Whittle CNC
Big Results

Assembly Instructions

Last Updated: 12/12/2016

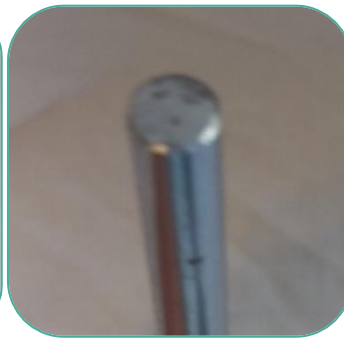# Table of Contents

The shafts have one Cut side (A) and one Sanded side (B).

Only push the sanded side (B) through bearings.

A   **B**

Step 1

Parts List

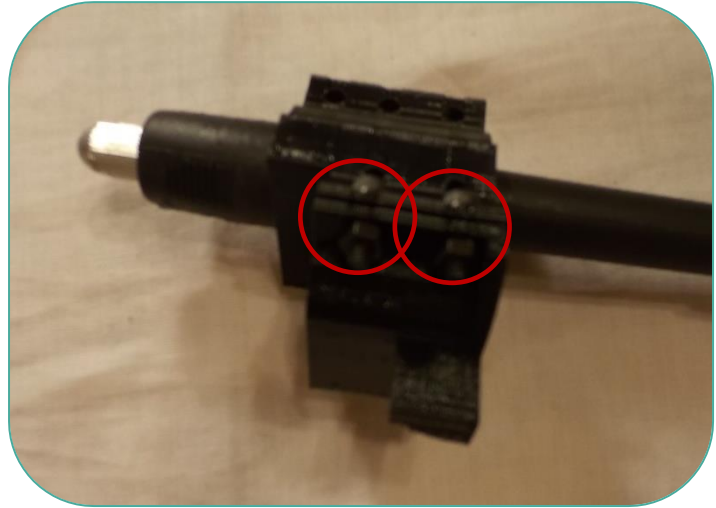| Bag #1 |
| --- |
| Flex Shaft |
| Z-Shuttle |

Insert the bearings into the bottom of the Z-Shuttle.

Insert 2x 10mm Bolts into each side of the Z-Shuttle and secure with Hex Nuts.

Insert 3x 20mm Bolts into the front of the Z-Shuttle and secure with 3x Hex Nuts.

Step 2

Parts List
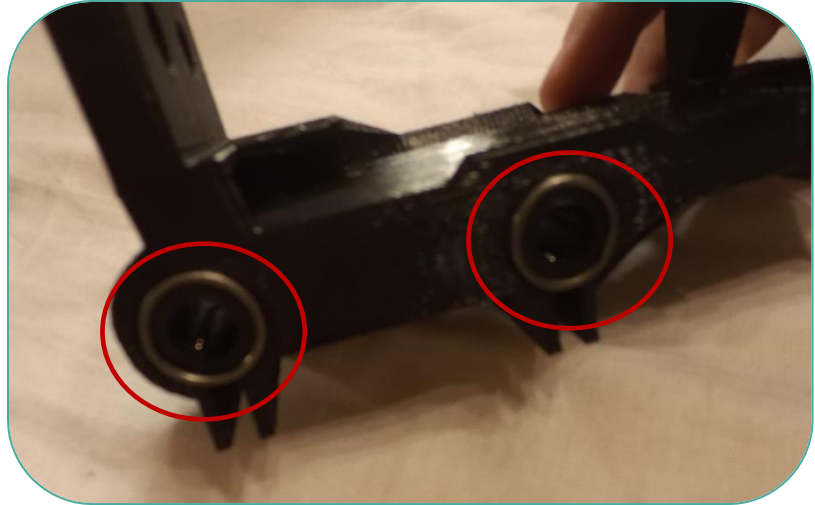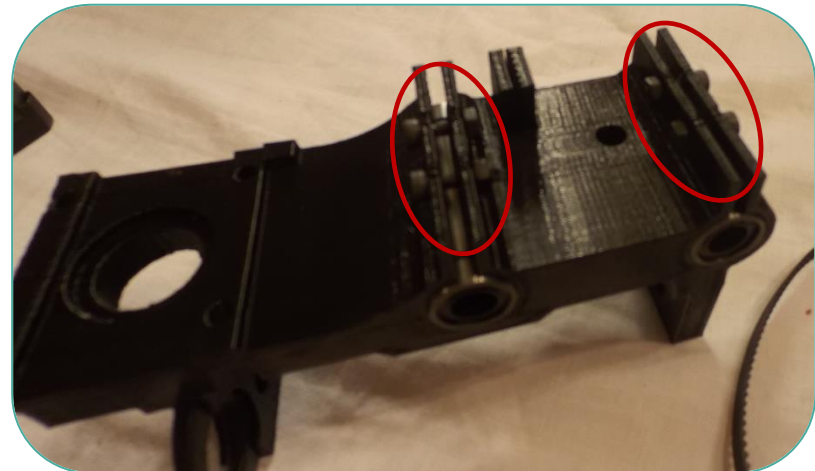### Bag #2
1x Stepper Motor
X-Shuttle

Attach the Belt Pulley to the Stepper Motor. *Make sure the set screw is against the flat side of the shaft.*

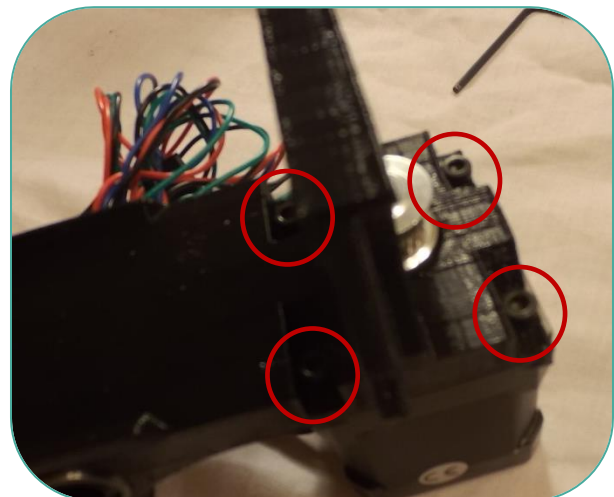**Insert Bearings into the X-Shuttle.**

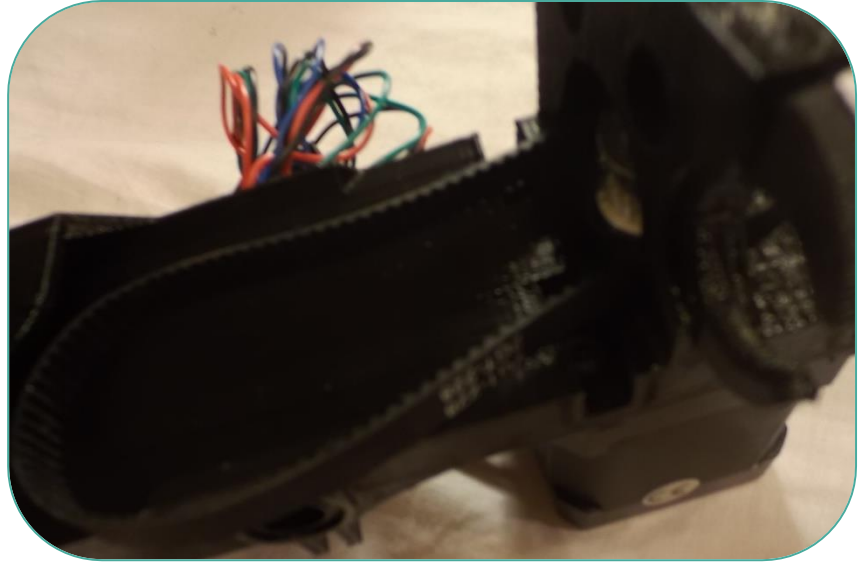**Secure bearings with 4x 10mm bolts and 4x hex nuts.** *Do not fully tighten at this point.*

Secure the Stepper Motor to the X-Shuttle using 4x 10mm hex bolts.
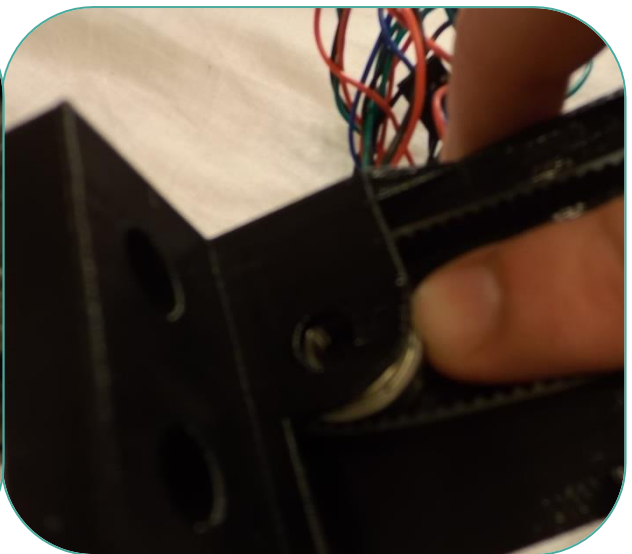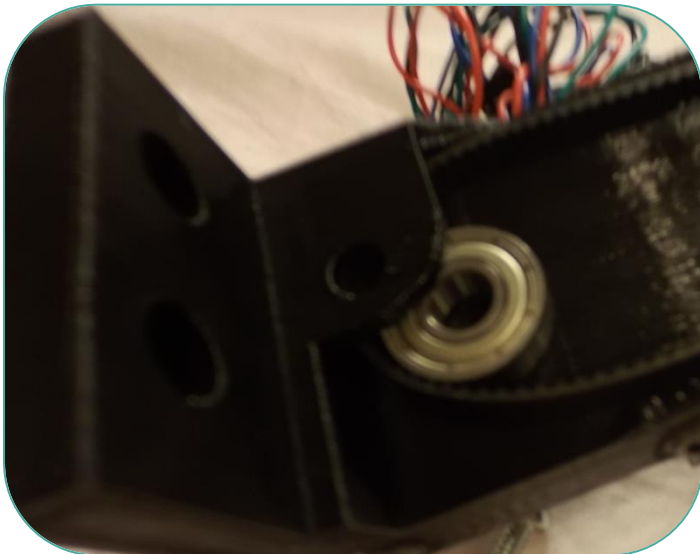
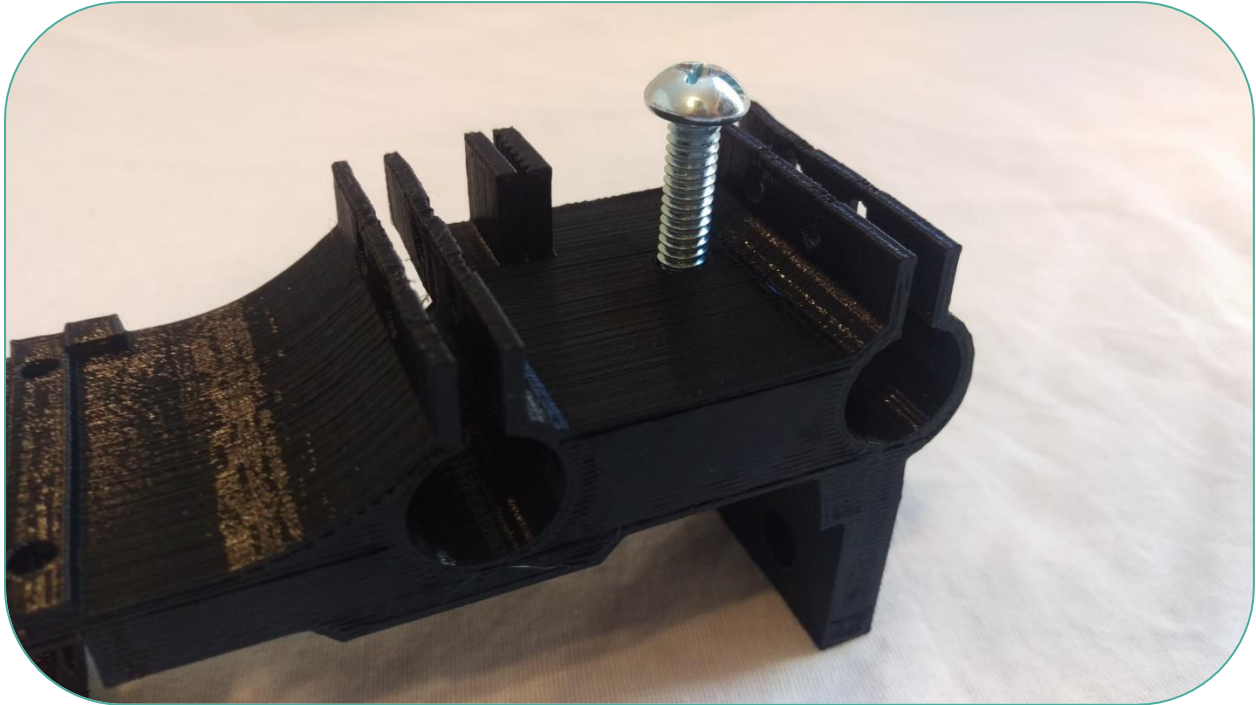*Orient the Motor so the wires are facing up.*

