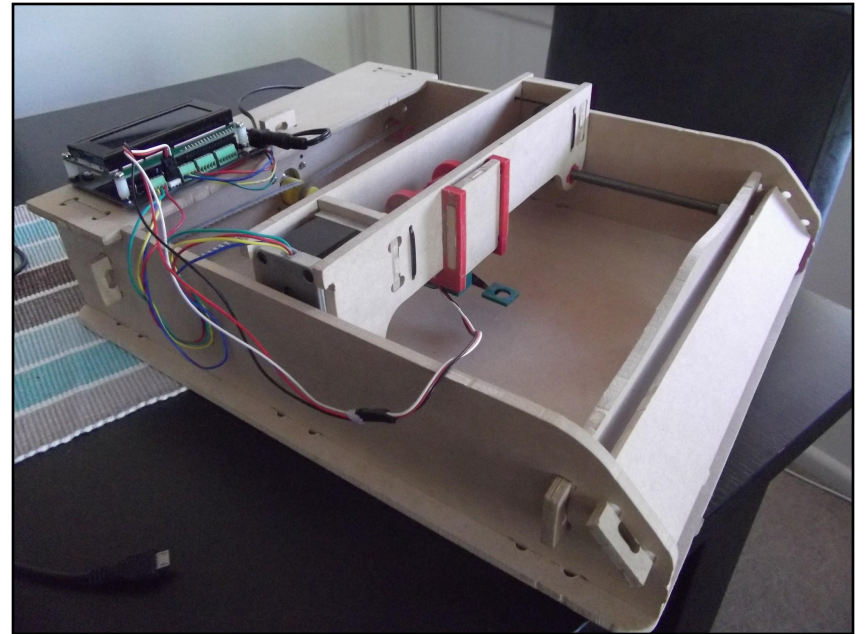
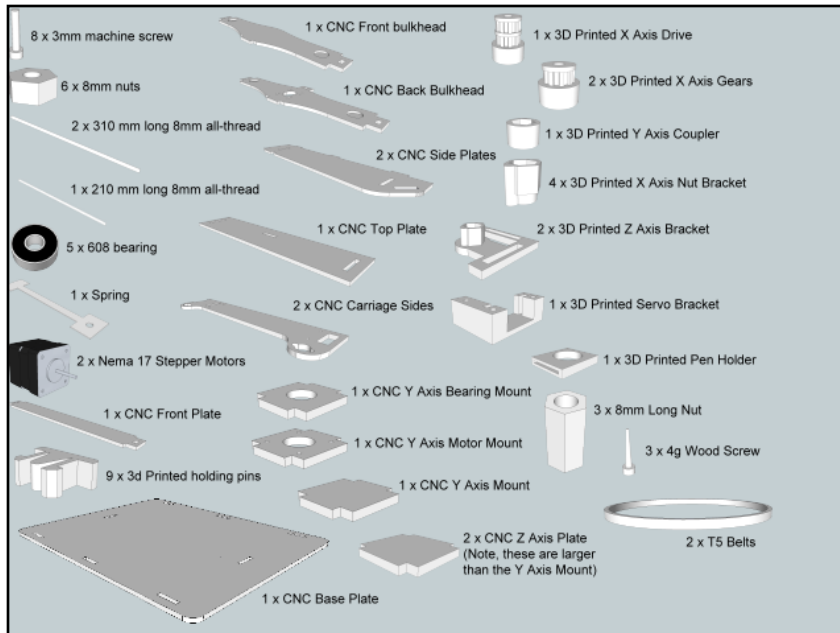


hackCNC

Frame Assembly Manual

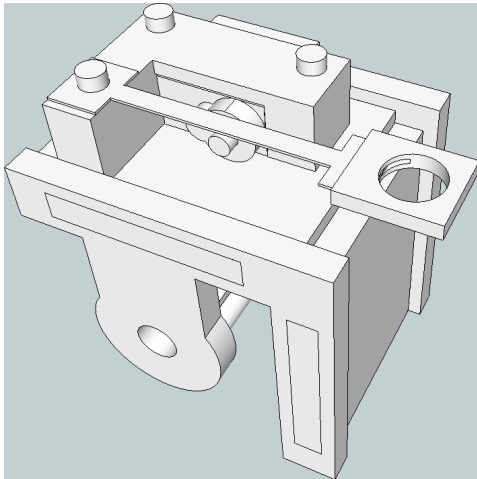




Hints

1. If parts don't fit, first try turning them 90 degrees. A lot of them look square, but are actually rectangles (blame the designer).
2. Don't be afraid to try some brute force and ignorance. A lot of these parts are a VERY tight fit.
3. The wires on the stepper motors should be facing UP.
4. Without superglue on the nuts, this won't work. But don't worry, a pair of pliers will break the bond so you can break your hackCNC down for your trip home.

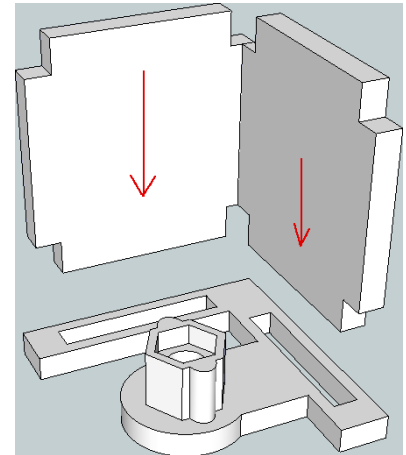
Section 1 : Z Axis Carriage



Section 1 : Step 1

Parts

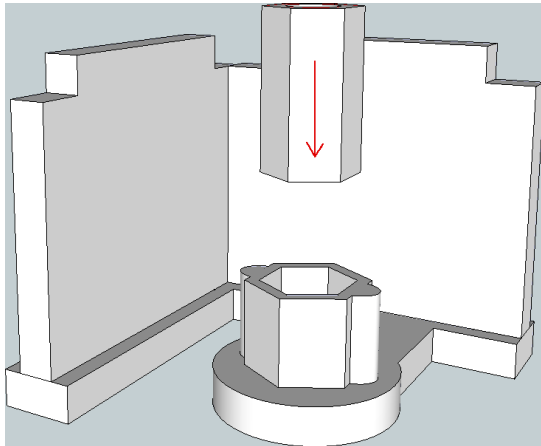
1 x 3D Printed Z Axis Bracket
2 x CNC Z Axis Plate



Section 1 : Step 2

Parts

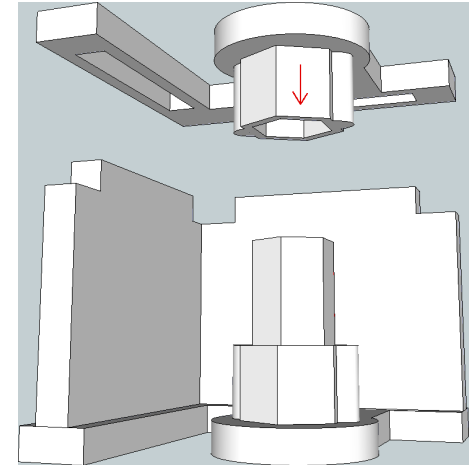
1 x 8mm Long Nut



Section 1 : Step 3

Parts

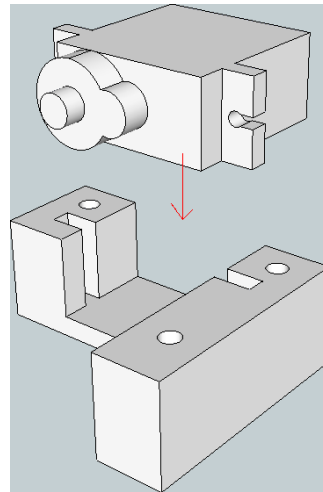
1 x 3D Printed Z Axis Bracket



Section 1 : Step 4

Parts

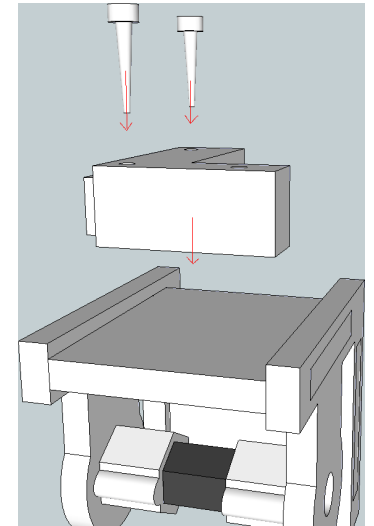
1 x 3D Printed Servo Bracket
1 x 9g microservo



