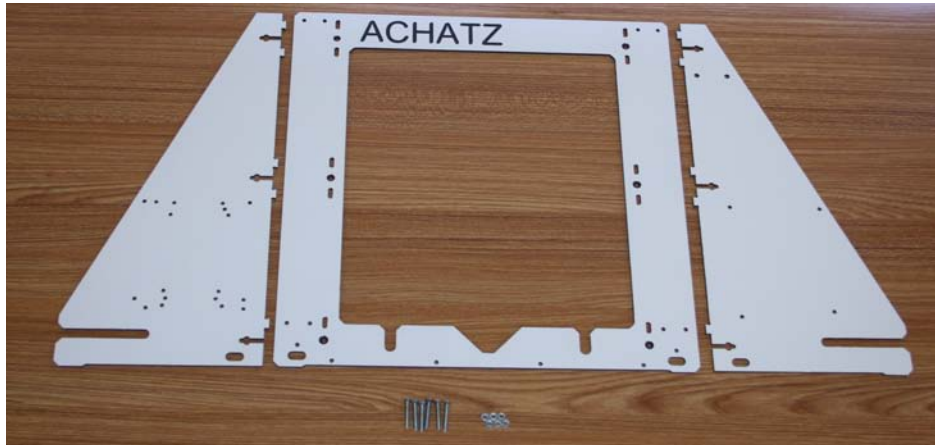
Step 2




X & Z-axis Assembly



4

Dibond Frame – Collecting all Parts



Non-Printed Parts		
Prusa i3 Achatz Edition Dibond Main Frame + 2 Side Panels	M4x25 Flat Head Bolt	M4 Nut
		
1x	6x	6x

4-1

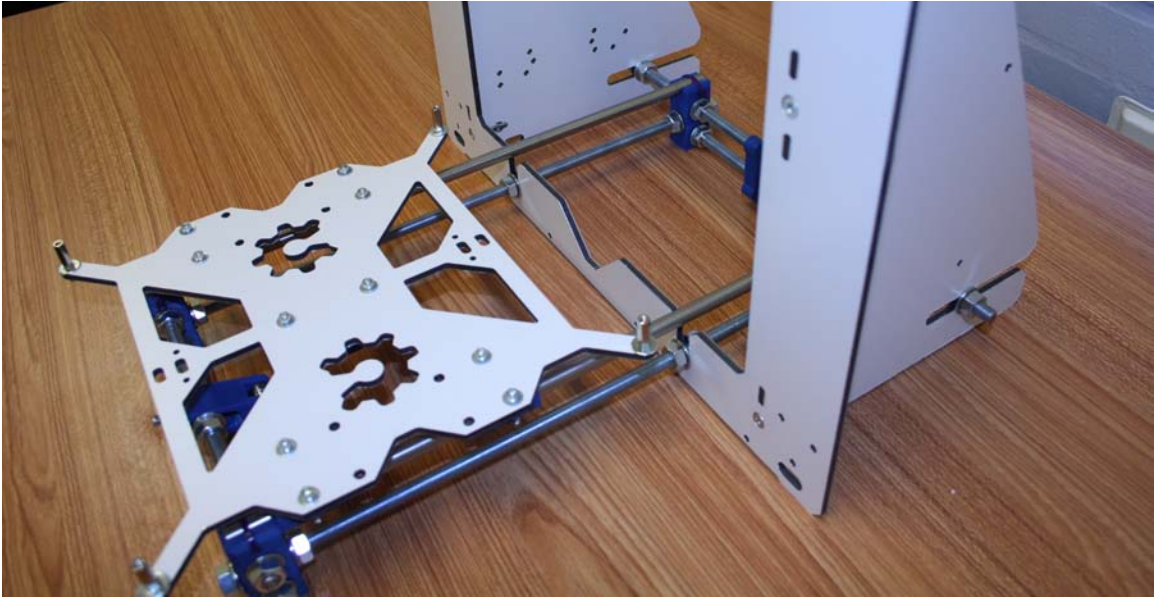
Putting up the Dibond Frame



Connect the Dibond Main Frame with the two Side panels by using 6 M4x25 Flat Head Bolts. Fix them on the side panels with a M4 Nut.