Insert the Belt so it goes around the Belt Pulley.

Place the bearing against the belt and push into place.

While holding the bearing in place

insert the 1/4"x1" bolt and tighten.

Step 3

Parts List
Bag #3
Y-Shuttle Right

Insert the bearing and secure using 4x 10mm bolts and 4x hex nuts.
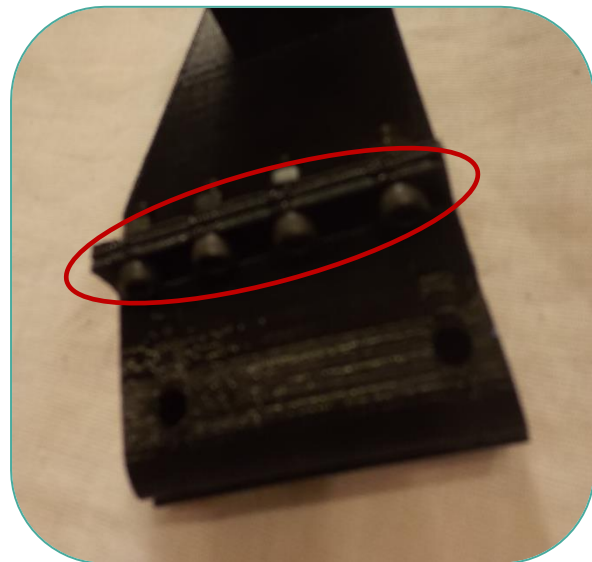
Take the 1/4"x1" bolt and place the larger washer, bearing, and smaller washer on it.

Install the unit from the previous step on the rear of the Y-Shuttle Right. *Do not over tighten.*

Install the remaining screw on the bottom of the Shuttle *(Updated to a Black Screw)*.
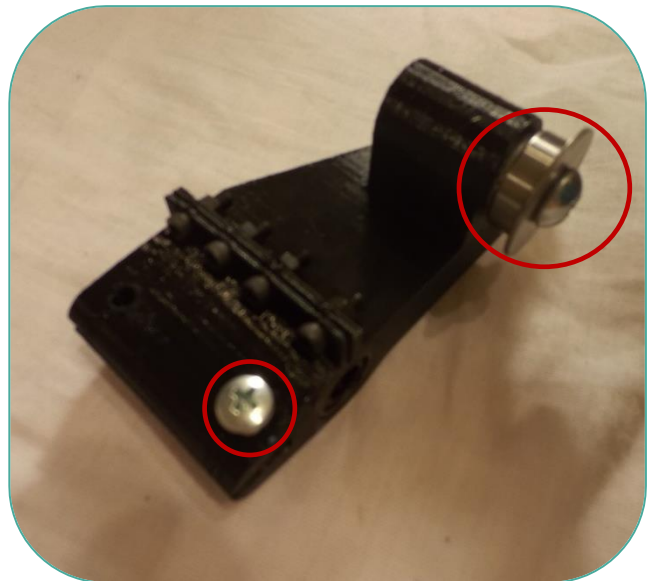
Step 4

Parts List
Bag #4
1x Stepper Motor
Y-Shuttle Left

Insert the bearing and secure using 4x 10mm bolts and 4x hex nut.
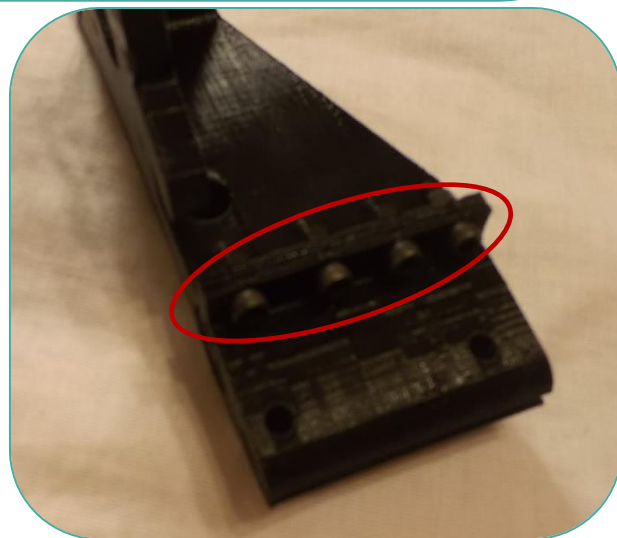
Install the Stepper Motor using 4x 10mm bolts. *Orient the motor so the wires are pointing up (away from the bearing).*

Attach The Pulley to the Motor Shaft Ensuring the bolt is against the flat part of the shaft (not pictured)

Step 5

Parts List

Bag #5

1x Stepper Motor

Left Rear Base

Attach the Pulley to the Stepper Motor.
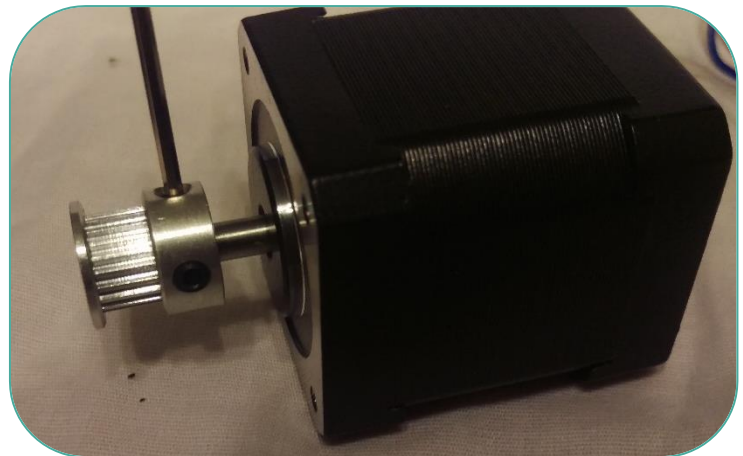
Attach to base to the Motor Using 2x 10mmM3 bolts.
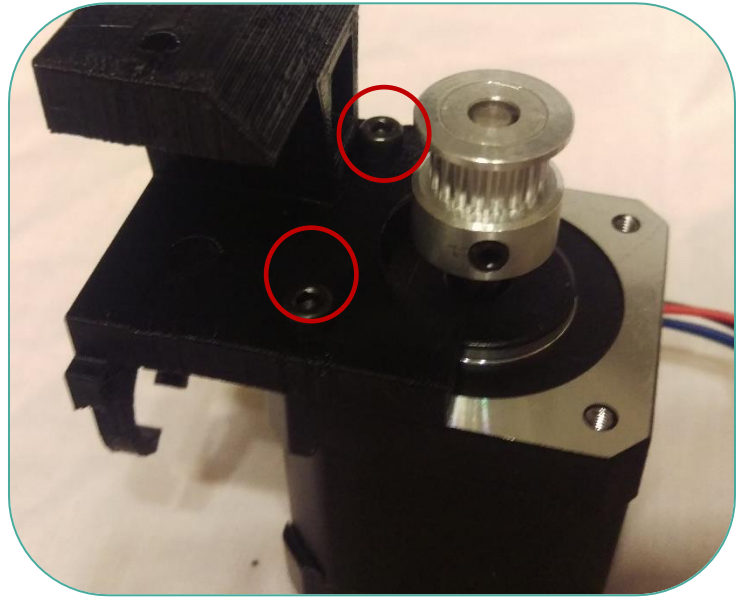
Step 6

Parts List
Bag #6
3x Remaining Base Pieces

Start the 1x Screw into the top of a base section. Then Insert 1x Large Washer, 1x Bearing, 1x Small Washer, and 1x Large Washer. Then screw the screw completely into the base.