Section 1 : Step 5

Parts

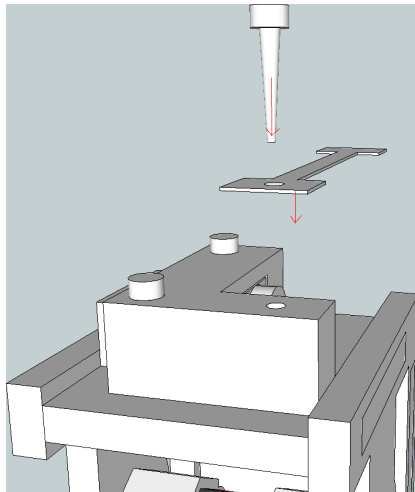
2 x 4g Wood Screw



Section 1 : Step 6

Parts

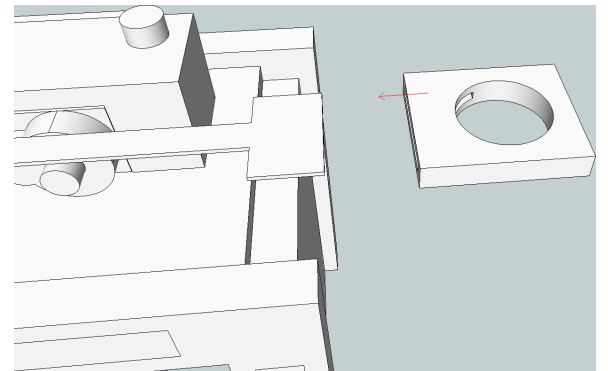
1 x 4g Wood Screw
1 x Spring



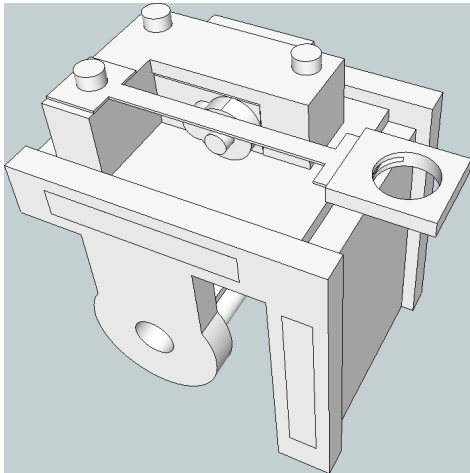
Section 1 : Step 7

Parts

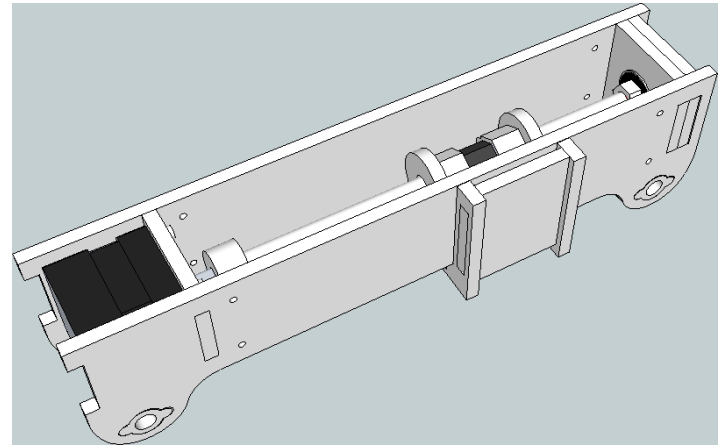
1 x 3D Printed Pen Holder



Section 1 : Complete!



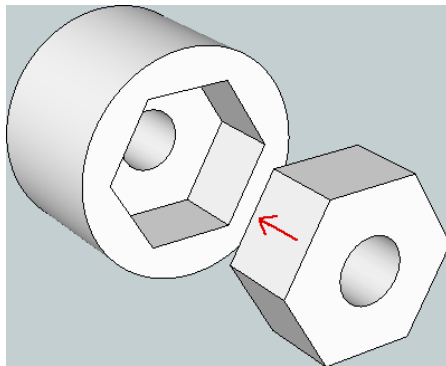
Section 2 : Y Axis Carriage



Section 2 : Step 1

Parts

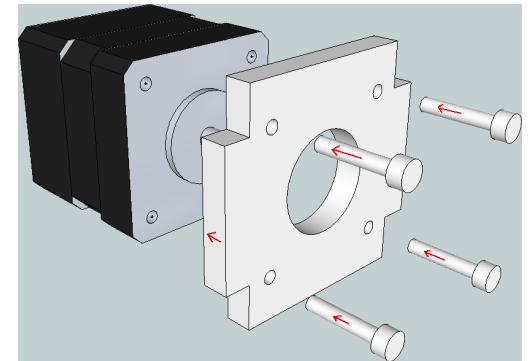
1 x 3D Printed Y Axis Coupler
1 x 8mm nut