4-2

Connecting Frame to Y-Axis



'Marry' the Y-Axis frame to the Dibond frame by tightening the M8 nuts on the threaded rods.

4-3

Adjusting the frame










Measure the distance from the Dibond Main Frame to the back of the frontal Y corners. Fix it at exactly 20 cm.

4-4

Z-Axis Top & Bottom – Collecting all Parts

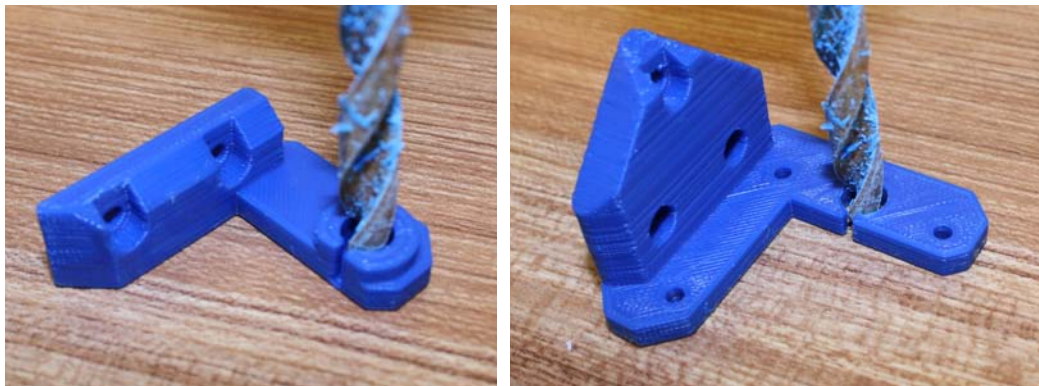


Printed Parts			
Z Axis Top Left	Z Axis Top Reft	Z Axis Bottom Left	Z Axis Bottom Right
			
1x	1x	1x	1x

Non-Printed Parts		
M3 Nut	M3 Washer (L)	M3x16 Bolt
		
10x	10x	10x

4-5

Preparation



Widen the holes of the Z-Axis Top & Bottom parts with an 8 mm drill.

Note: DO NOT PENETRATE THE Z-AXIS TOP PARTS! JUST WIDEN THE EXISTING HOLE. Be extremely careful not to crush the plastic parts.

4-6

Mount Z-Axis Top & Bottom Parts



Fix the Z-Axis Top & Bottom parts to the Dibond Frame with 10 M3x16 Bolts. Use a M3 Washer (L) and a M3 Nut on the backside of the frame.











Note: The holes of the Z-Axis Top & Bottom parts might be a little too small. Use a 3 mm drill to widen the gap. Be extremely careful not to crush the plastic parts.




5

X-Axis – Collecting all Parts



Printed Parts		
X End Idler	X End Motor	Z Coupler
		
1x	1x	2x

Non-Printed Parts				
Threaded Rod M5 x 300mm	Smooth Rod 8mm x 320mm	Smooth Rod 8mm x 370mm	M4 Nut	M4x25 Bolt
				
2x	2x	2x	1x	1x

M4 Washer (S)	M5 Nut	M5 Washer Special	LM8UU Bearing	Small Ball Bearing
				
4x	4x	2x	7x	2x

5-1

Push the bearings



Push two LM8UU Bearings in the X End Idler, and two LM8UU Bearings in the X End Motor parts. Use a rubber mallet for this procedure.

Note: Be extremely careful not to crush the plastic parts.

5-2

Assemble X End Idler



Slide an M4x25 Bolt with three M4 Washers (S) through the X End Idler, put two Small Ball Bearings in the middle. Fix the Bolt with an M4 Washer and an M4 Nut. The ball bearings need to rotate smoothly.

Note: You might need to remove some plastic material to make the two Small Ball bearings fit. Use a Dremel/Knife for this procedure.

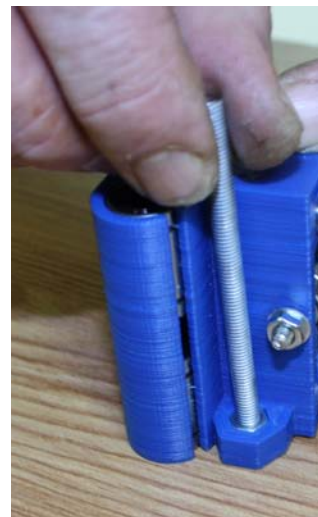
5-3

Preparation



Widen the holes of the X End Idler & X End Motor with an 8 mm drill.