Be Sure not to over tigthen as this will bind the bearing.
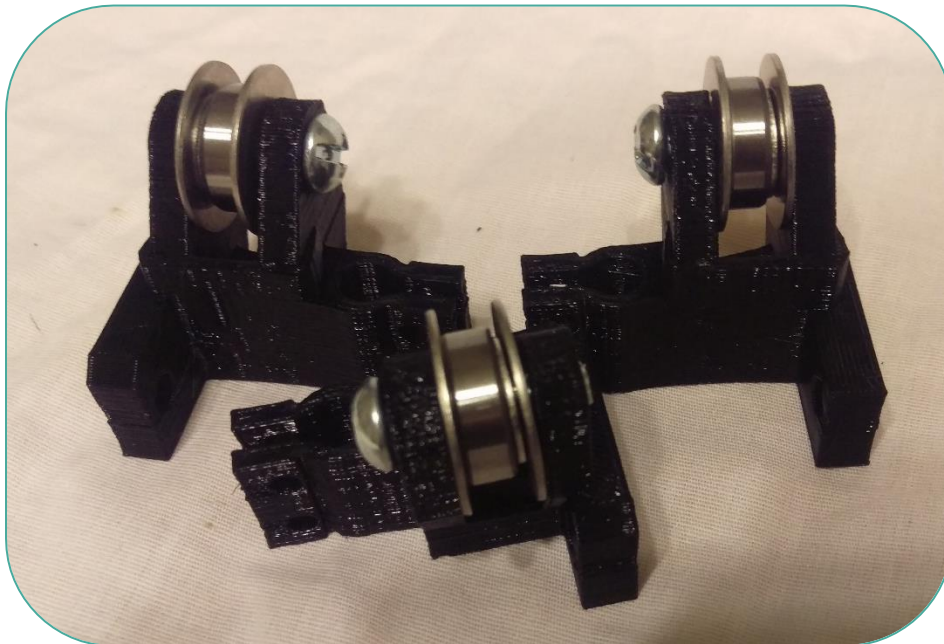
Step 7

Parts List
Bag #7
Black Frame
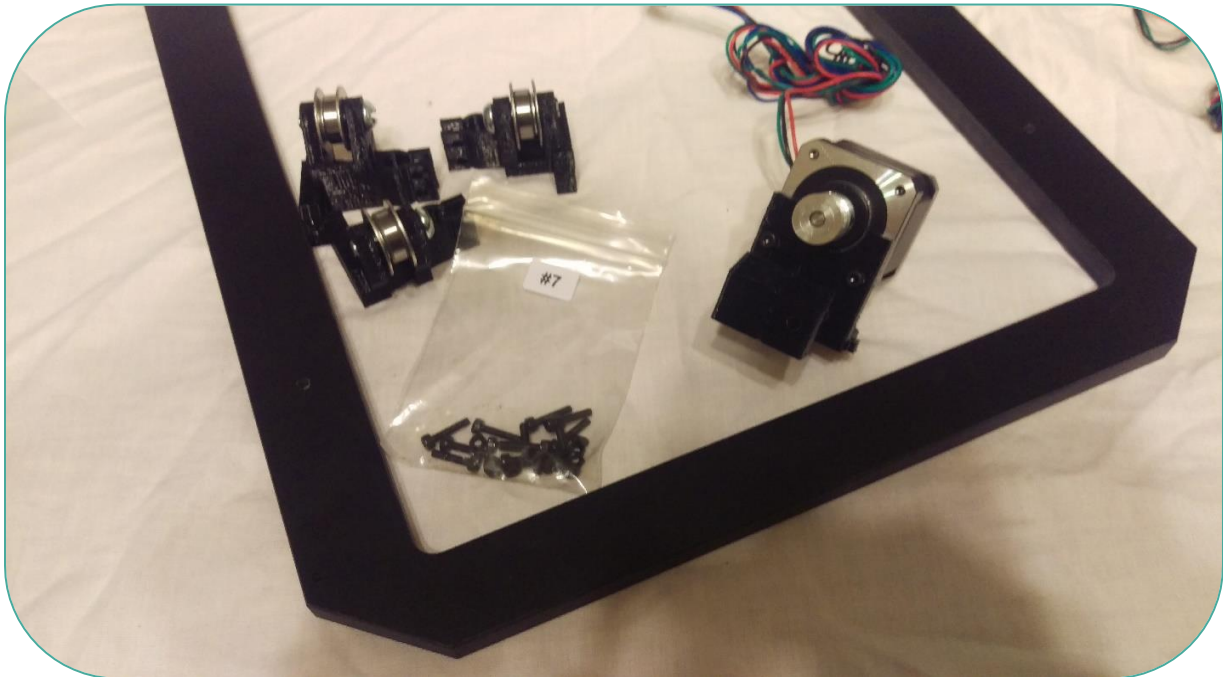### 3x Parts from Step 6
Part from Step 5

Insert 2x Screws into the top of each base and secure with 2x Nuts.
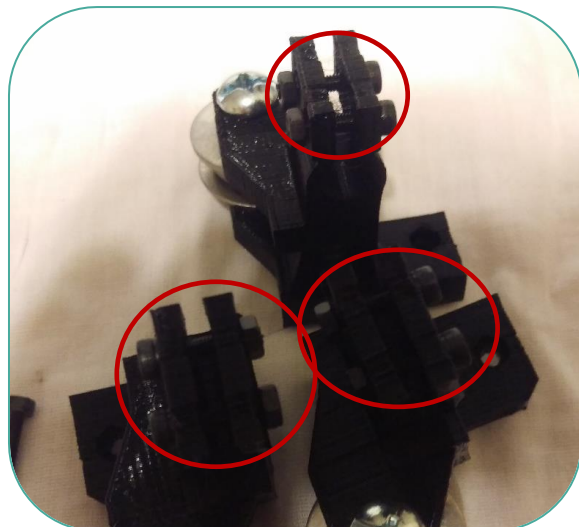
Attach all 4 Base sections to the frame with 4x 14mmM3 and secure with hex nuts. Insert the Bolts into the underside of the frame. *(The underside has countersunk holes)*

Front Left   **Front Right**
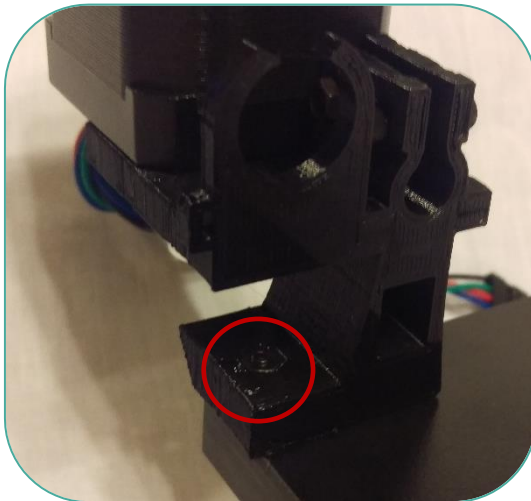
Rear Left   **Rear Right**
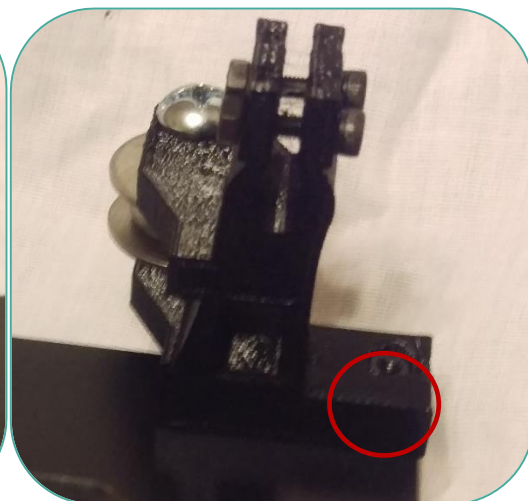
Step 8

Parts List

Parts List
2x 100mm Rods
X-Shuttle
Z-Shuttle

Push the Z-Shuttle onto the Belt.

It will be snug.

Insert the Rods in the X-Shuttle Securing the Z-Shuttle.

For rigidity, these will be very snug. They will take some working to get in.
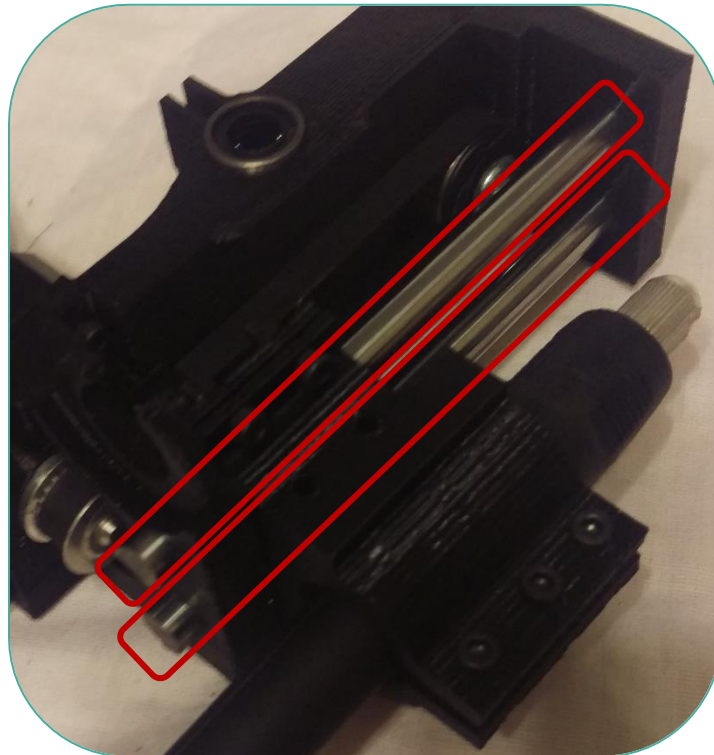
Step 9

