



## Assembly Manual

Small package. Big fun. Micron.

Introduction	03
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Frame	06
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This printer wouldn't have happened if it were not for all the hard work from the following users on the Voron Discord and Døm Discord

- Deepfriedheroin
- DocSparky
- Finn
- Gfunnymoney
- Kayos Maker
- L.e.o.p.a.r.d
- TheWarolf
- zruncho

## STL FILE KEY

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The STL naming convention used for Micron is the same as that used for VORON printers:

### PRIMARY COLOR

**Example z\_drive\_main\_a\_x2.stl**

These files will have nothing at the start of the filename.

### ACCENT COLOR

**Example [a]\_z\_motor\_mount\_a\_x2.stl**

These files will have "[a]" to the front to mention that they are intended to be printed with an accent color.

### QUANTITY REQUIRED

**Example [a]\_z\_motor\_mount\_a\_x2.stl**

If a file ends with "\_x#", that is telling you the quantity of that part required to build this system..

## PRINT GUIDELINES

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The recommended print settings are also those used for VORON printers:

### FDM MATERIAL

Micron was designed for ABS. Use other plastics at your own discretion.

### LAYER HEIGHT

Recommended : 0.2mm

### EXTRUSION WIDTH

Recommended : Forced 0.4mm

### INFILL PERCENTAGE

Recommended : 40%

### INFILL TYPE

Grid, Gyroid, Honeycomb, Triangle or Cubic.

### WALL COUNT

Recommended : 4

### SOLID TOP/BOTTOM LAYERS

Recommended : 5

### SUPPORTS REQUIRED

None at all.

## HOW TO GET HELP

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If you need assistance with your build you can head over the DOOMCUBE Discord server and post your questions (typically in the « micron » channel). It is the primary development channel for the Micron! You can also check the Github page for the latest releases.



**DISCORD**

<https://discord.gg/doomcube>

# GitHub

<https://github.com/hartk1213/Micron>



**Note:**

Look for this logo throughout the manual  
to take you to the github page for that part.

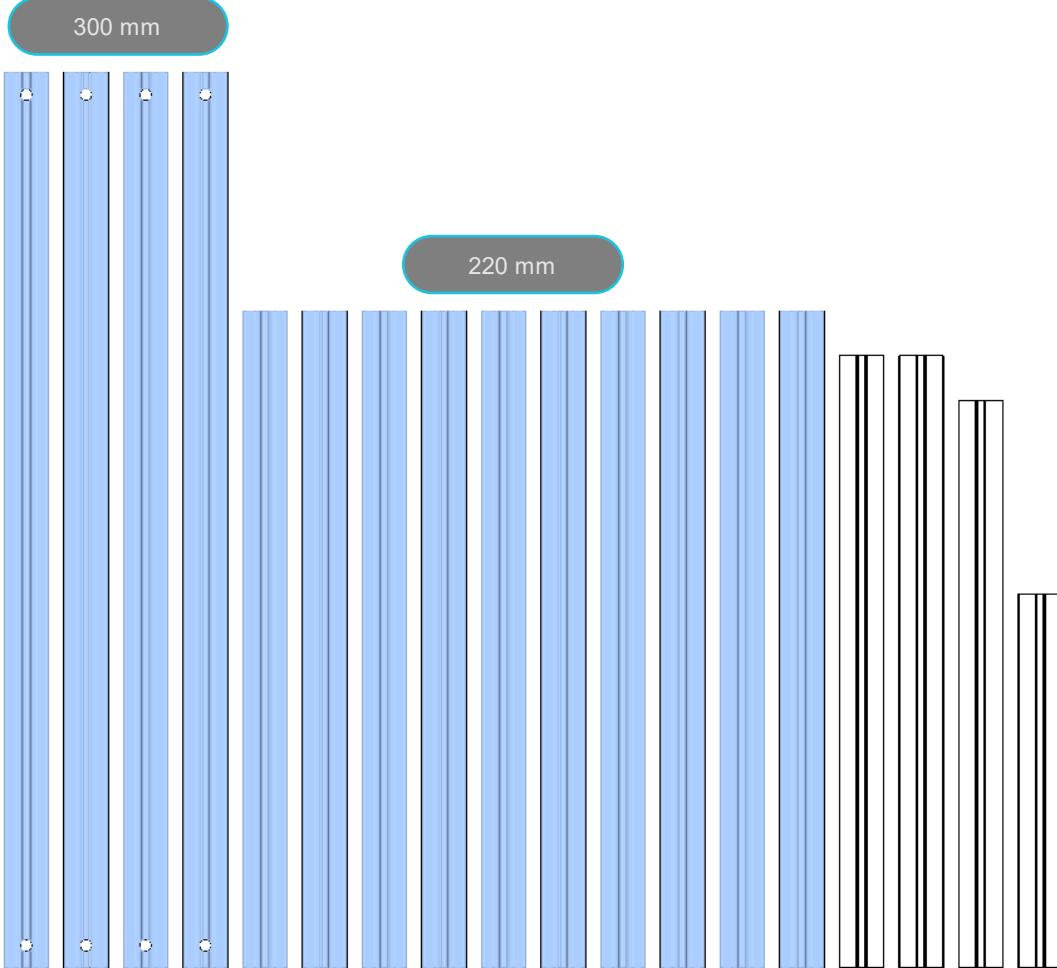
FRAME

MICRON



## GATHERING EXTRUSIONS

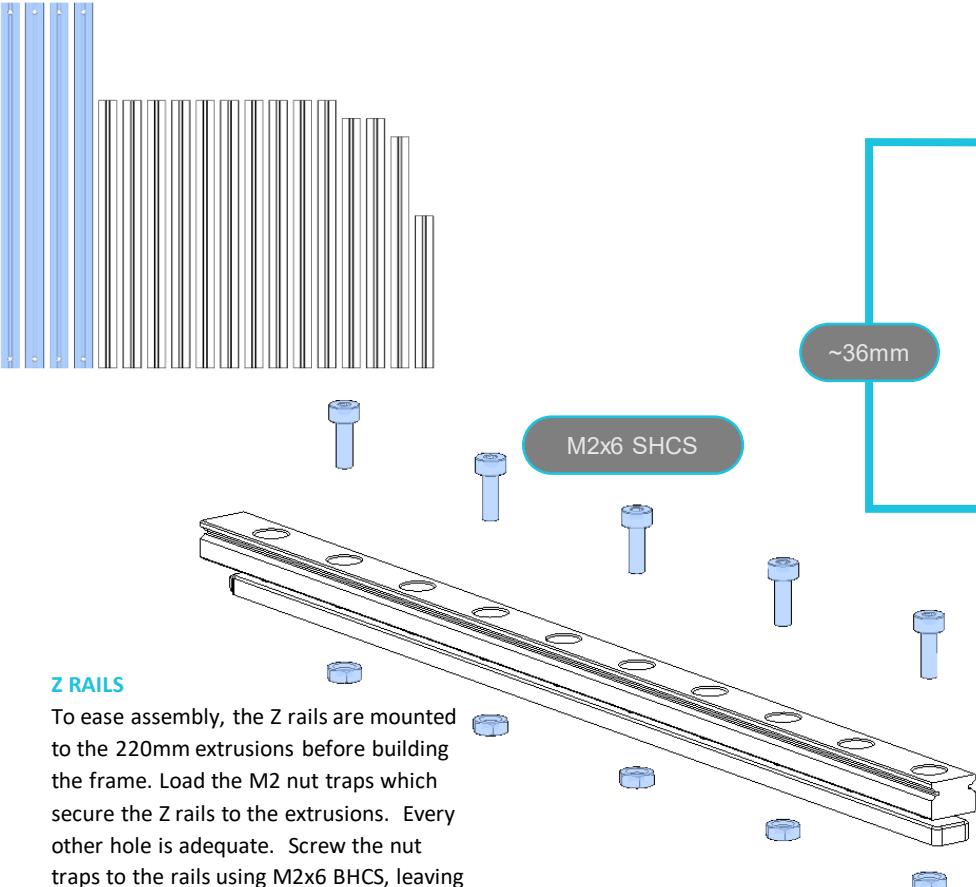
MICRON



### GETTING EXTRUSIONS TOGETHER

Separate your extrusions by length. In the following steps, we will use the four 300mm pieces, as well the ten 220mm pieces. The remaining extrusions will be used later in the build and can be placed aside for now.

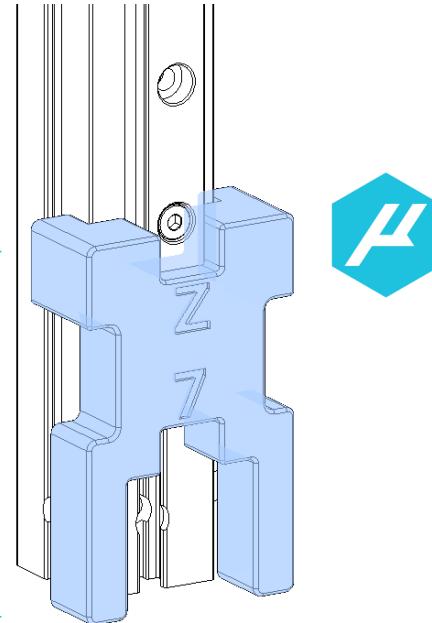
## Z RAIL



### Z RAILS

To ease assembly, the Z rails are mounted to the 220mm extrusions before building the frame. Load the M2 nut traps which secure the Z rails to the extrusions. Every other hole is adequate. Screw the nut traps to the rails using M2x6 BHCS, leaving them loose enough so they may be easily slid into place on the extrusions. Slide the rail onto the 220mm extrusion, and repeat this process for the remaining 220mm extrusions. Don't tighten the screws, as we will align and secure them in the next step.

## MICRON

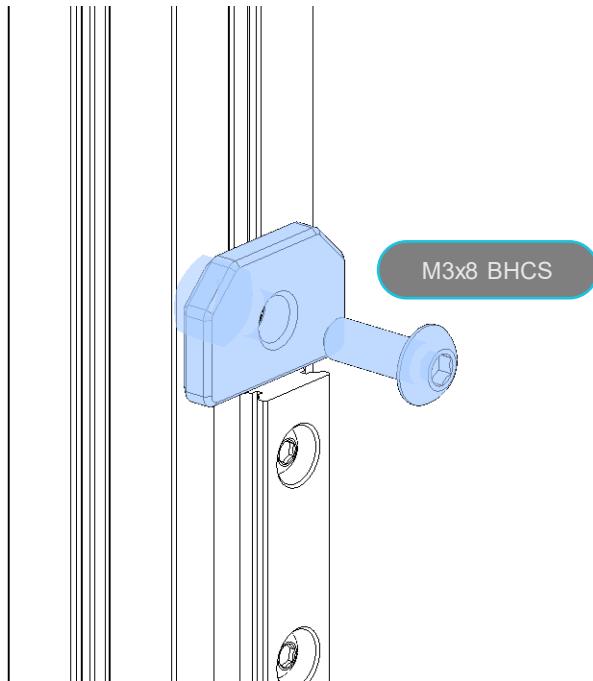


### Z RAILS ALIGNMENT

Stand up one of the 220mm extrusions and use the printed rail alignment tool as shown to align the bottom of the rail. The rail end should be ~36mm from the bottom of the extrusion. Use a second rail alignment tool on the upper half of the rail, using the section marked '7', to properly center the length of the rail on the extrusion. Tighten the screws, being careful to maintain the alignment provided by the printed tools. Repeat this process for all 4 220mm extrusions and their rails.

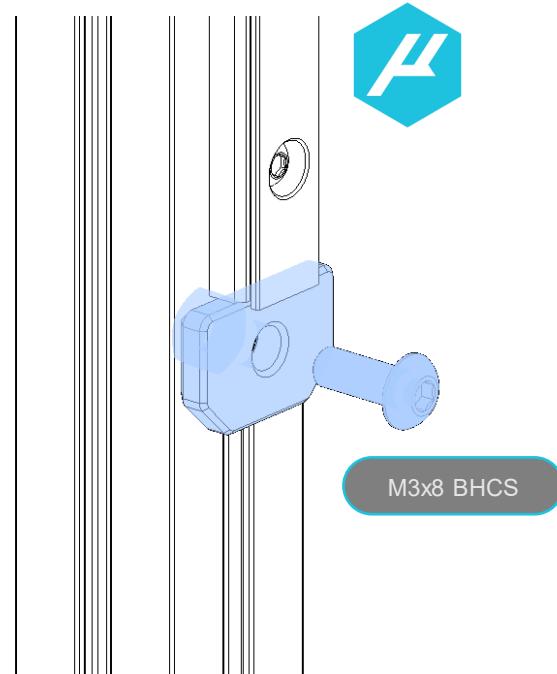
## Z RAIL STOPS

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### RAIL STOPS

With the Z rails installed, the rail stops can now be added to both ends. Loosely screw an M3x8 BHCS through each rail stop into an M3 nut, and slide it into place. Tighten the screws firmly. Repeat for all 4 Z rails. Now you can work on the build without concern of a carriage flying off its rail.



## BLIND JOINTS AND PRINTED NUT HOLDERS

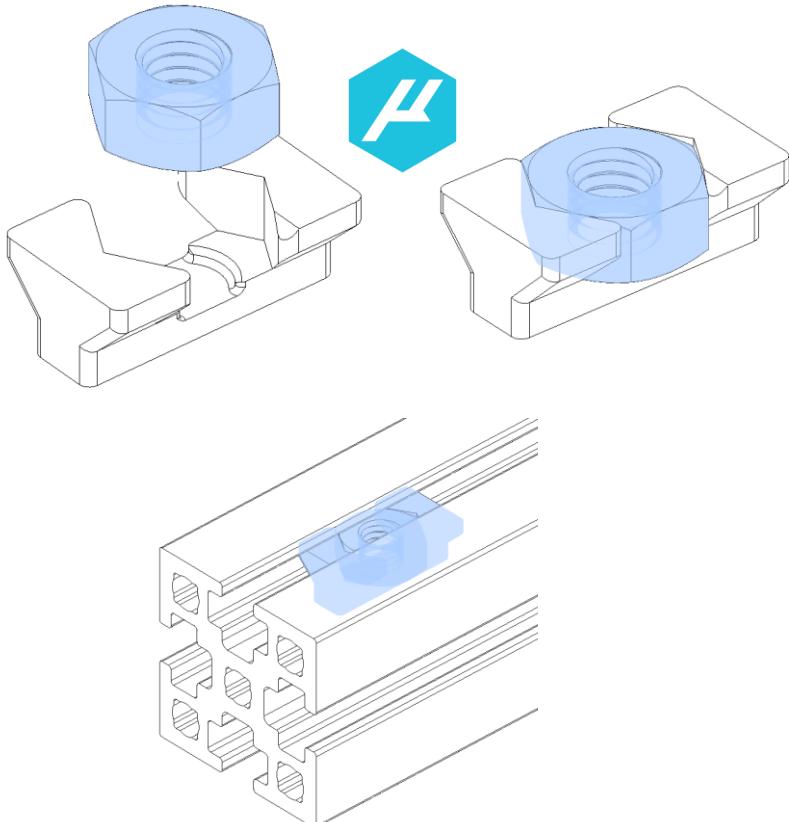
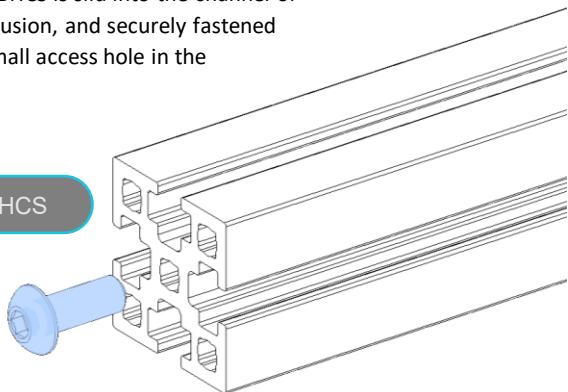
MICRON

### NO DROP NUTS (OPTIONAL)

1515 extrusions require most nuts to be preloaded during frame assembly. To make it easier to install and align these nuts, you can use these printed “No Drop Nuts” to keep them in place and in the correct orientation. They can be used anywhere preloaded nuts are needed.

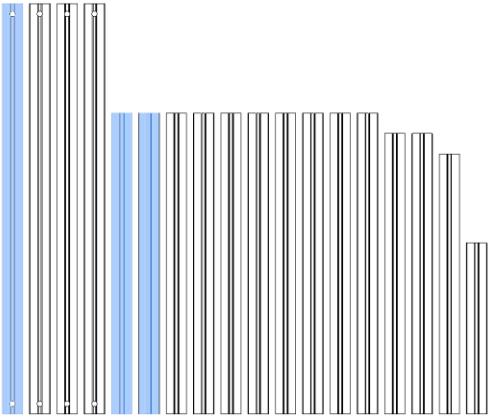
#### BLIND JOINTS

Blind Joints provide a cost effective and rigid frame assembly method. After being screwed into the end of one extrusion, the head of the BHCS is slid into the channel of another extrusion, and securely fastened through a small access hole in the extrusion.

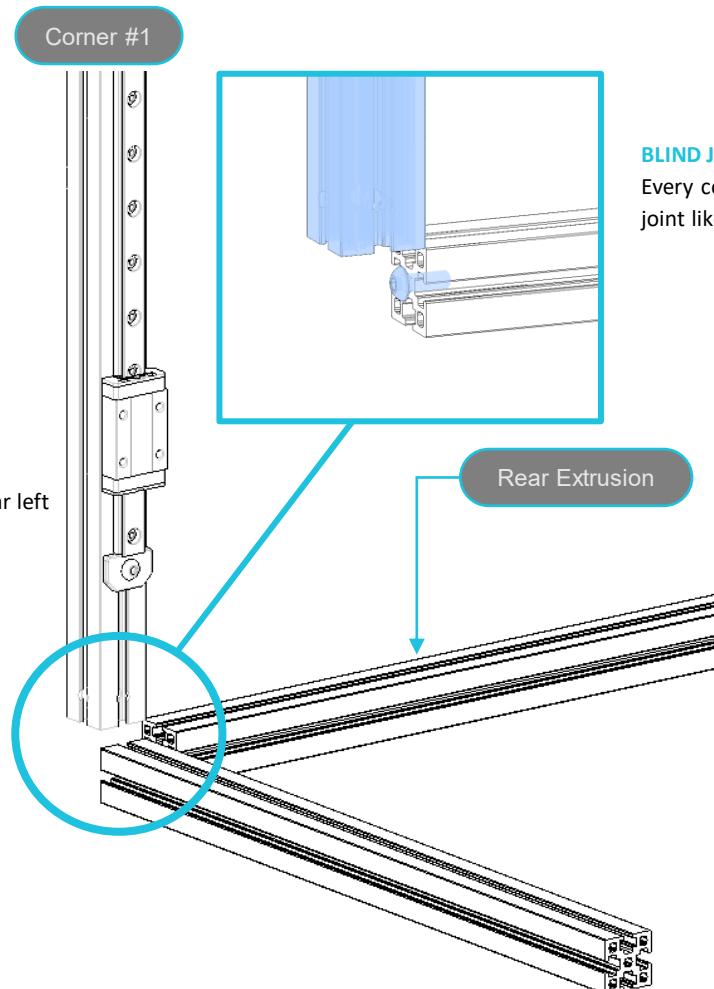


## ASSEMBLE FIRST CORNER

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Corner #1



### CORNER #1

Corner #1 will always be the rear left corner when referenced.

### BLIND JOINTS

Every corner will be assembled with a blind joint like this

### BUILD ON A FLAT SURFACE

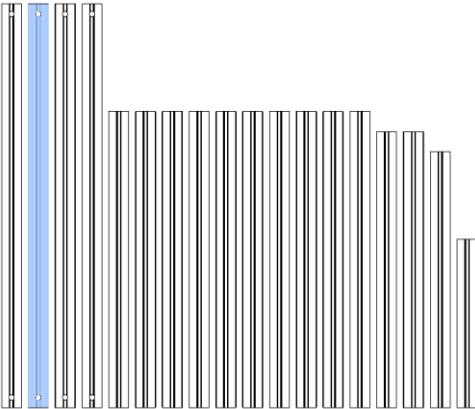
Assemble your frame on the flattest surface you have available. Glass tables and granite counters are two excellent options. This will make it much easier to assemble a frame that is square all the way around.

### TAKE YOUR TIME

Your entire printer is built on and around the frame. Take the extra time here to be sure everything is lined up correctly and square. Check the diagonal measurements of each side as you build, ensuring that the measurement is the same or within 1mm, to ensure a square, true frame.

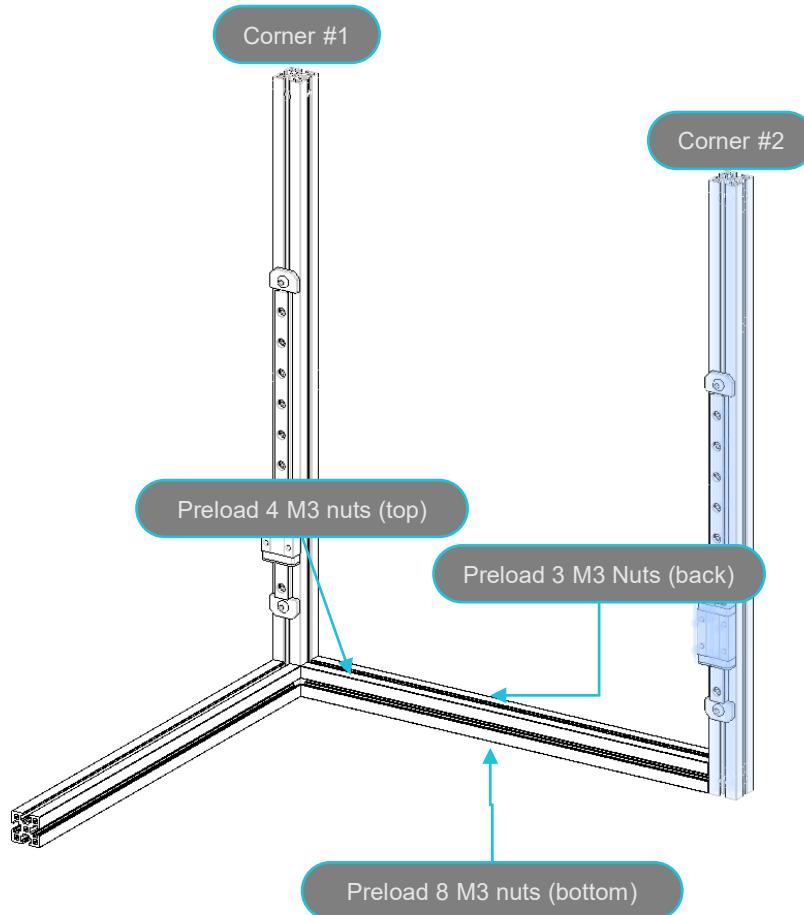
## ASSEMBLE SECOND CORNER

MICRON

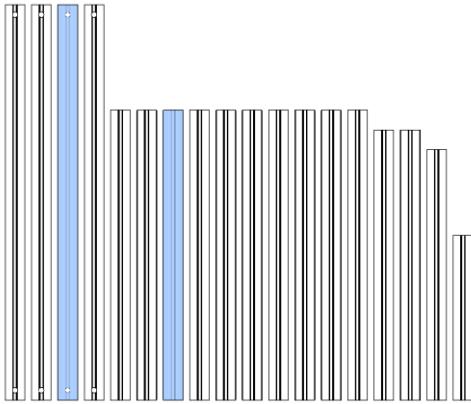


### SECOND CORNER

Before attaching the 2nd vertical extrusion, you need to preload 4 m3 nuts on top, 8 m3 nuts on the bottom of the extrusion, and 3 m3 nuts on the back .

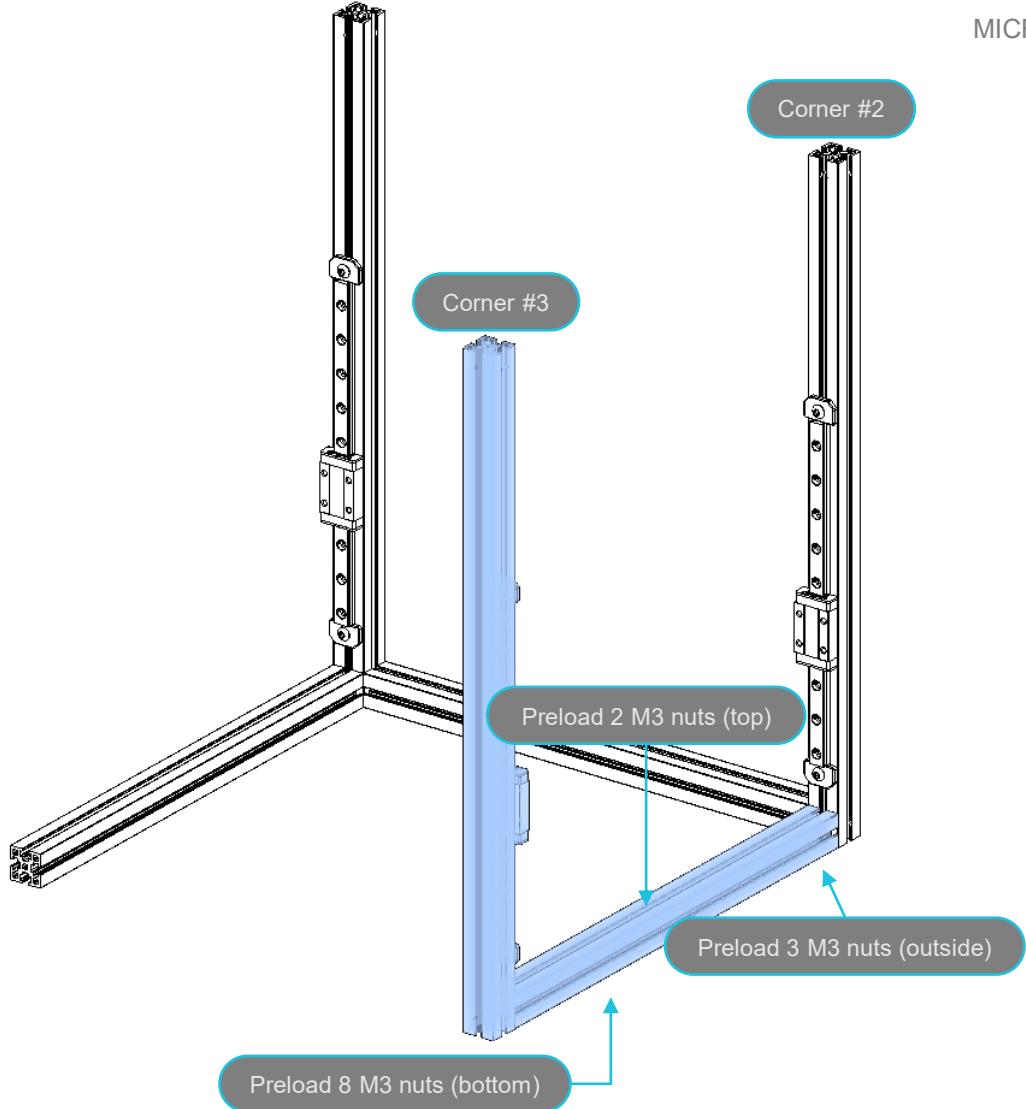


## ASSEMBLE THIRD CORNER



Corner #1

MICRON

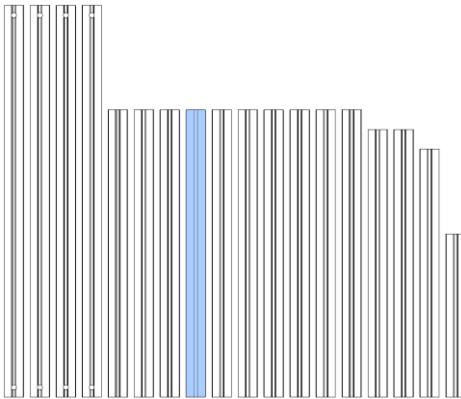


### THIRD CORNER

In the same way to the previous step, the horizontal extrusion needs 2 m3 nuts on top and 8 m3 nuts on the bottom. In addition, you need 3 m3 nuts on the outside of the extrusion as well.