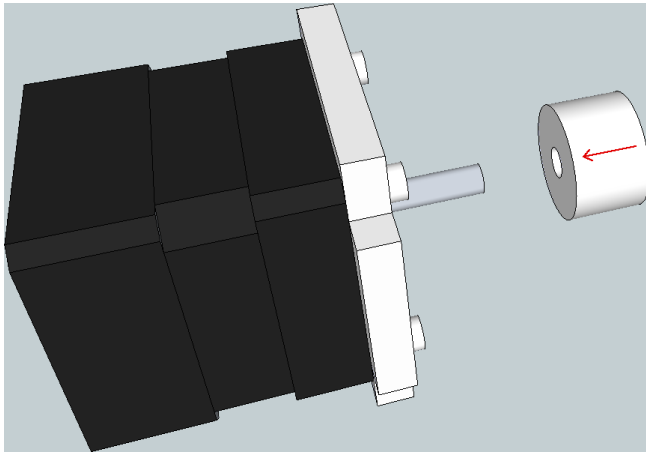
Section 2 : Step 2

Parts

1 x Nema 17 Stepper Motors
1 x CNC Y Axis Motor Mount
4 x 3mm Machine Screws



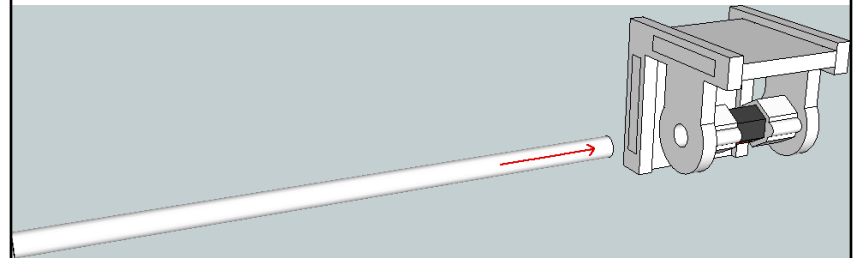
Section 2 : Step 3



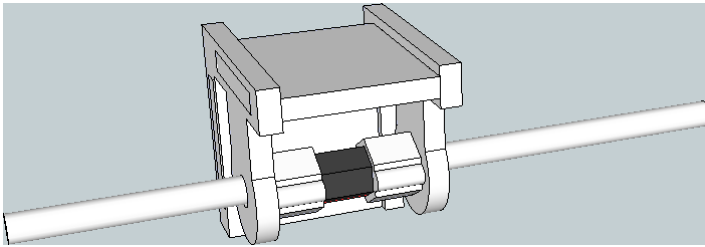
Section 2 : Step 4

Parts

1 x 210 mm Long 8mm all-thread
Part from Section 1



Section 2 : Step 4 - complete

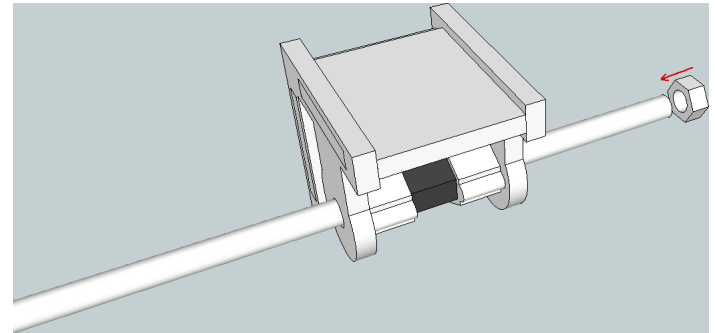


Section 2 : Step 5

Parts

1 x 8mm nuts

Part from Section 2 : Step 4

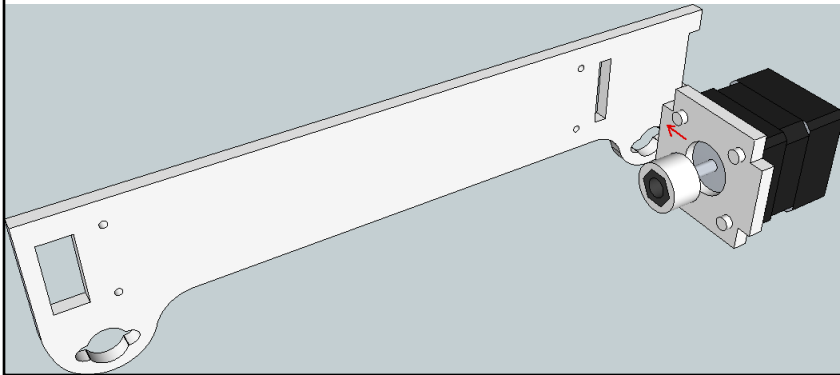


Section 2 : Step 6

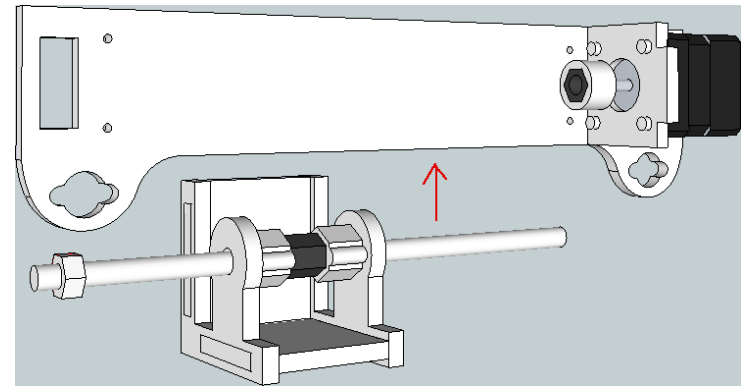
Parts

1 x CNC Carriage Side

Part from Section 2 : Step 3

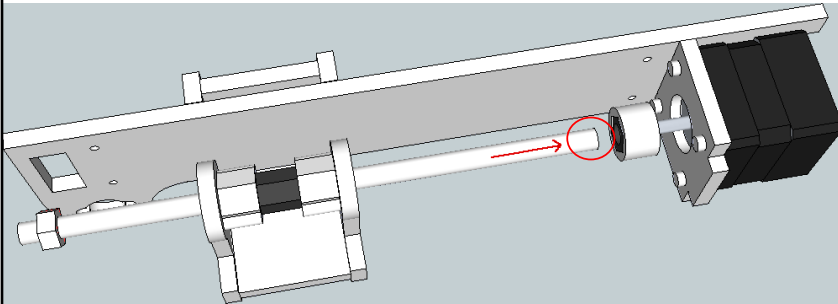


Section 2 : Step 7



Section 2 : Step 8

Superglue the end of the rod where it goes into the nut

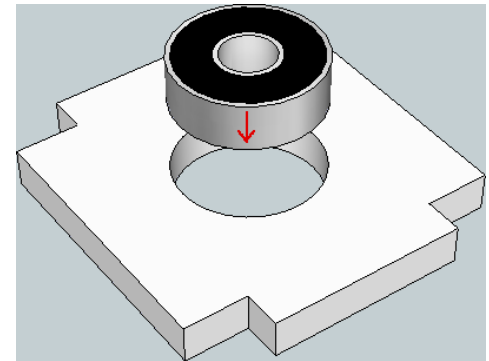


Section 2 : Step 9

Parts

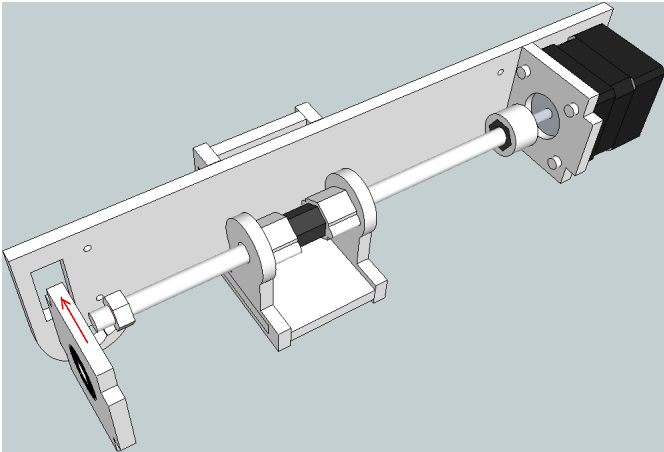
1 x CNC Y Axis Bearing Mount

1 x 608 bearing

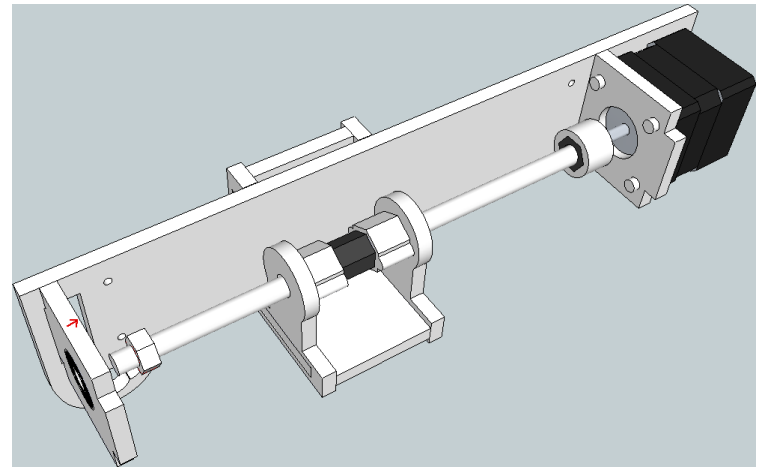


Section 2 : Step 10

Place an 8mm washer between the bearing and nut (not shown)