Parts List

Previous Step Part

2x 300mm Rods

Y-Shuttle Left

Y-Shuttle Right

Insert the Rods Into the Y-Shuttle Left.
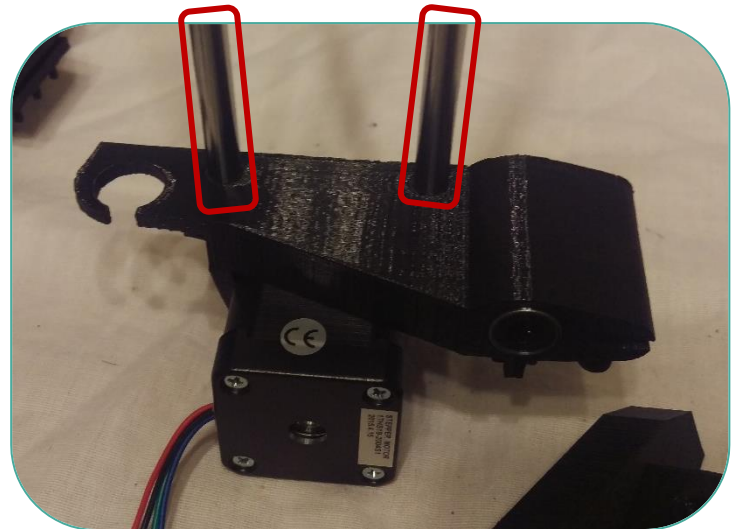
Slide the X-Shuttle onto the Rods.
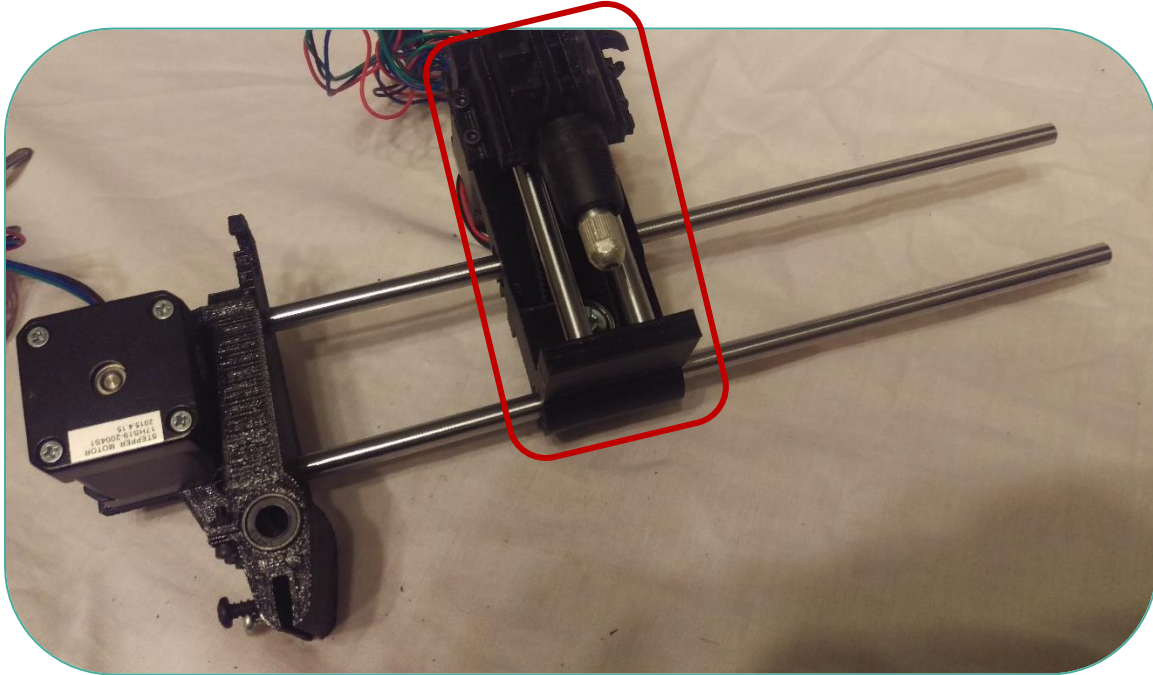
Attach the Y-Shuttle Right to the Rods.
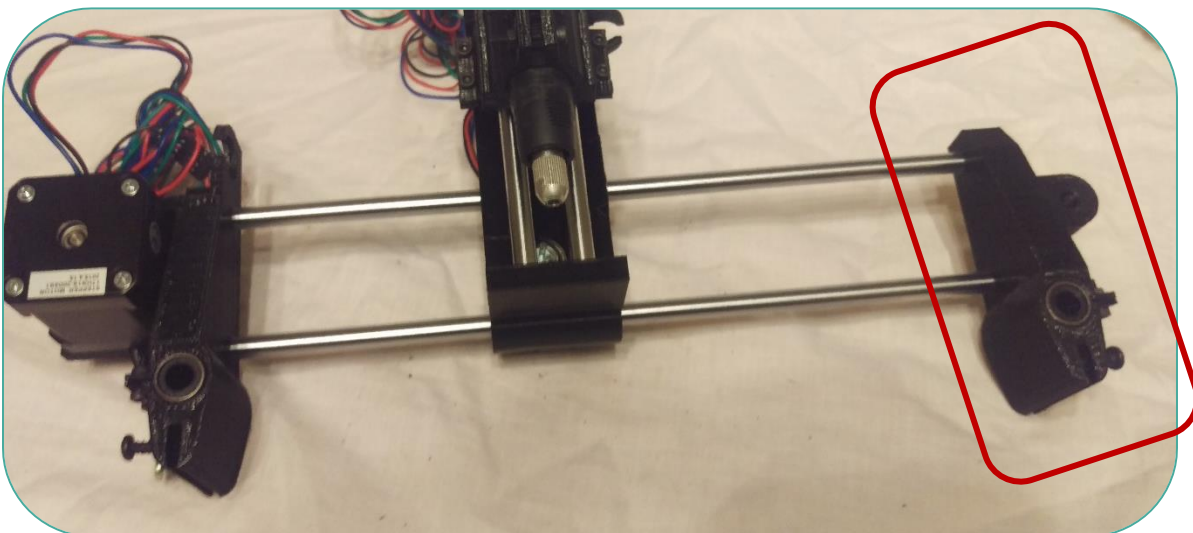
Step 10

Parts List

| Frame |
| 2x 400mm Rods |
| Previous Step Part |

Insert the Rods Partially. Around 70%.

Slide the X-Shuttle onto the Rods.
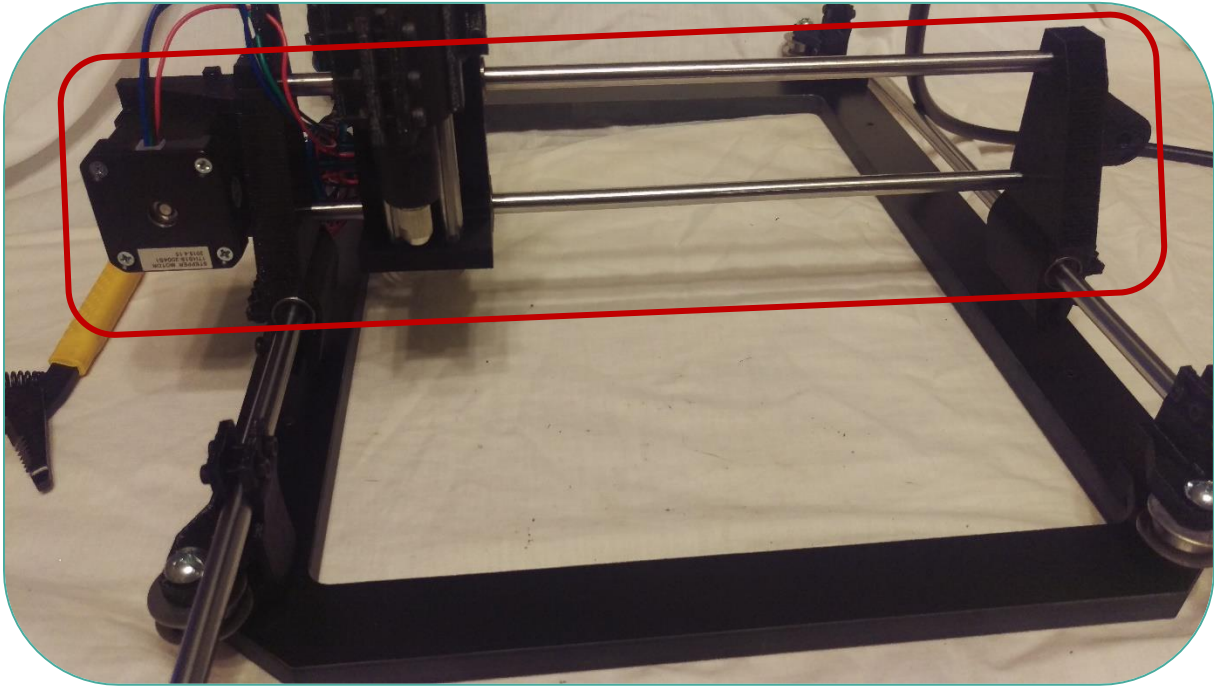
Push the Rods Competely In and Tigthen all 4 Sets of Base Clamp Screws. *(The Screws that tigthen the clamps on the Rods)*
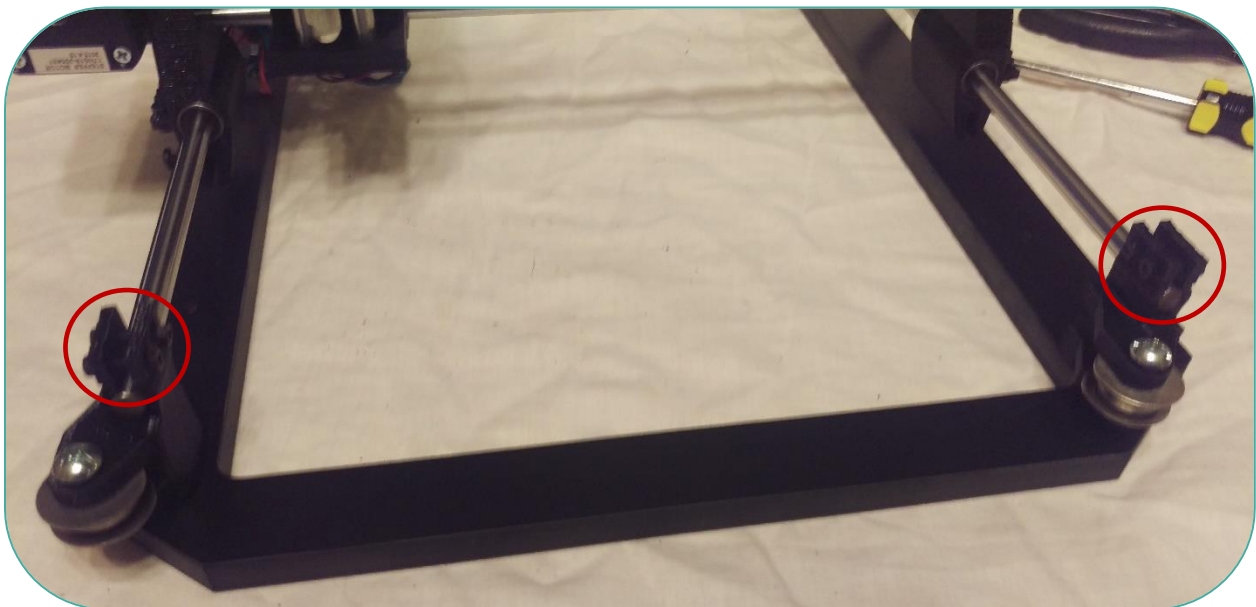
Step 11

Parts List
Belt Bag
WhittleCNC
Zip Tie Bag

Belts are a longer then needed and will require cutting to size after everything is connected and working.