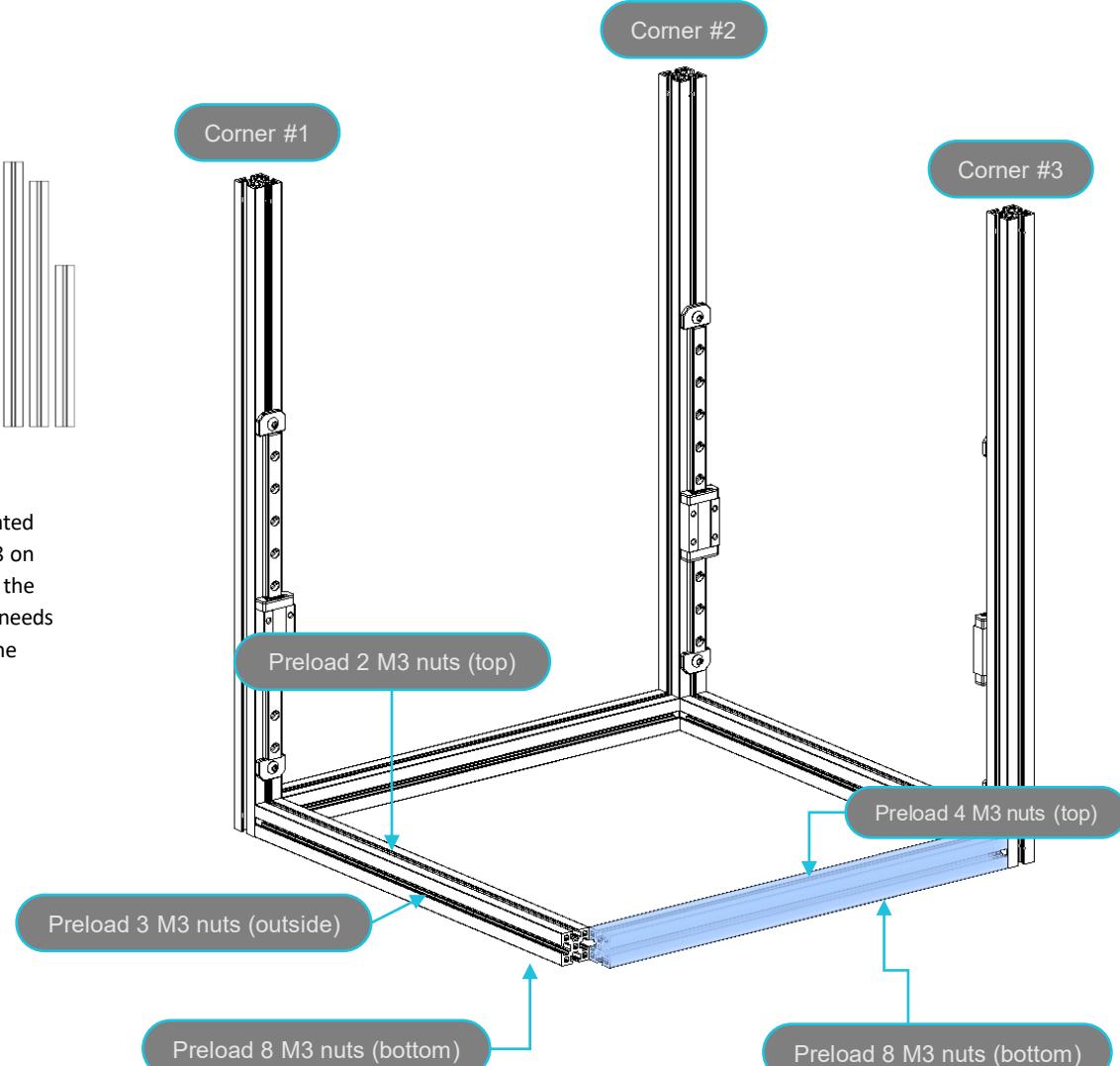
## FINAL LOWER EXTRUSION

MICRON

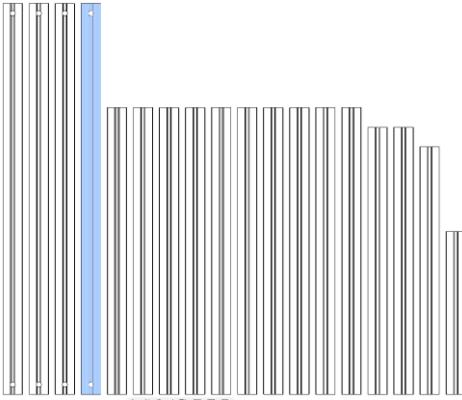


### FINAL LOWER EXTRUSION

The final lower extrusion which is located on the front needs 4 on the top, and 8 on the bottom. You also need to preload the nuts in the first side extrusion, which needs 4 on top, 3 on the outside, and 8 on the bottom

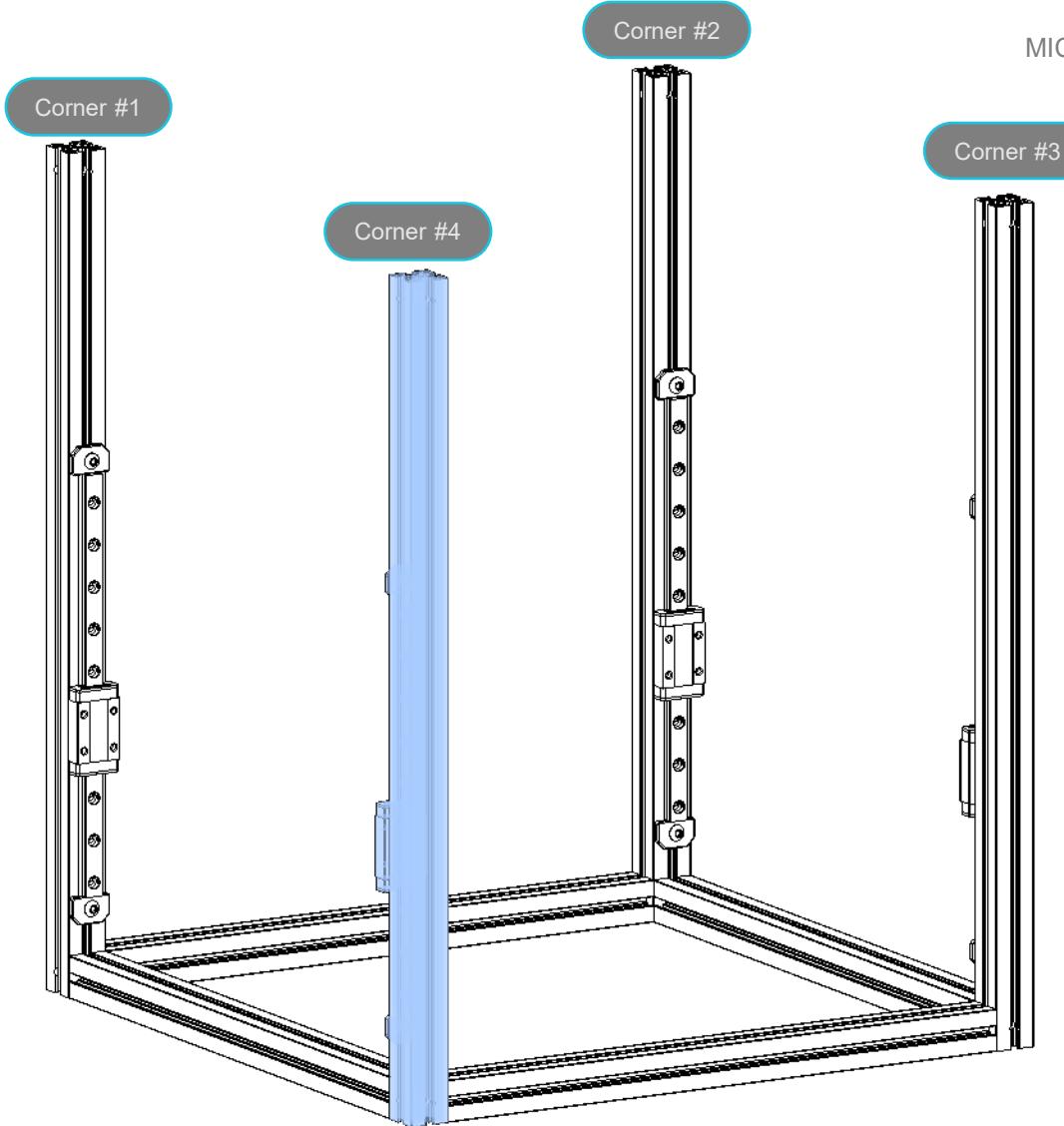


## ASSEMBLE THE FOURTH CORNER

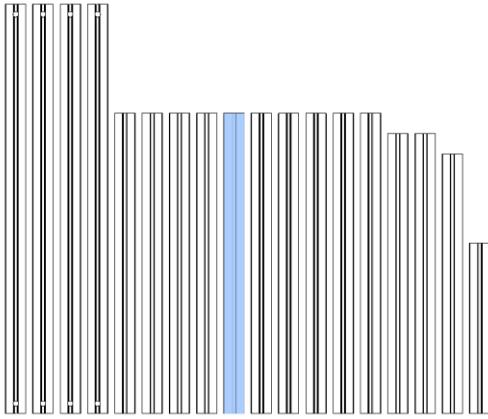


### FOURTH CORNER

The final vertical extrusion will now be installed.



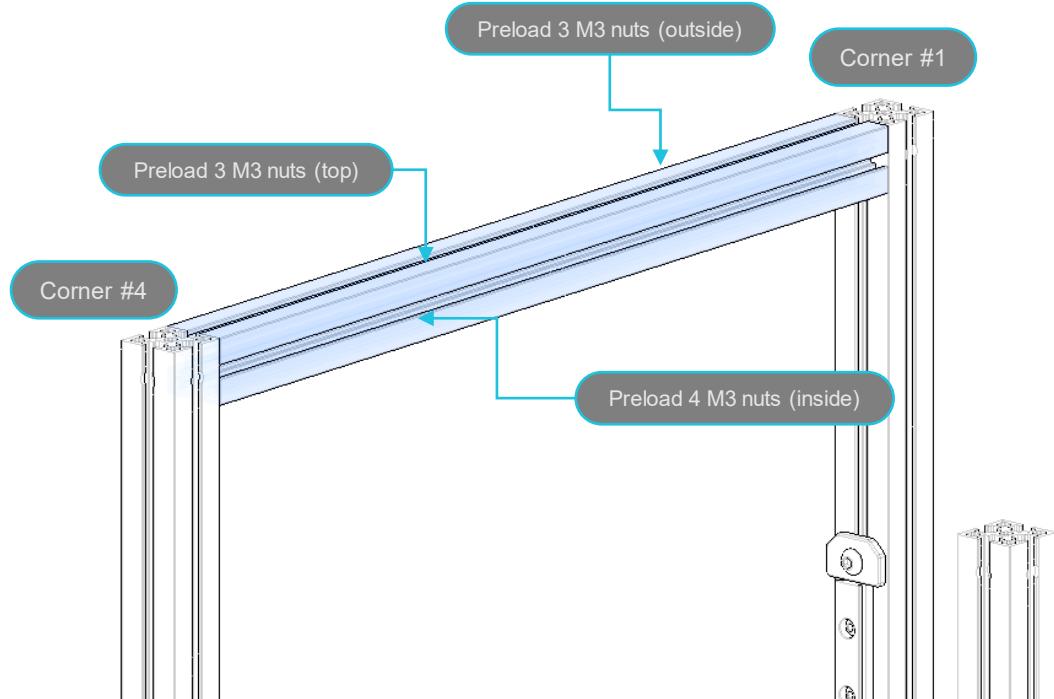
## TOP OF FRAME



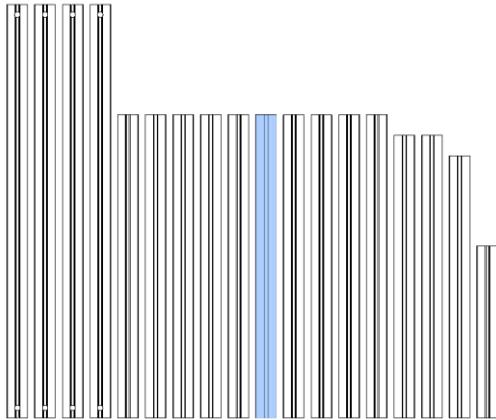
## TOP OF FRAME

The first of the top extrusions needs 4 nuts on the inside, 3 on top, and 3 on the outside.

MICRON



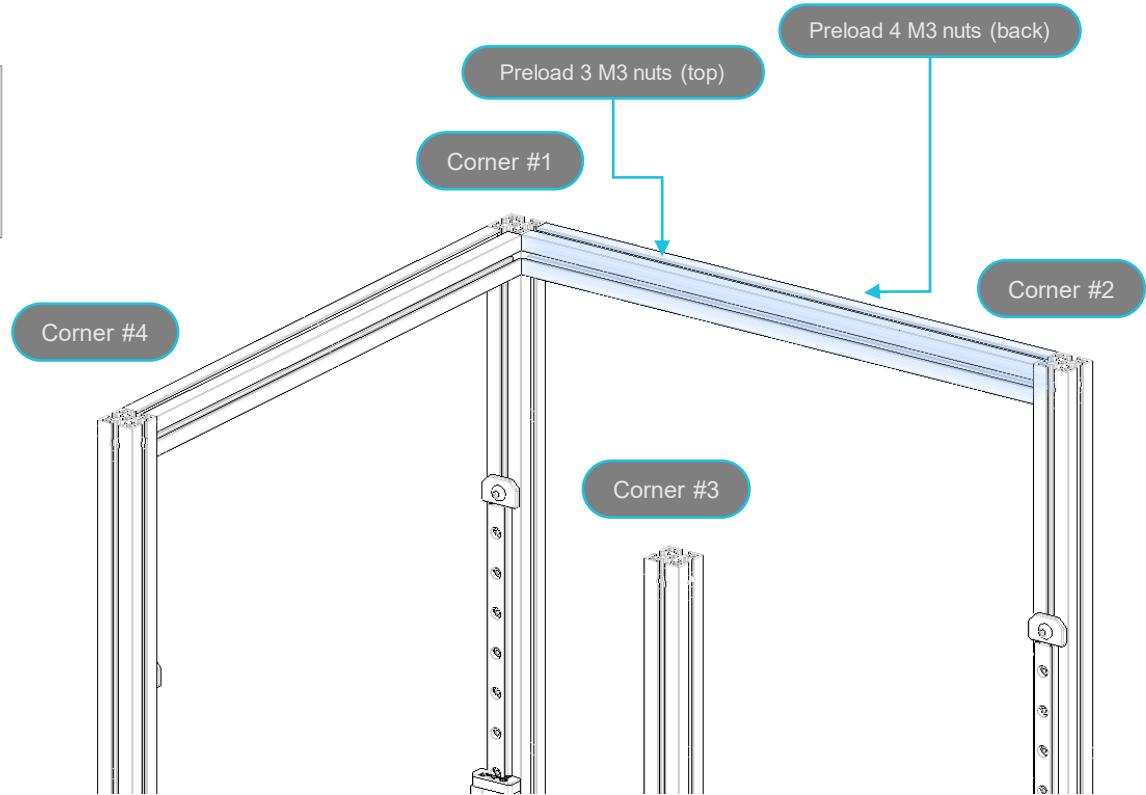
## TOP OF FRAME



MICRON

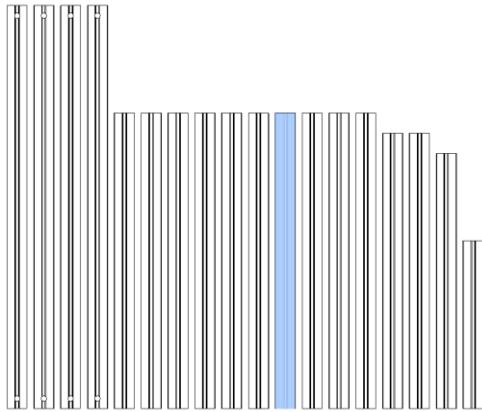
## TOP OF FRAME

The rear of the top extrusions needs only 3 nuts in the top of it



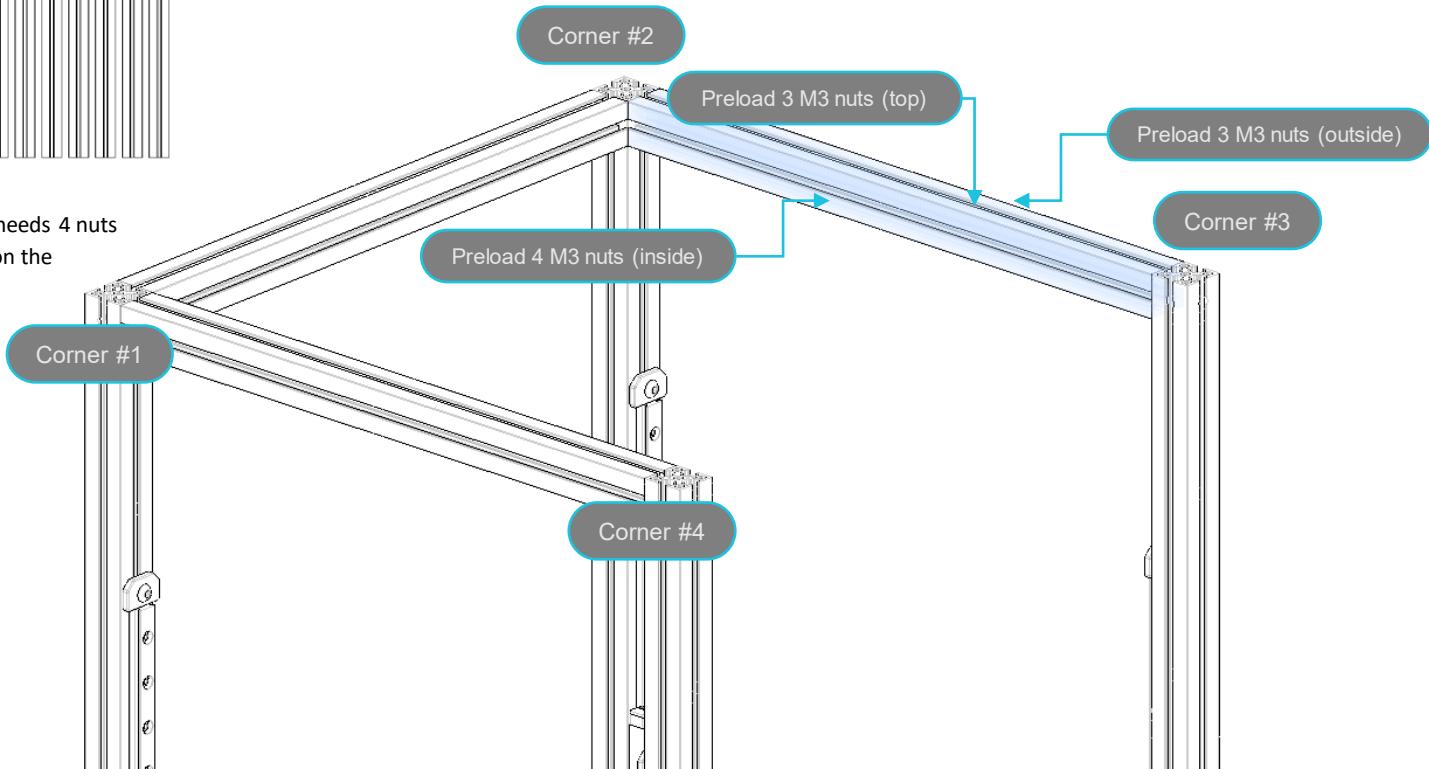
## TOP OF FRAME

MICRON

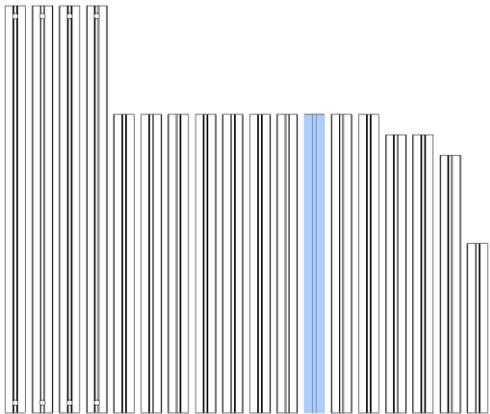


## TOP OF FRAME

The first of the top extrusions needs 4 nuts on the inside, 3 on top, and 3 on the outside.



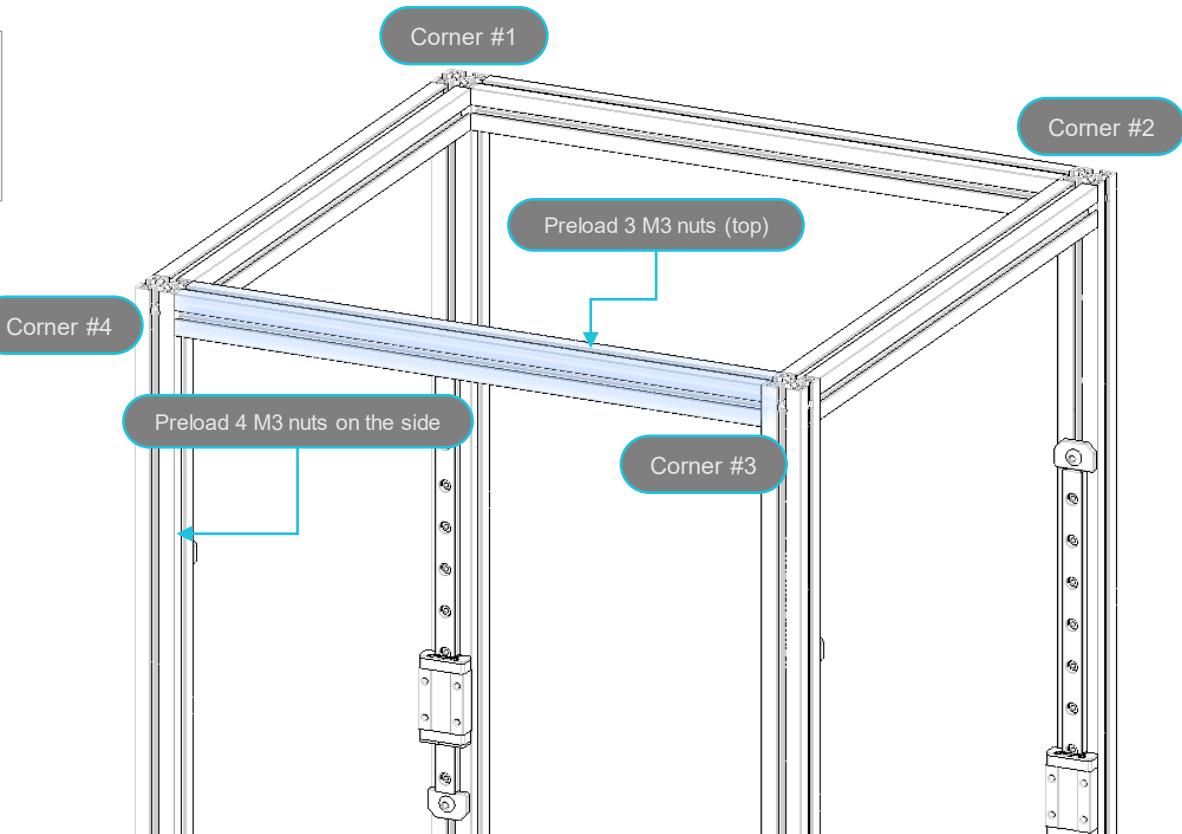
## FRAME



MICRON

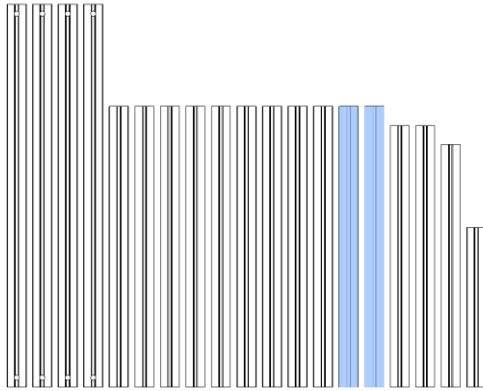
## TOP OF FRAME

The final top extrusion requires 3 preloaded nuts



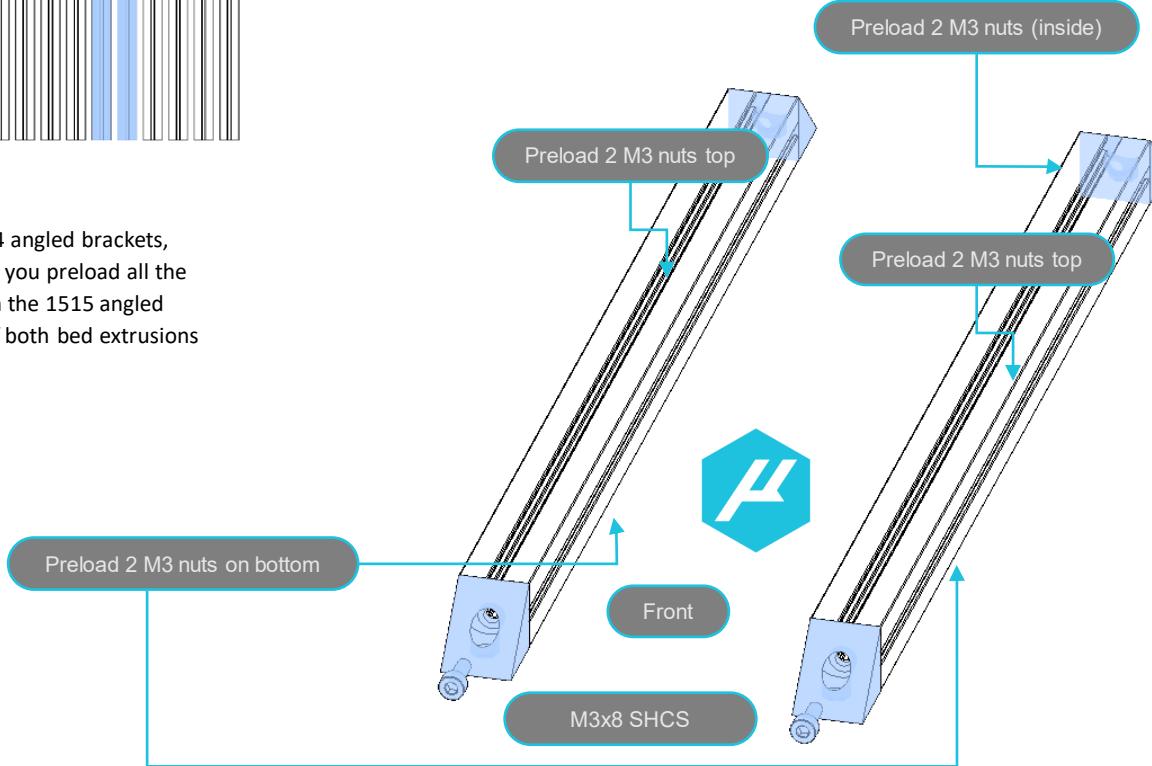
## BED EXTRUSIONS

MICRON



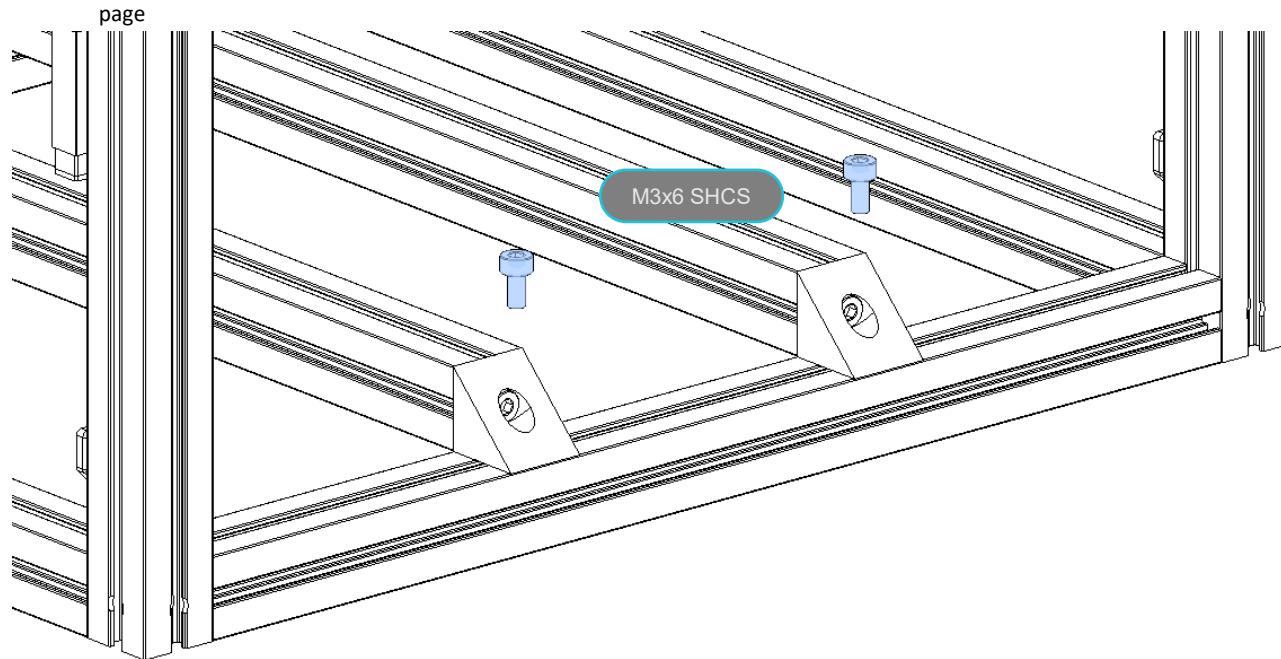
### BED EXTRUSIONS

Before you attach the 4 angled brackets, you need to make sure you preload all the M3 nuts. Then screw in the 1515 angled brackets to the ends of both bed extrusions using M3x8 SHCS



**BED EXTRUSIONS**

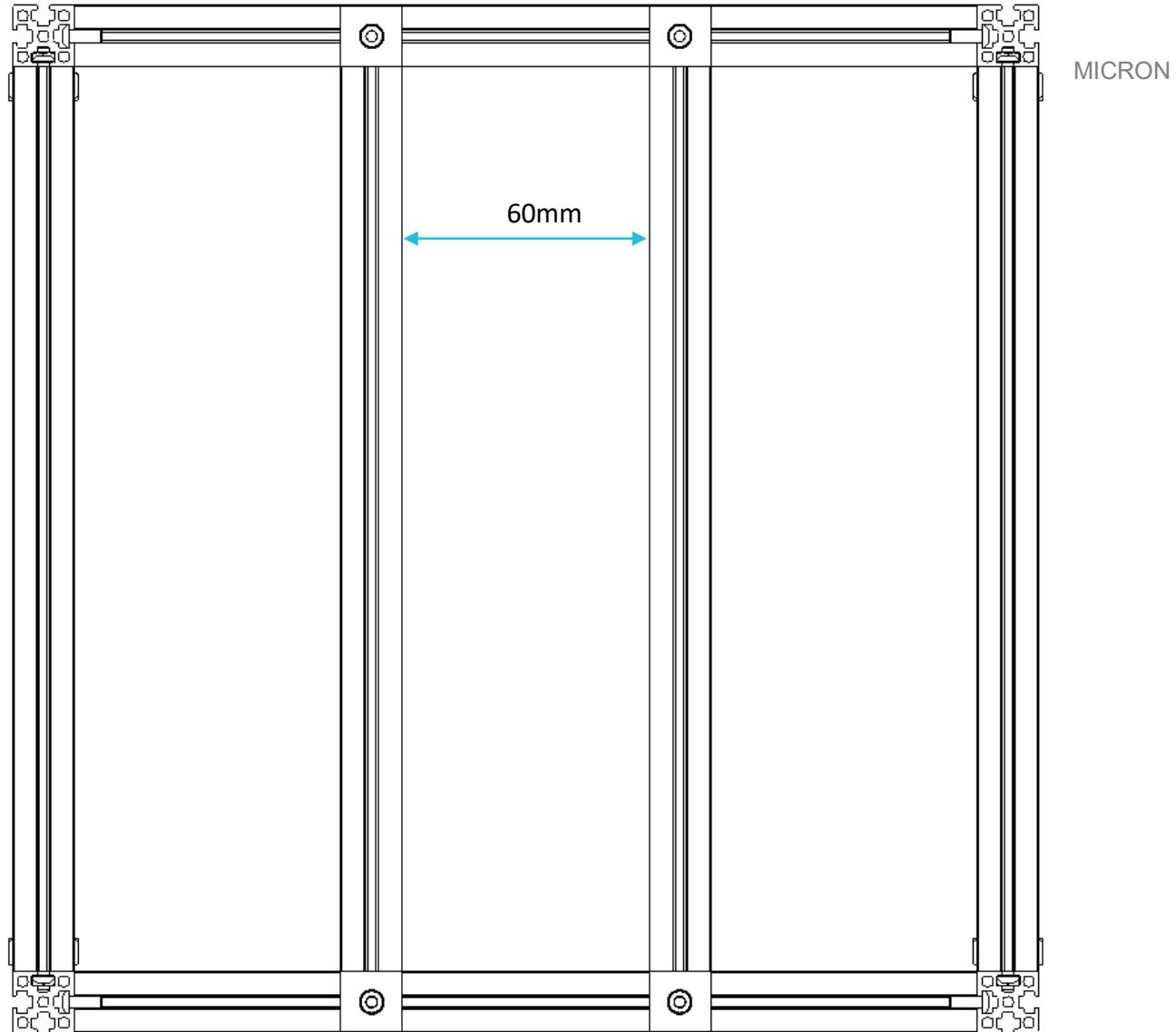
Mount the bed extrusion as shown, making sure to center them with 60mm between them as shown on the diagram on the next page