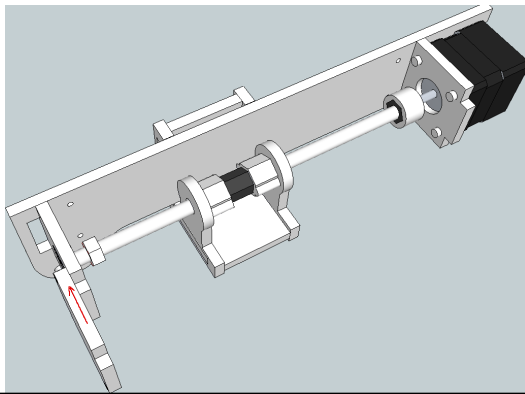
Section 2 : Step 11



Section 2 : Step 12

Parts

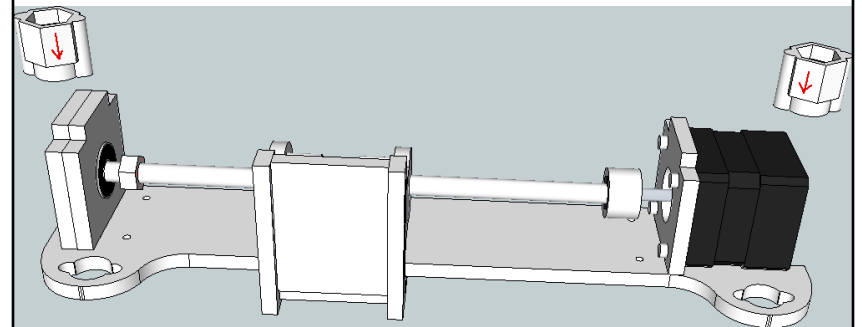
1 x CNC Y Axis Mount



Section 2 : Step 13

Parts

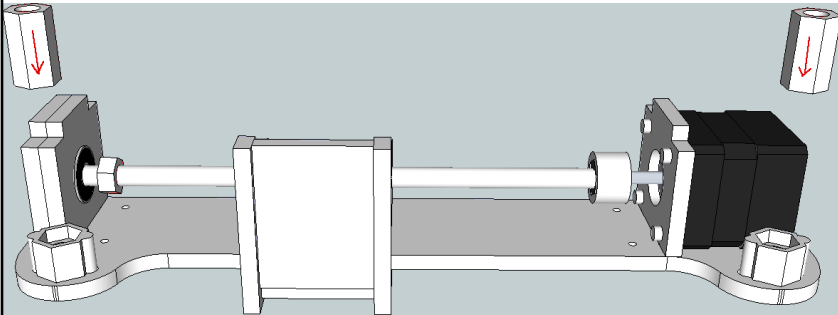
2 x 3D Printed X Axis Nut Bracket



Section 2 : Step 14

Parts

2 x 8mm Long Nut

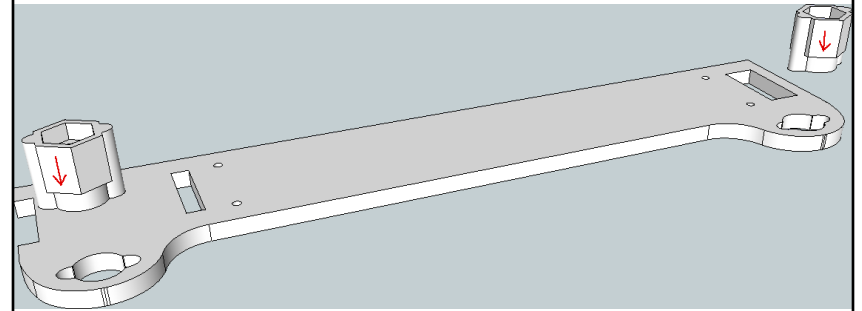


Section 2 : Step 15

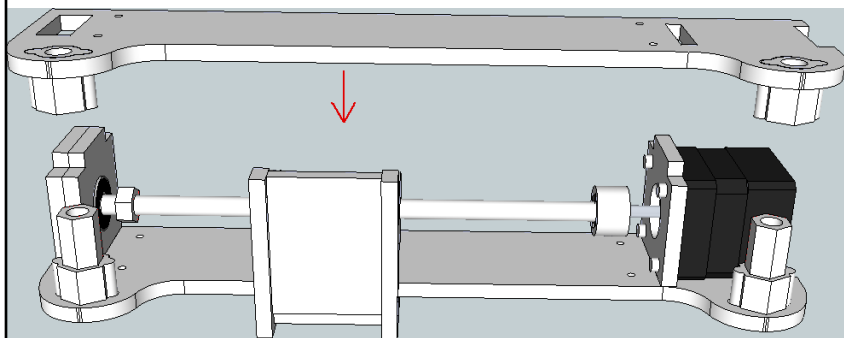
Parts

1 x CNC Carriage Side

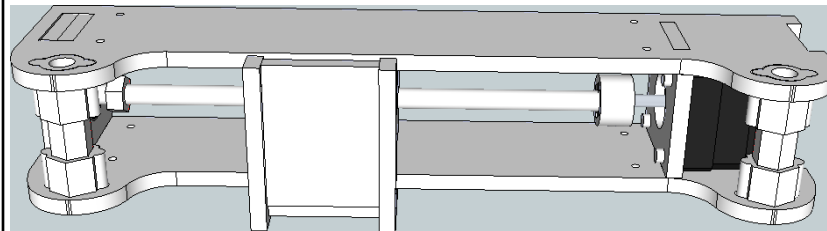
2 x 3D Printed X Axis Nut Bracket



Section 2 : Step 16

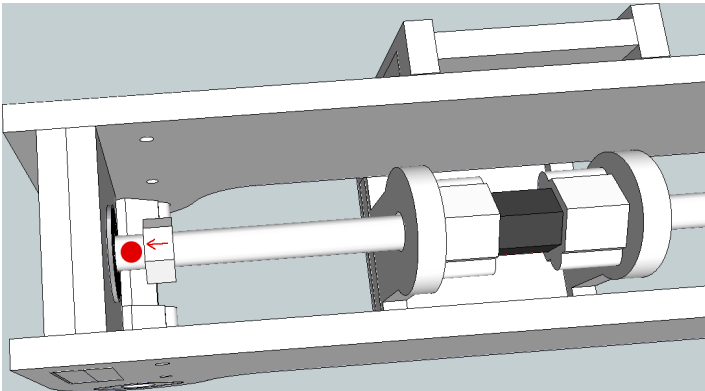


Section 2 : Step 16 - Complete

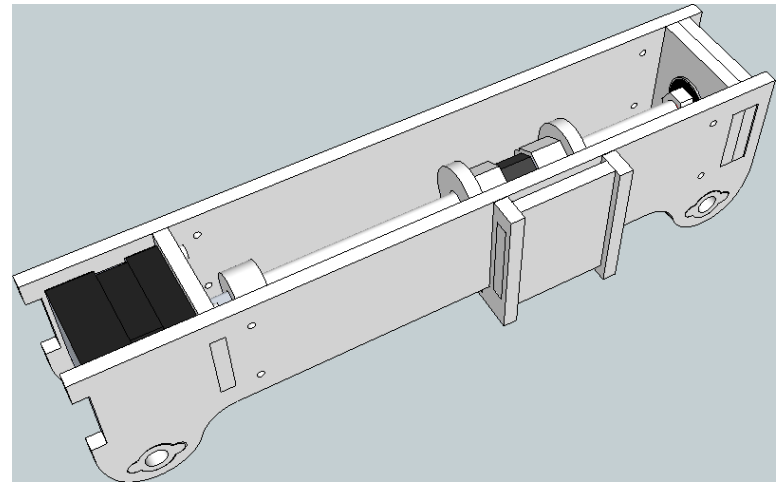


Section 2 : Step 17