Below is an overview of where the three different belts will go.
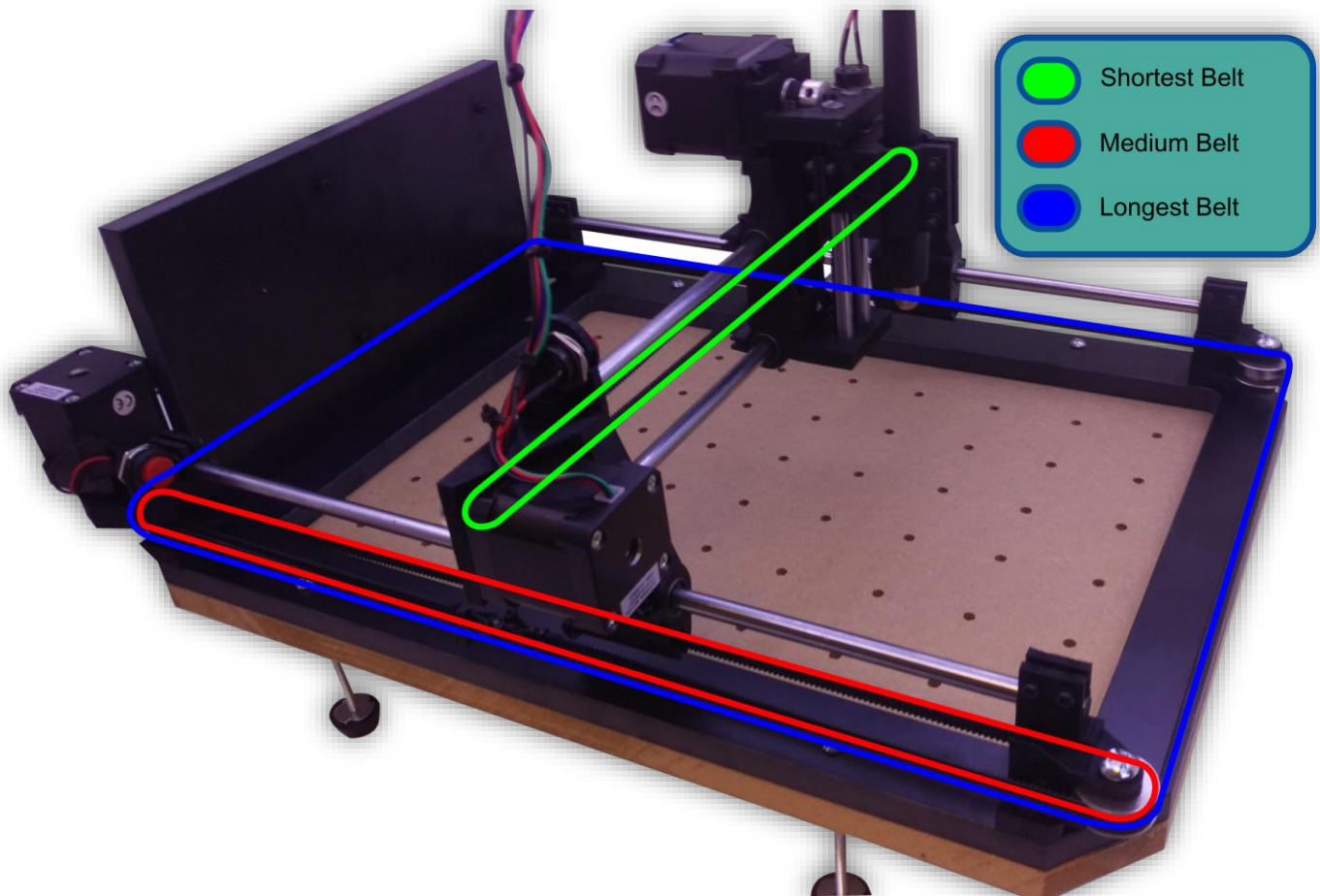
Take all 3 Belts and Zip tie one end as shown.

Insert the shortest belt into the Rear Side of the X-Shuttle.

Wrap the belt around the pulley and bearing and zip tie the end of the belt so it is ¼" from the other end. Zip tie the ends together.
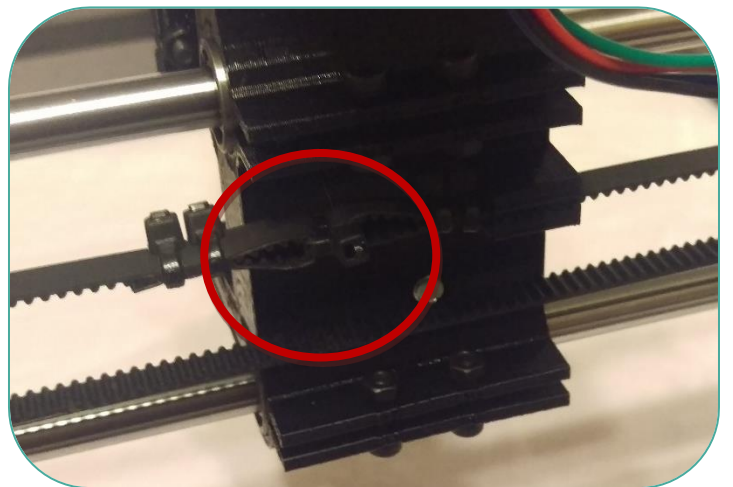
Take the medium length belt and repeat the previous step on the left size of the WhittleCNC. *(The Y-Motor Side)*

Take the longest belt and attach it to the previous belt in the following configuration.
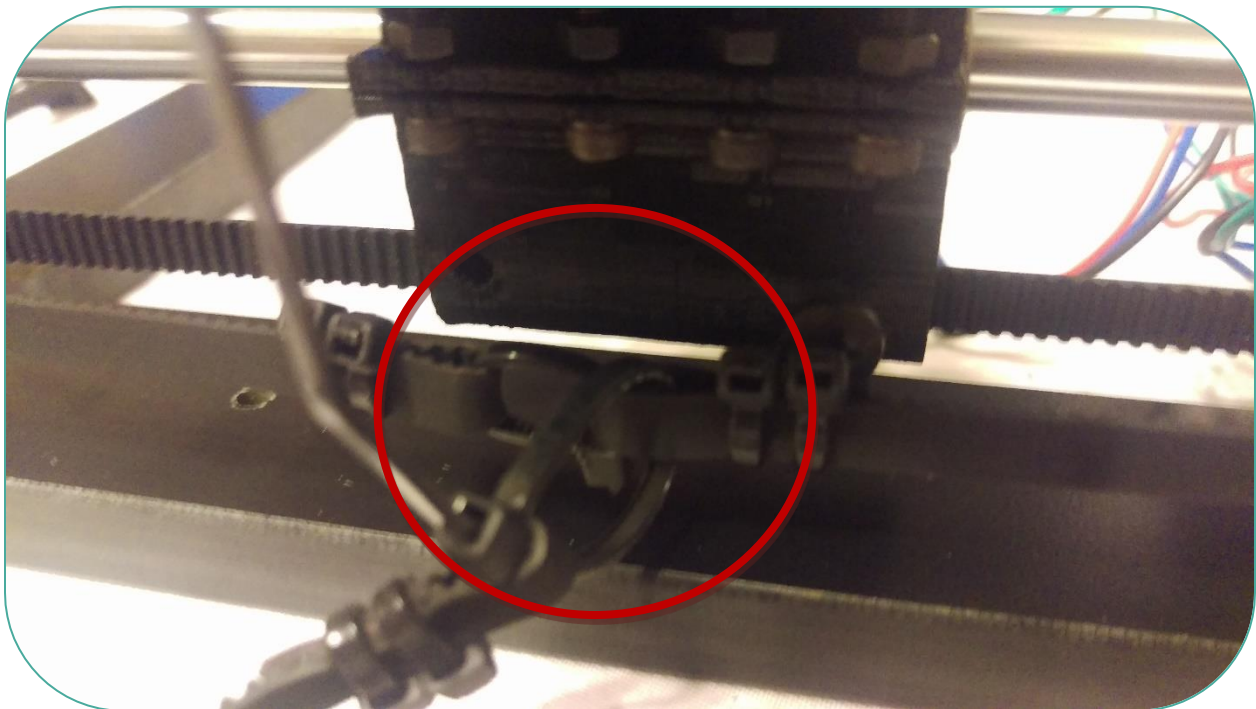
Feed the belt through all four sides of the WhittleCNC and secure the end to the previous belt. It will be secured to the side that the current belt is not already attached to. So the zip ties will criss cross.
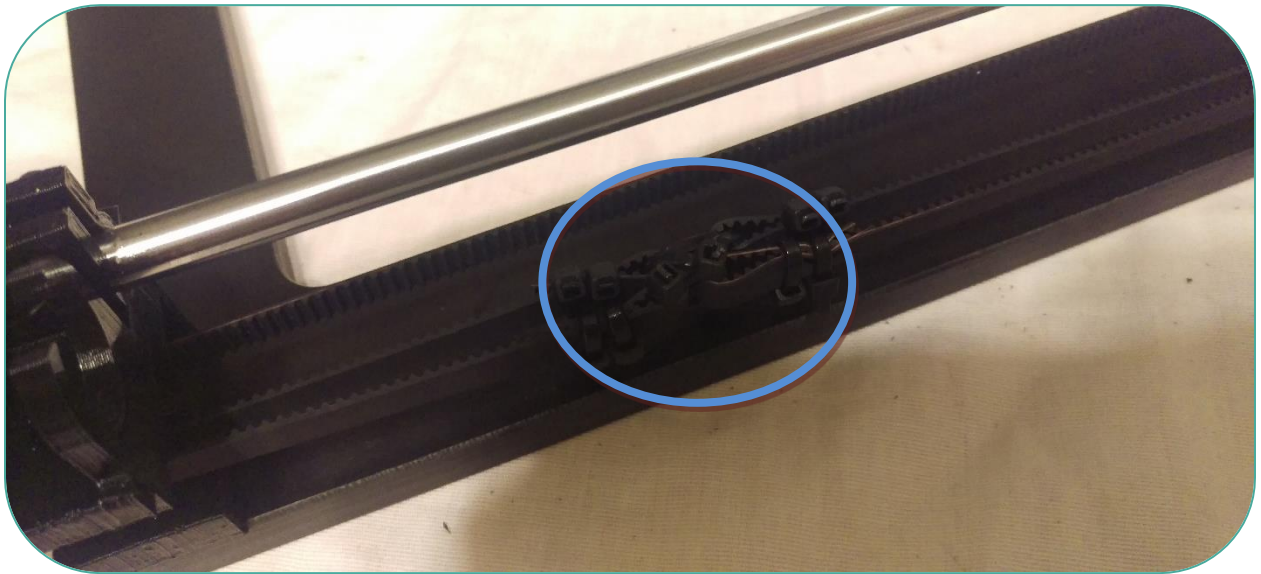
Push the Gantry all the way to the back and move the Zip Tied Belts (Pictured Above) all the way to the front.
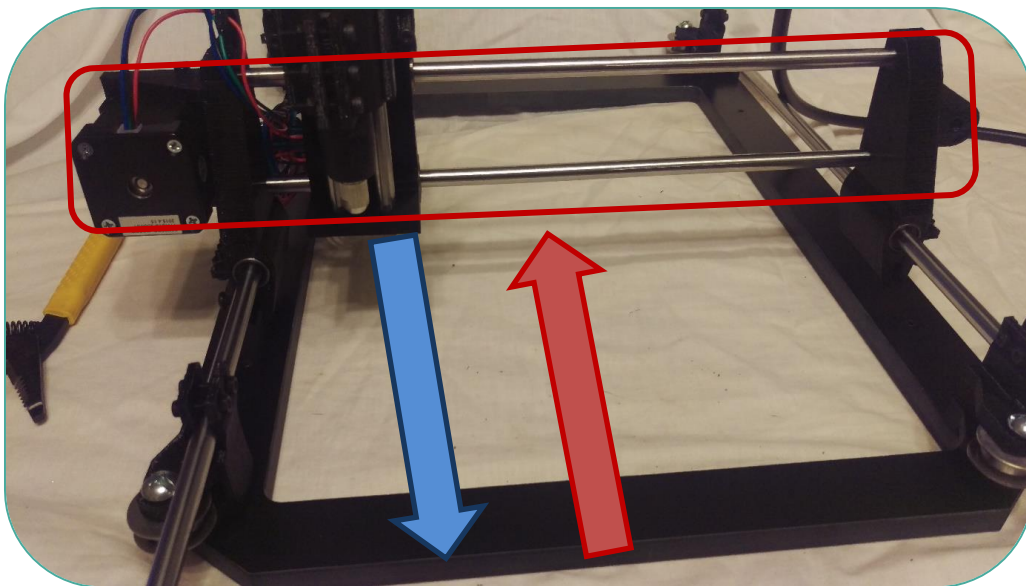
Tighten the Set Screw on the Left Side of the Gantry to the Belt.
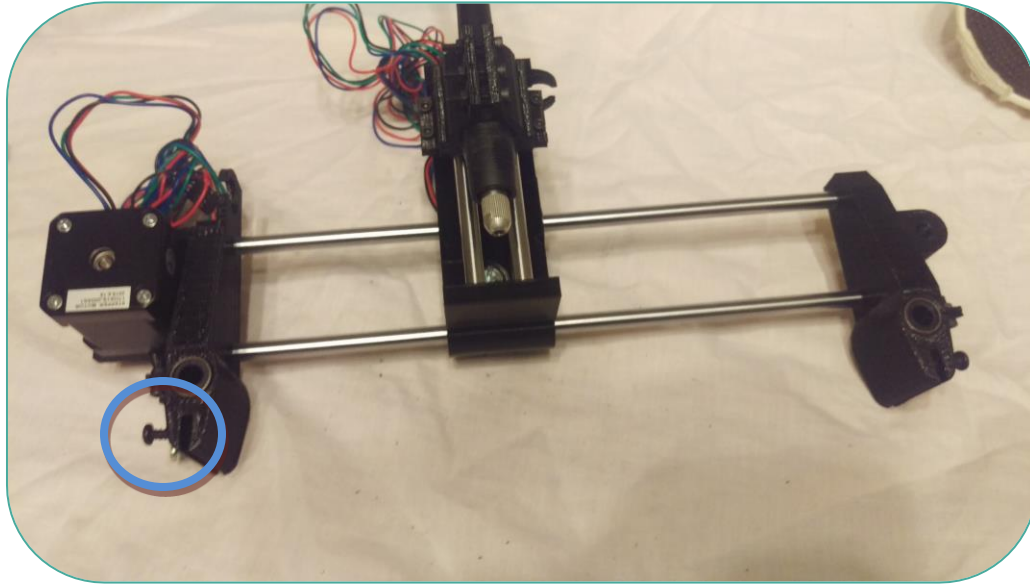
Push the Gantry all the way to the front. Now tighten the right set screw.
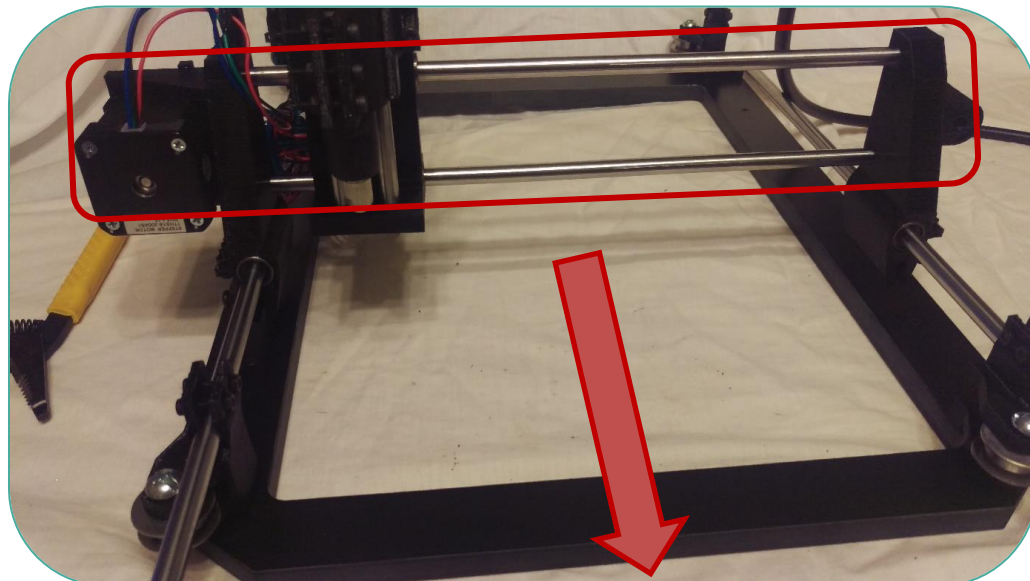
Step 12