## BED ASSEMBLY

### BED EXTRUSIONS

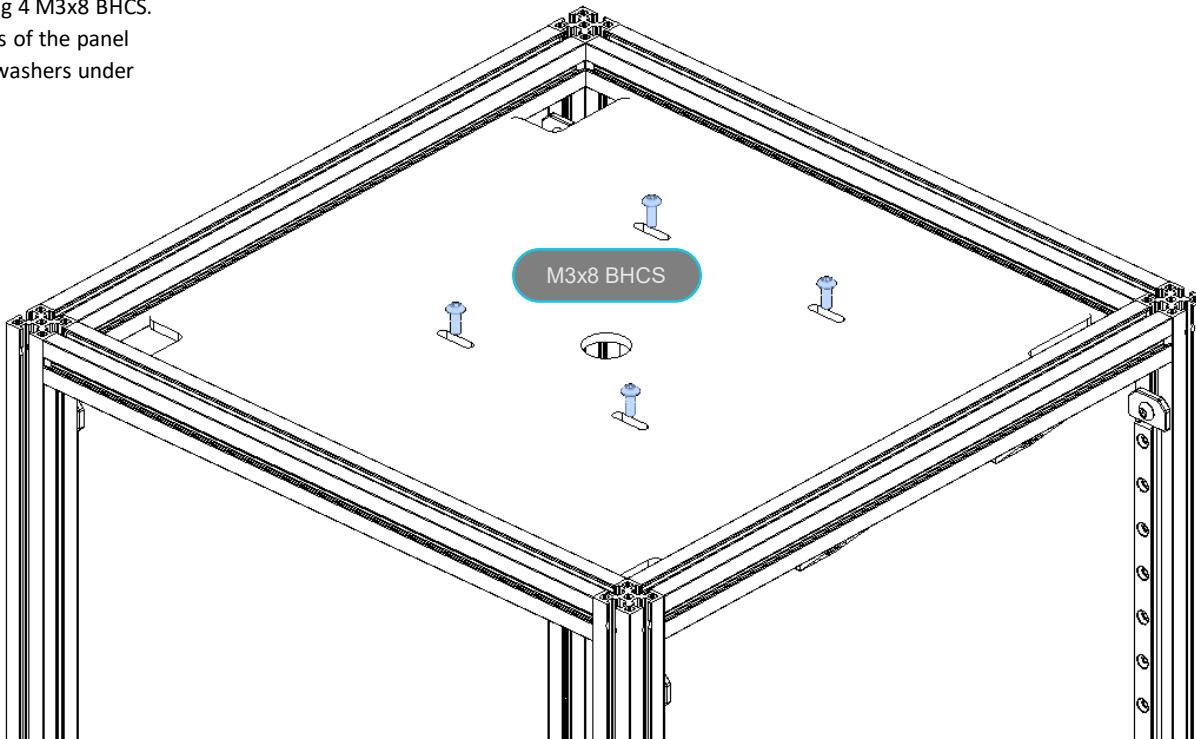
Mount the bed extrusion as shown, making sure to center the extrusions on the frame with 60mm of space between them



**DECK PANEL**

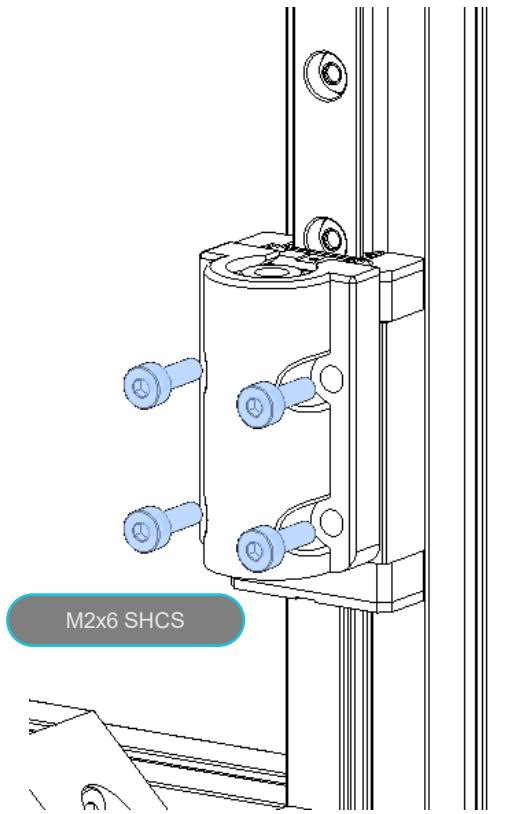
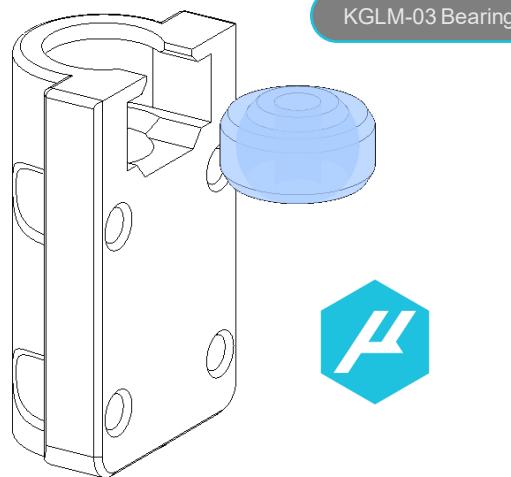
Install the deck panel , using 4 M3x8 BHCS.

Depending on the thickness of the panel  
you may or may not need washers under  
the screws



### Z JOINTS

Install the 4 KGLM-03 bearings into the printed part. Attach these to the Z rail carriages using 4 M2x6 SHCS

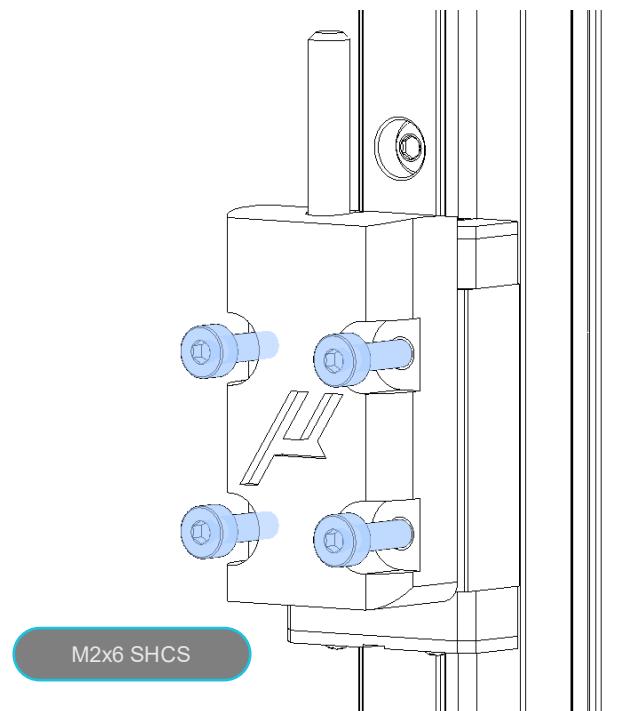
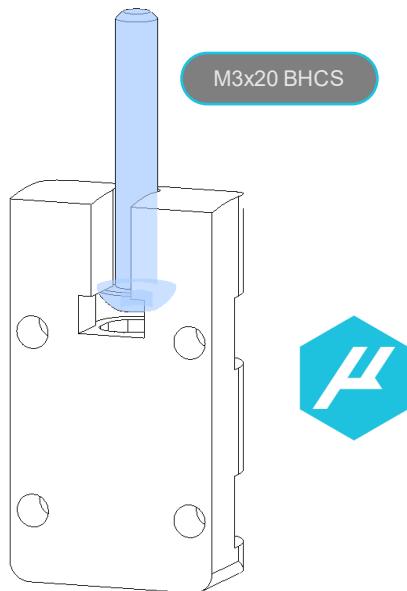


## Z JOINTS (Option 2)

MICRON

### Z JOINTS

Attach these to the Z rail carriages using 4  
M2x6 SHCS



**FRAME**

MICRON

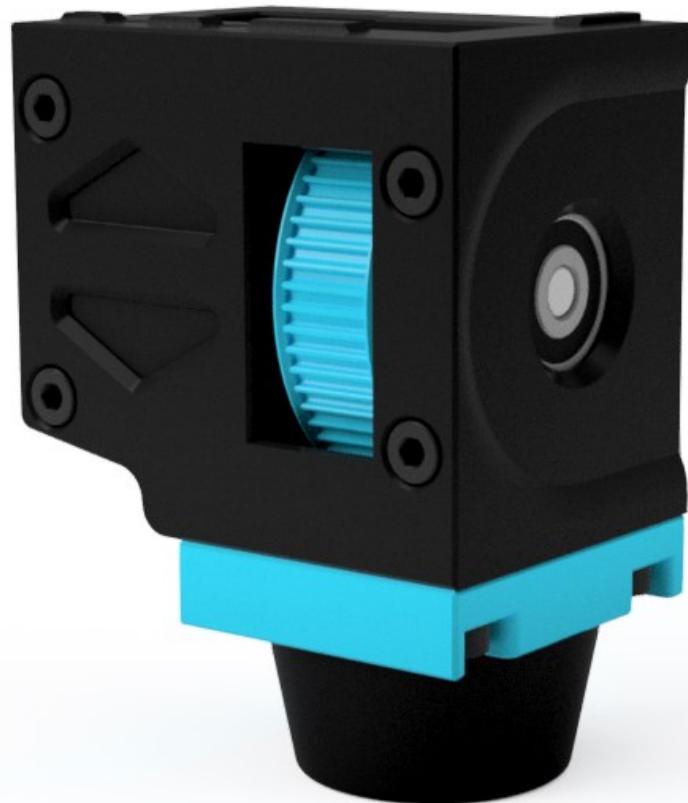


**FRAME**

At this point your frame should be looking like this.

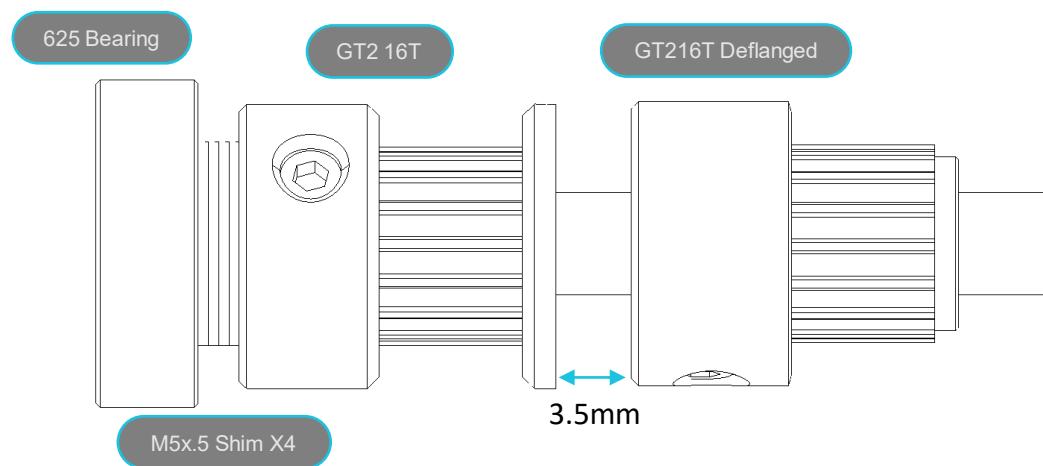
Z DRIVES

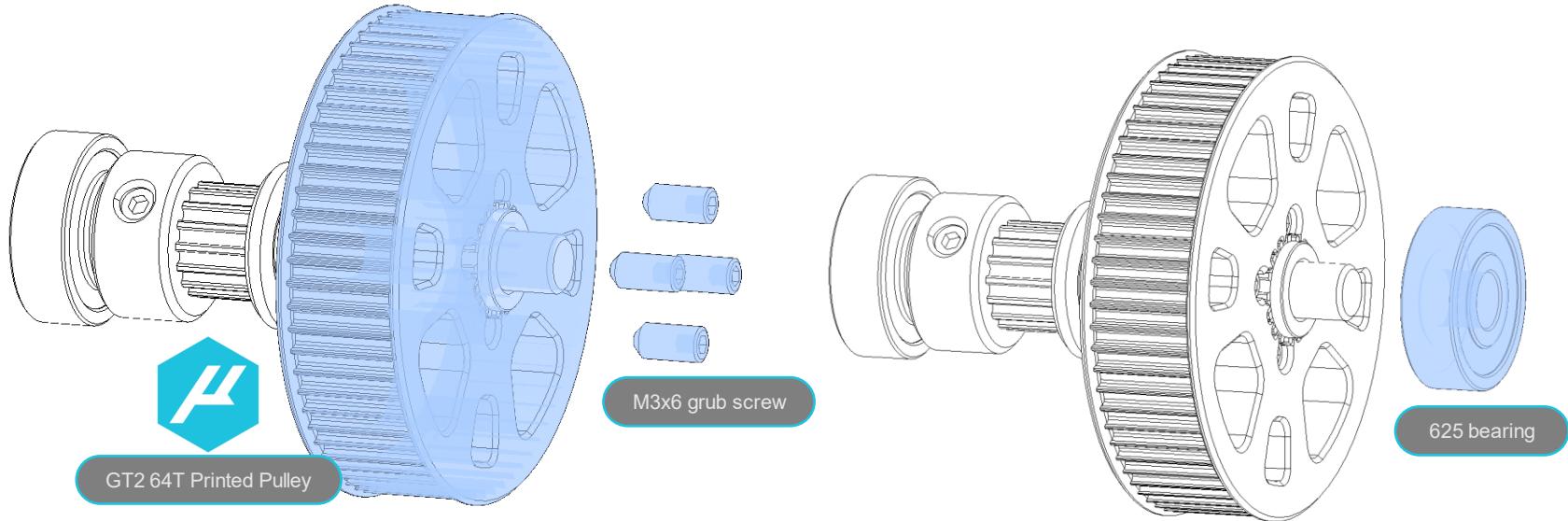
MICRON



## Z DRIVE 64T PULLEY ASSEMBLY

MICRON



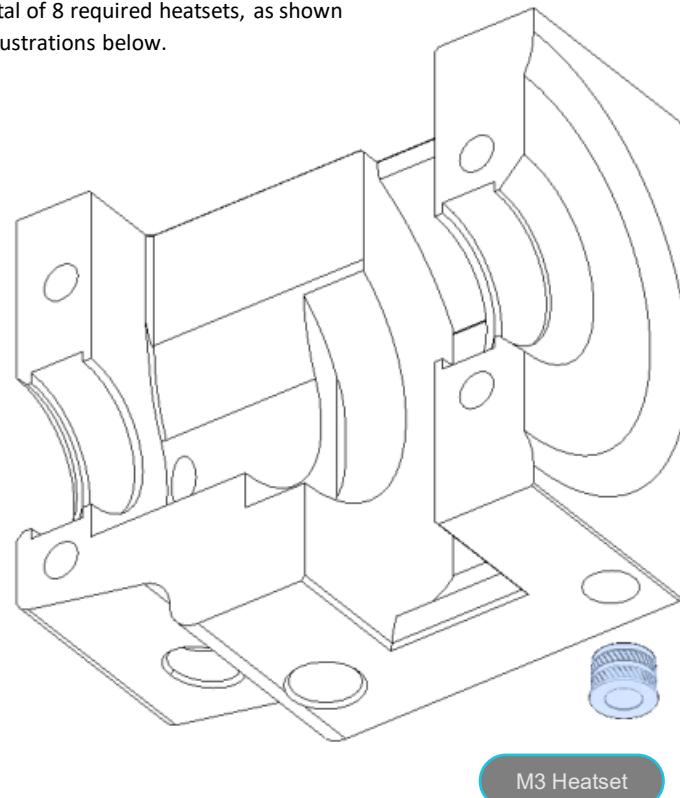
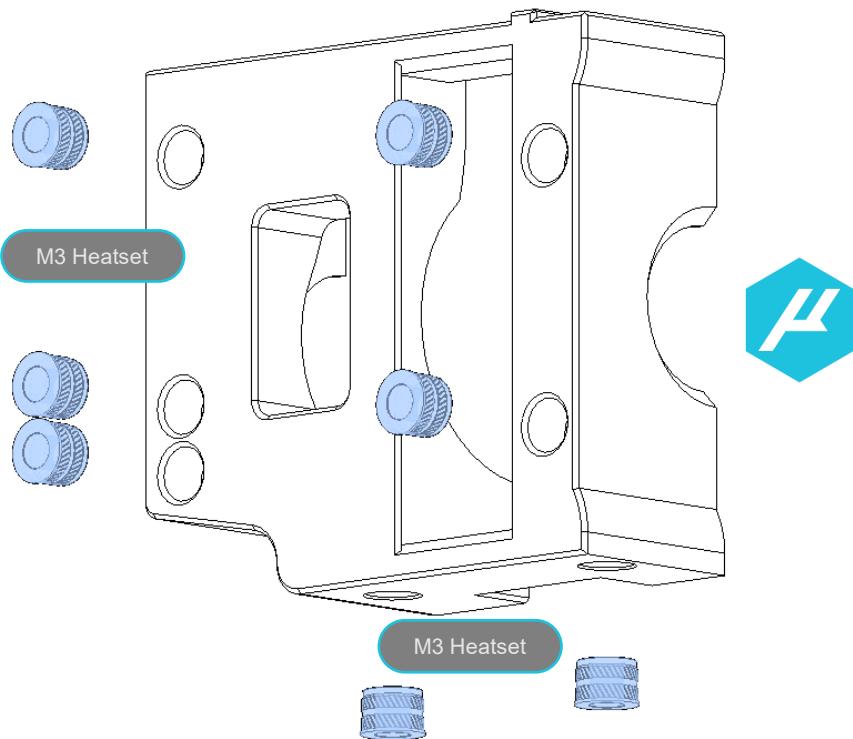


### ASSEMBLING 64T PULLEY

Assembly of the printed 64T pulley is simple. Observe that one side of the printed part is flat, and the other concave. Insert a deflanged 16T pulley into the socket on the concave side of the printed part, as shown below. Use 4 M3x6 grub screws to lock the two components together. Repeat for all 4 64T gears.

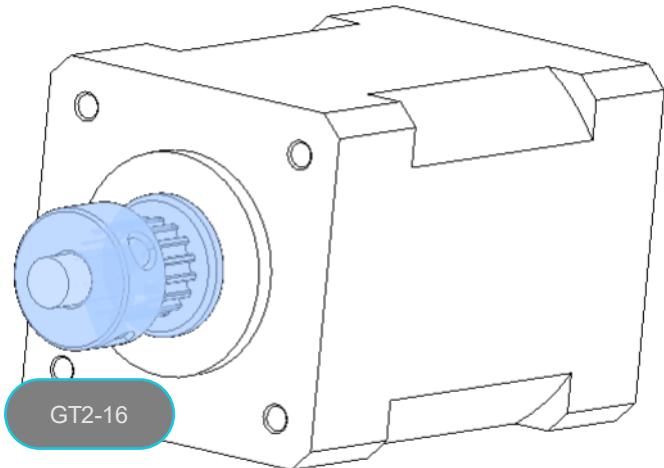
**Z DRIVE ASSEMBLY**

Begin by installing the heatset inserts into the Z drive parts. Each pair of Z drive halves has a total of 8 required heatsets, as shown in the illustrations below.



## Z MOTOR PULLEY ASSEMBLY

MICRON

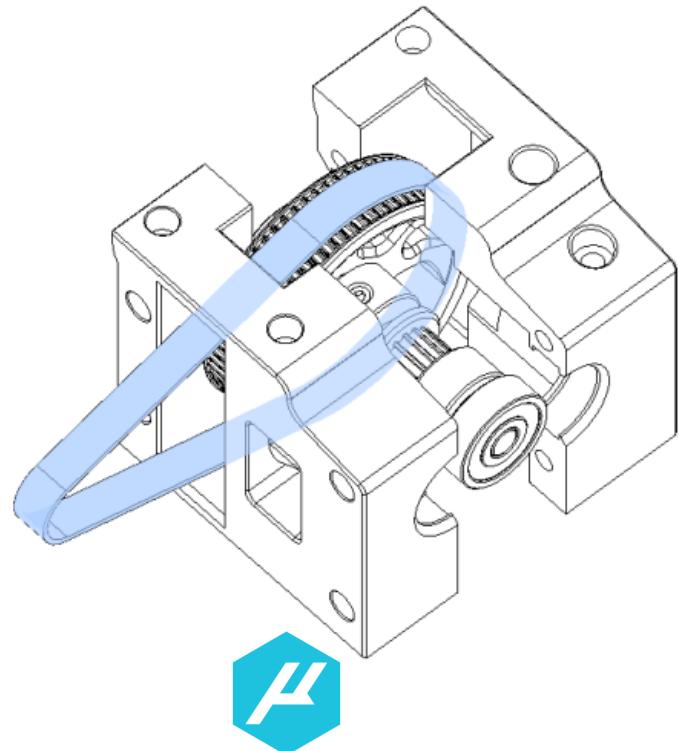


### Z MOTOR PULLEY

To continue with the Z drive assembly, attach a GT2 16T pulley as shown to each of the 4 Z motors. Tighten one of the set screw just tight enough to keep the pulleys from falling off. DO NOT USE LOCTITE AT THIS POINT! We will determine the precise positioning of these pulleys once the motors are mounted to the printer. For now, we are just putting the pulleys in place, so we don't have to slide them on to mounted motors.

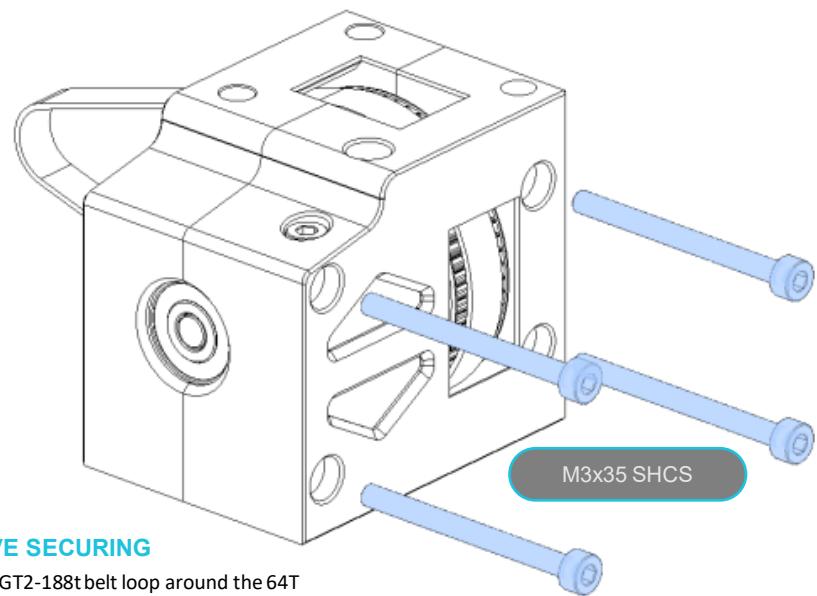
## Z DRIVE ASSEMBLY

MICRON



### Z DRIVE BELT

Add the GT2-188t belt loop around the 64T pulley before closing it off.

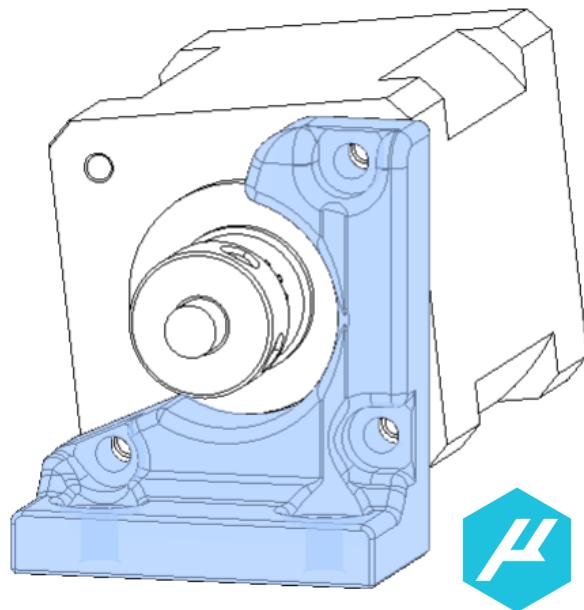


### Z DRIVE SECURING

Add the GT2-188t belt loop around the 64T pulley before closing it off.

## Z MOTOR MOUNT

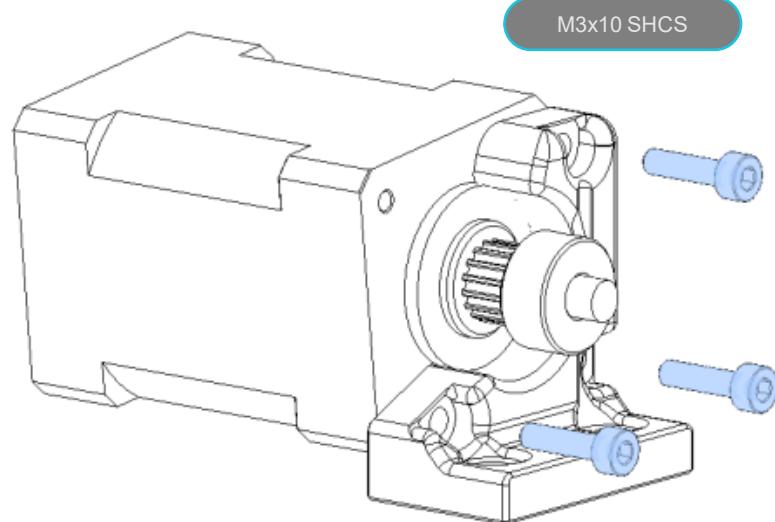
MICRON



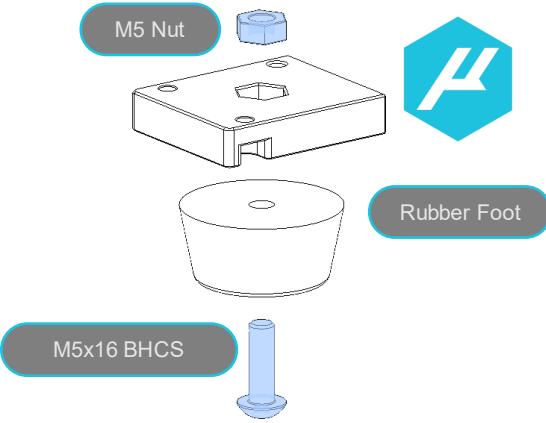
### Z MOTOR MOUNT

Z motor mount is best used with the wires for the z to be facing down or towards the inside of the printer

Note: The motor is on a slight angle in relation to the motor mount.

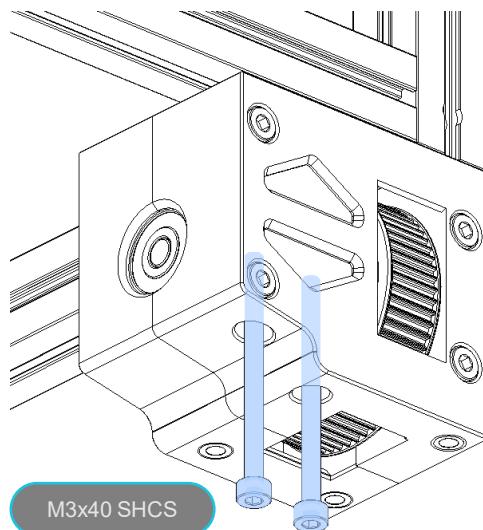


## Z DRIVES MOUNTING



### FEET ASSEMBLY

To assemble the Z drive cap / feet, you need to insert an M5 nut into the drive cover



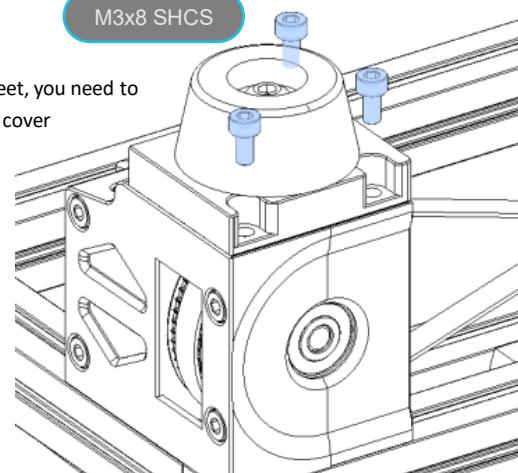
### Z DRIVE MOUNT

Z Drive is mounted using the new M3x40 bolts. If you installed the printed NDN nut holder then this is where you will use that to secure the drive housing.