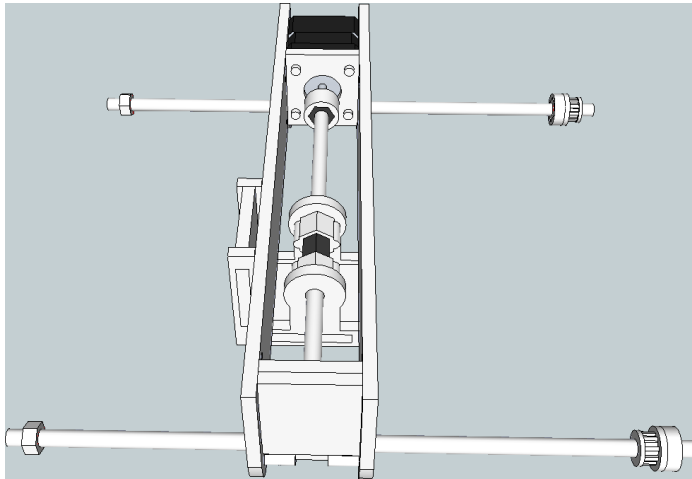
Put a dab of glue before turning the nut



Section 2 : Complete!



Section 3 : X Axis Rails



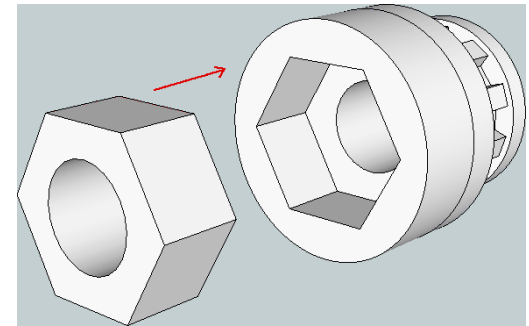
Section 3 : Step 1

Parts

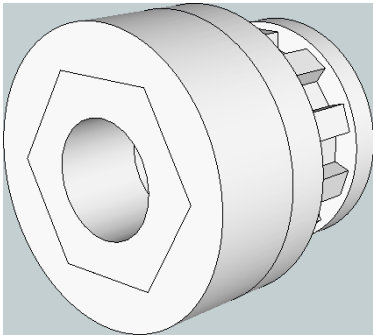
2 x 8mm nuts

2 x 3D Printed X Axis Gears

X 2



Section 3 : Step 1 - Complete



Section 3 : Step 2

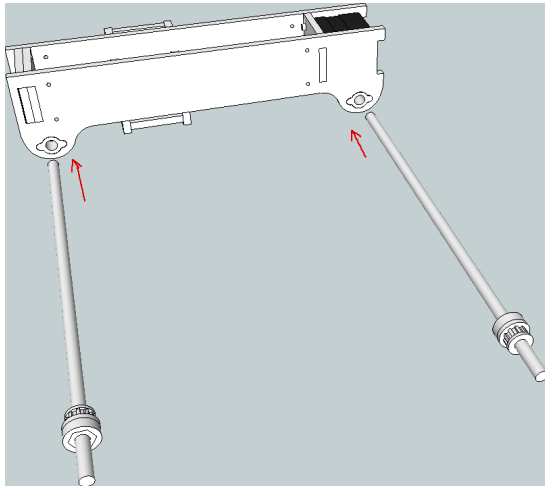
Parts

2 x 310mm long 8mm all-thread



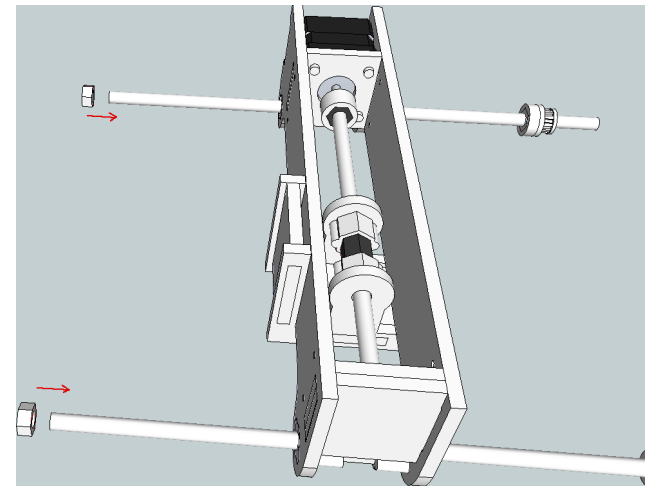
Section 3 : Step 3

Parts
Part from Section 2

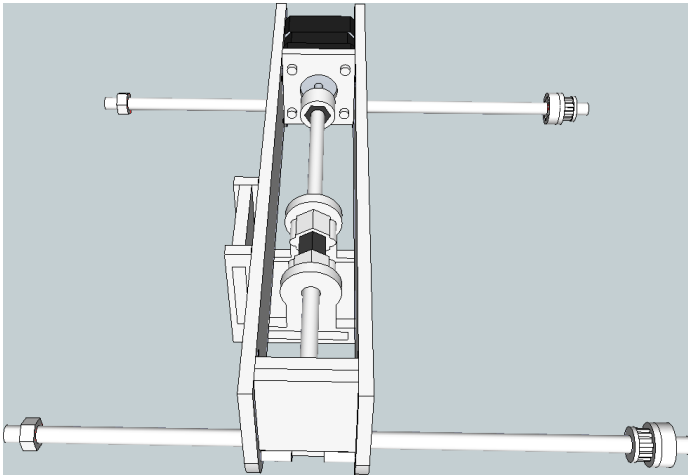


Section 3 : Step 4

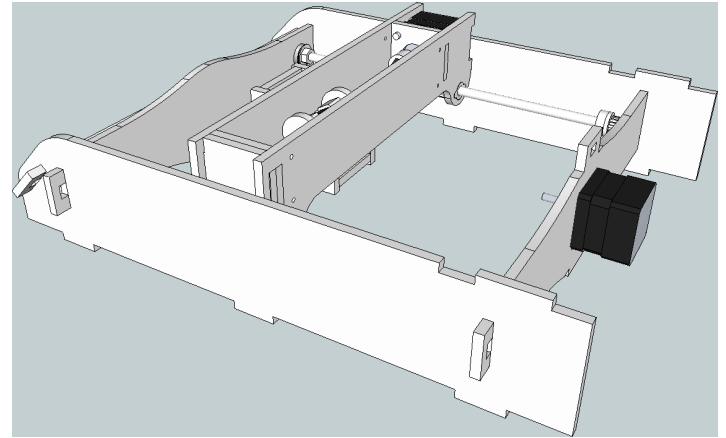
Parts
2 x 8mm nuts



Section 3 : Complete!