Parts List

Bag #8

Power Supply

Frame Back

Secure the Power Supply to the Back on the Frame. *The Power Supply will be to the left of the Frame back when oriented correctly.* Due to updates, you may have two sets of Bolts to Attach the Power Supply to the Frame. If one set is too short use the other provided set. (4x14mm & 4x16mm)
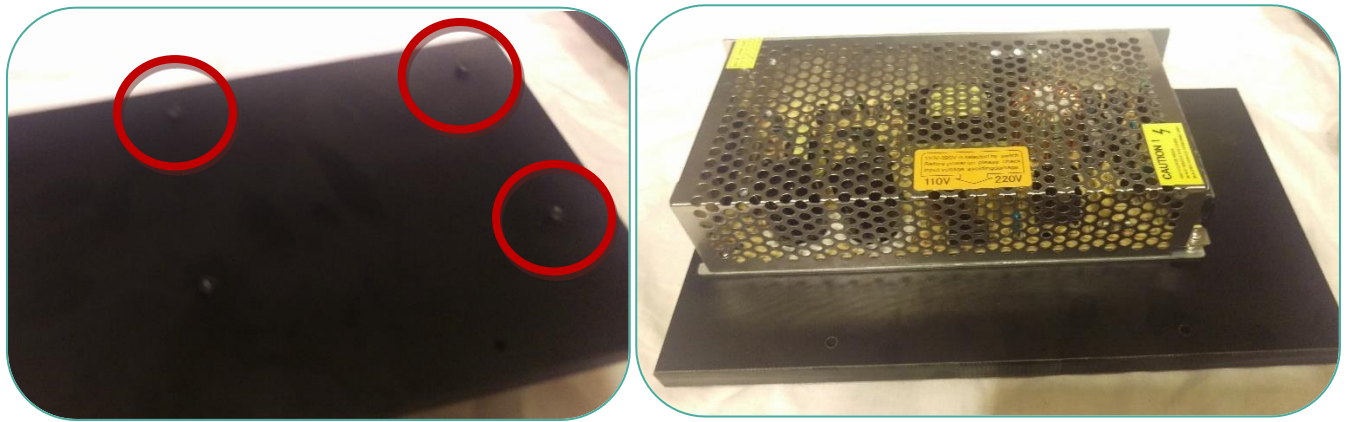
Use 2x 20mmM3 bolts to attach the Back to the Frame.
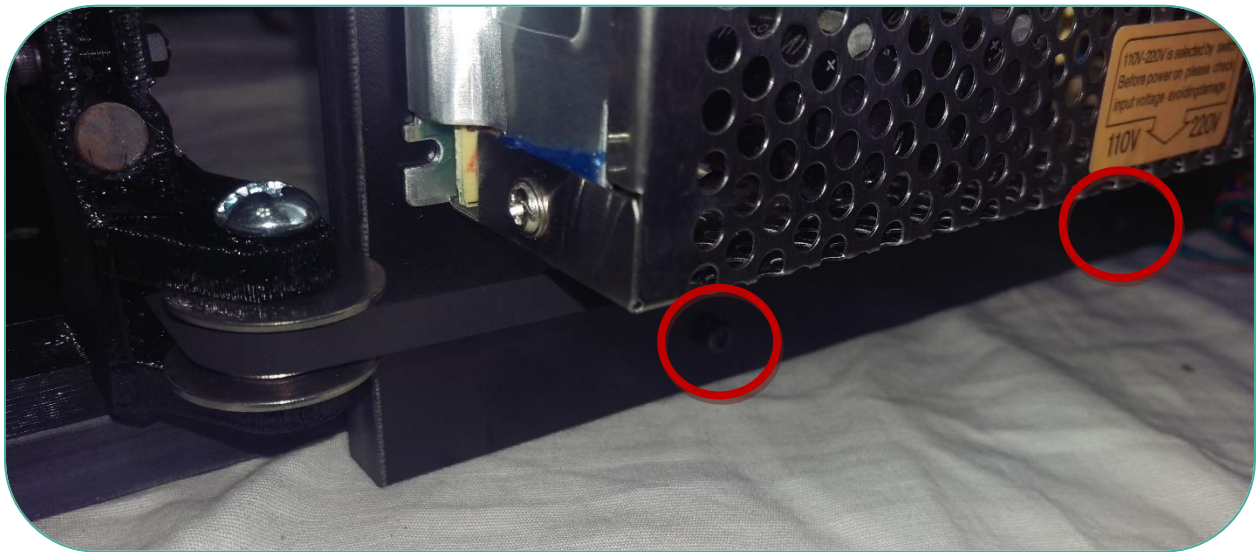
Step 13