MICRON

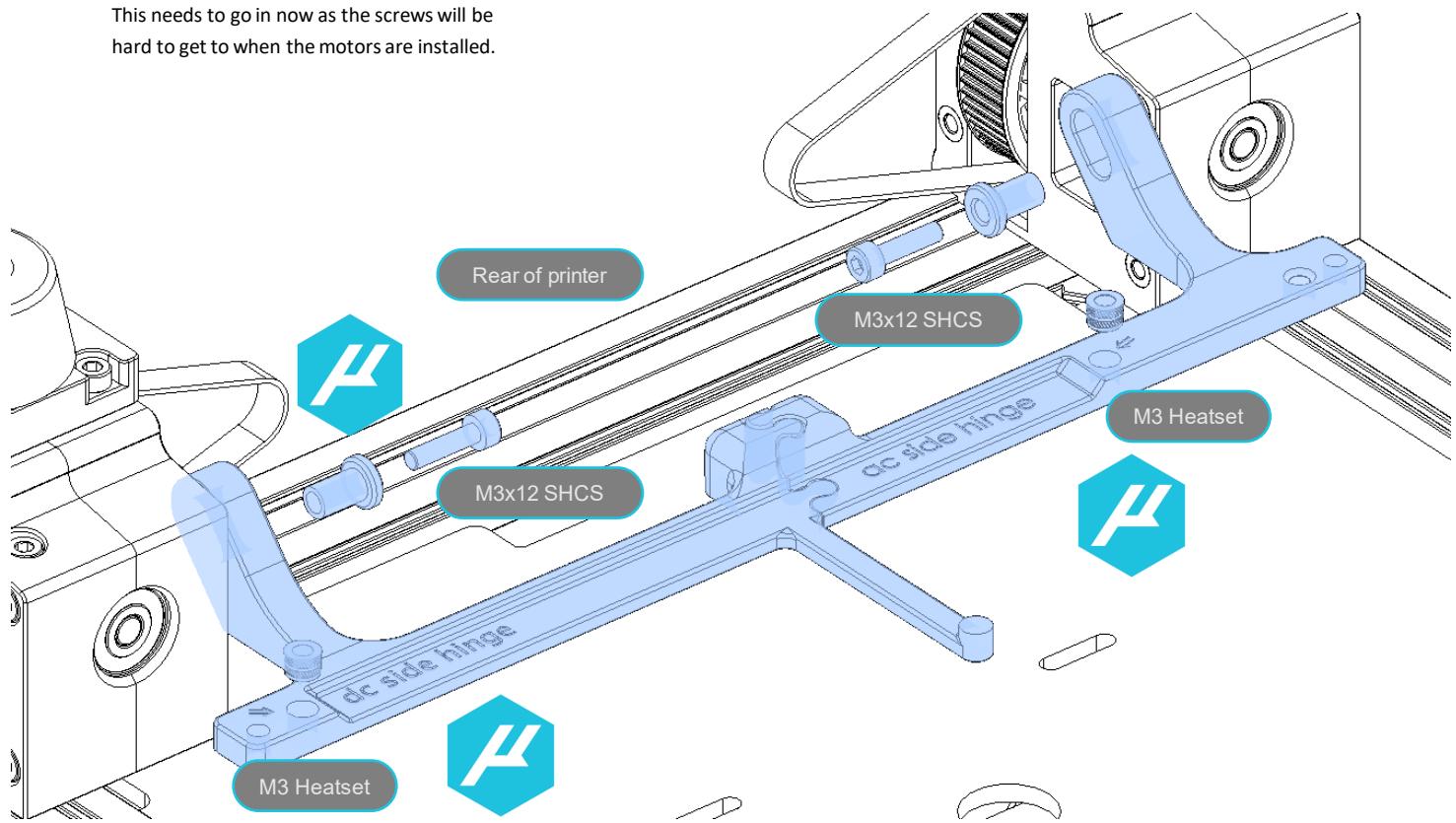
### FEET ASSEMBLY

To assemble the Z drive cap / feet, you need to insert an M5 nut into the drive cover



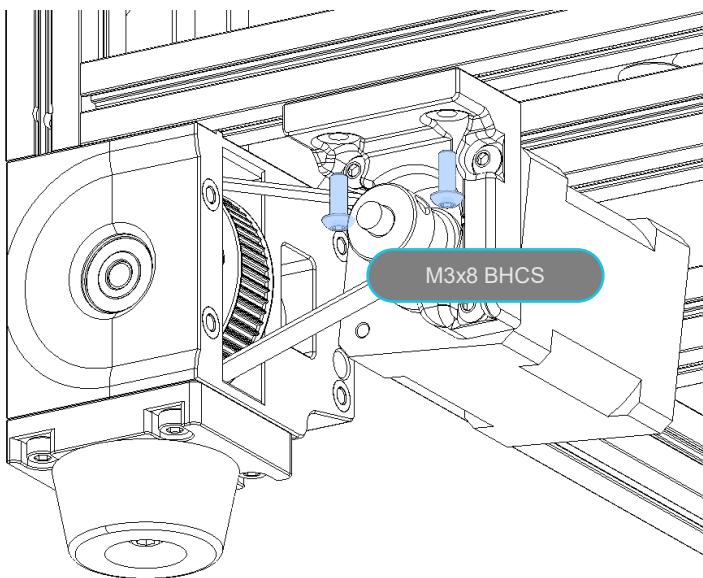
**ELECTRONICS HINGED MOUNT**

This needs to go in now as the screws will be hard to get to when the motors are installed.



## Z MOTOR MOUNTING

MICRON



### Z MOTOR MOUNTING

Using 2 M3x8 BHCS and the printed nut holder on this side attach the Z motor. This is when you will tension the 188 tooth belt loop. The motor should be

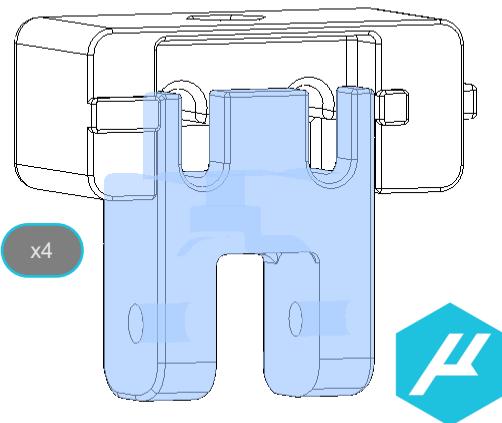
Z IDLERS

MICRON



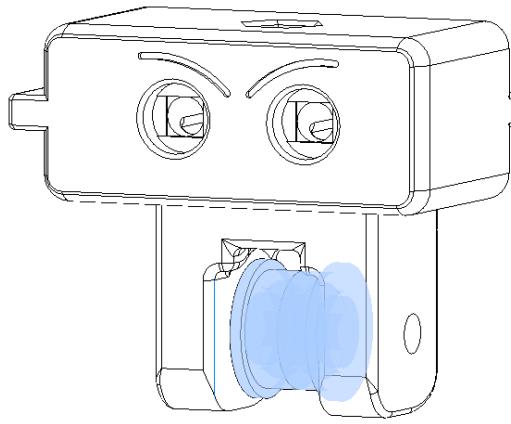
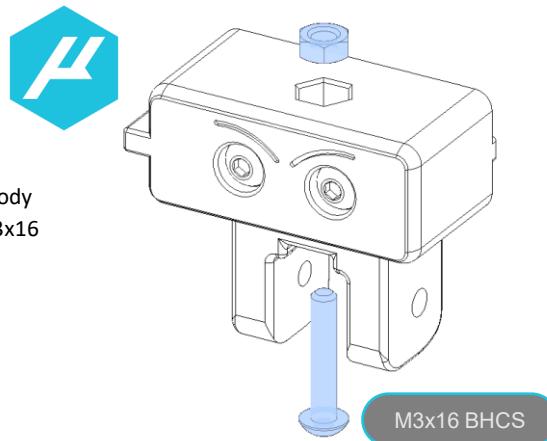
## Z IDLERS

MICRON



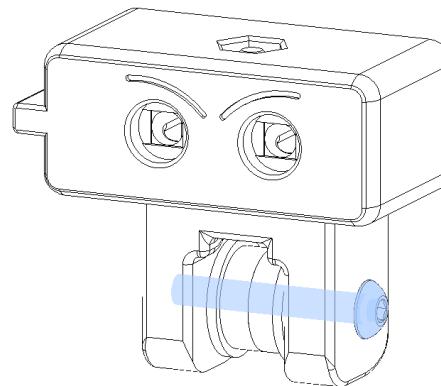
## Z TENSIONER

Slide the tensioner into the main body securing them together with an M3x16 BHCS and M3 hex nut.

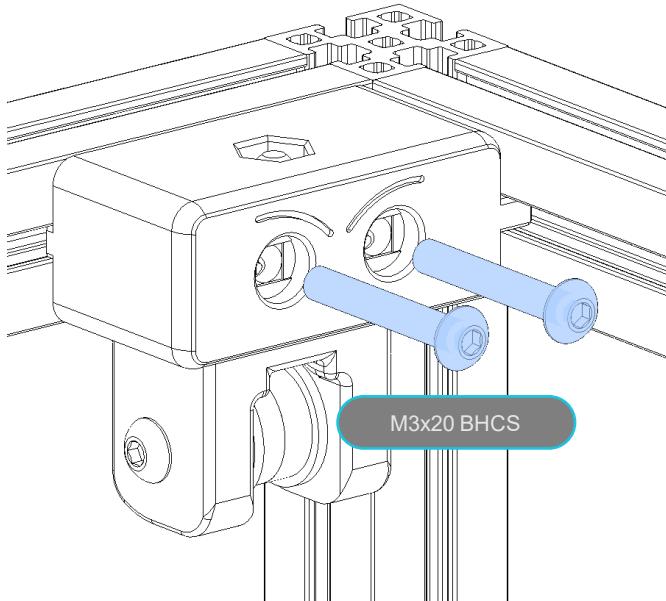


## Z TENSIONER PULLEY

Take the F623 bearing stack and place them between the idler securing them using an M3x20. Note the direction the screw is going.



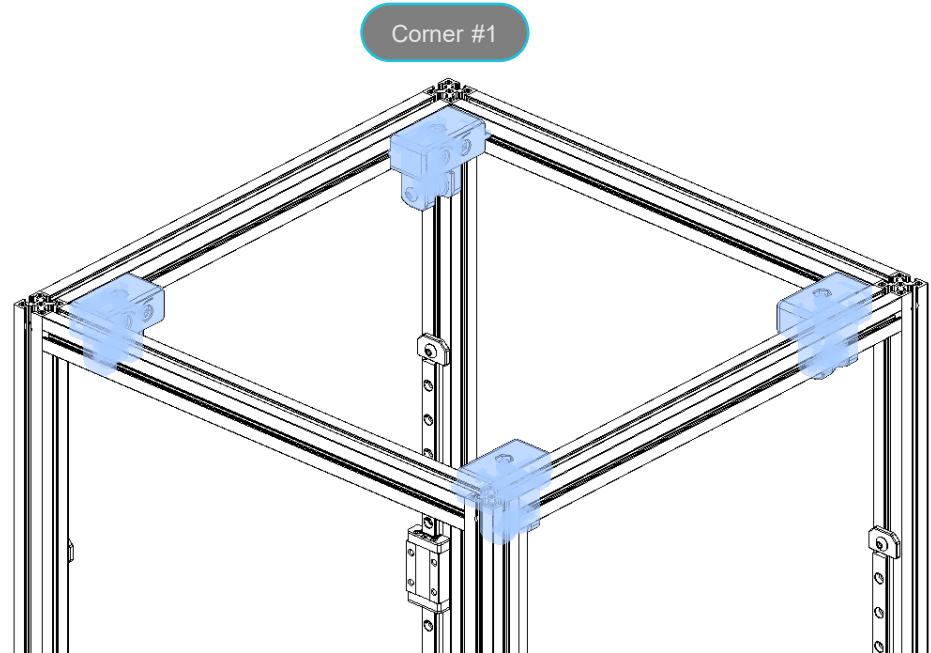
## Z IDLERS



### Z IDLER MOUNTING

mounting the Z idlers on the top of the frame along the side extrusion. These can be mounted using the printed nut holders as well.

## MICRON



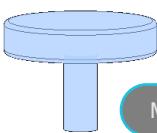
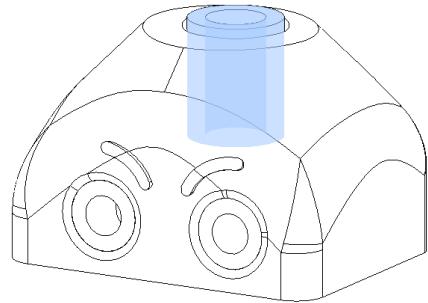
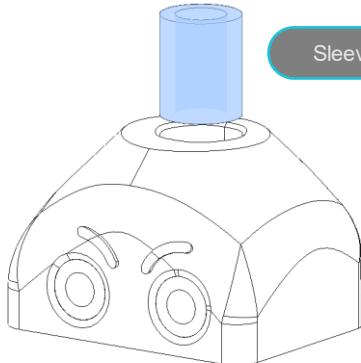
Z ENDSTOP

MICRON

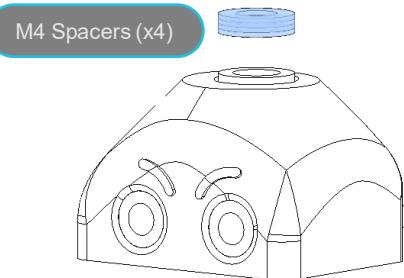


## Z ENDSTOP ASSEMBLY

MICRON

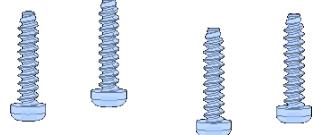
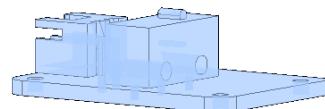
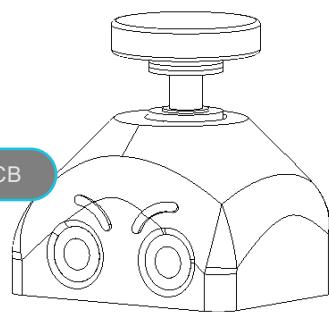


M4 Thumbscrew



5mm Binding Post Screw

Z Endstop PCB

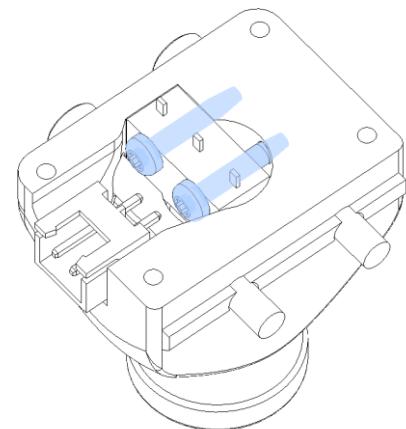


M2x10 Self Tapping screws

### Z Endstop PCB/ No PCB

The endstop housing supports both Non-PCB and PCB endstops there are 2 ways of assembling it. With the PCB you attach the PCB with 4 m2x10 screws on each corner , with the non PCB you screw the switch in with 2 m2x10 screws through the switch

M2x10 Self Tapping screws

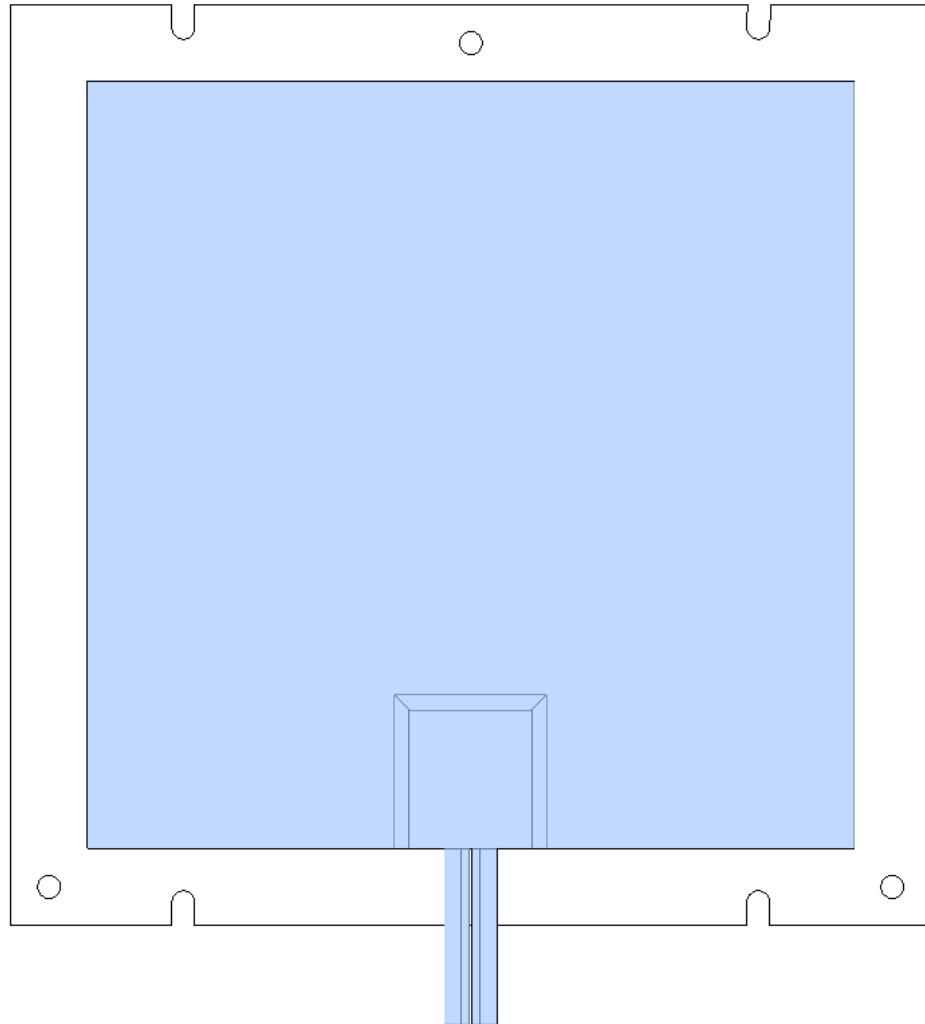


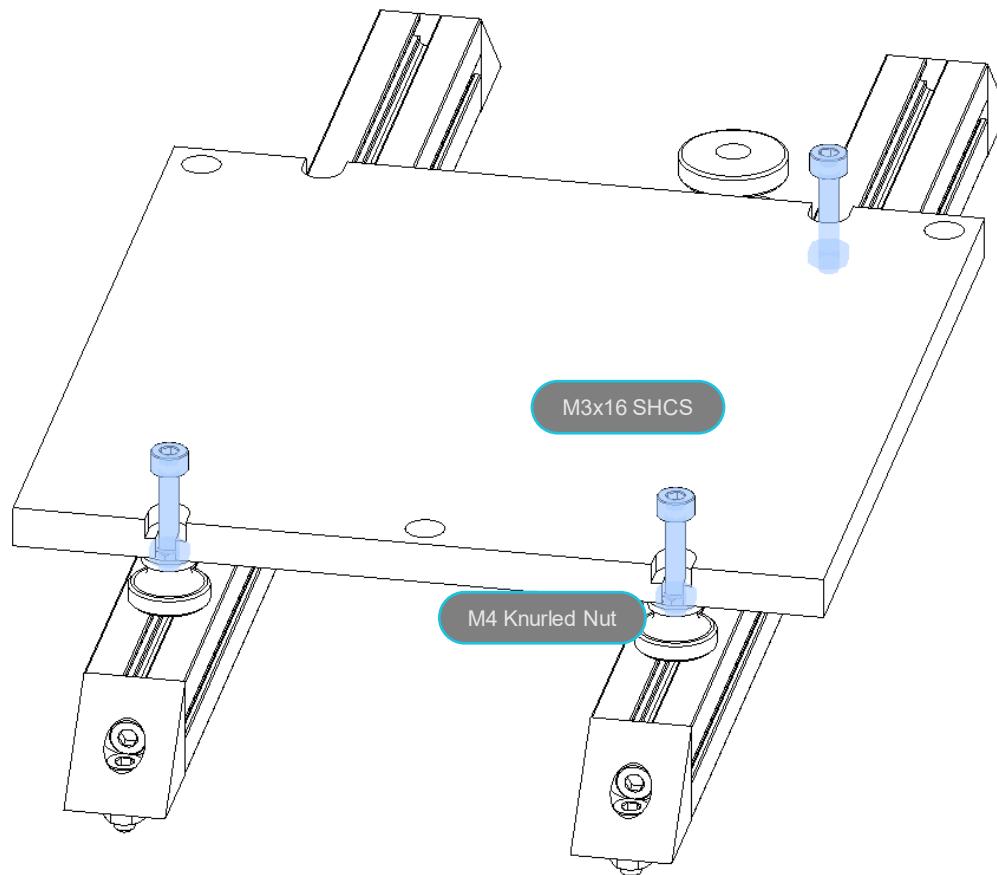
## BED HEATER

MICRON

### BED HEATER

The bed uses a silicone heater this can be powered by either AC mains voltage or DC 24v. Make sure if you use an AC mains voltage bed to add a ground wire as well as a thermal fuse in line on the L line of the mains wiring.



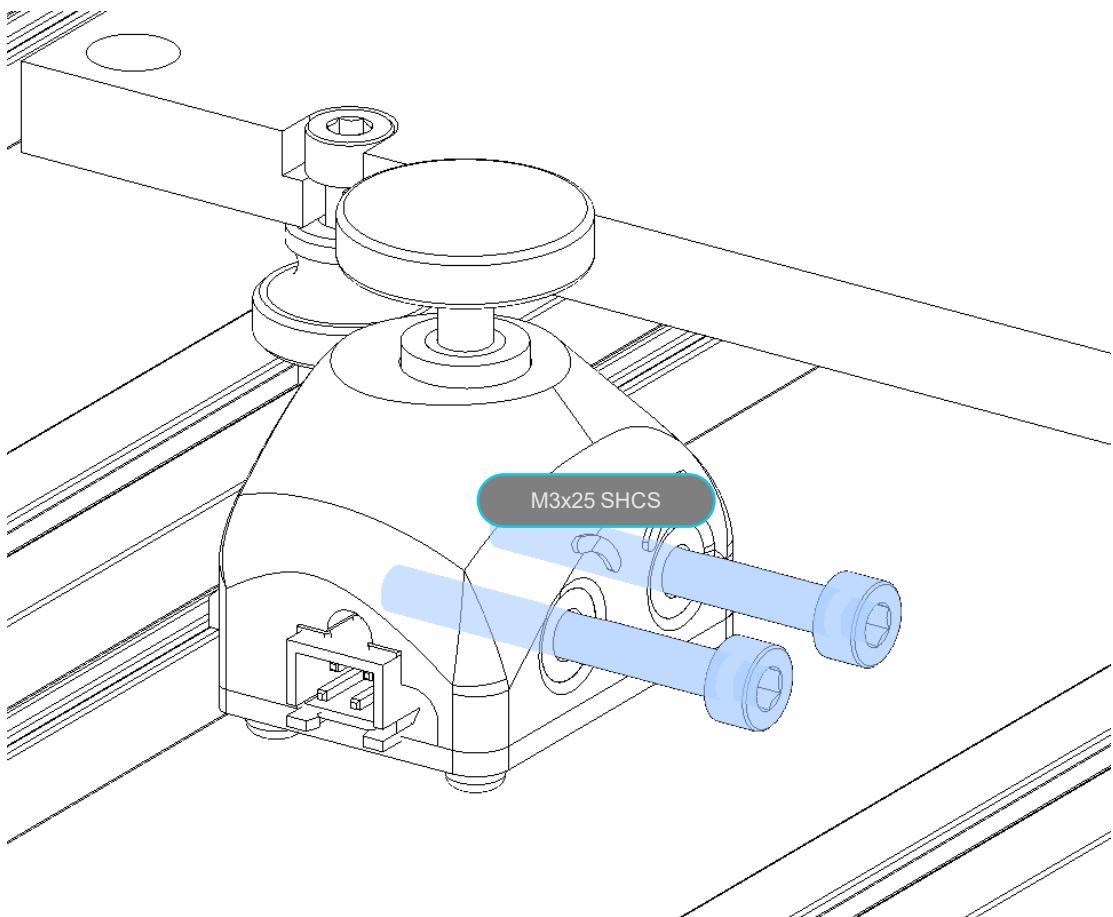


## Z ENDSTOP MOUNTING

MICRON

### Z ENDSTOP MOUNTING

Mount the Z endstop along the inside of the right bed extrusion, doesn't really matter exactly where, as you will finalize that later with the firmware.



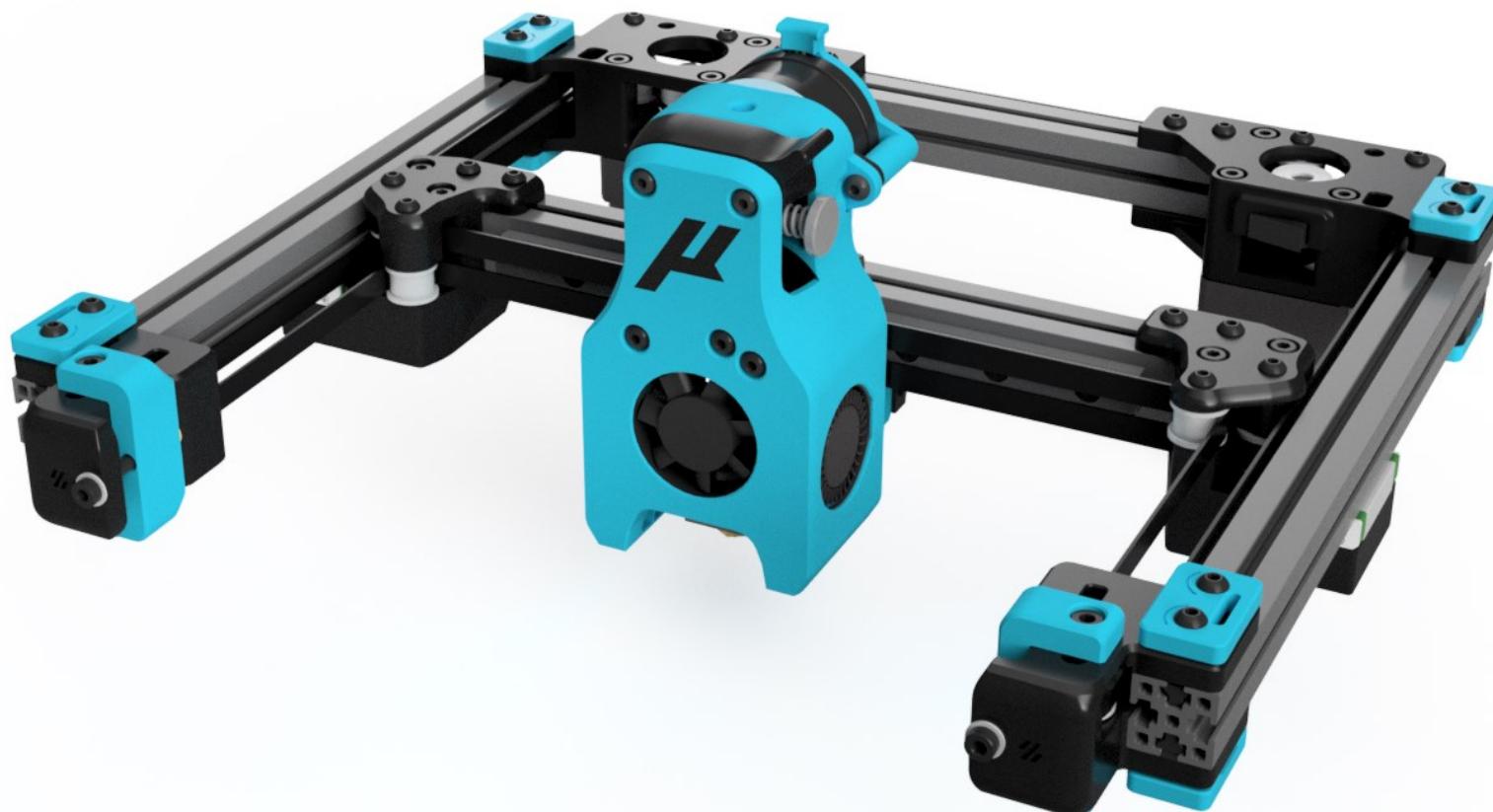
FRAME

MICRON



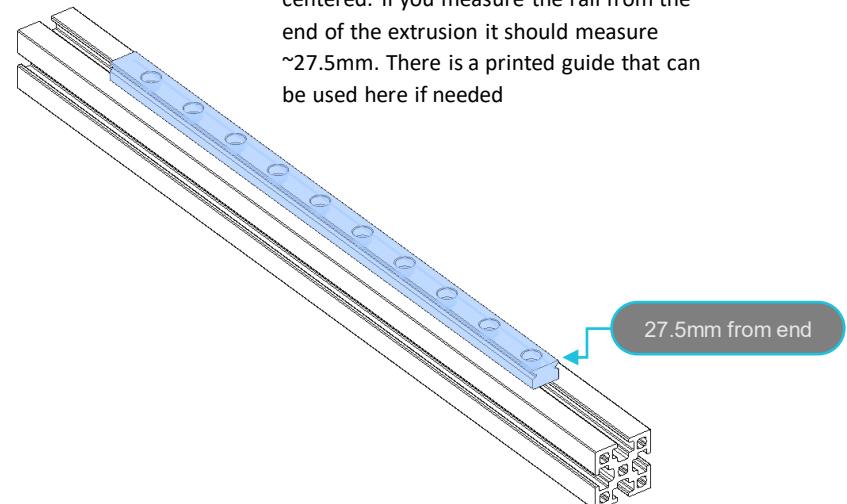
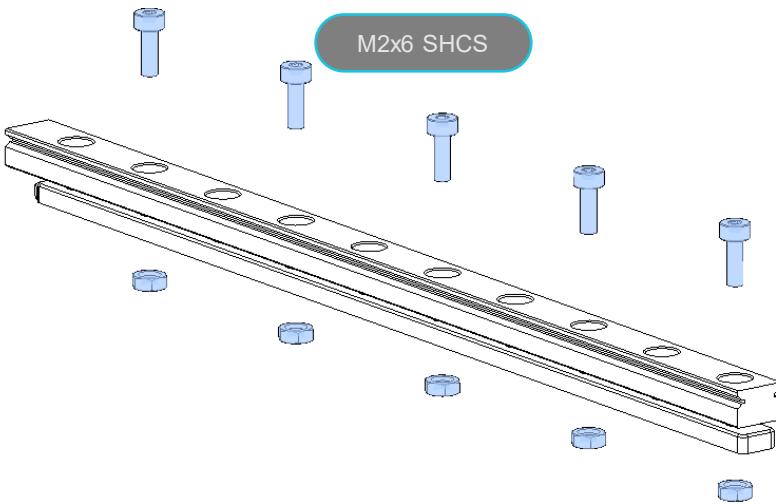
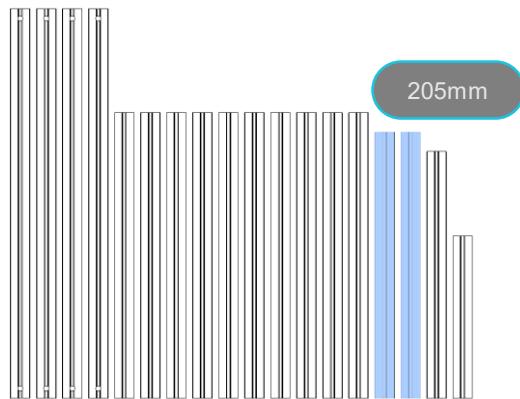
GANTRY