Note: Be extremely careful not to crush the plastic parts.



Heat up two M5 Nuts (e.g. with a normal cigarette lighter) and place them into the special side pockets of the X End Idler and X End Motor.

5-4

Assemble X & Z Axis

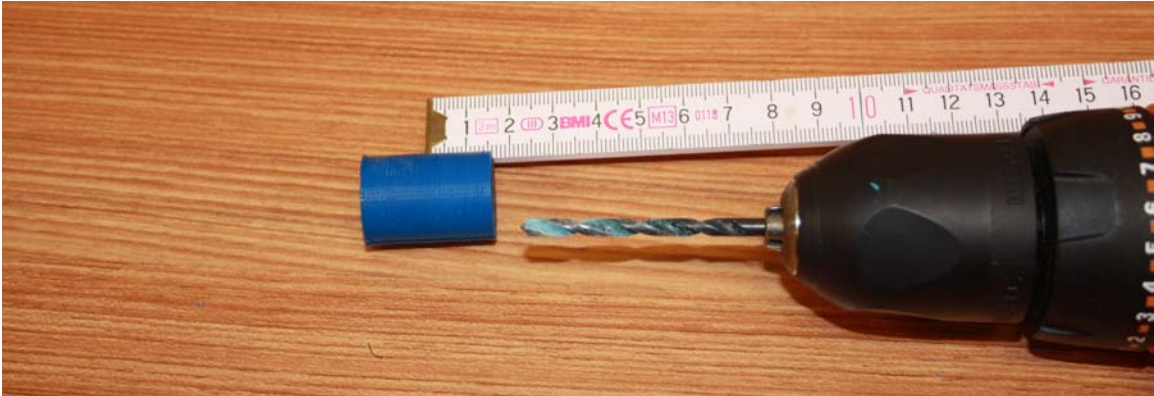


Slide one 320 mm Smooth Rod through the fixed Bearings of the X End Idler, and another 320 mm Smooth Rod through the fixed bearings of the X End Motor. Take two 370 mm Smooth Rods. Put two LM8UU Bearings on the upper Rod and one on the other Rod. Connect the smooth rods to the X End Idler and Motor parts.

Note: You might need to push the X End Idler and X End Motor parts a little with a rubber mallet. Be extremely careful not to crush the plastic parts.

5-5

Prepare Z Couplers



Widen one hole of both Z Couplers with an 5 mm drill and do not drill deeper than 15 mm. This side will be attached, later, to the motor shaft.

Note: Be extremely careful not to crush the plastic parts.

5-6

Assemble Z Couplers



Turn the two M5 x 300 mm Threaded rods in the other opening of the Z Couplers. Fix them with a special M5 Washer and a Nut.

Note: For extra stability, put a little plastic glue into the Z Coupler.

5-7

Connect X & Z Axis to Dibond Frame

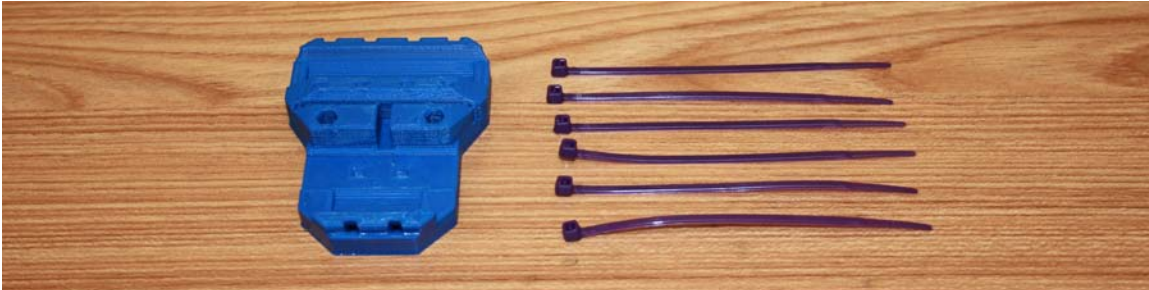



Now, connect the X & Z Axis to the Aluminium Dibond Frame. Make sure that the Smooth Rods fit easily in the Z-Axis Top and Bottom parts and that you have a straight alignment. The X-End Motor and X-End Idler should glide up and down fairly smoothly.