Section 4 : Top Frame

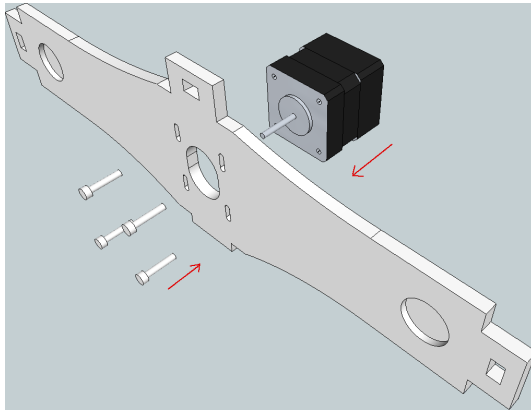


Section 4 : Step 1

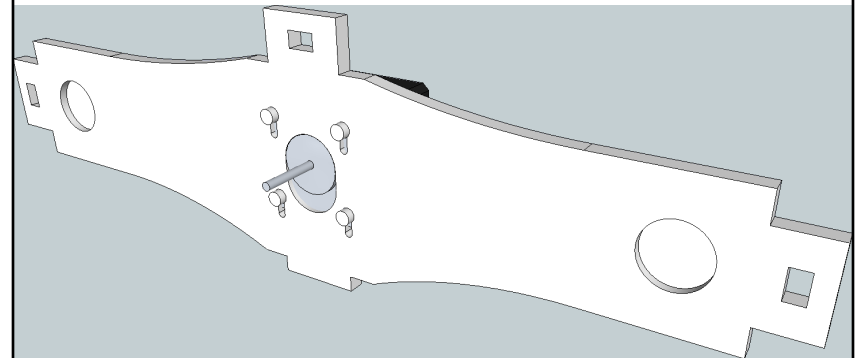
Parts

- 1 x Nema 17 Stepper Motor
- 4 x 3mm machine screws
- 1 x CNC Back Bulkhead

These should be somewhat loose.



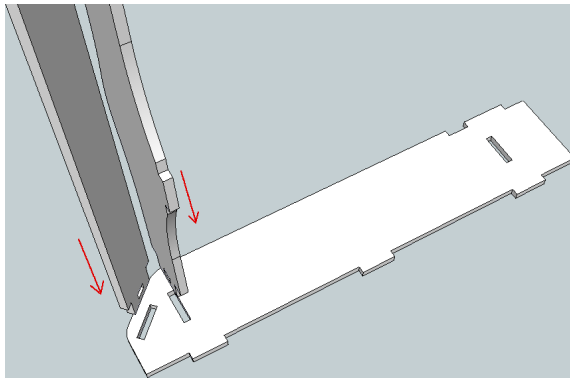
Section 4 : Step 1 - Complete



Section 4 : Step 2

Parts

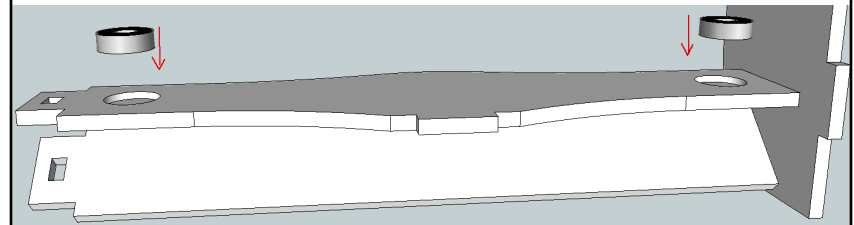
- 1 x CNC Front Bulkhead
- 1 x CNC Side Plate
- 1 x CNC Front Plate