MICRON



## Y AXIS LINEAR RAILS

MICRON

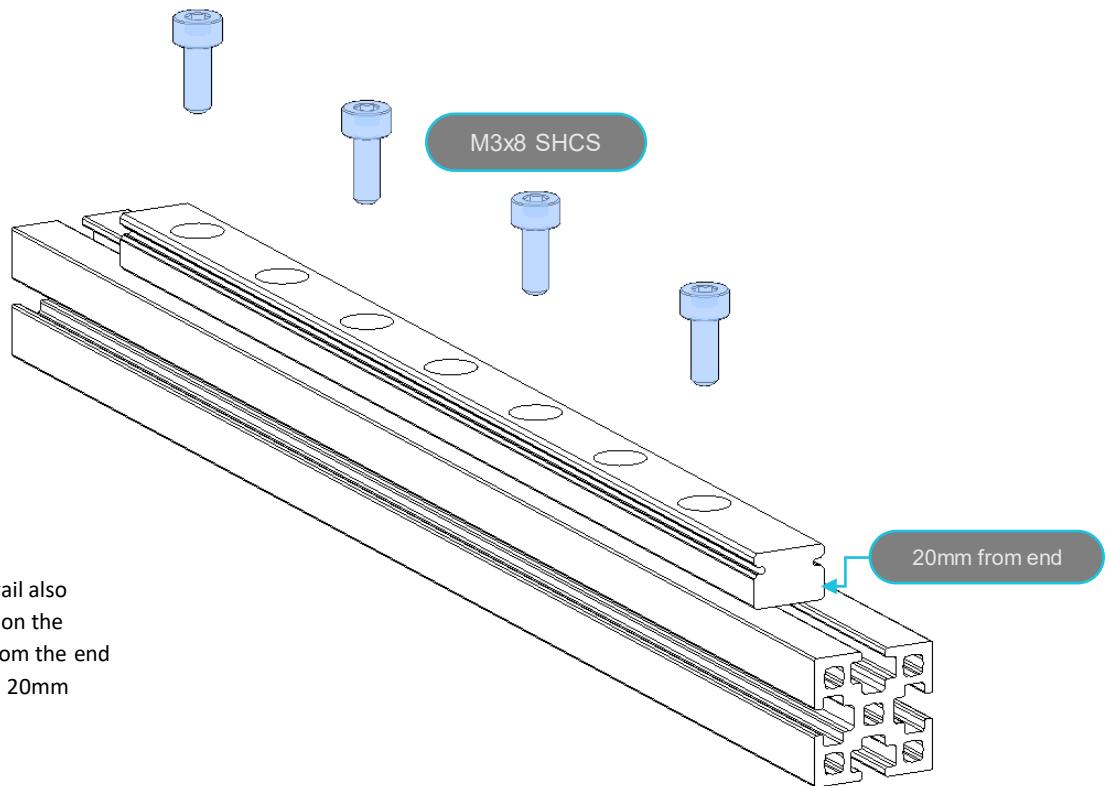
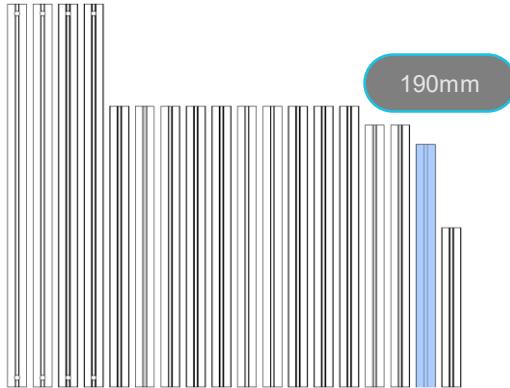


## Y AXIS LINEAR RAILS

There are 2 linear rails on the Y-axis mounted to the 205mm long extrusions and they both need to be exactly in the centered. If you measure the rail from the end of the extrusion it should measure ~27.5mm. There is a printed guide that can be used here if needed

## X AXIS LINEAR RAIL

MICRON

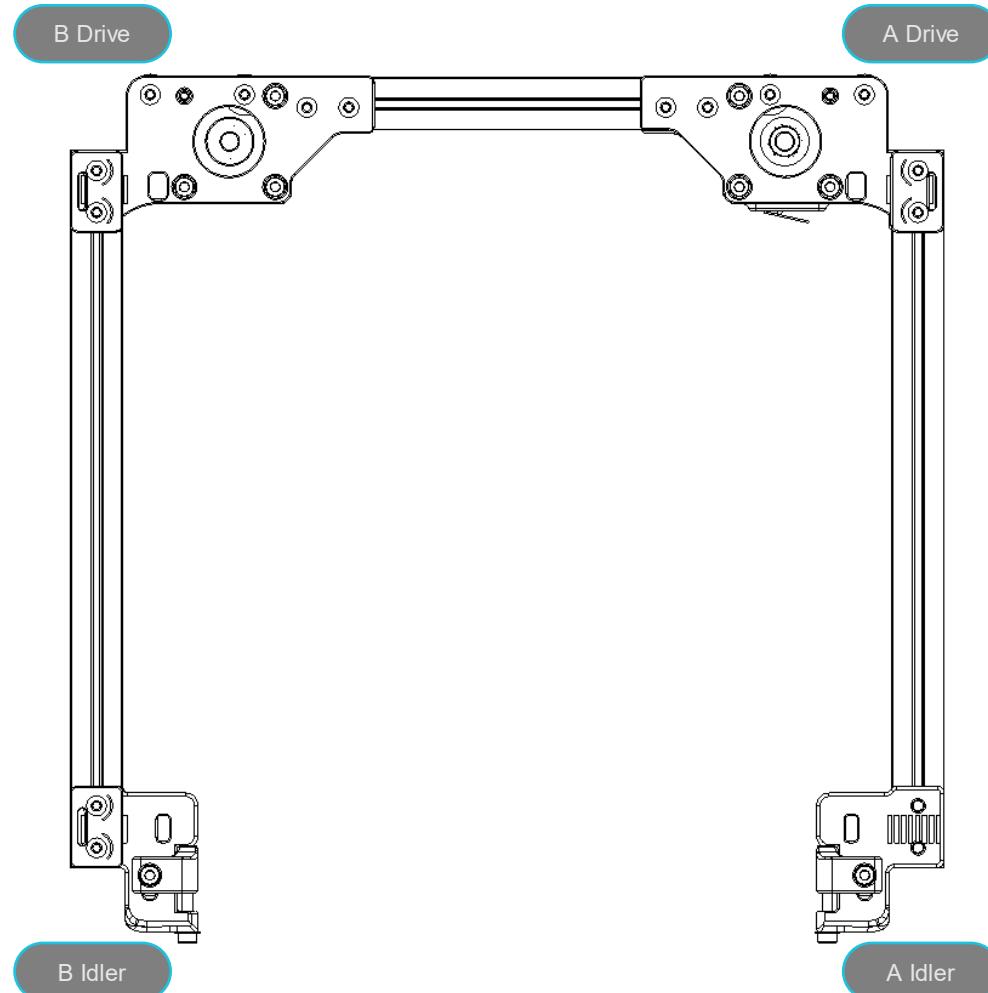


### X Axis Linear Rail

As with the Y linear rail , the X rail also needs to be perfectly centered on the extrusion. The measurement from the end of the rail to end of extrusion is 20mm

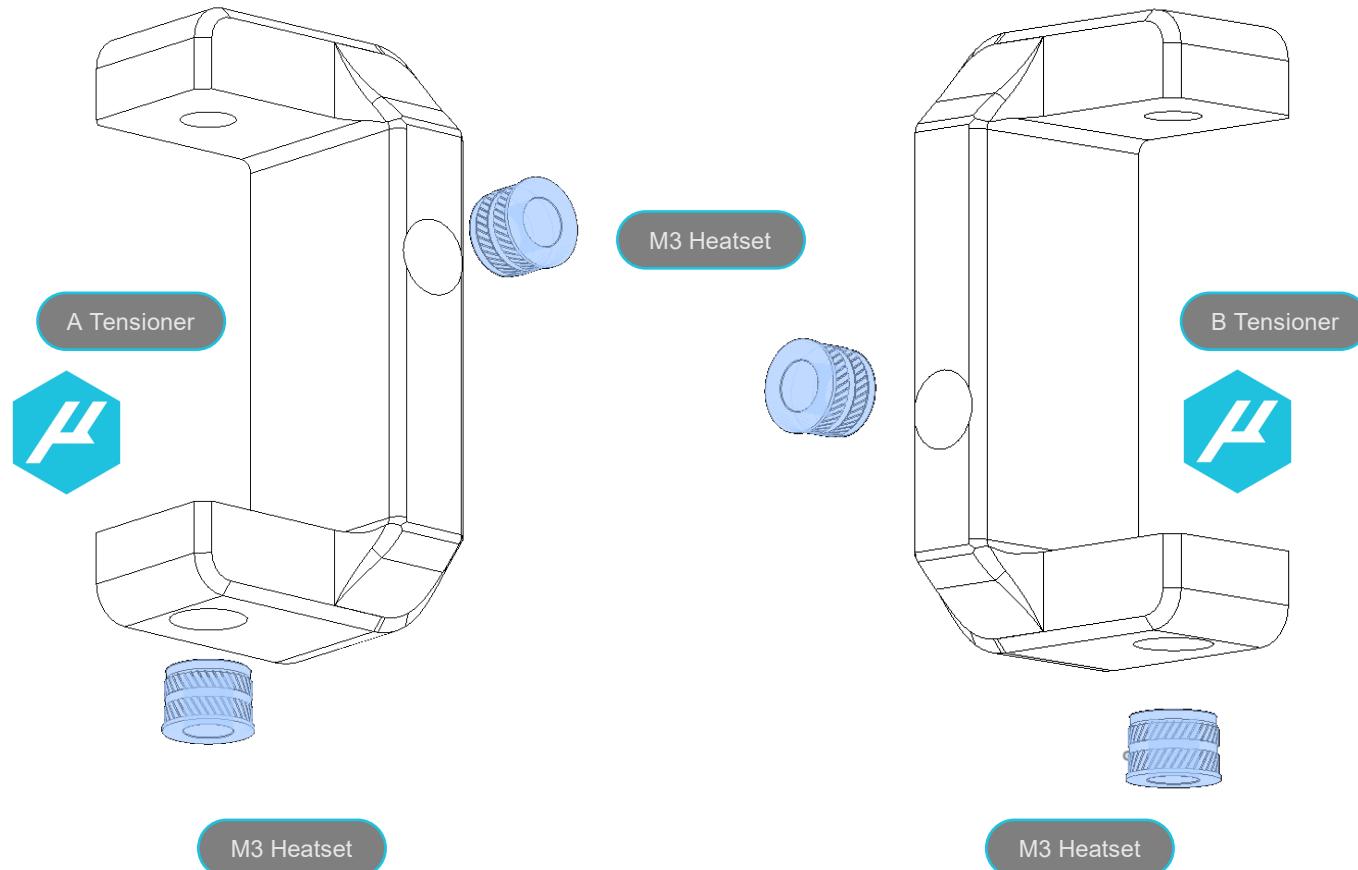
## GANTRY FRAME OVERVIEW

MICRON



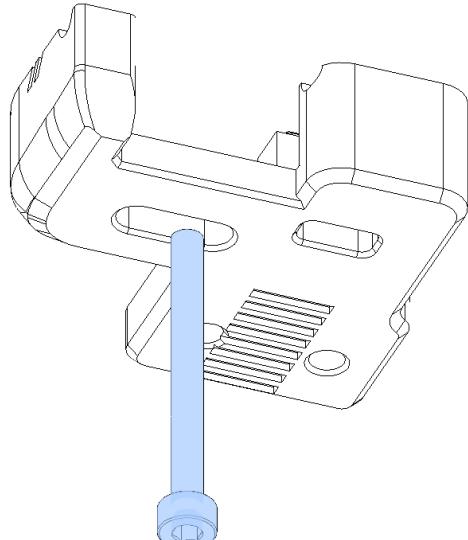
A/B IDLERS

MICRON

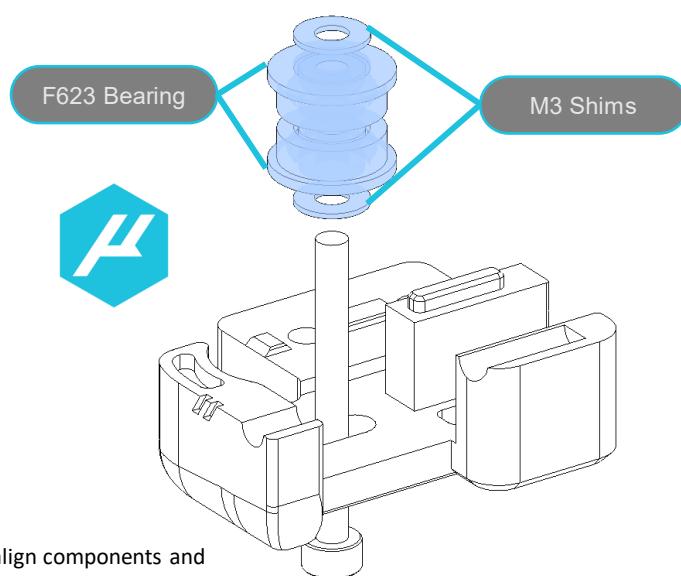


## A/B IDLERS

MICRON

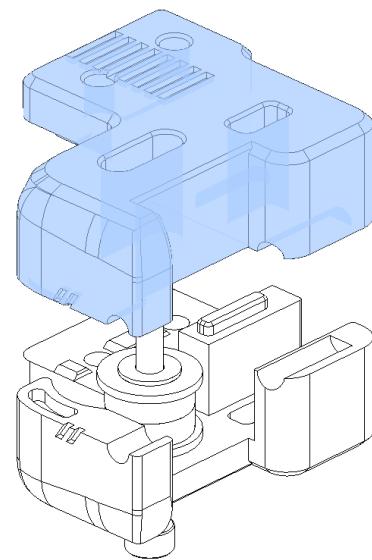


M3x30 SHCS



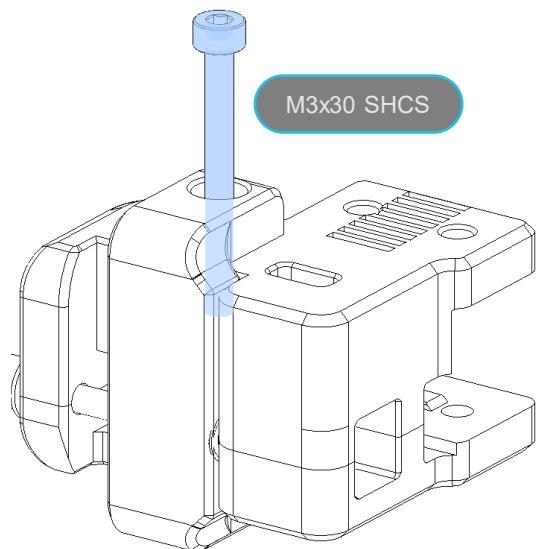
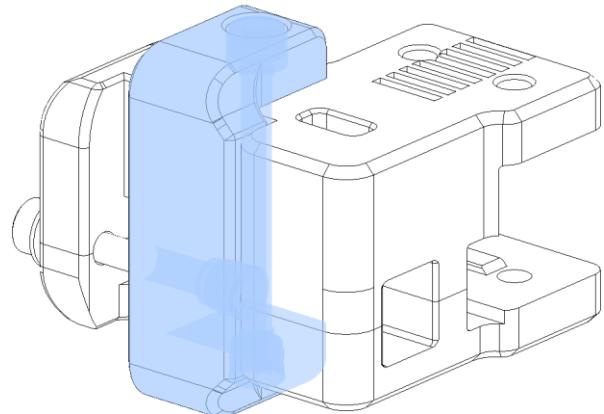
### ASSEMBLY AID

This screw is used to align components and will be removed in a later step



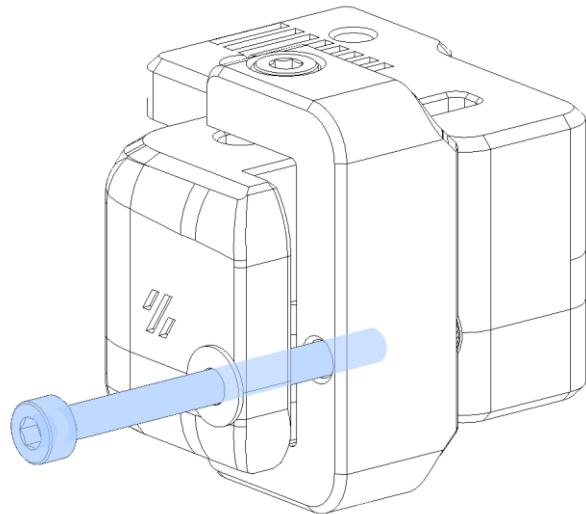
A/B IDLERS

MICRON



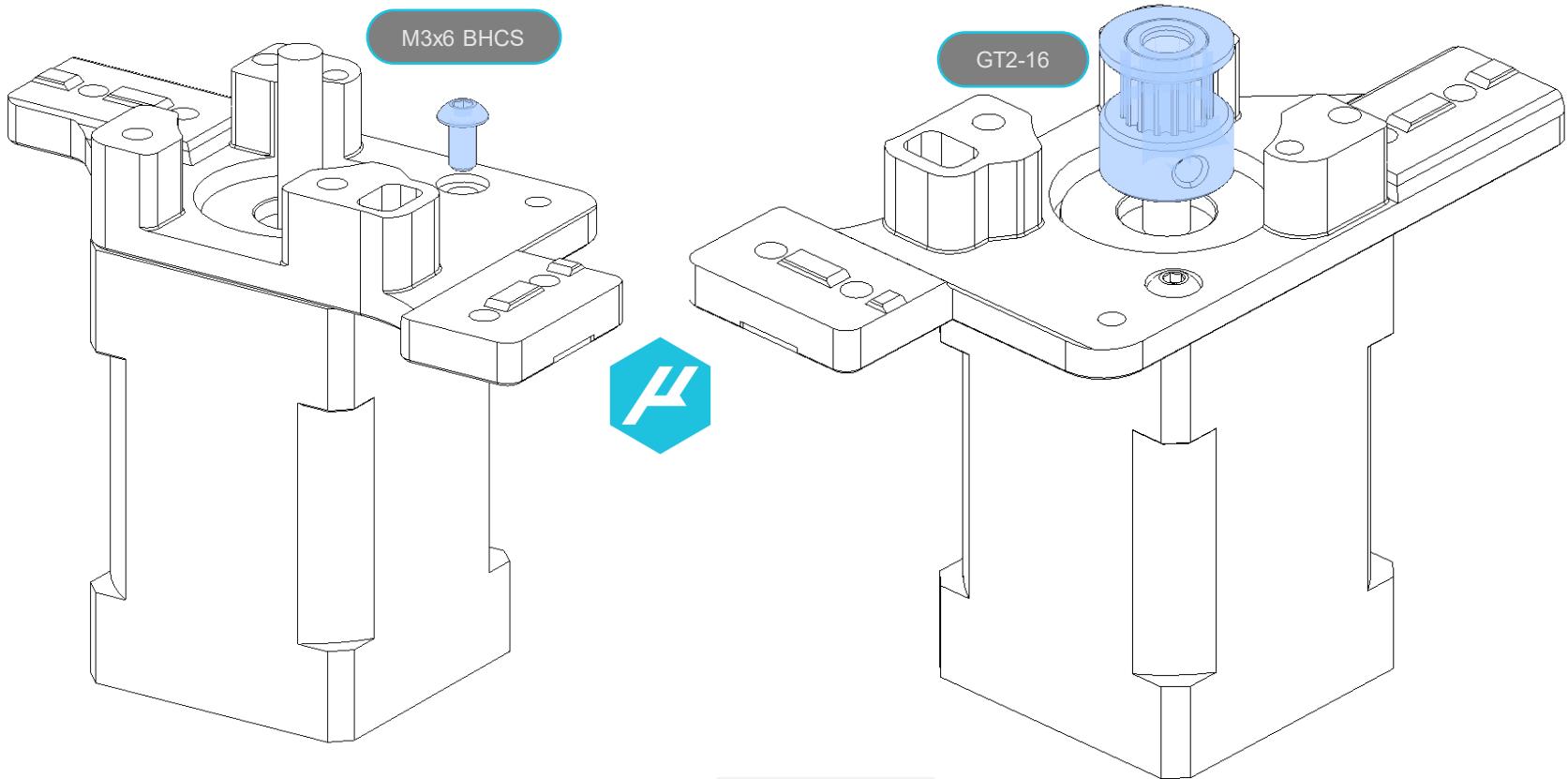
**REMOVE ASSEMBLY AID**

Remove the assembly aid screw as you insert the tensioner screw and slide the tension arm into place.



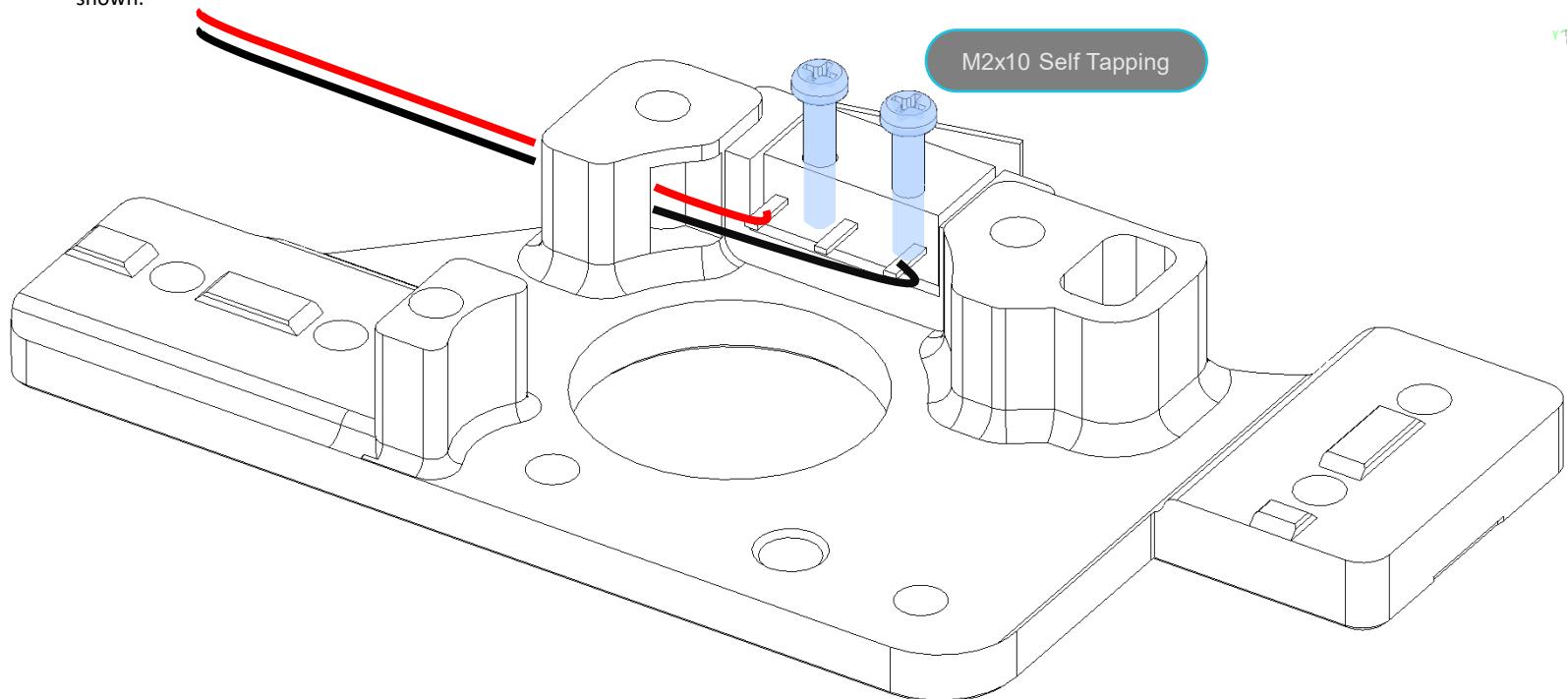
**A MOTOR PULLEY**

To attach the A drive stepper, orient the motor so the wiring is facing in towards the middle of the printer . Using 1 m3x6 BHCS to secure the stepper to the lower half of the A drive. Install a GT2-16 tooth pulley on the stepper as shown. Don't tighten it down just yet until you run the belts later in the assembly.



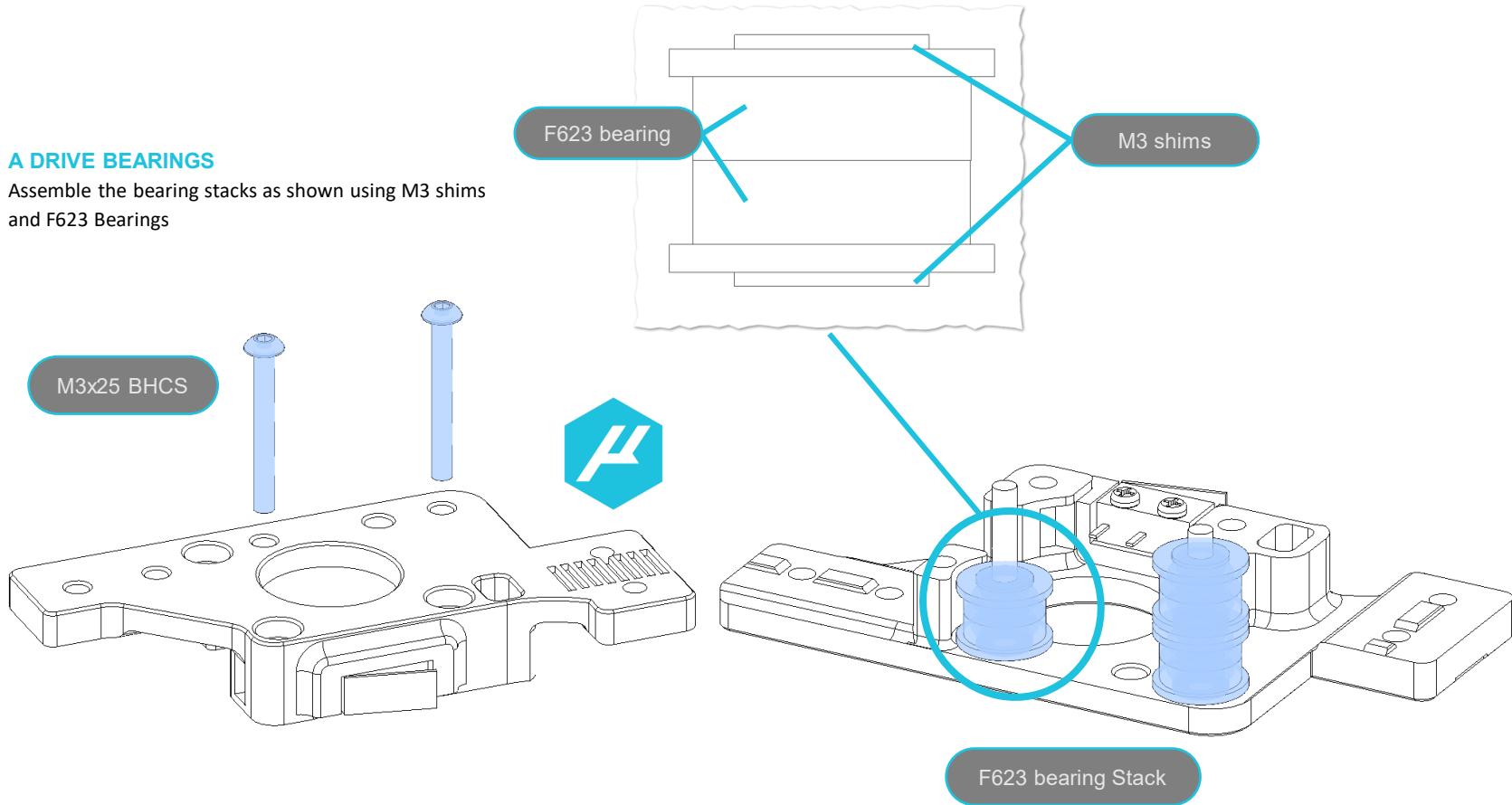
**A DRIVE UPPER / Y ENDSTOP**

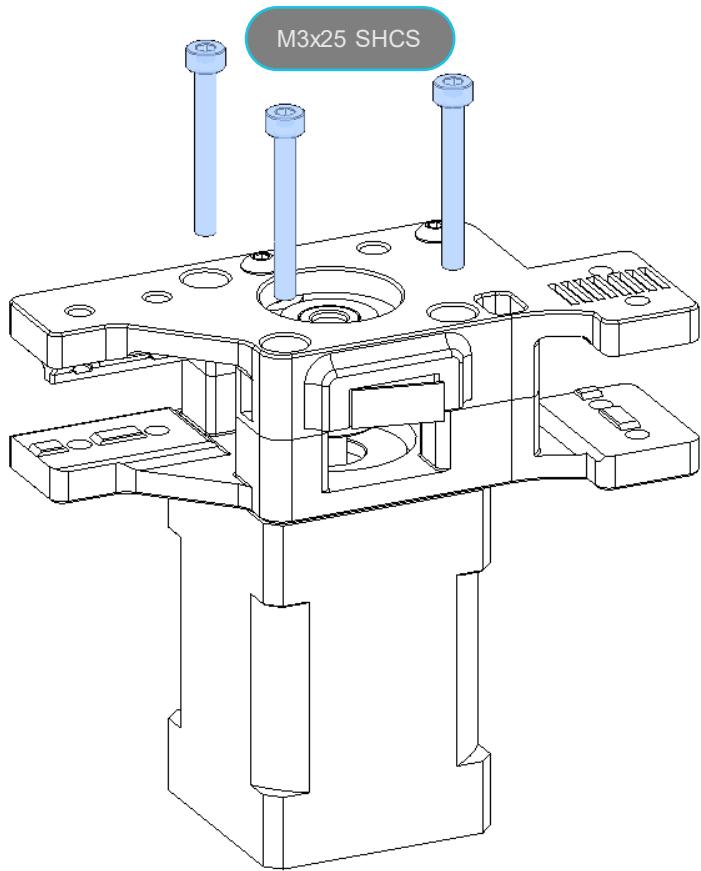
Start by installing the Y endstop switch into the upper A drive, securing it with 2 m2x10 self tapping screws. Insert 2 wires into the hole next to the microswitch and solder them to the 2 outer pins as shown.