Thread the Z-Couplers through the M5 Nut of the X-End Idler & Motor parts.

6

X-Carriage / Collecting all Parts

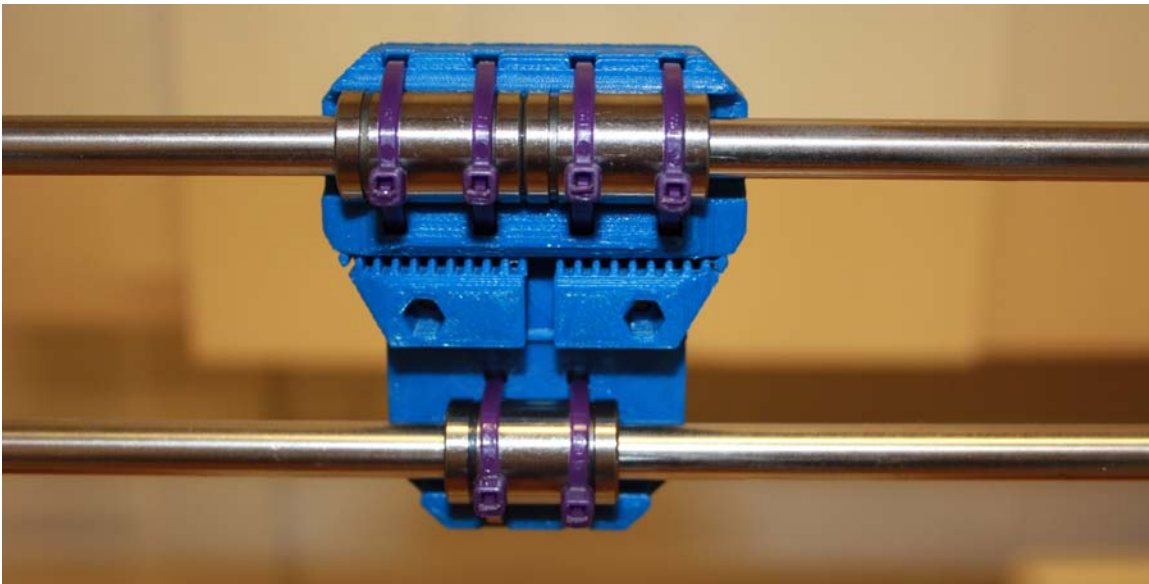


Printed Parts	
X Carriage	
	
1x	

Non-Printed Parts	
Tie-wraps	
	
6x	

6-1

Mount X-Carriage to Z-Axis












Pull the Tie-wraps through the openings of the X-Carriage. Fix them tightly to the bearings of the X-axis. The Bearings shouldn't be visible from the front.







7

Extruder / Collecting all Parts



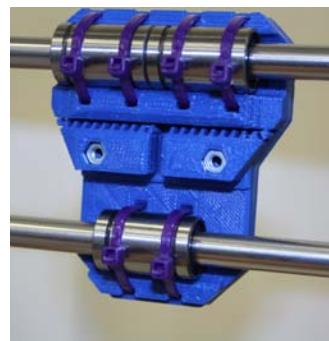
Printed Parts		
Extruder Block	Wade Big Gear	Gidler
		
1x	1x	1x

Non-Printed Parts					
M3 grub screw 70mm	M8 grub screw 20mm	Hobbed Bolt	M3 Nut	M3x25 Bolt	M3x35 bolt
					
2x	1x	1x	5x	1x	2x

M3 Wingnut	M5 Washer (L)	M8 Nut	M8 Washer	Ball Bearing Large	Compression Spring
					
2x	2x	2x	3x	3x	2x

7-1

Prepare X-Carriage



Heat up two M3 Nuts and place them into the openings on the X-Carriage.