Parts List

WhittleCNC
Bag with Feet
Cutting Bed

Insert the 8-32 x 3" Screws into the 4 holes of the frame.
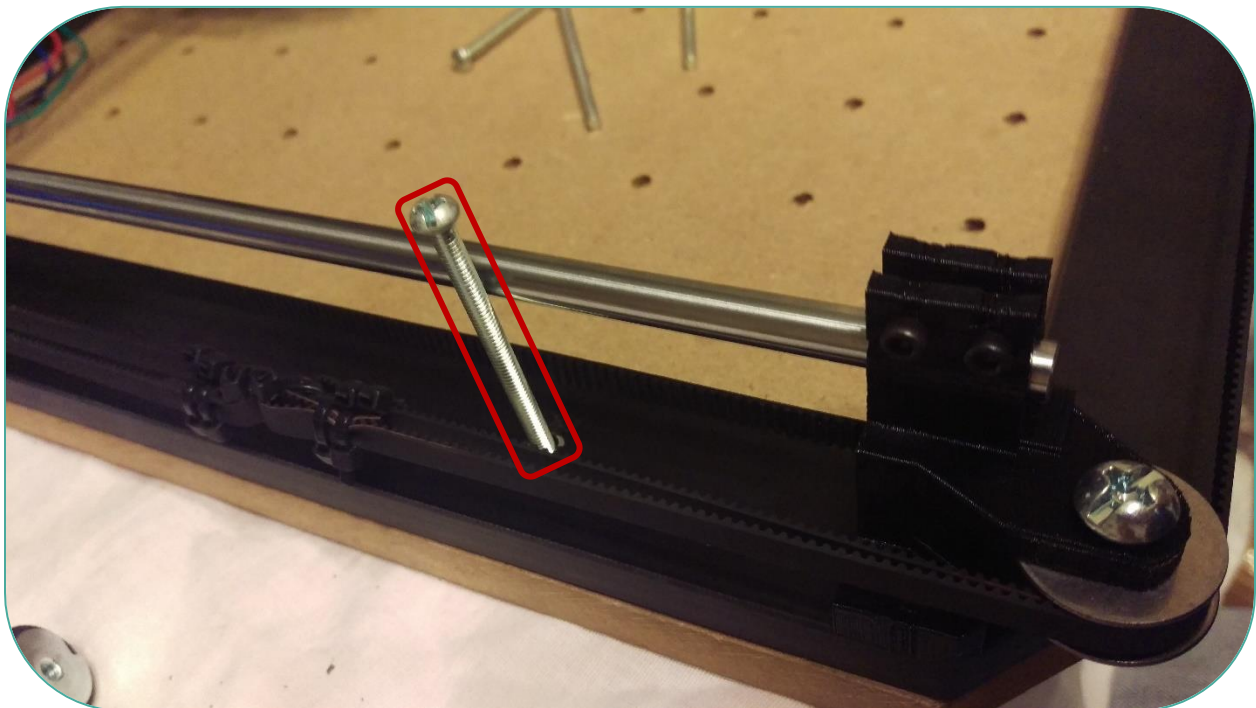
Attach the feet to the bottom of the Screws.

Step 14

End Stops

Parts List

WhittleCNC
Bag with End Stops

Install the End Stops as Shown Below.
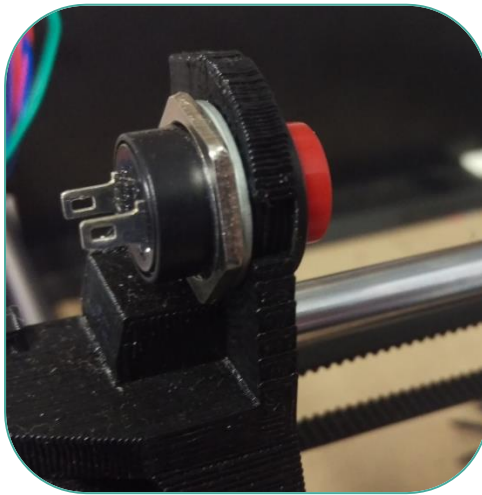
X Axis   Z Axis

Y Axis *(This End Stop switch comes pre wired)*
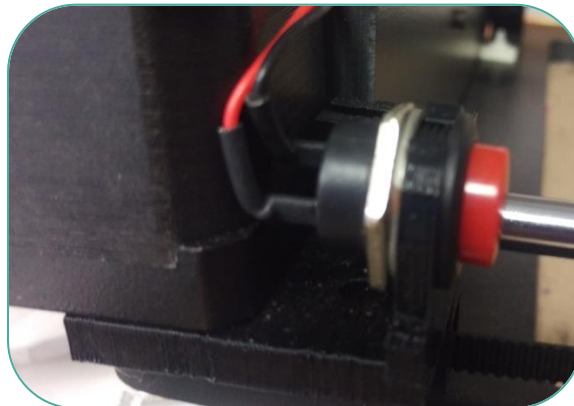
Push on the connectors for the Z and X End Stops
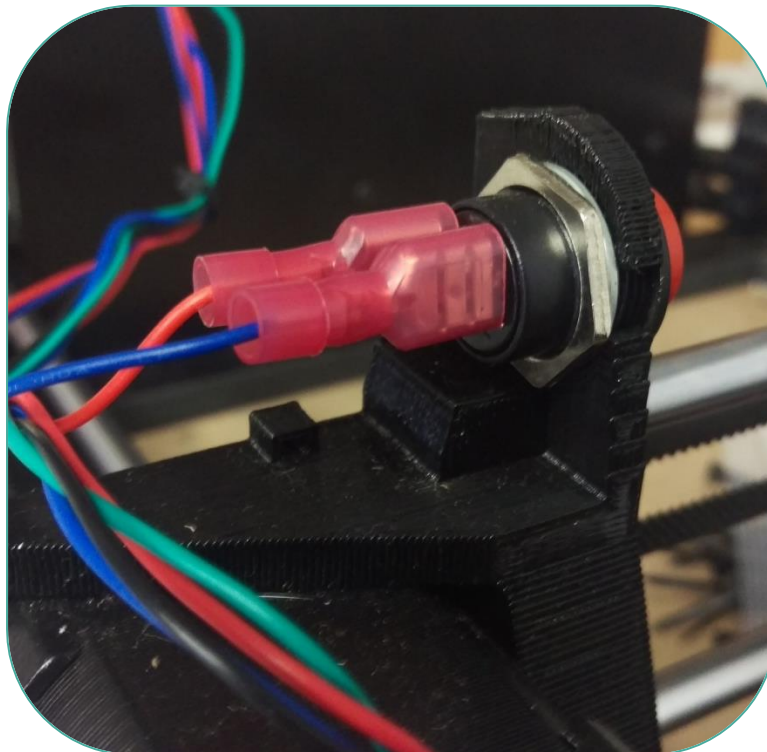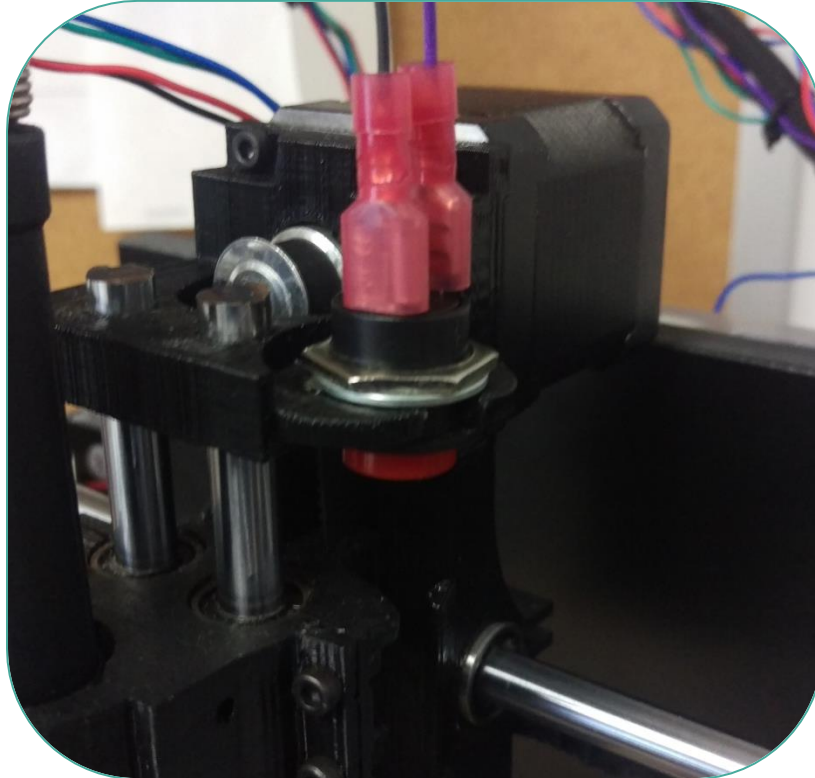
Step 15

Wiring

Parts List
Bag #8
Control Board
Fan

Connect the control board to the Power Supply in the following configuration: 8mmM3 bolt, Control Board, Spacer, Power Supply at the #1 location.

Secure the Other Side (#8) Using the Adhesive Support Connect the fan to the Power Supply using 20mmM3 bolt at the #2 location.

Attach wire connectors to the following locations:

3. Z-Axis Motor

4. Y-Axis Motor

5. X-Axis Motor

6. Power Supply Wire

(Black Left, Red Right)

7. Fan

(Lower two Pins Pictured)

Detailed connection guide on Page 41.
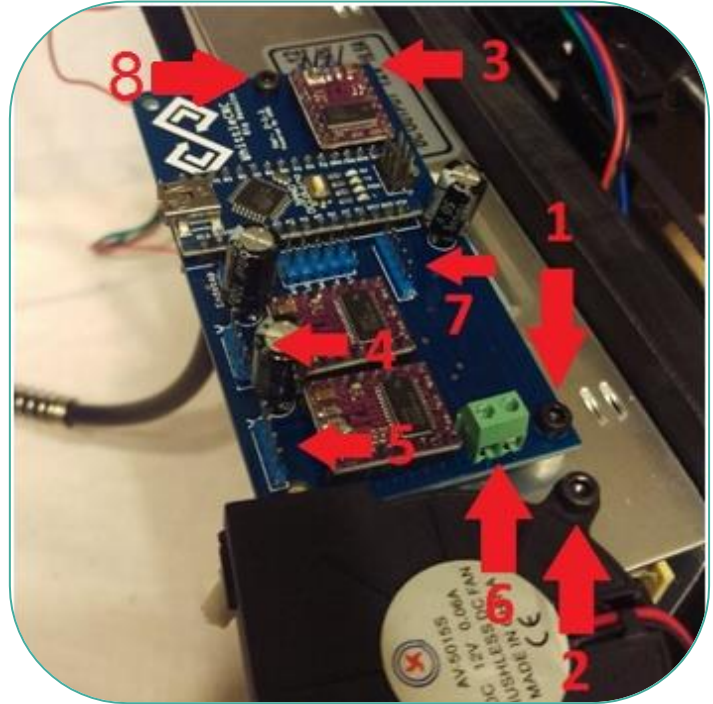
Ensure the correct supply voltage is selected using a small screwdriver.