**A DRIVE BEARINGS**

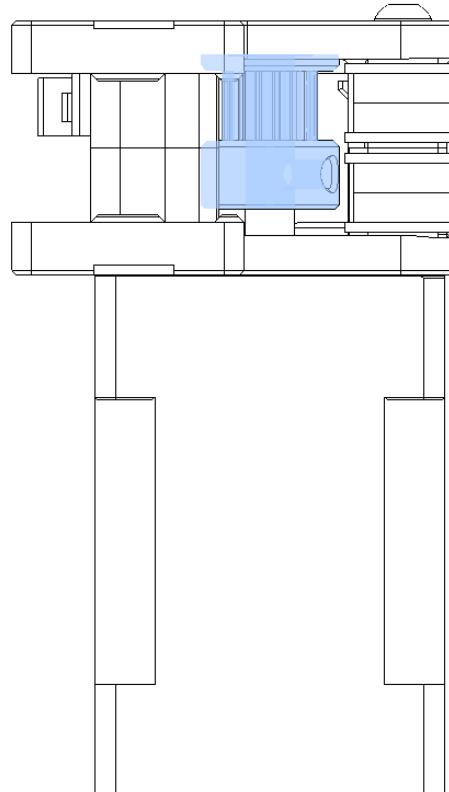
Assemble the bearing stacks as shown using M3 shims  
and F623 Bearings





### A DRIVE PULLEY

Now is time to align the drive pulley with the top bearings and tighten the grub screw.

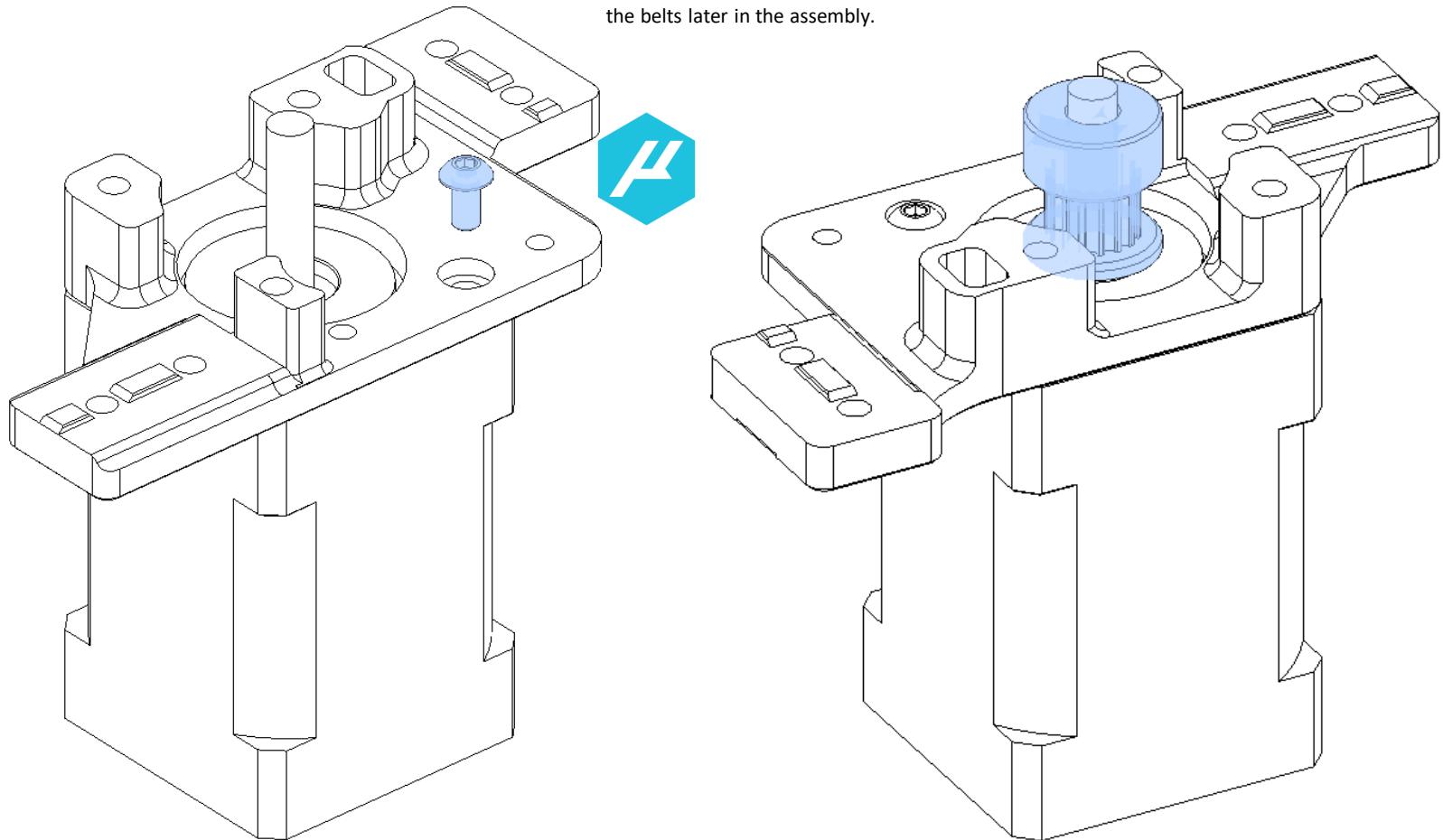


## B DRIVE

### B MOTOR PULLEY

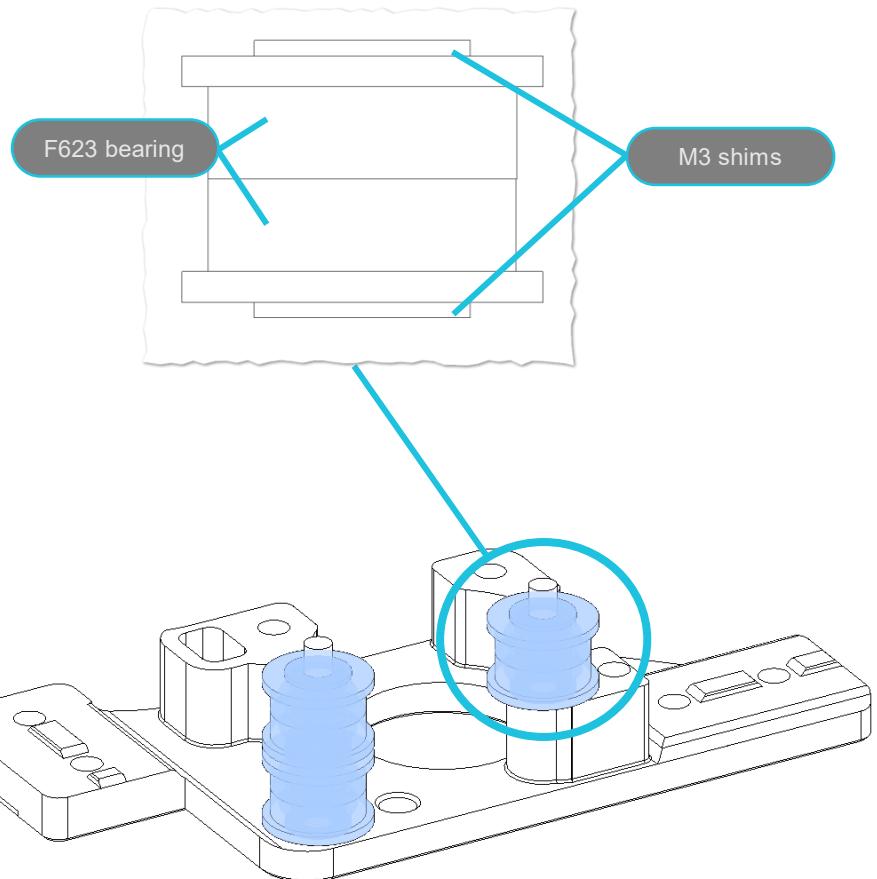
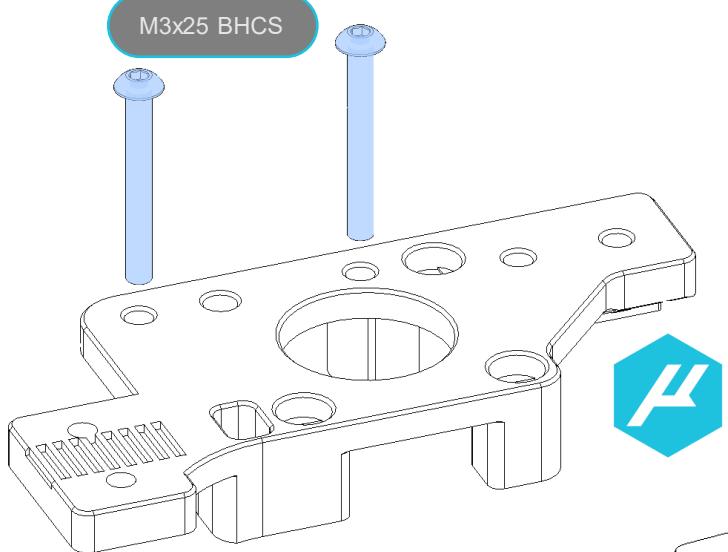
To attach the B drive stepper, orient the motor so the wiring is facing in towards the middle of the printer . Using 1 m3x6 BHCS to secure the stepper to the lower half of the B drive. Install a GT2-16 tooth pulley on the stepper as shown. Don't tighten it down just yet until you run the belts later in the assembly.

MICRON

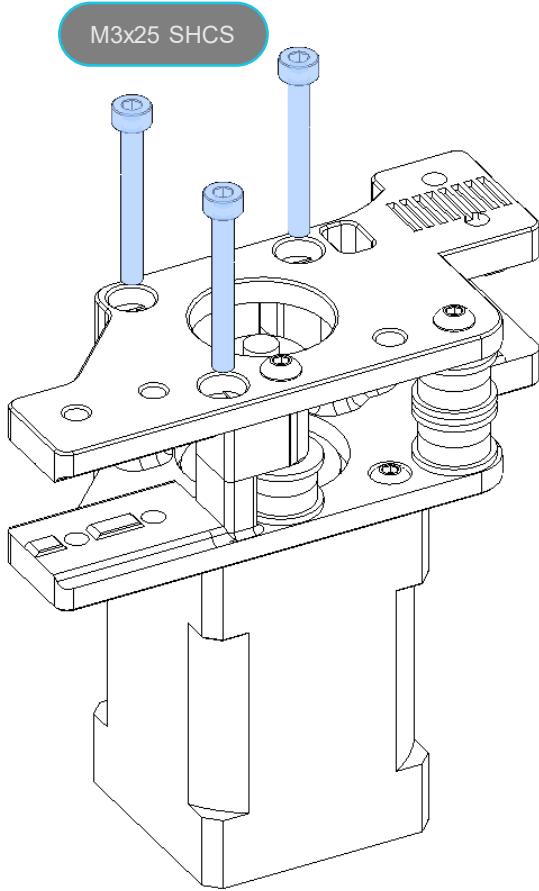


**B DRIVE BEARINGS**

Assemble the bearing stacks as shown using M3 shims  
and F623 Bearings



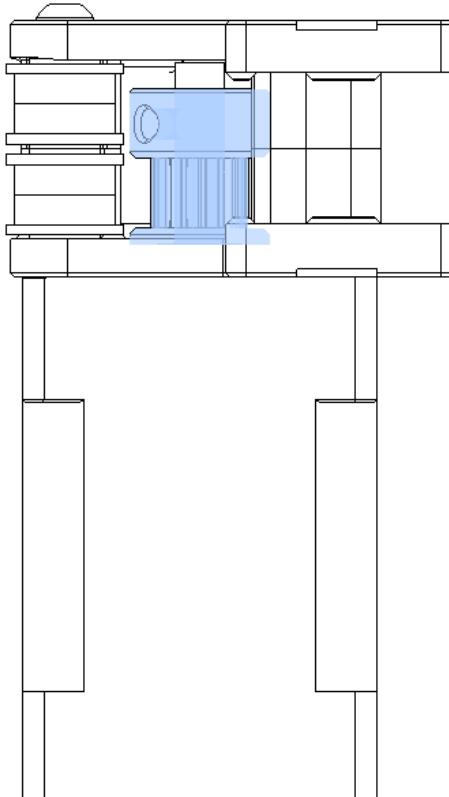
FRAME



MICRON

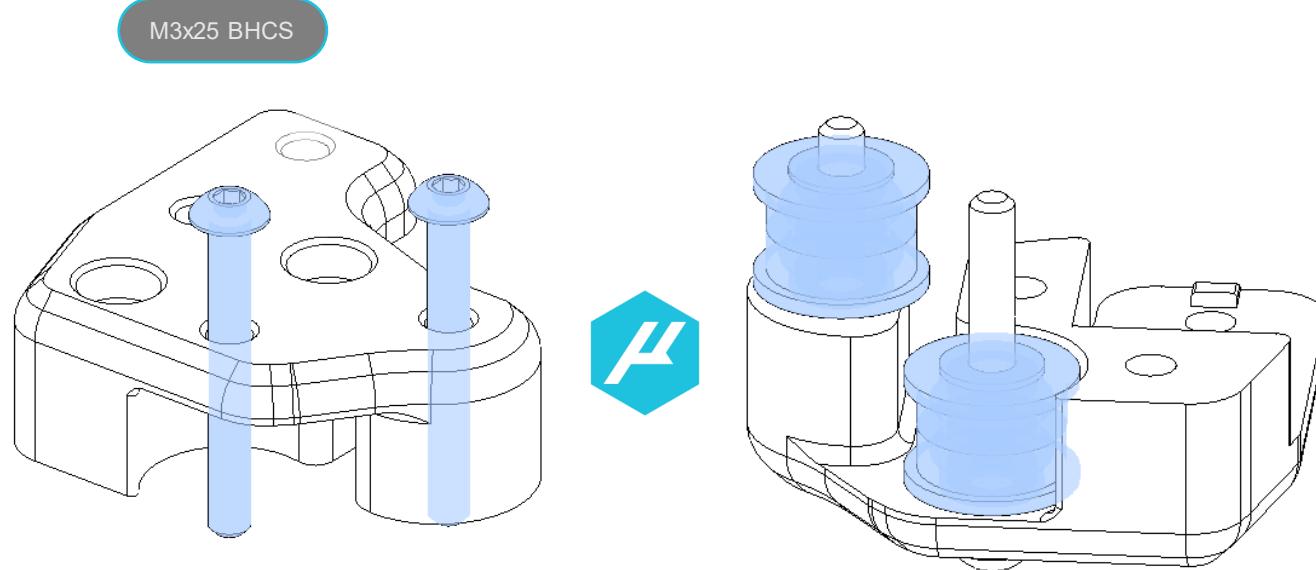
### B DRIVE PULLEY

Now is time to align the drive pulley with the top bearings and tighten the grub screw.



## LEFT XY JOINT ASSEMBLY

MICRON

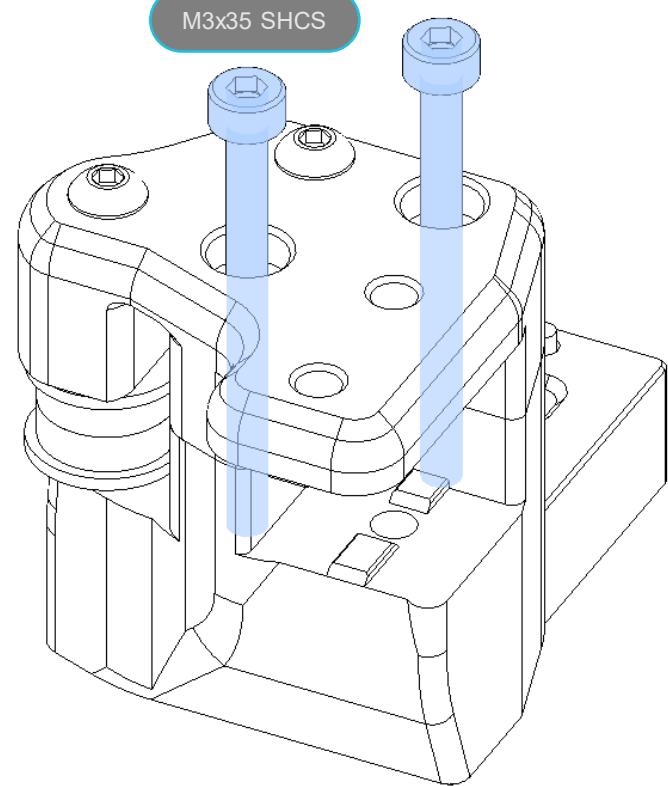
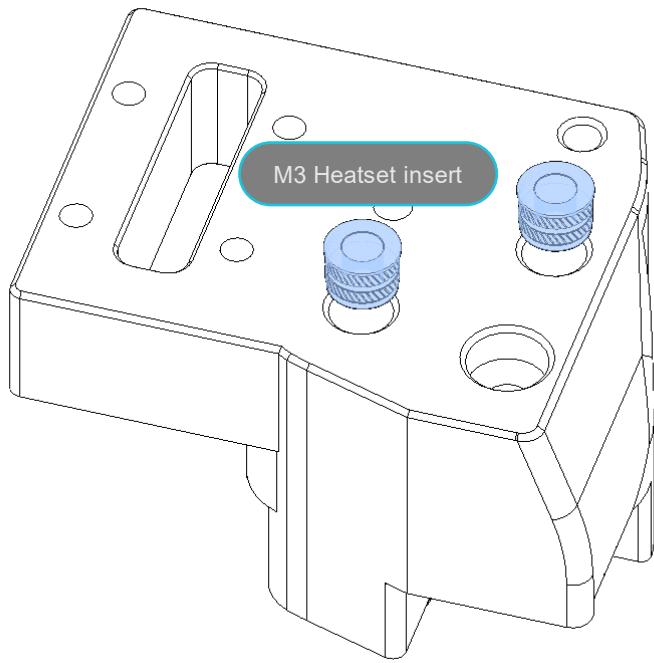


### LEFT XY JOINT BEARING STACKS

See previous examples for how to assemble these. We use the same bearings and fasteners used in other steps.

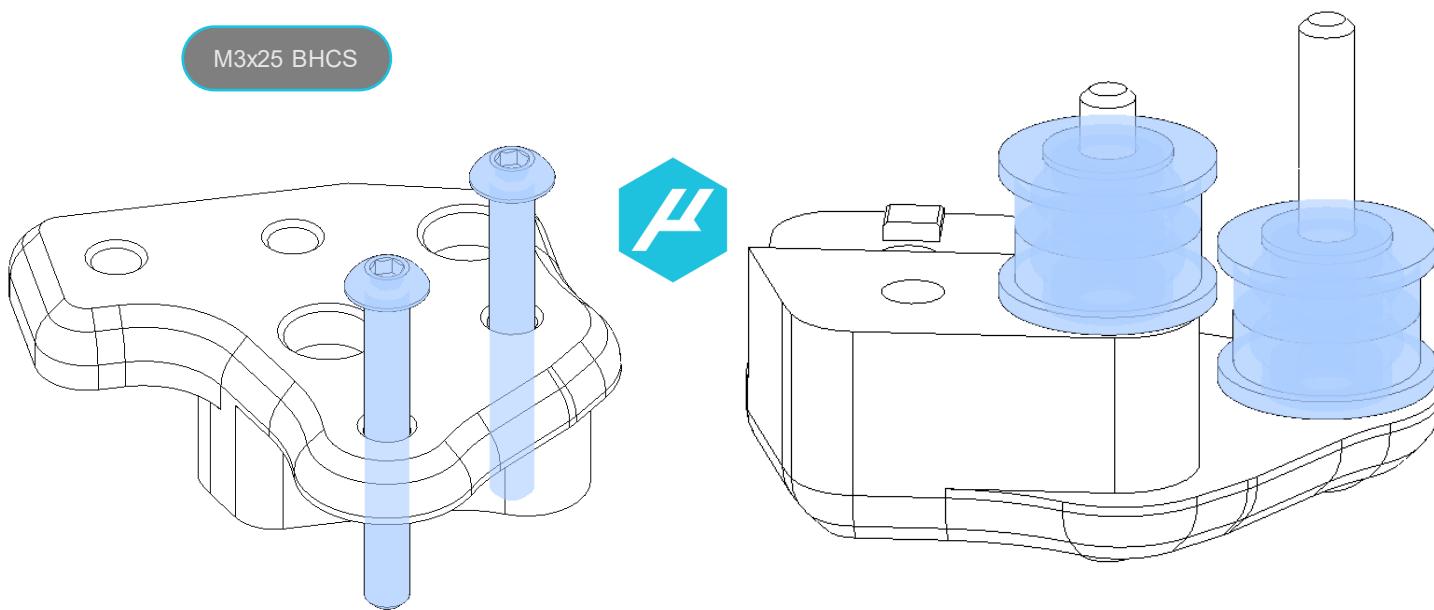
## LEFT XY JOINT CONTINUED

MICRON



## RIGHT XY JOINT

MICRON

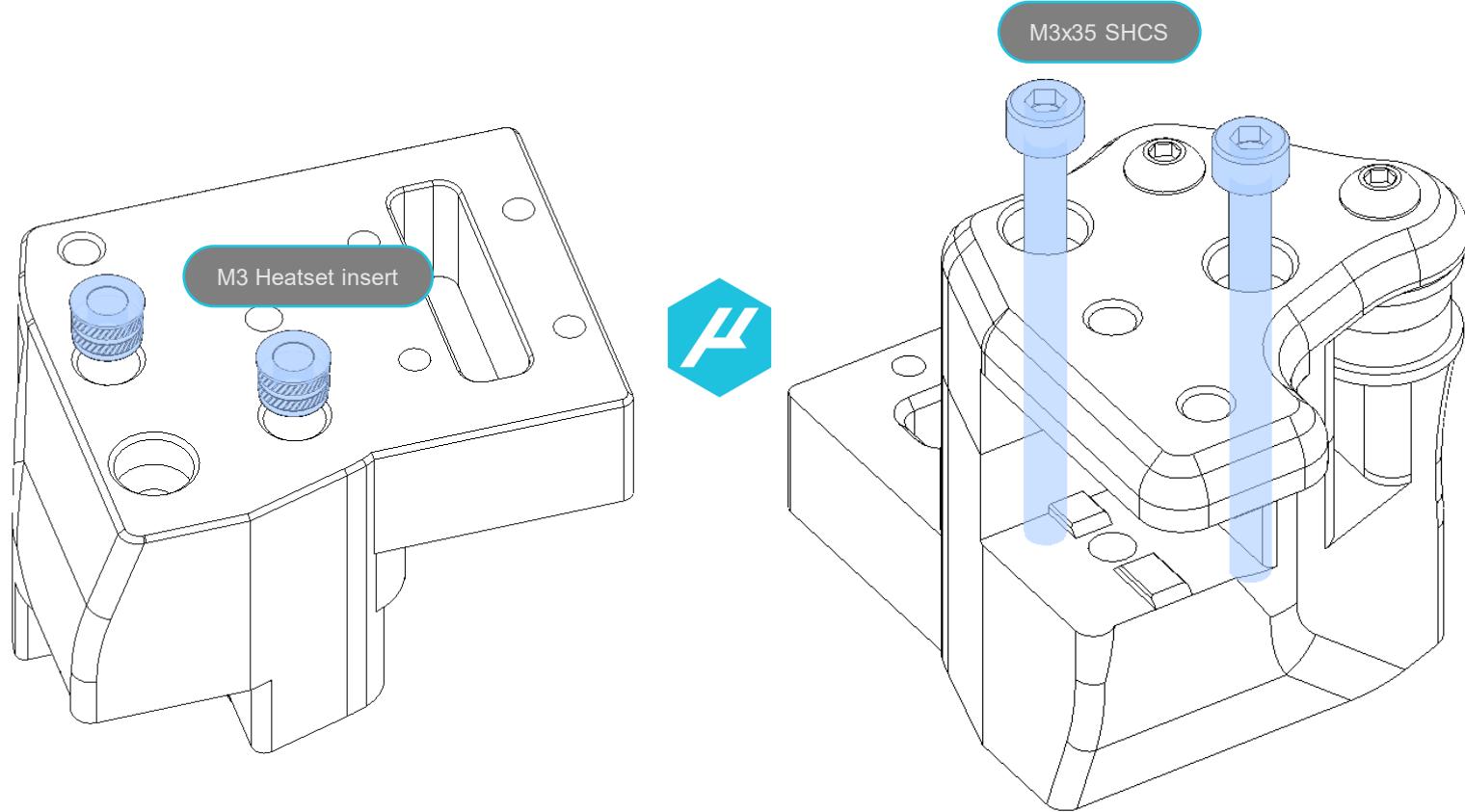


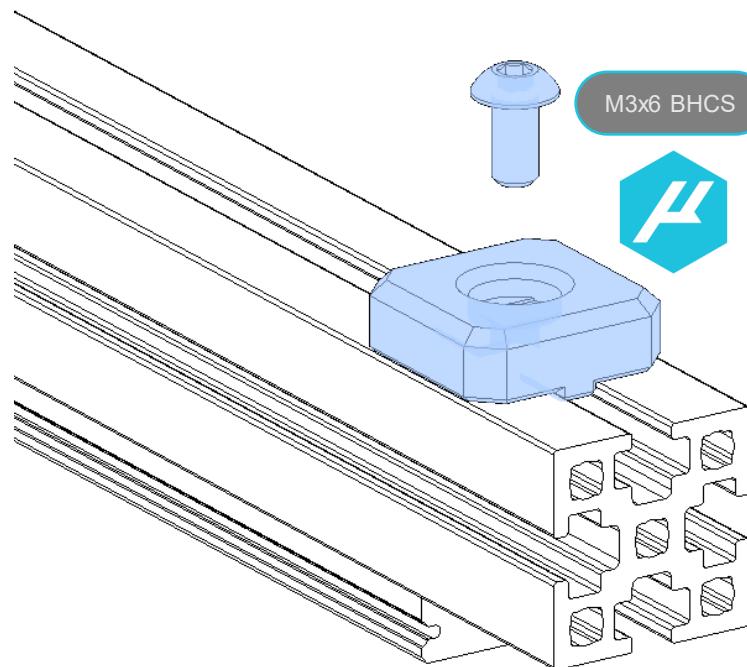
### RIGHT XY JOINT BEARING STACKS

See previous examples for how to assemble these. We use the same bearings and fasteners used in other steps.

## RIGHT XY JOINT CONTINUED

MICRON

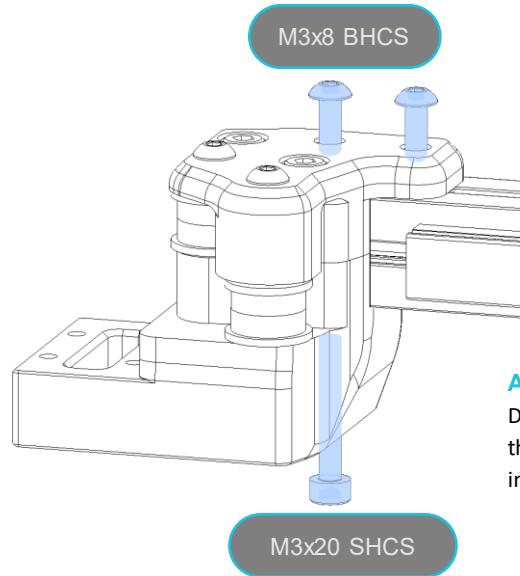




M3x6 BHCS

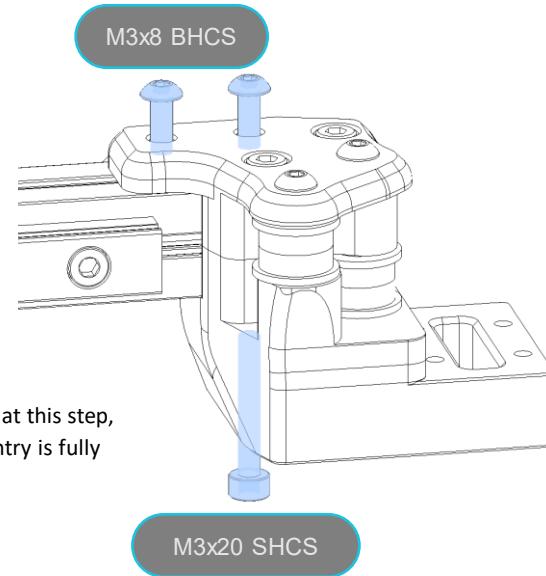
**Y Endstop extender**

The Y endstop needs this little printed part to make sure it gets hit properly. This should be installed 8mm from the end of the extrusion. This gets installed on the opposite side of the MGN9C x rail.