7-2

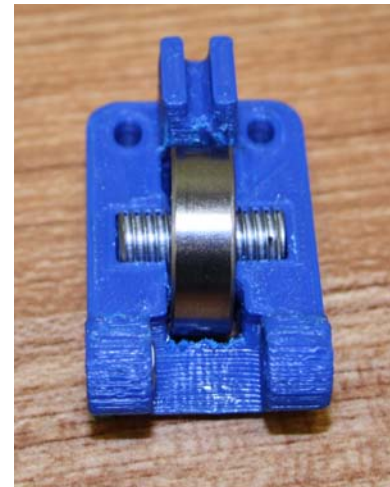
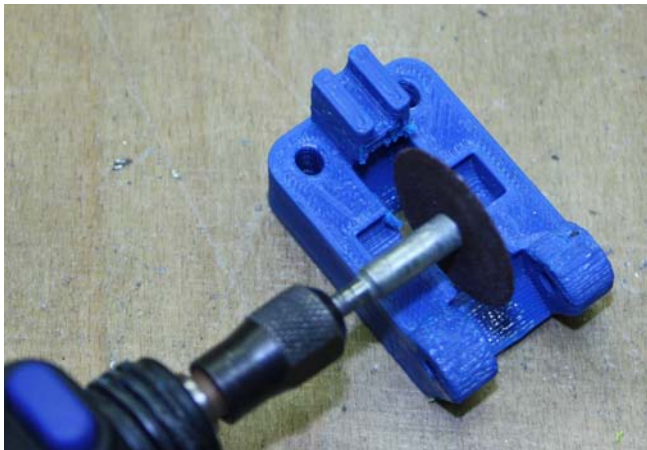
Prepare Gidler



Heat up an M3 Nut and place it into the side of the Gidler.

7-3

Assemble Gidler

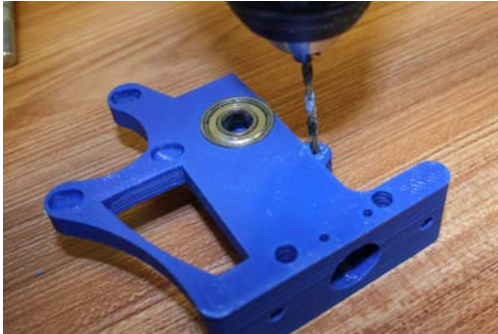


Slide the 20 mm Grub Screw through a Large Ball Bearing. Push it inside the Gidler with a rubber Mallet. Make sure that the Bearing turns around with ease.

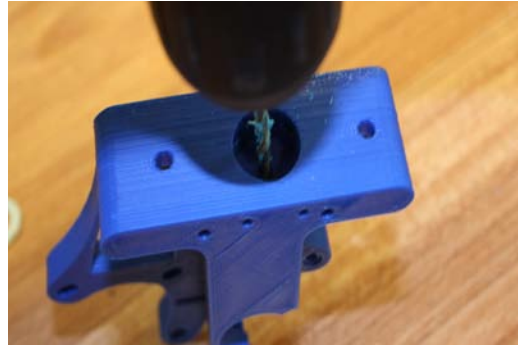
Note: Be extremely careful not to crush the plastic parts. You might need to remove some plastic material from the Gidler with a Dremel/Knife to make it turn around smoothly.

7-4

Prepare Extruder



Re-drill (3 mm) the side hole of the extruder.