Section 4 : Step 3

Parts

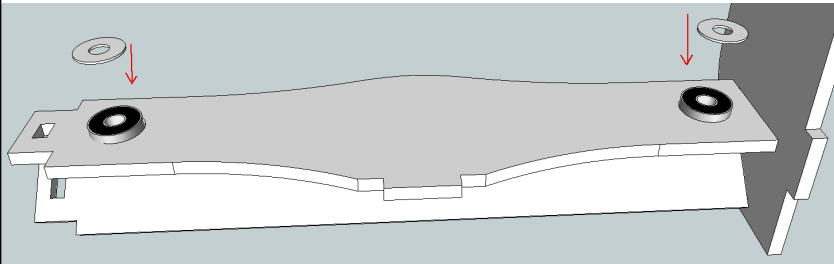
- 2 x 608 bearings



Section 4 : Step 4

Parts

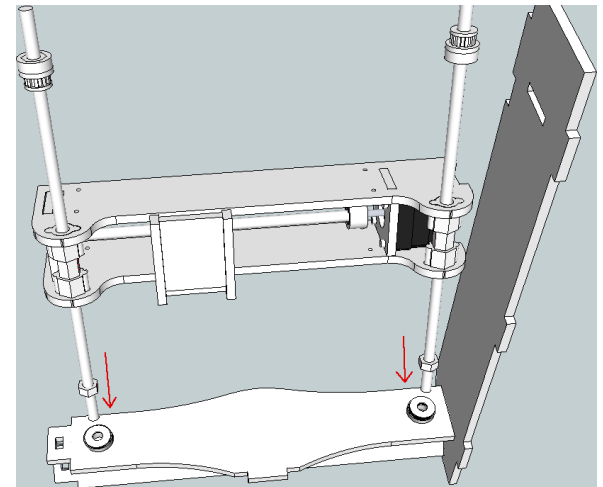
2 x 8mm Washers



Section 4 : Step 5

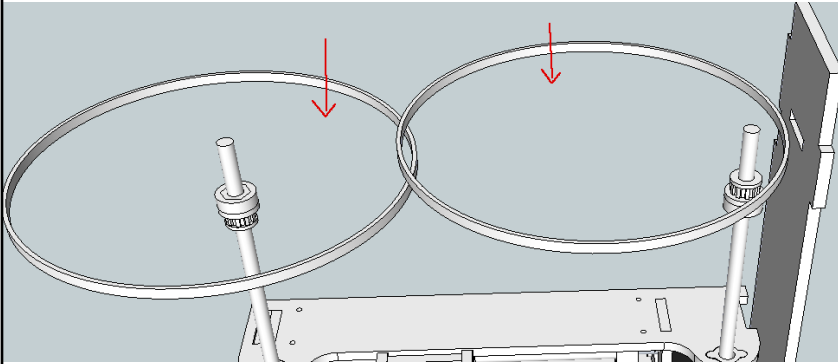
Parts

Section 3



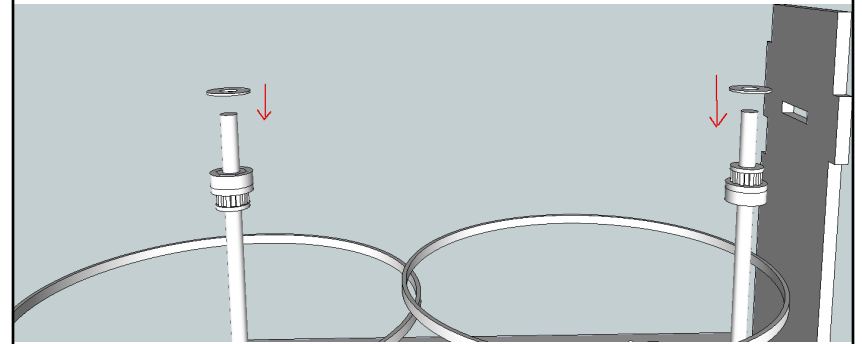
Section 4 : Step 6

Parts
2 x T5 Belts



Section 4 : Step 7

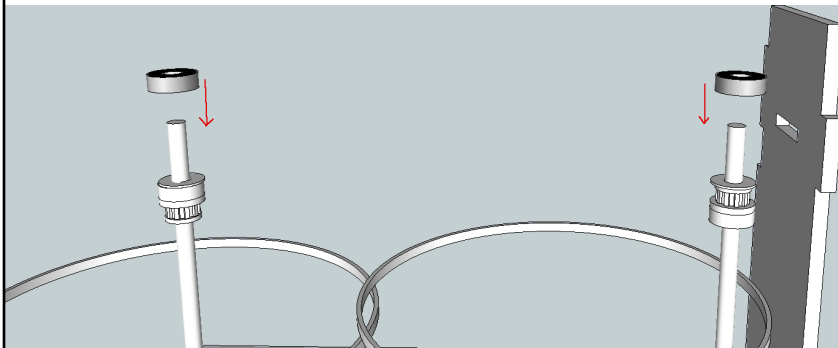
Parts
2 x 8mm Washers



Section 4 : Step 8

Parts

2 x 608 Bearings

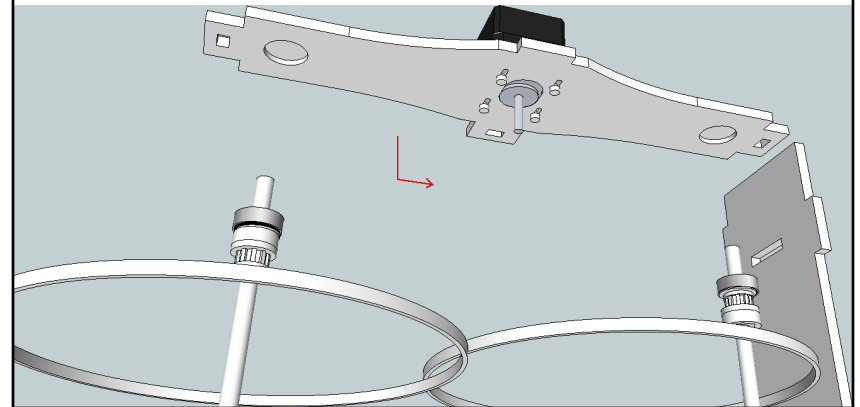


Section 4 : Step 9

Parts

Section 4 : Step 1

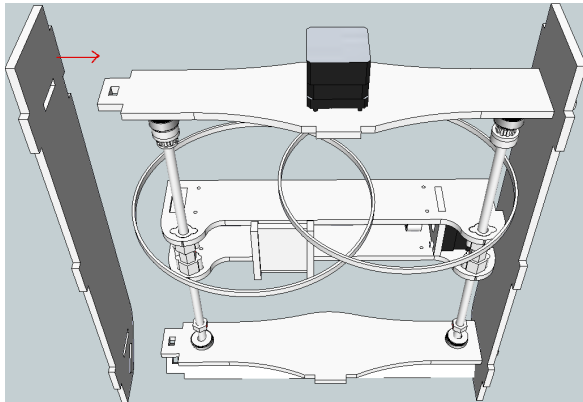
You will need to wiggle these together a bit



Section 4 : Step 10

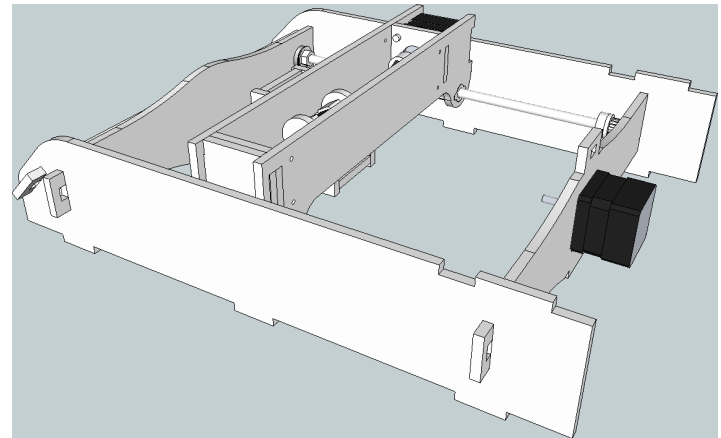
Parts

1 x CNC Side Plate



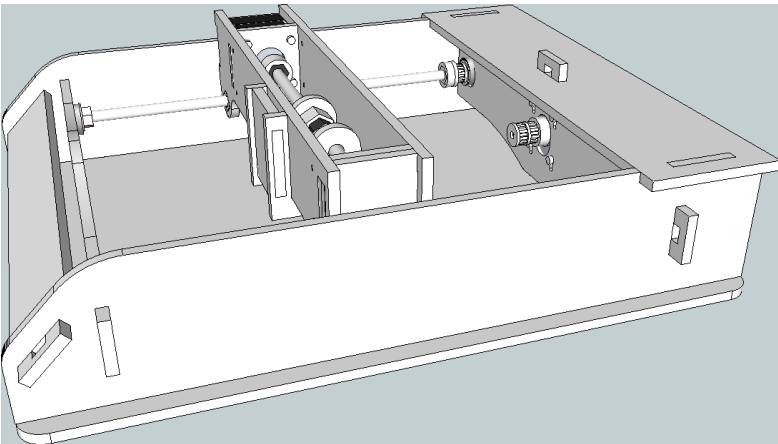
Section 4 : Complete!

(Belts removed from view)



Section 5 : The Whole Frame

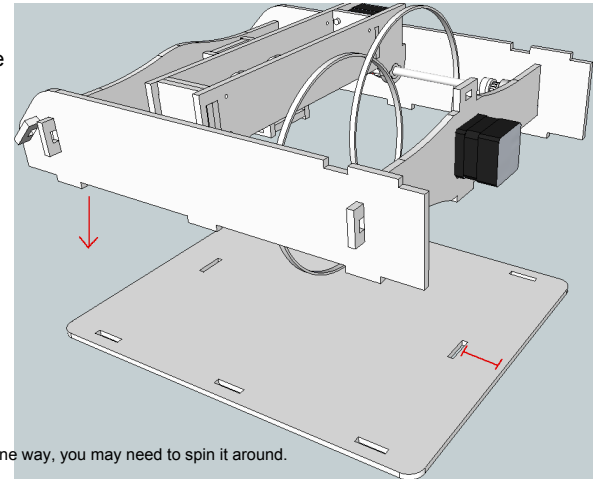
(Belts removed from view)



Section 5 : Step 1

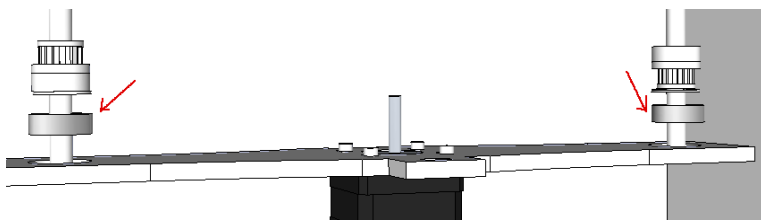
Parts

1 x CNC Base Plate

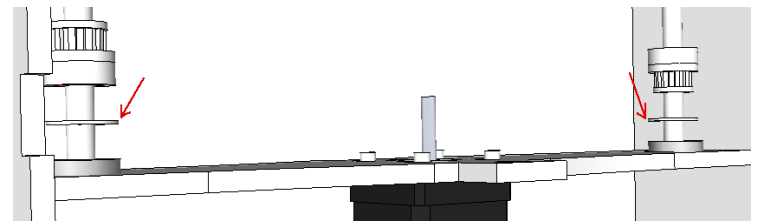


The base plate only fits one way, you may need to spin it around.