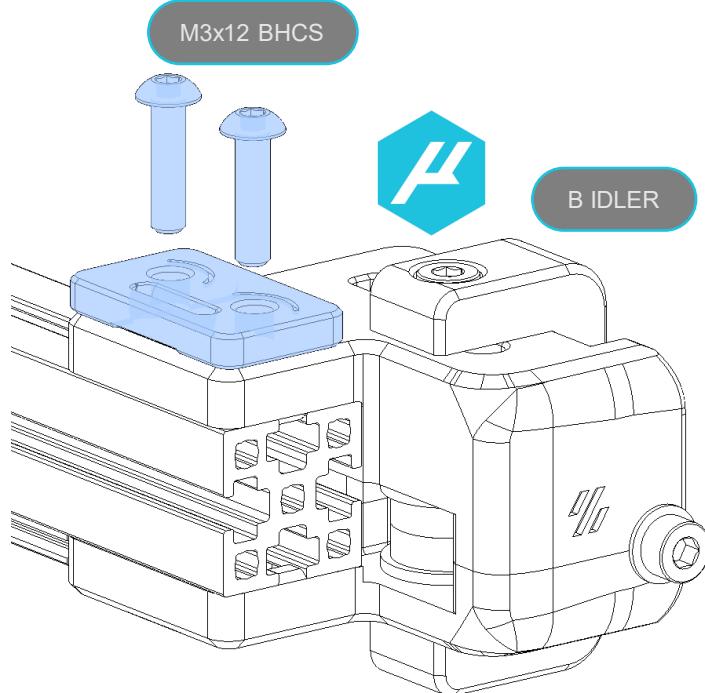


#### Assembling the X axis

Don't tighten the X axis all the way at this step, that will be done later once the gantry is fully installed.



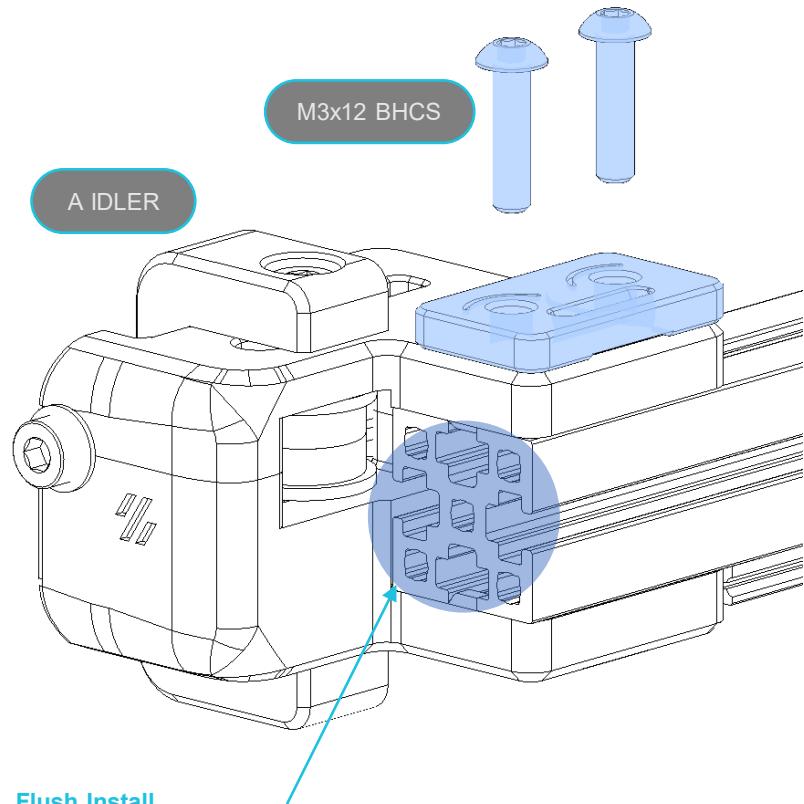
## AB IDLERS



### Belt Clamps

Note only the top belt clamps are installed at this time.

## MICRON

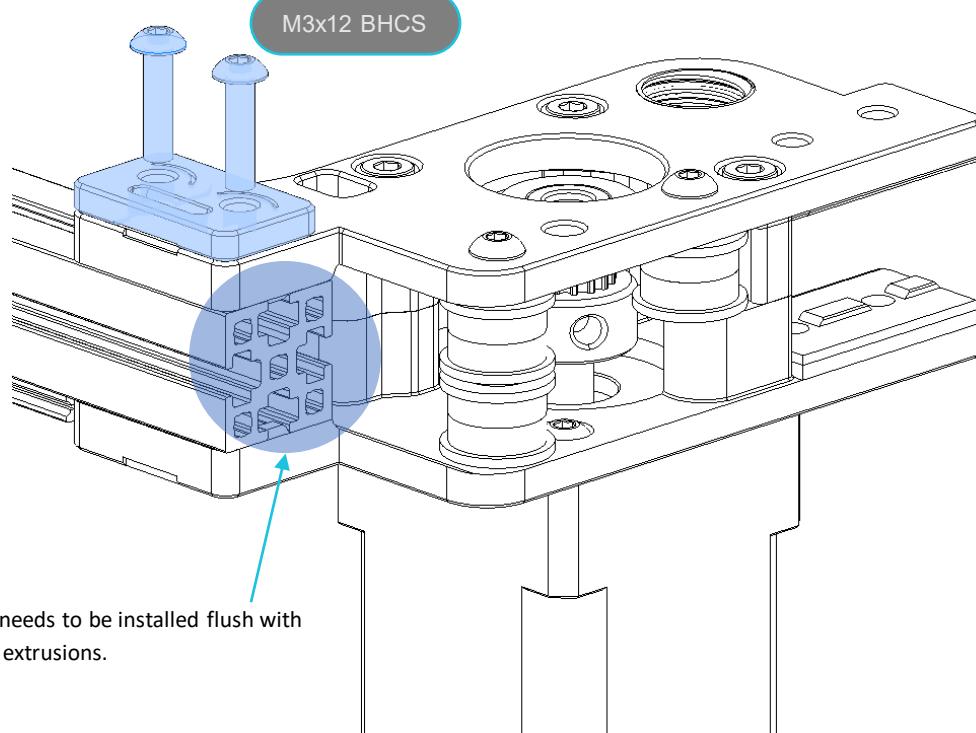


### Flush Install

The front idlers need to be installed flush with the end of the Y gantry extrusions.

**Belt Clamps**

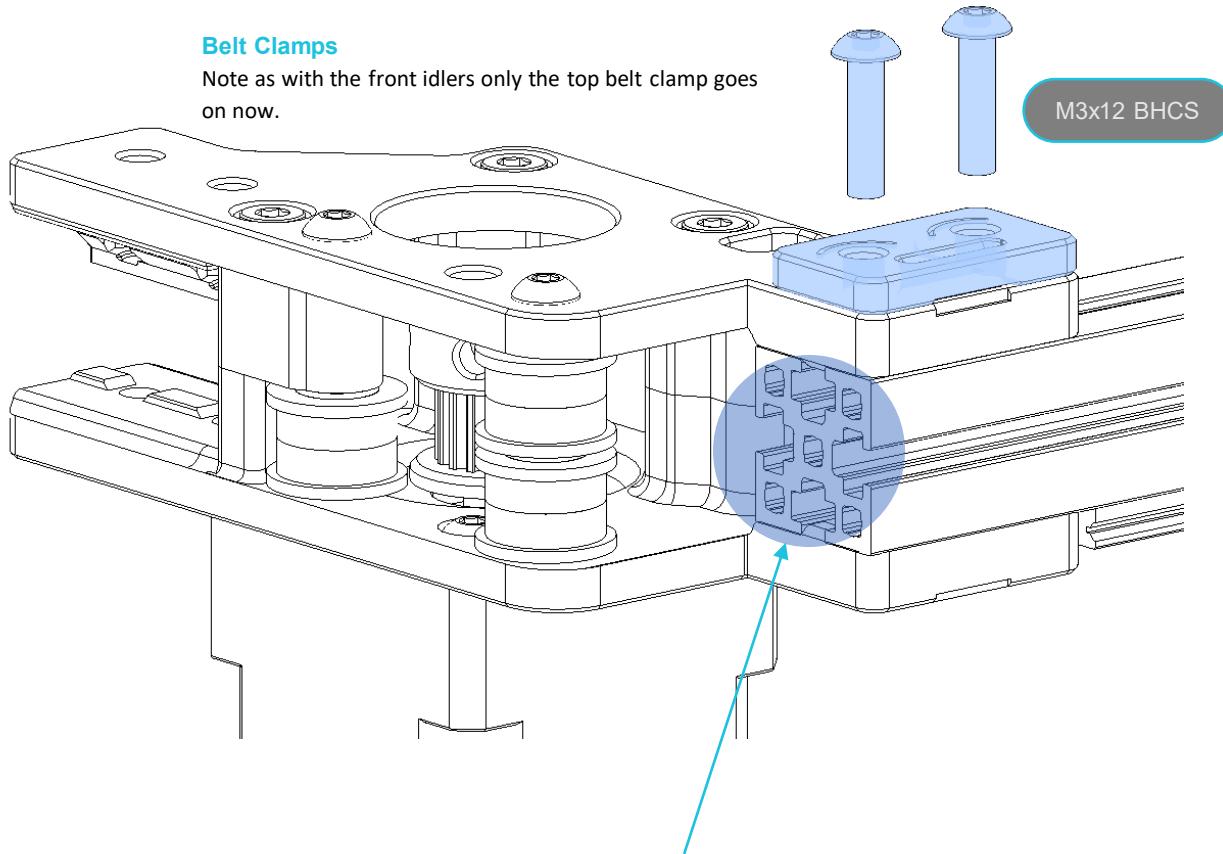
Note as with the front idlers only the top belt clamp goes on now.

**Flush Install**

The rear of the A drive needs to be installed flush with the end of the Y gantry extrusions.

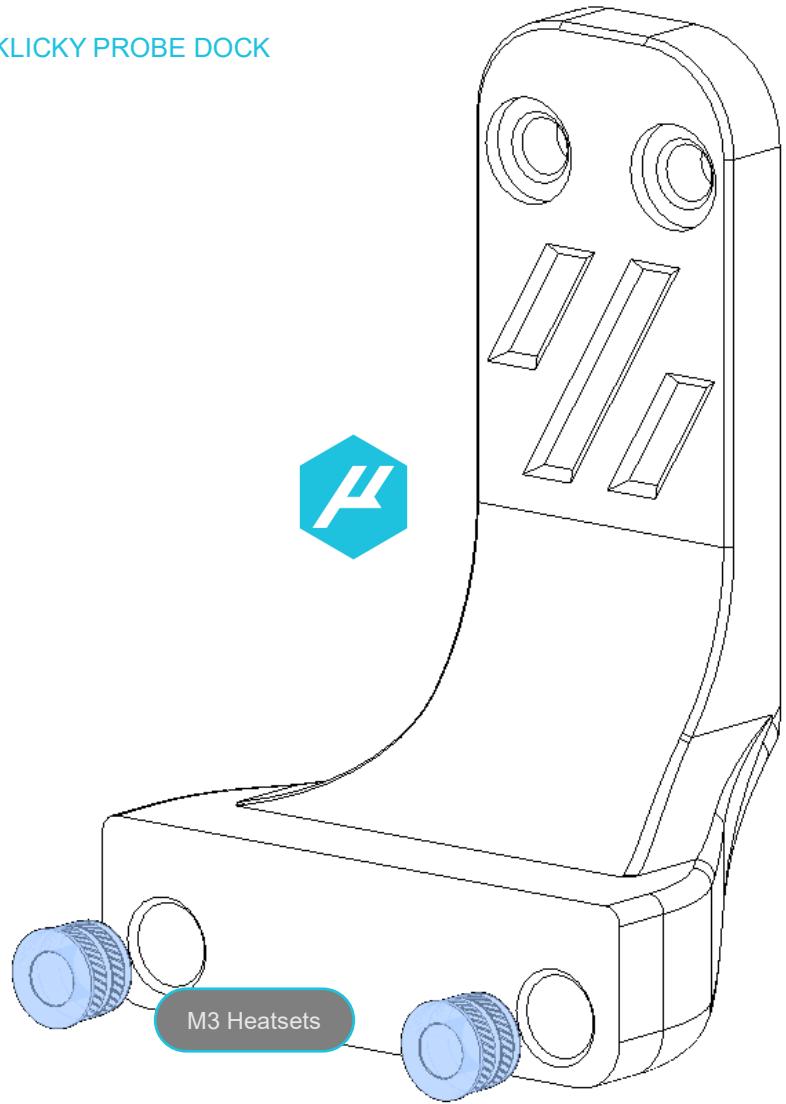
**Belt Clamps**

Note as with the front idlers only the top belt clamp goes on now.

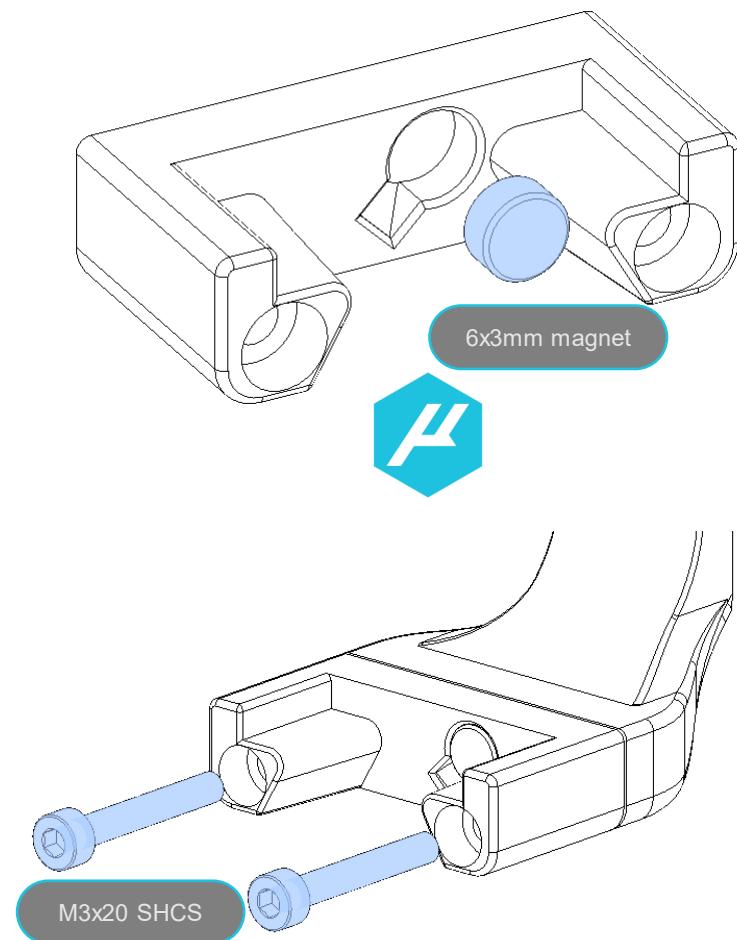
**Flush Install**

The rear of the B drive needs to be installed flush with the end of the Y gantry extrusions.

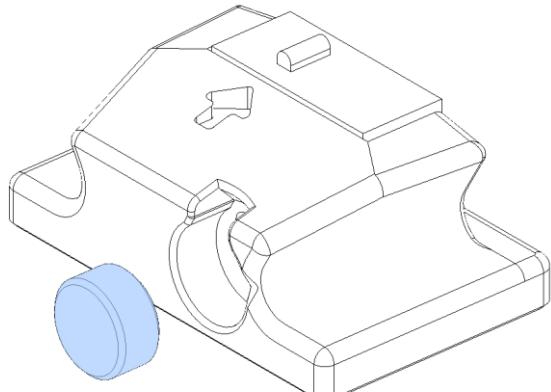
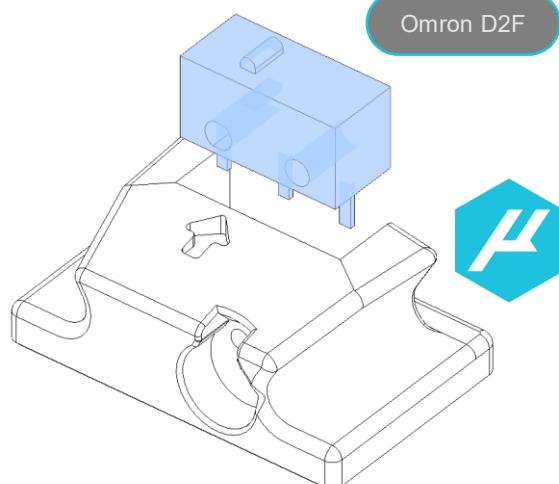
KLICKY PROBE DOCK



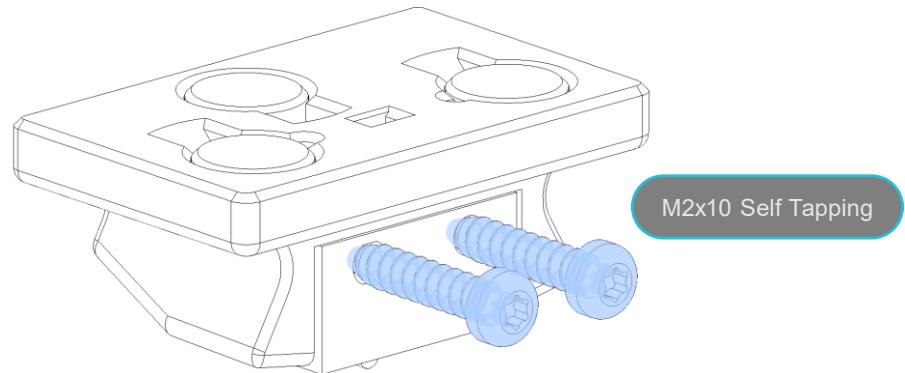
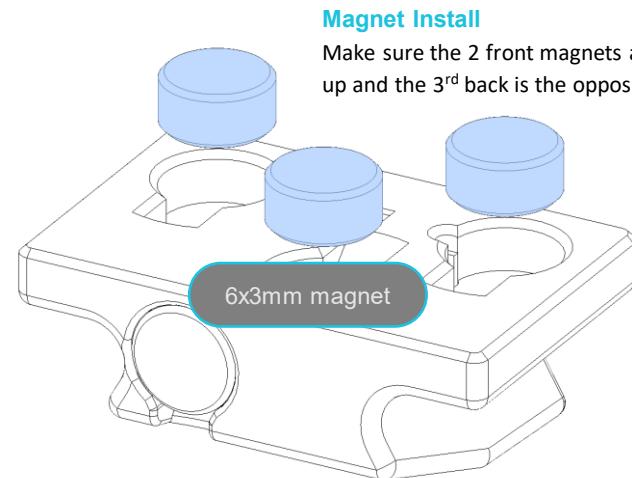
MICRON



## KLICKY PROBE

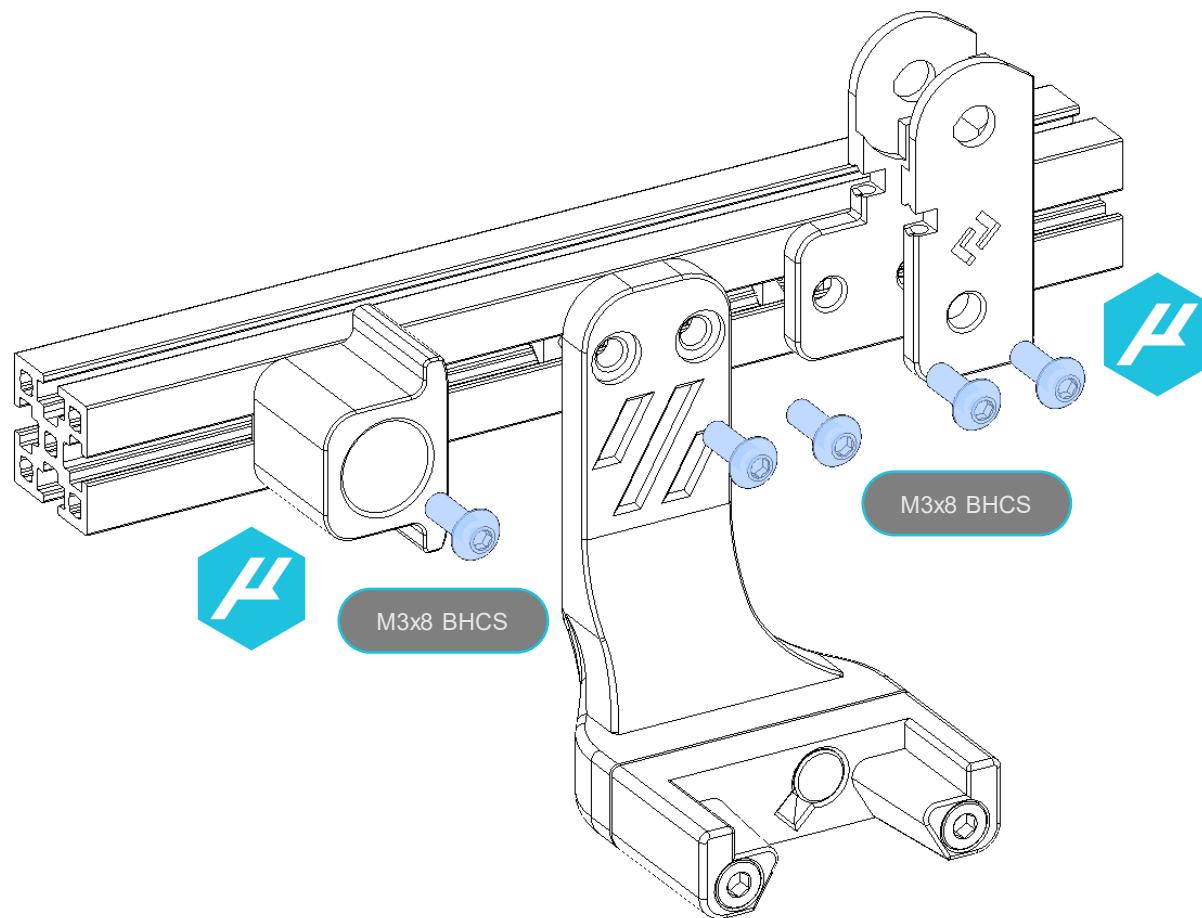


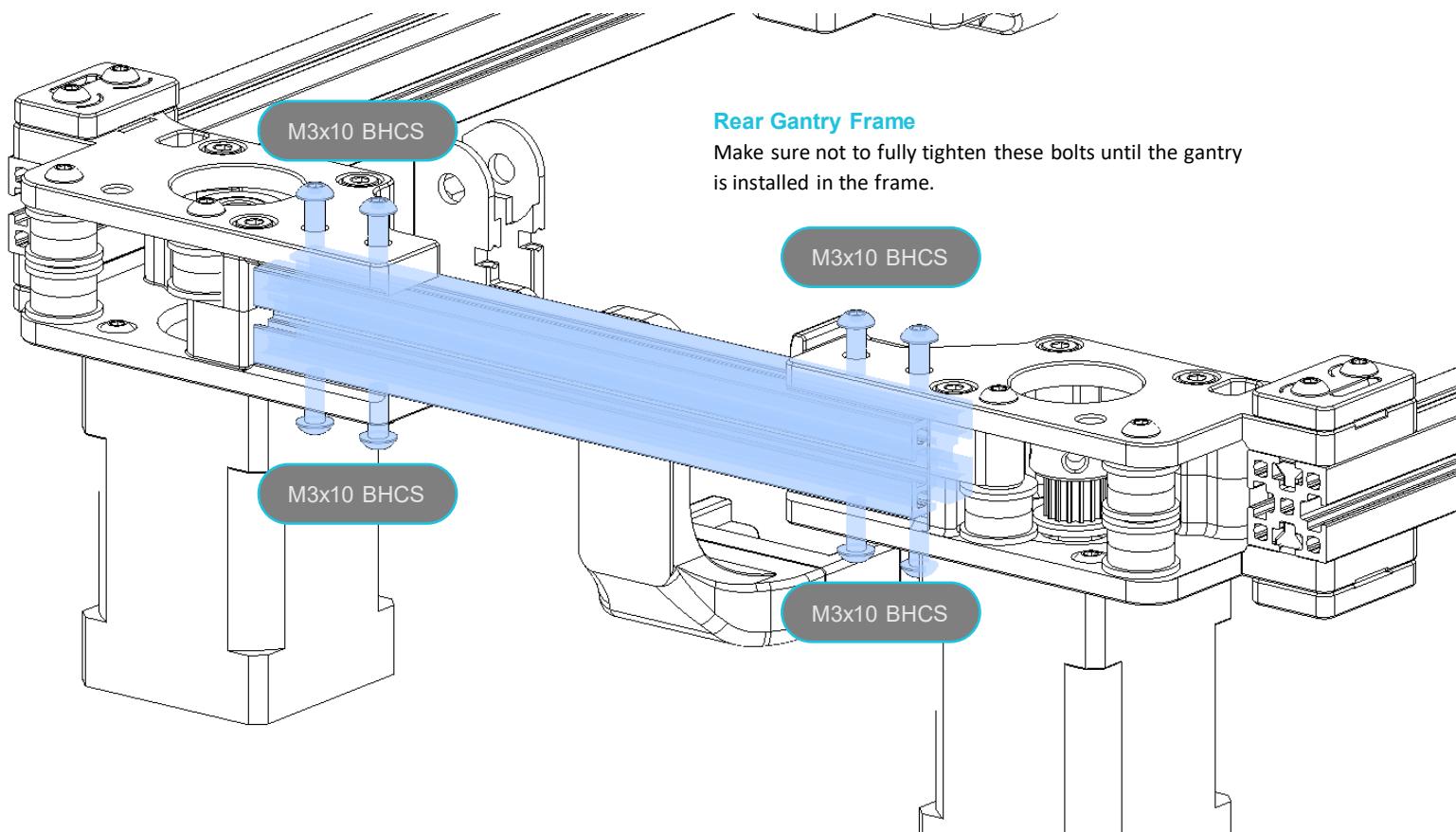
## MICRON



## REAR GANTRY FRAME

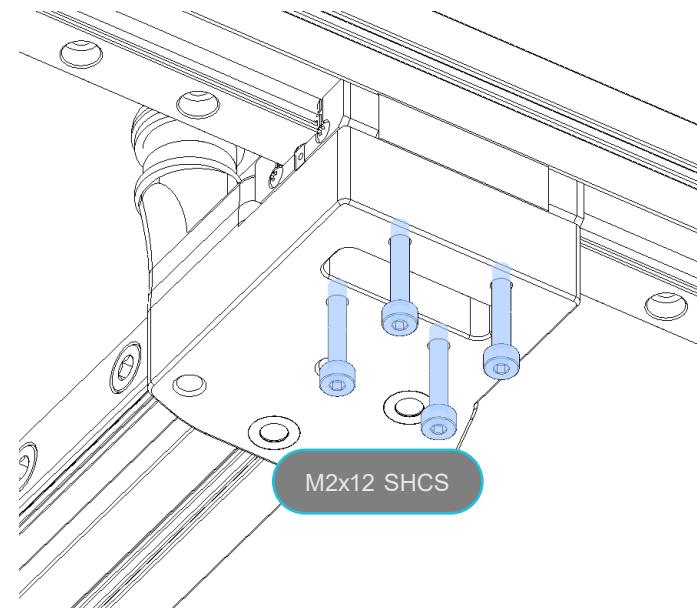
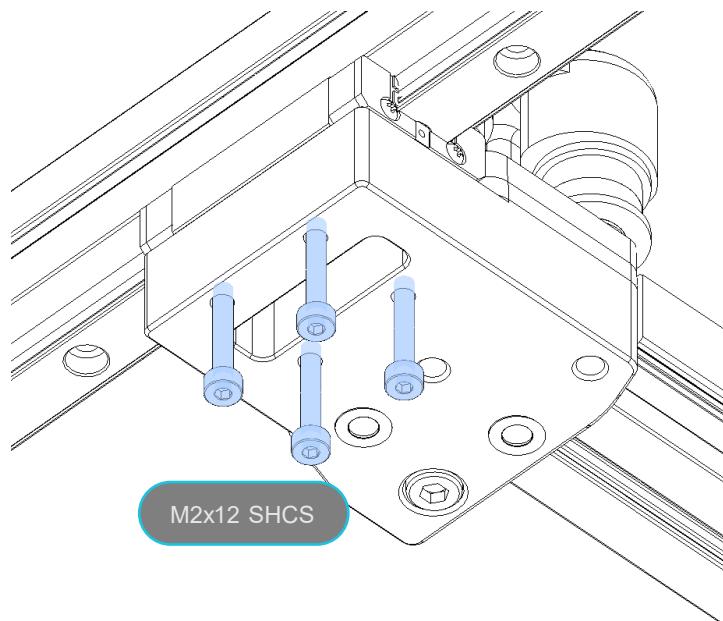
MICRON

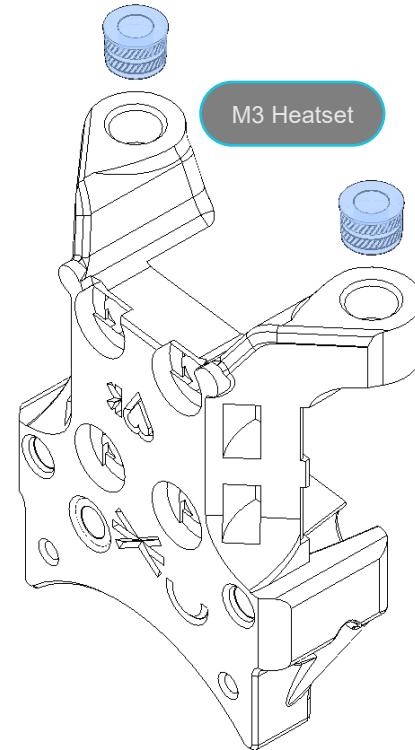
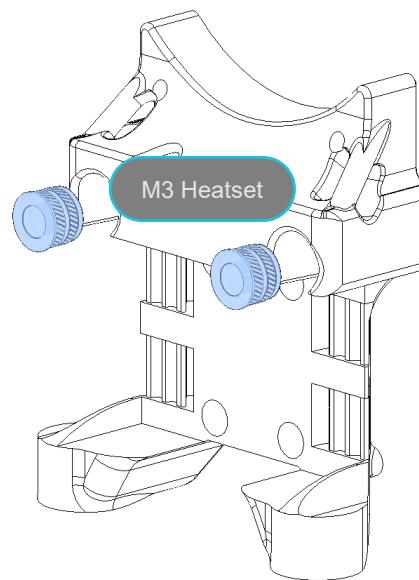
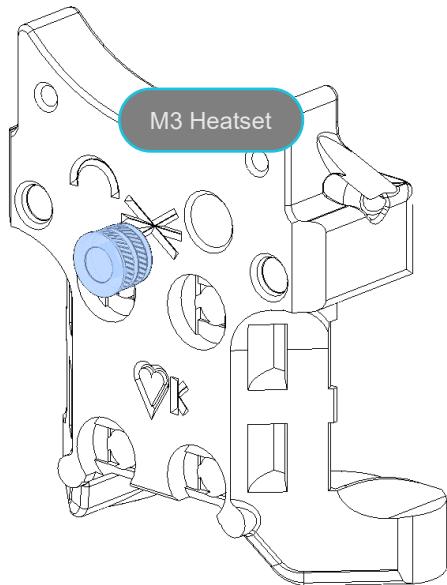




**X Axis installation**

Install the X axis on the Y rails making sure that the mgn9 linear rail is facing forward.