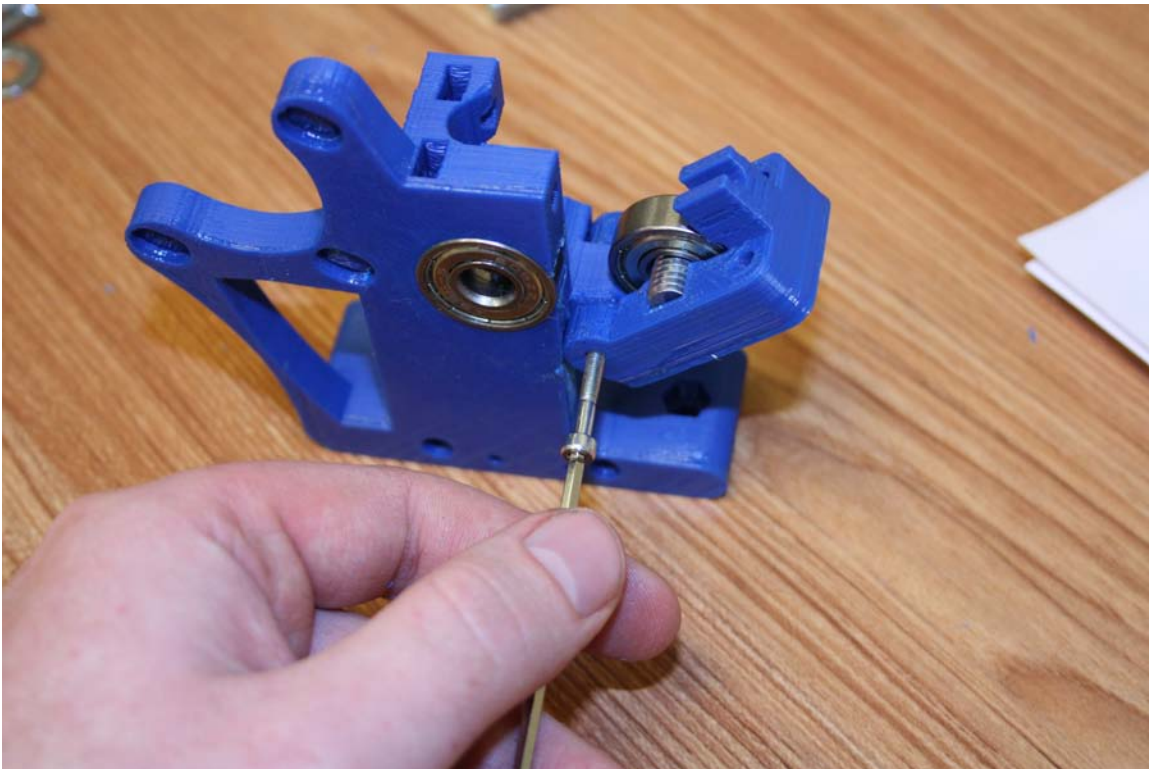


Re-drill (3,5 mm) the bottom hole of the extruder.

Note: Be extremely careful not to crush the plastic parts.

7-5

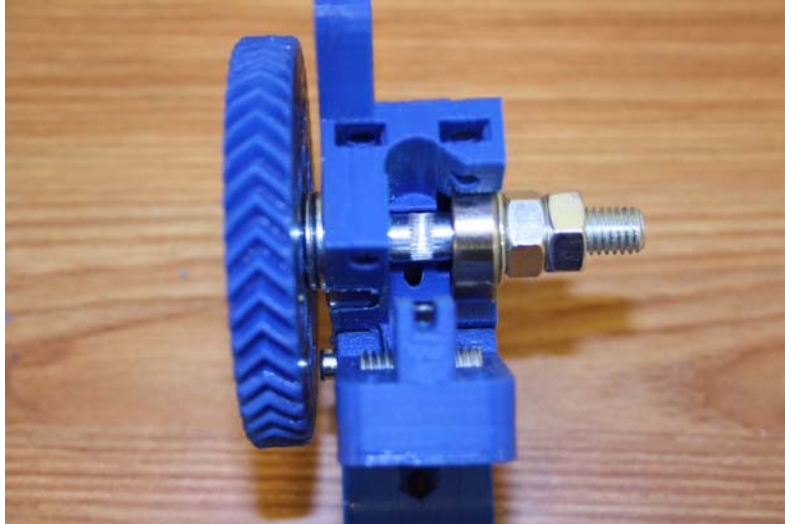
Connect Gidler / Extruder



Connect the Gidler to the extruder with an M3x25 Bolt.