Section 5 : Step 2



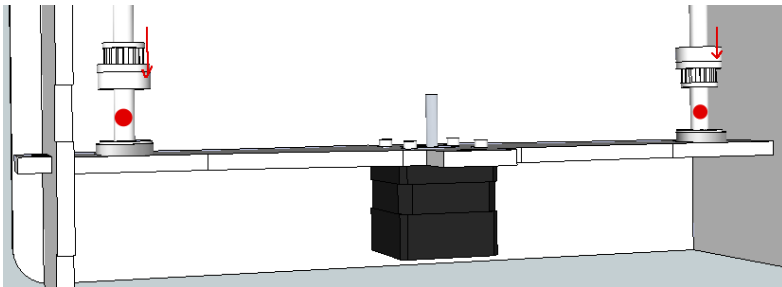
Section 5 : Step 3



Section 5 : Step 4

Small dab of glue before doing up.

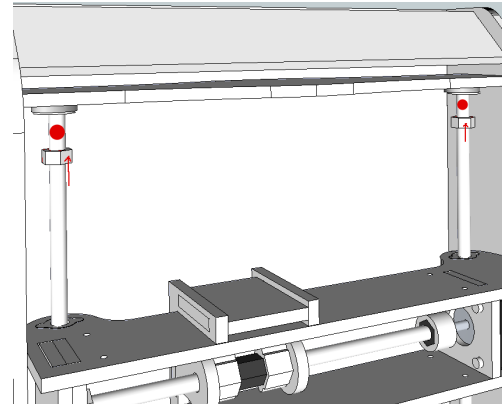
The all-thread should fit comfortably in the bearing, but not poke through the hole at the back (it is just for adjusting).



Section 5 : Step 5

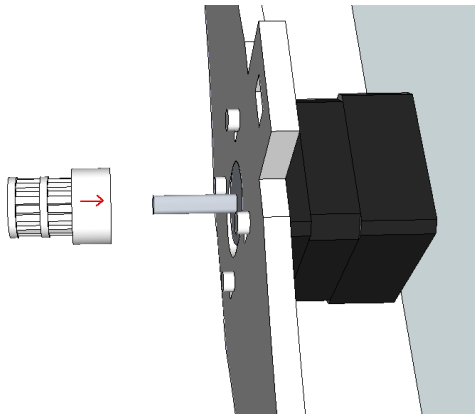
Small dab of glue before doing up

There should be no slop, but the all-thread should move smoothly.



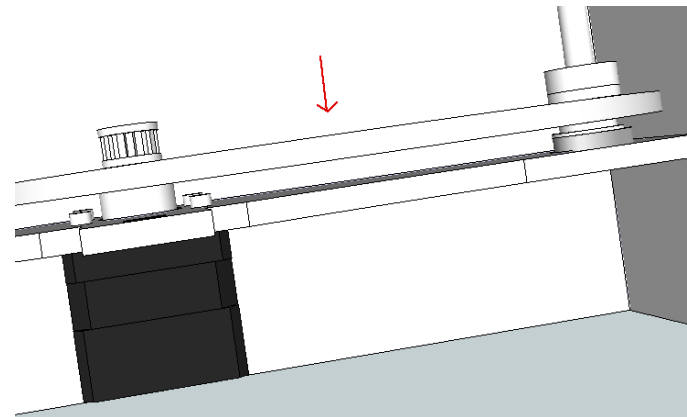
Section 5 : Step 6

Line up the teeth with the ones on the all-thread



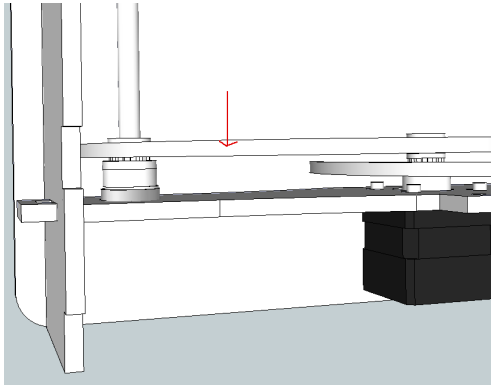
Section 5 : Step 7

You will have to turn the belt on.



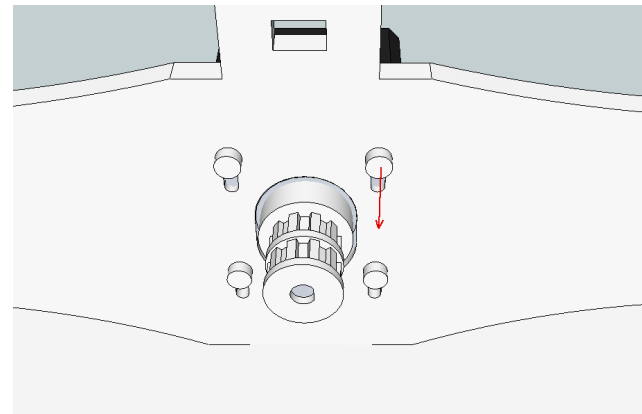
Section 5 : Step 8

This belt will need turning on too. Before turning on, try to get the gantry level by rotating the all-thread. Turn on by rotating the stepper.



Section 5 : Step 9

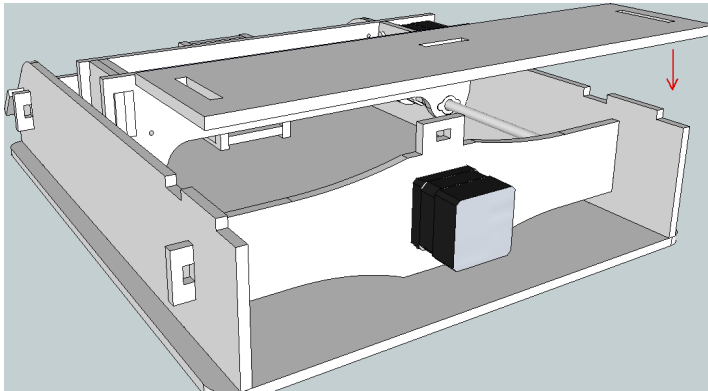
(Belts magically invisible!)
Slide the stepper down to increase the tension on the belts.



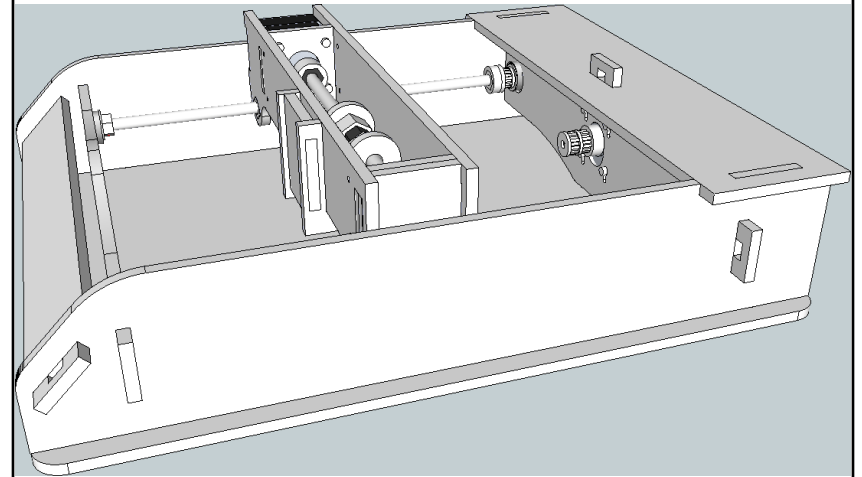
Section 5 : Step 10

Parts

1 x CNC Top Plate.



Section 5 : Complete!



Frame Complete!

Now to Assemble the Electronics.

Thank You

A big thank you to everyone who helped develop this project.
Without everyone's contribution, it simply wouldn't be possible.

Andy Geleme
Jon Oxer
Shane Rogers
John Bosua
Dave Chanter
Rob Brittan
Bob Powers
Michael Sullivan
Stuart Young
Luke Weston

And all the crew at CCHS.