Attach wires to the
following locations:

1. Control Board Red Wire

2. Control Board Black Wire

4. Power Cord Black or Brown

5. Power Cord White or Blue

3. Power Cord Ground
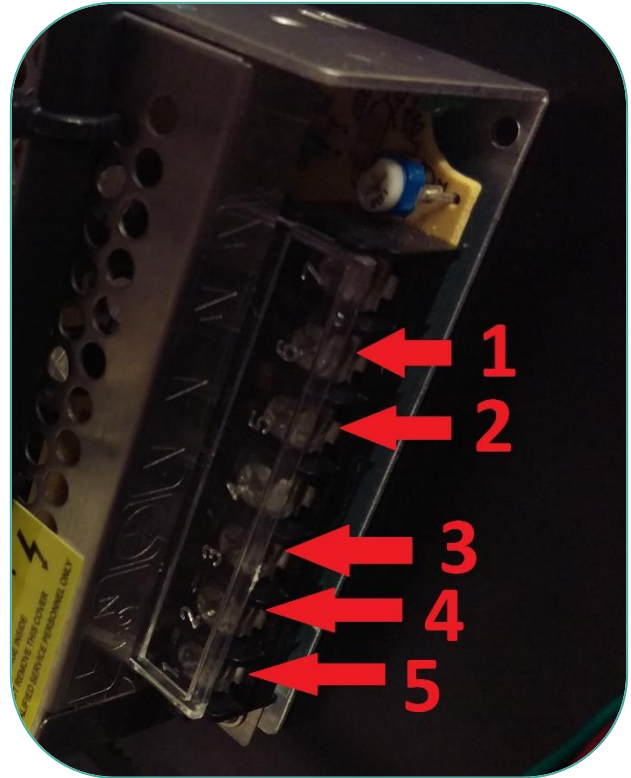
Take two zip ties and bend them as
shown
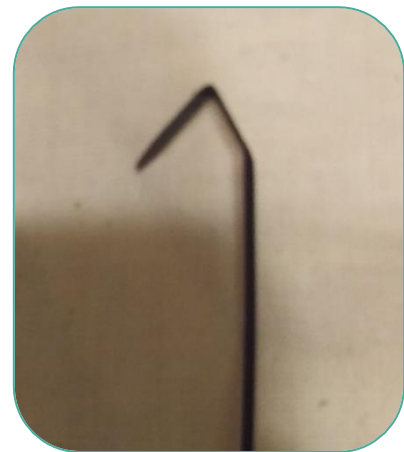
Push them Into the power supply and pull them through.

Secure the flex shaft to the power supply as shown.
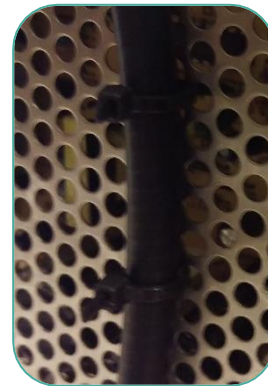
Adjust the potentiometers (dials) on the boards so the flat part lines up with the yellow lines below.

This is the general area they will need to be set and can be adjusted for more or less power to the motors.
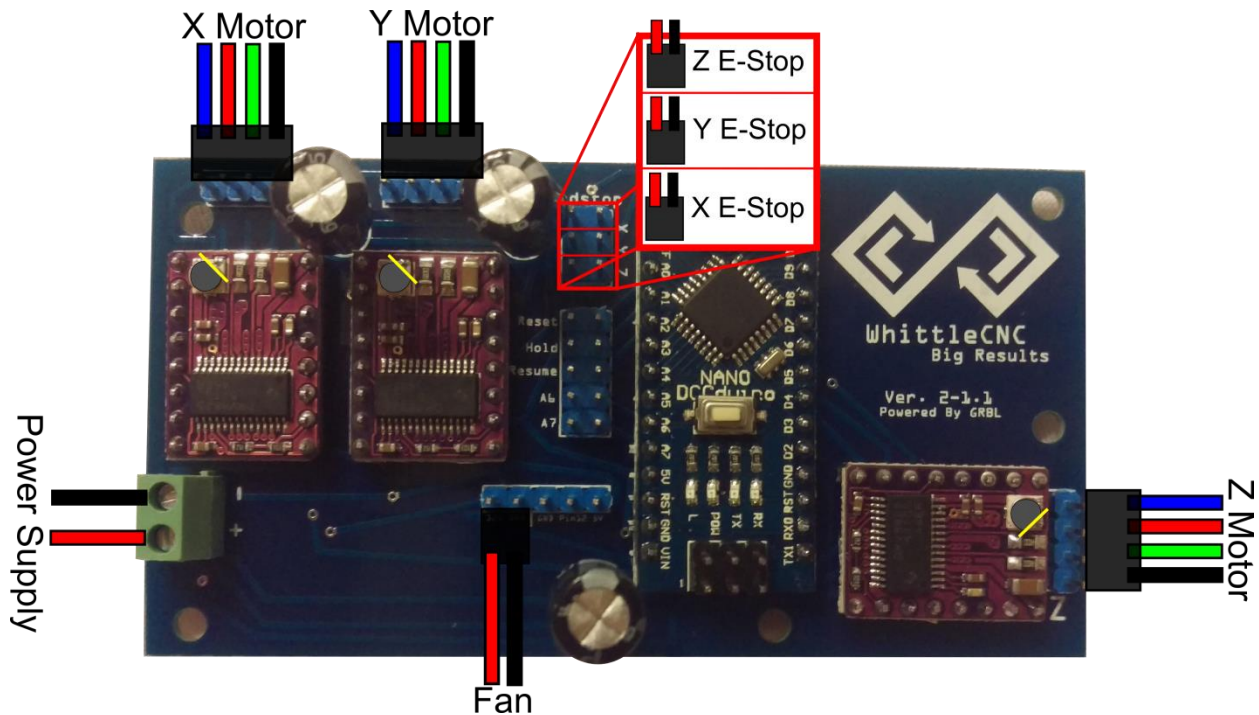
Never Disconnect Stepper Motors when the Board Has Power. This WILL destroy the 3 Stepper Motor Drivers.

Please Note the End Stop Printed Labeling is incorrect. From top to bottom the connections are Z,Y,X as shown in the image above. The Z and X labels are switched.

Step 16

Parts List
Rotary Tool
Flex Shaft

Remove the ring from the collar of the Rotary Tool

Pull the Shaft Out 2" from the Flex Shaft

Insert the Shaft into the Rotary tool and Tighten the Black Collar.
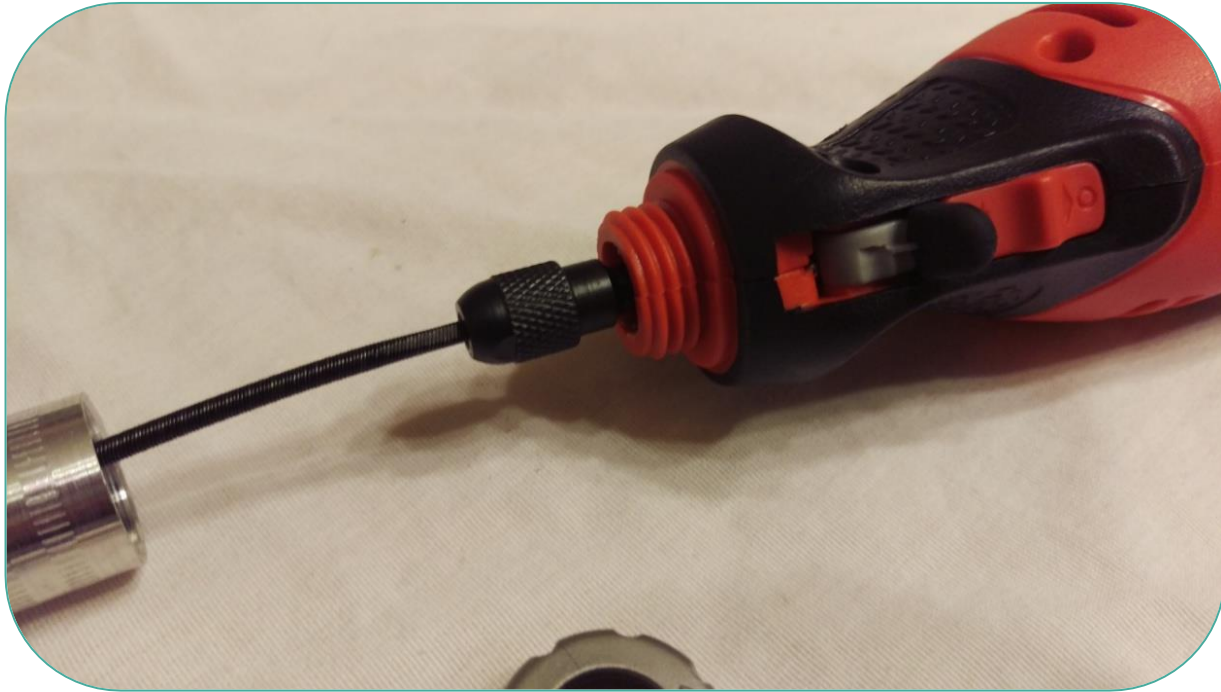
Push the Flex Shaft onto the Rotary tool and Tighten the shaft.

Assembly is now Complete!

For a detailed guide on how to connect your WhittleCNC to Easel and your Computer please go to

http://www.whittlecnc.com/pages/support
"Driver Installation & Easel Setup"

Please remember to monitor the rotary tool and give the tool breaks to cool down if the motor is getting too hot. Depending on your location and environmental conditions it may need a break during cut jobs.

Parts List
Starter Bits
Flex Shaft
Wrench
Shaft Tool

Changing Bits

Insert the Shaft Tool into the hole on the End of the Flex Shaft. *There is an interior hole on the shaft that you can lineup by rotating the shaft.*
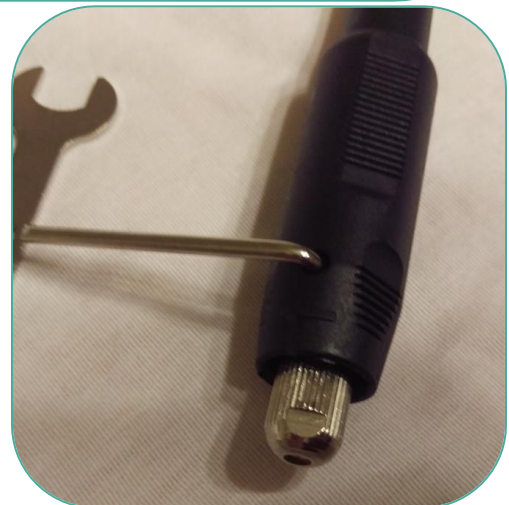
Insert the Bit

Use the wrench to secure
the bit.

Bit Type & Recommended Uses

Ball Nose End Mill

Ball nose (aka contouring) bits are fantastic for 3d carving.. You can carve with just the tip to get great detail and smooth contours or they can move a lot of material just like an end mill.

Burr End Mill

They're great for finishing cuts, but their material removing capacity is limited relative to other kinds of bits. Since they're gentle on the material, they are often used with composites, PC board material, and other layered materials.

Fluted Bit

Great general use bit for many material types and great chip removal. Remember to slow down your cut speed as more material is being removed per pass.

V-Bit

If you want to do lettering or detailed sign making, you'll need to get a v bit. These are sometimes called v-carving bits, v-groove bits, or engraving bits. This is the only way to get a sharp grooved bottom on the inside of those roman numerals.

Recommended Starter Settings

You can increase speeds as you become more familiar with your machine!

Material	Feed Rate	Tool Speed	Cut Depth
Aluminum	40 mm/min	High	0.2 mm
HDPE	355 mm/min	Low	1 mm
Polycarbonate	600 mm/min	Medium	1 mm
Acrylic	400 mm/min	Medium	1 mm
Plywood	500 mm/min	High	.7 mm
MDF	700 mm/min	High	1.5 mm
Foam "Starter Material"	800 mm/min (conservative)	High	2 mm