7-6

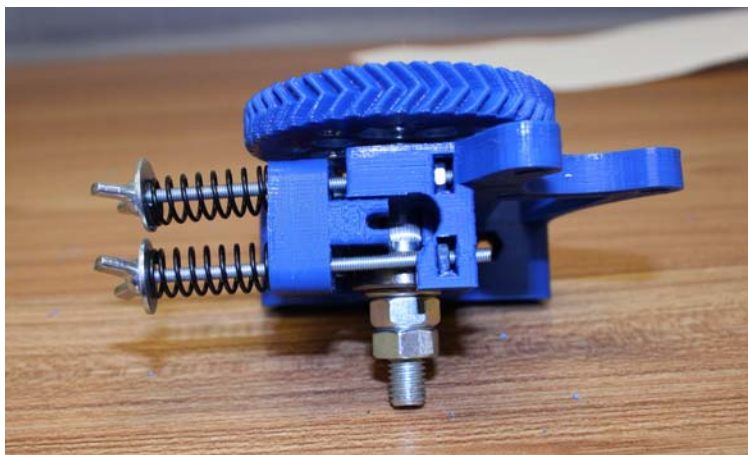
Position Big Gear



Slide a Hobbed Bolt through the Big Gear. Put two M8 Washers on the Hobbed Bolt. Now slide it through the side of the Extruder. Make sure that the Filament hole of the Gilder is in line with the teeth's of the Hobbed Bolt. Put a large Ball Bearing next to it. Fix the Hobbed Bolt with an M8 Washer and 2 M8 Nuts (next to the Large Ball Bearing).

7-7

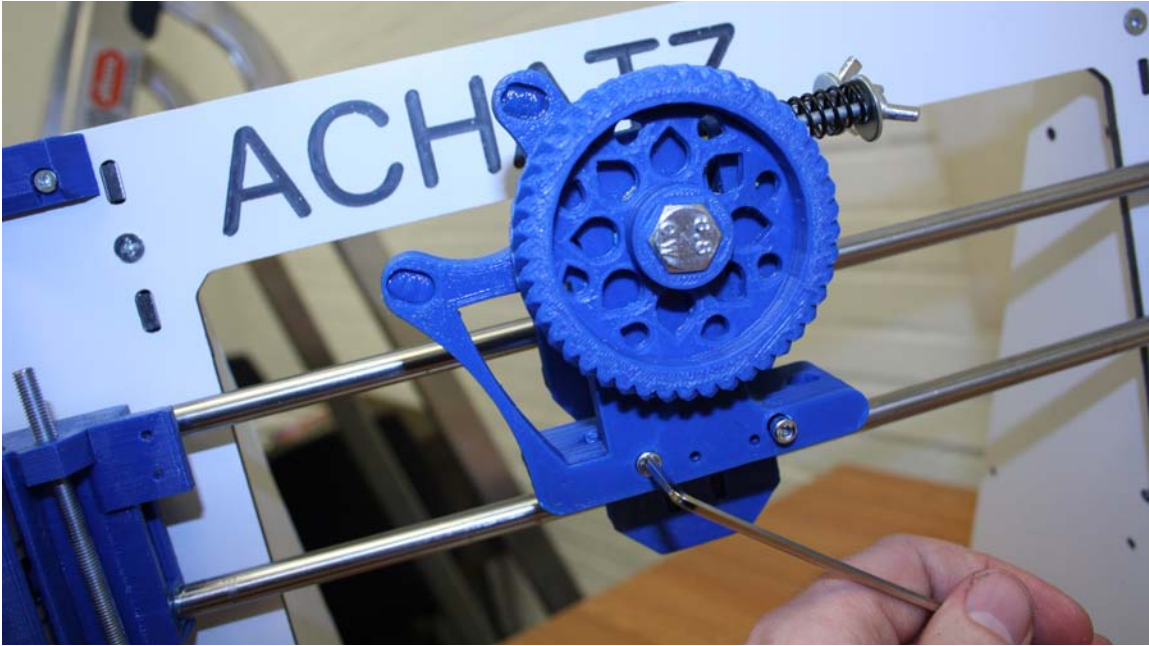
Extruder Springs



Slide two M3 x 70 mm Grub Screws through the Gilder & Extruder Block. Fix them inside the Extruder Block with a M3 Nut. On the outside put a spring and fix them with a M5 Washer (L) and an M3 Wing Nut.

7-8

Mounting the extruder




Mount the Extruder to the X-Carriage with two M3x35 Bolts. They perfectly fit into the M3 Nuts on the back of the X-Carriage.








Note: Be extremely careful not to crush the plastic parts. You might need to widen the wholes of Extruder Block with an M3 Drill.

8

Spool Holder – Collecting all Parts



Printed Parts
Improved Spool Circle

2x

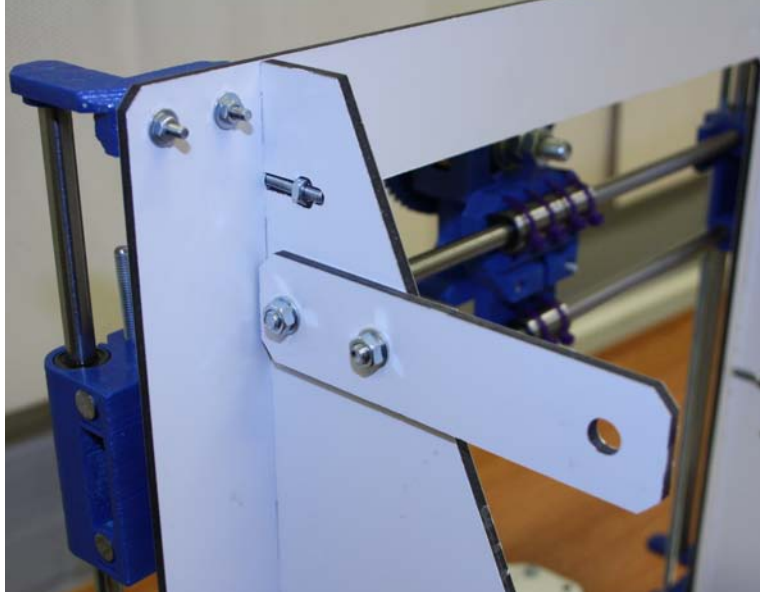
Non-Printed Parts							
Spool Holder Connection Plate	Threaded Rod M8 x 150 mm	M5 Nut	M5 Washer (S)	M5x16 Bolt	M8 Nut	M8 Washer	
							
1x	1x	2x	4x	2x	3x	2x	

Ball Bearing Large

2x

8-1

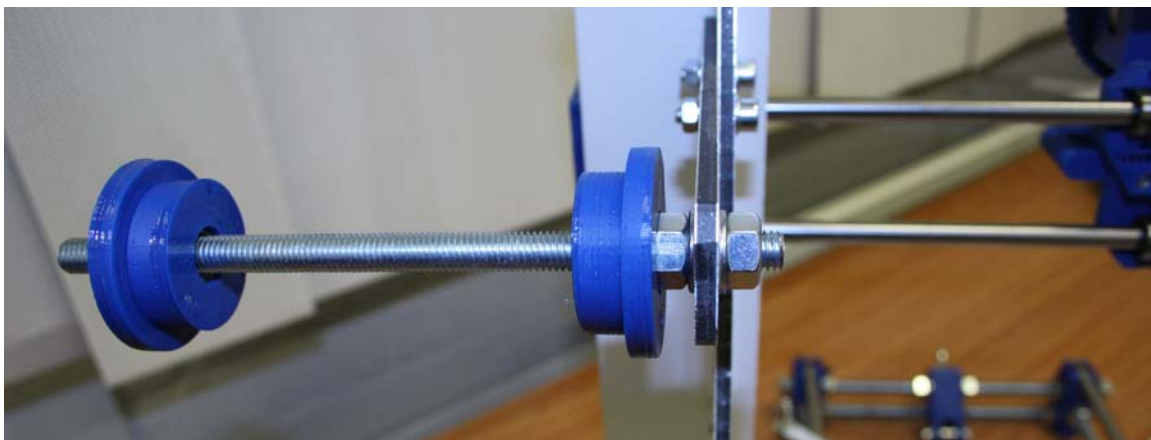
Mounting Spool Holder Connection Plate



Mount the Spool Holder Connection Plate to the side panel of the Dibond Main Frame. Fix the plate with two M5x16 Nuts, four M5 Washers (S) and two M5 Nuts.

8-2



Mounting Spool Holder Threaded Rod







Take the M8 x 170 mm Threaded Rod and fix it to the Spool Holder Connection Plate with a M8 Nut and Washer on either side. Your Filament spools will be locked between the Spool Circle pieces and a M8 Nut on the outside.

9

Parts for next steps

Printed Parts	
Wade Small Gear	Endstop Holder Small
	
1x	5x

Non-Printed Parts			
M3 Set Screw	M4 Nut	M4 Washer (L)	M4x20 Bolt
			
1x	2x	2x	2x

The Prusa i3 Achatz Edition Frame Kit contains some extra parts that you will need at later stages when mounting the Endstops and the Hotend.

10

Prusa i3 Frame Kit Ready



You have finished building up your Prusa i3 Achatz Edition Frame Kit. Great job!