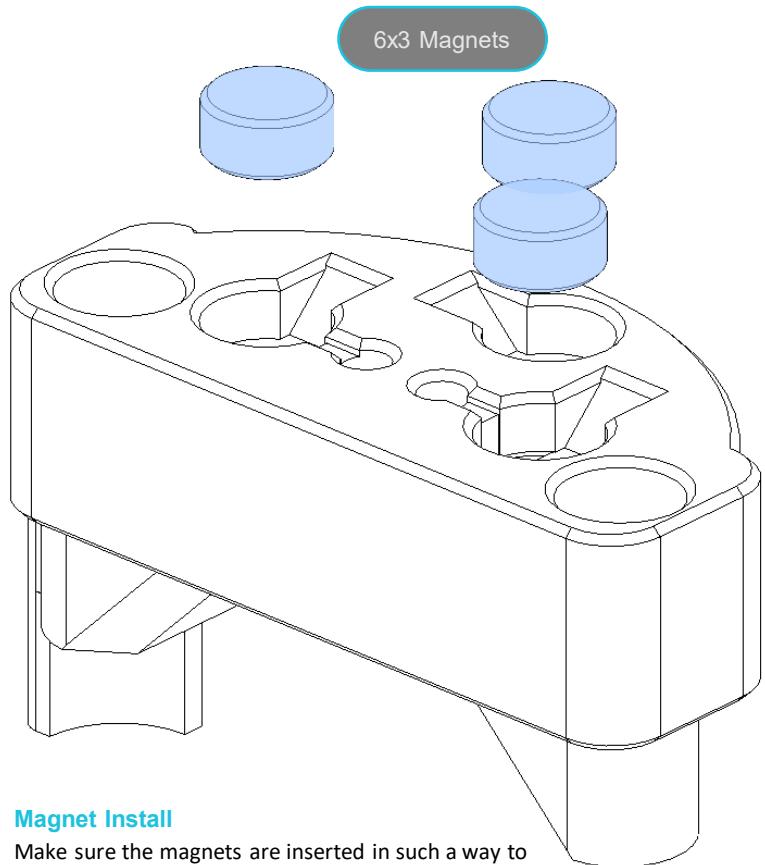


#### Prepare the X Carriage

Prepare the x carriage by inserting the 5 M3 heatsets  
inserts that are needed to attached the toolhead/ probe

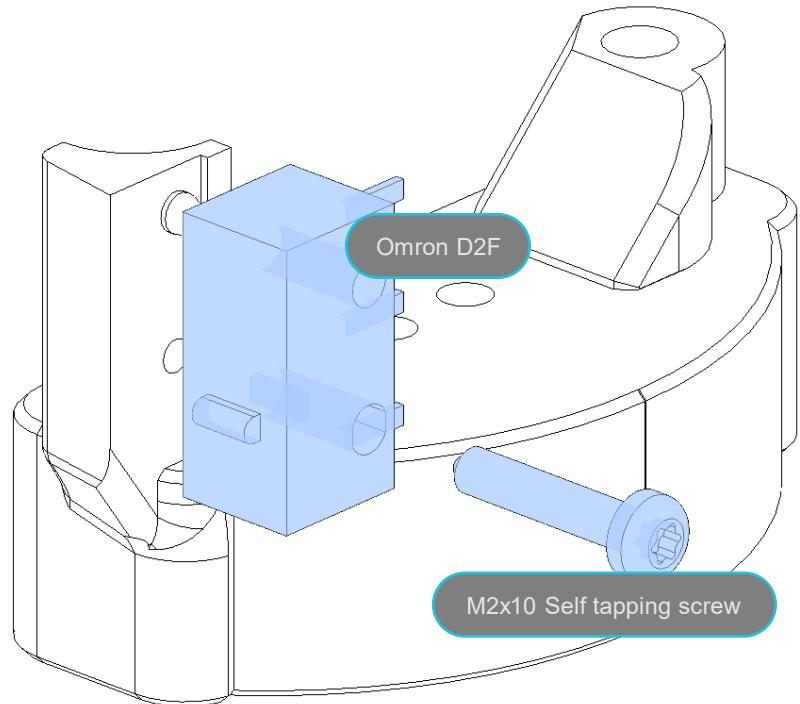
## CARRIAGE PROBE MOUNT

MICRON



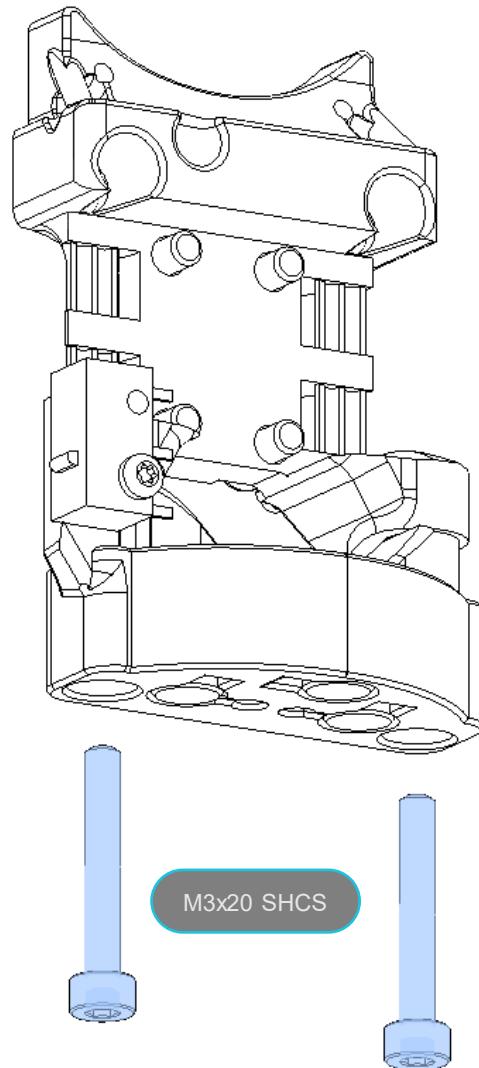
### Magnet Install

Make sure the magnets are inserted in such a way to attract the klicky probe that was assembled on pg 70.



X CARRAIGE PROBE MOUNT ASSEMBLY

MICRON

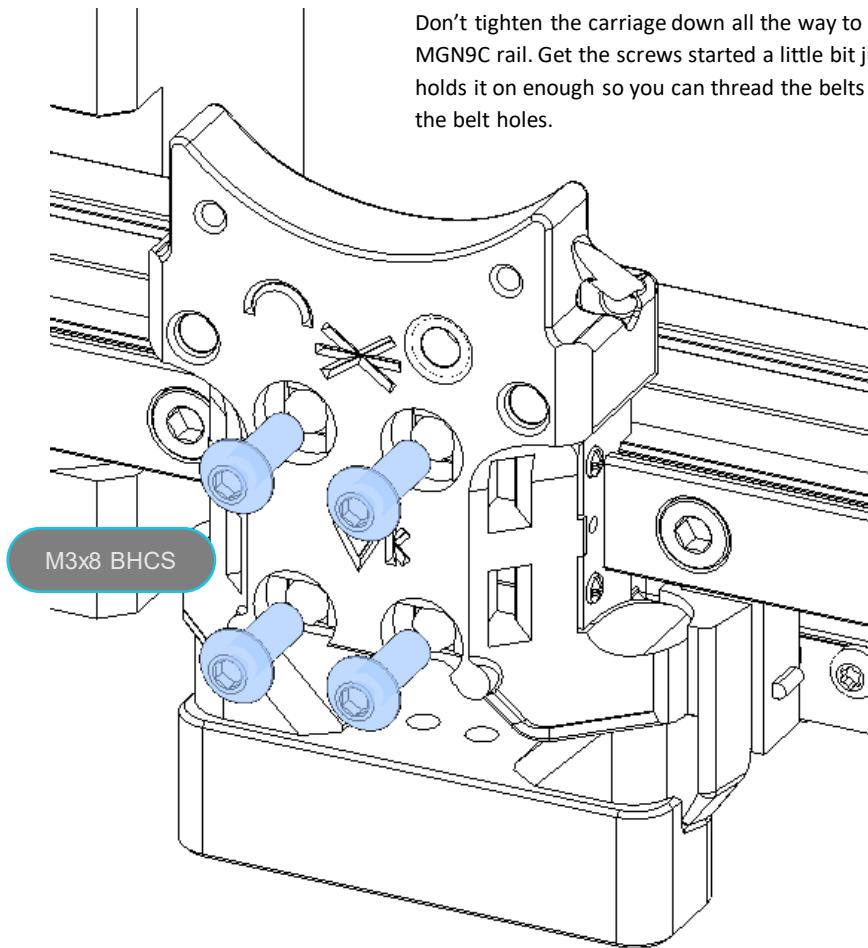


## CARRAIGE MOUNTING

MICRON

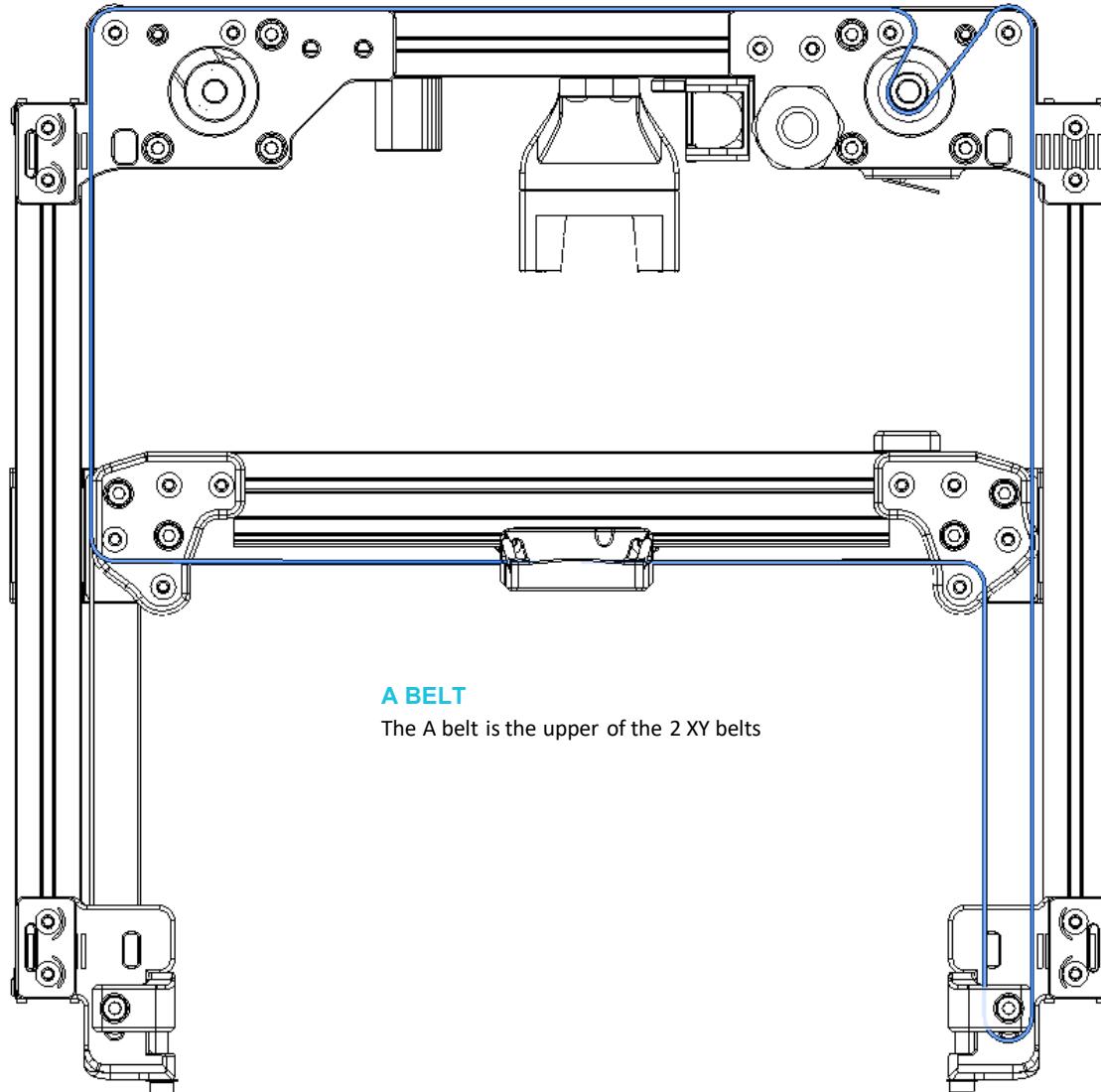
### CARRAIGE MOUNTING

Don't tighten the carriage down all the way to the MGN9C rail. Get the screws started a little bit just so it holds it on enough so you can thread the belts through the belt holes.



A BELT

MICRON

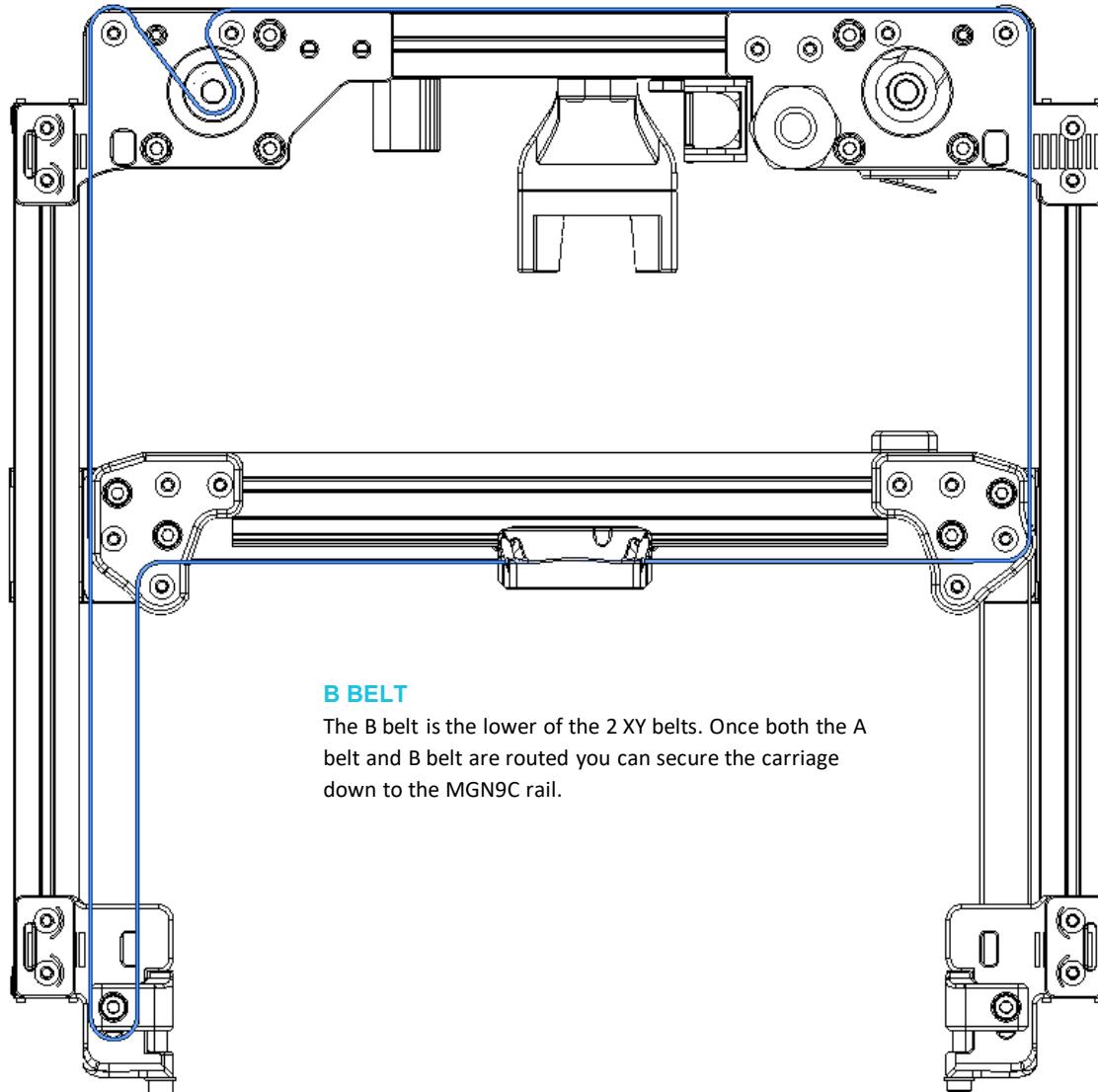


**A BELT**

The A belt is the upper of the 2 XY belts

B BELT

MICRON



**B BELT**

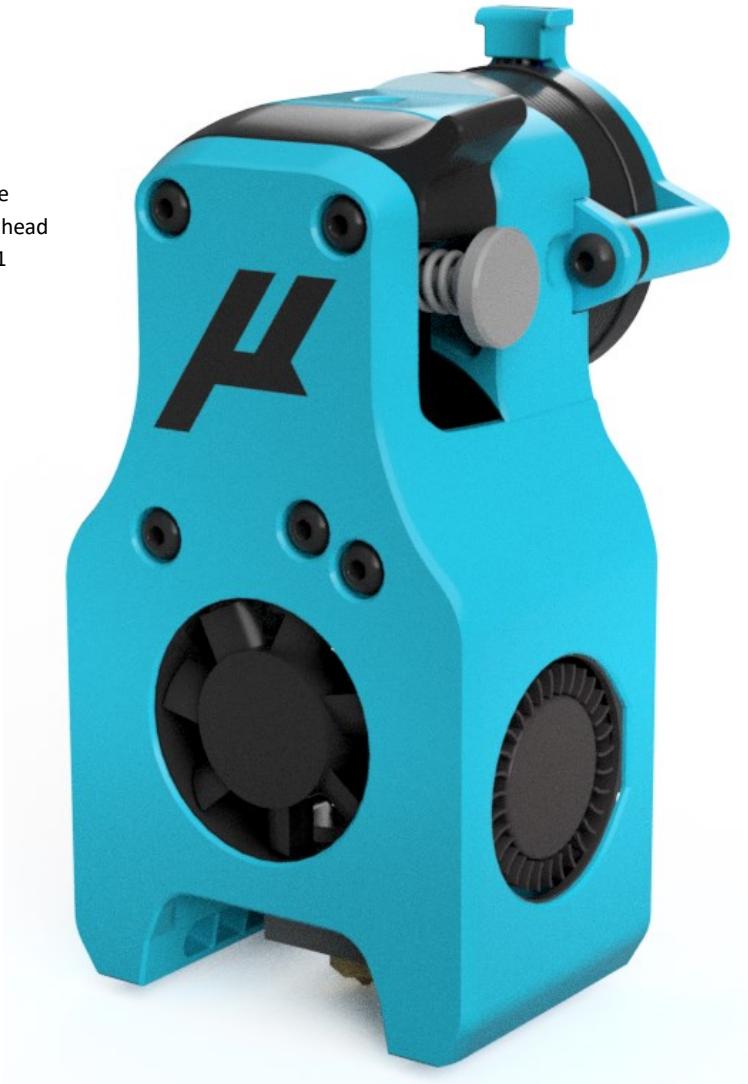
The B belt is the lower of the 2 XY belts. Once both the A belt and B belt are routed you can secure the carriage down to the MGN9C rail.

## MINI AFTERBURNER

MICRON

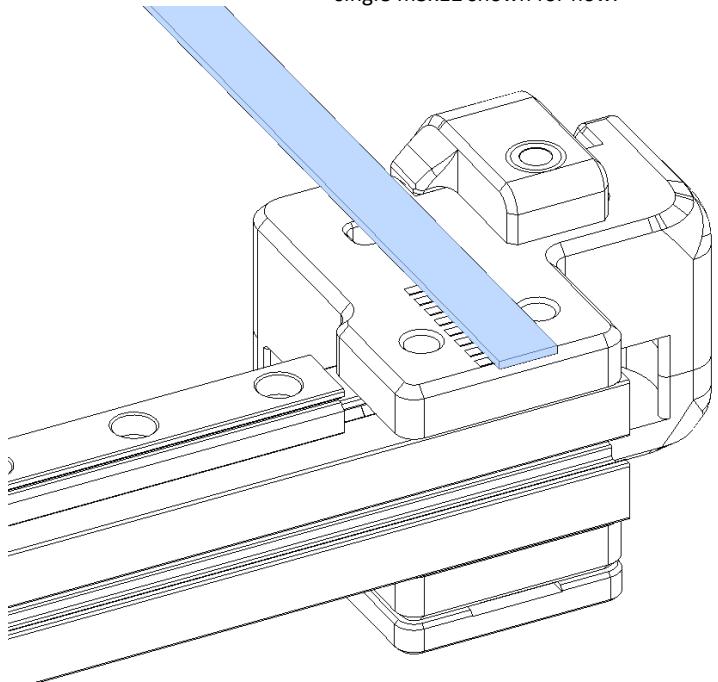
### Mini Afterburner

This manual is not going to go over the assembly of the Mini Afterburner toolhead as that can be found in the Voron V0.1 assembly manual

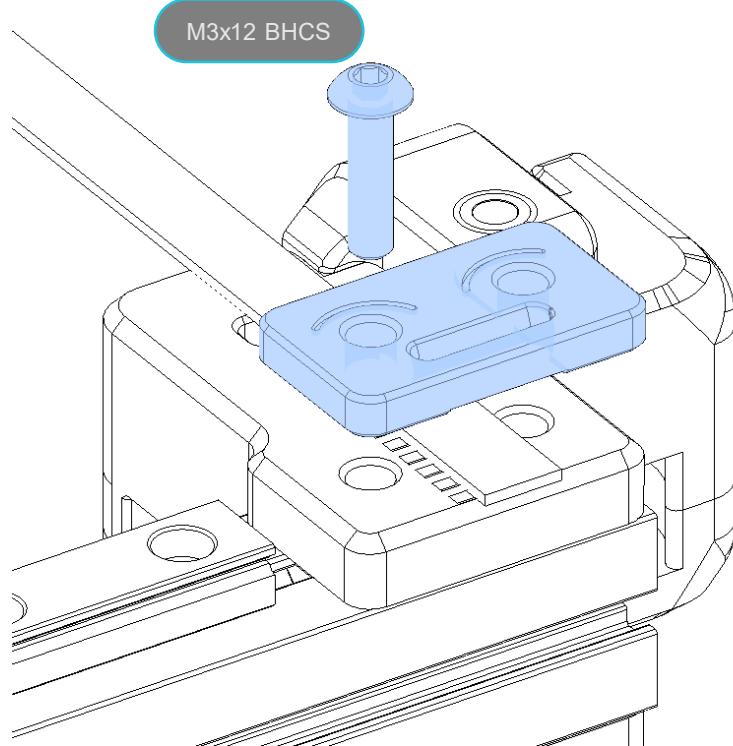


**Z belts**

With the gantry upside down you can now install the lower belt clamps. Using only the single m3x12 shown for now.

**Teeth down**

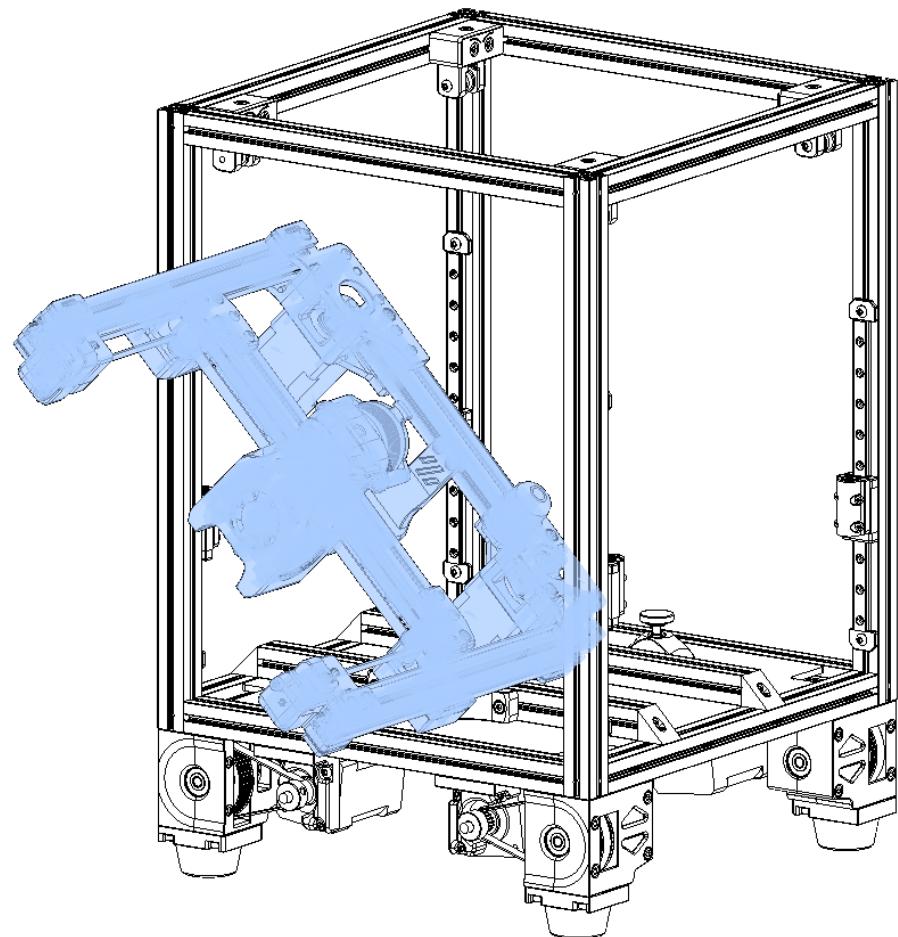
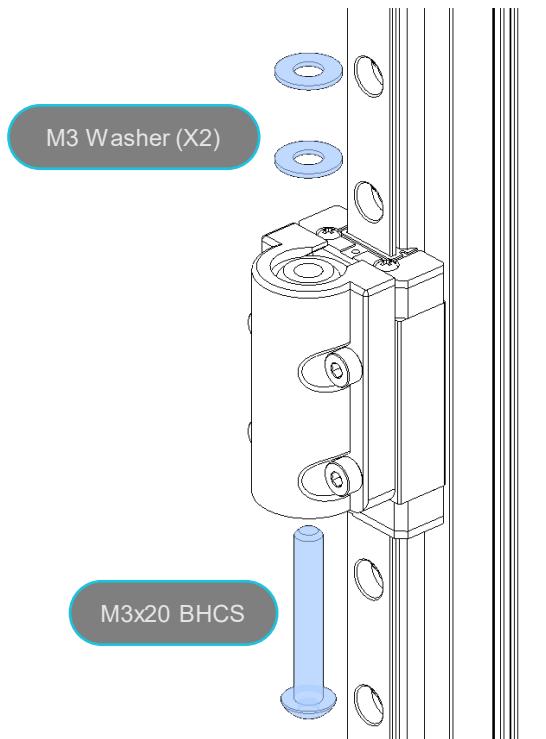
The teeth of the belts will be facing down into the grooves on the printed part



## Z BELTS

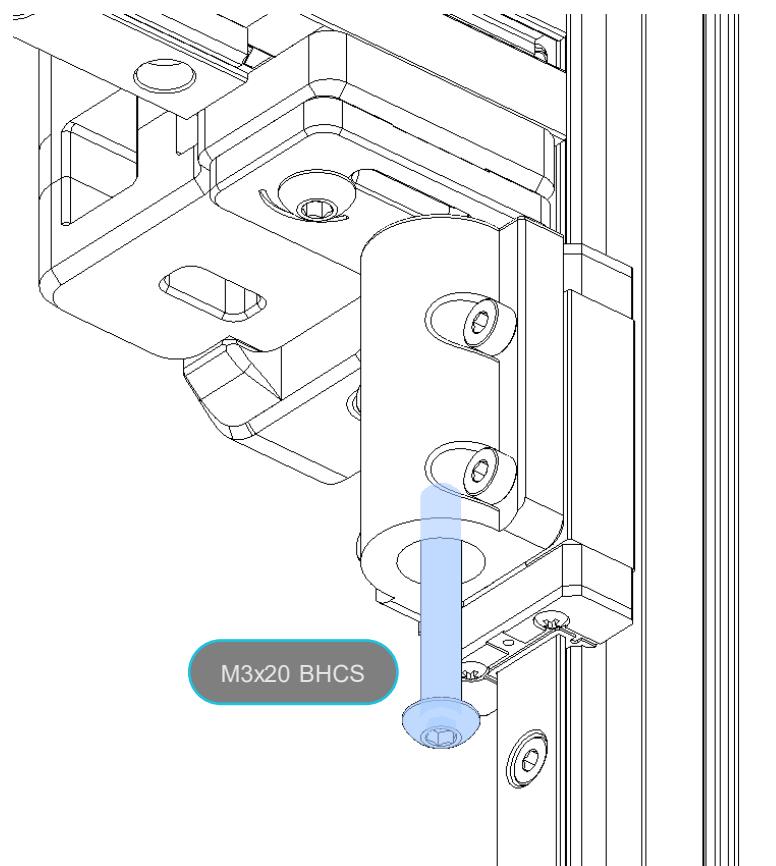
### Z Joints

Insert an M3x20 and 2 M3 washers on to the Z joint in preparation for the gantry.



**Installing Gantry**

Using the M3x20 and attach the gantry to the last remaining hole on the lower belt clamp

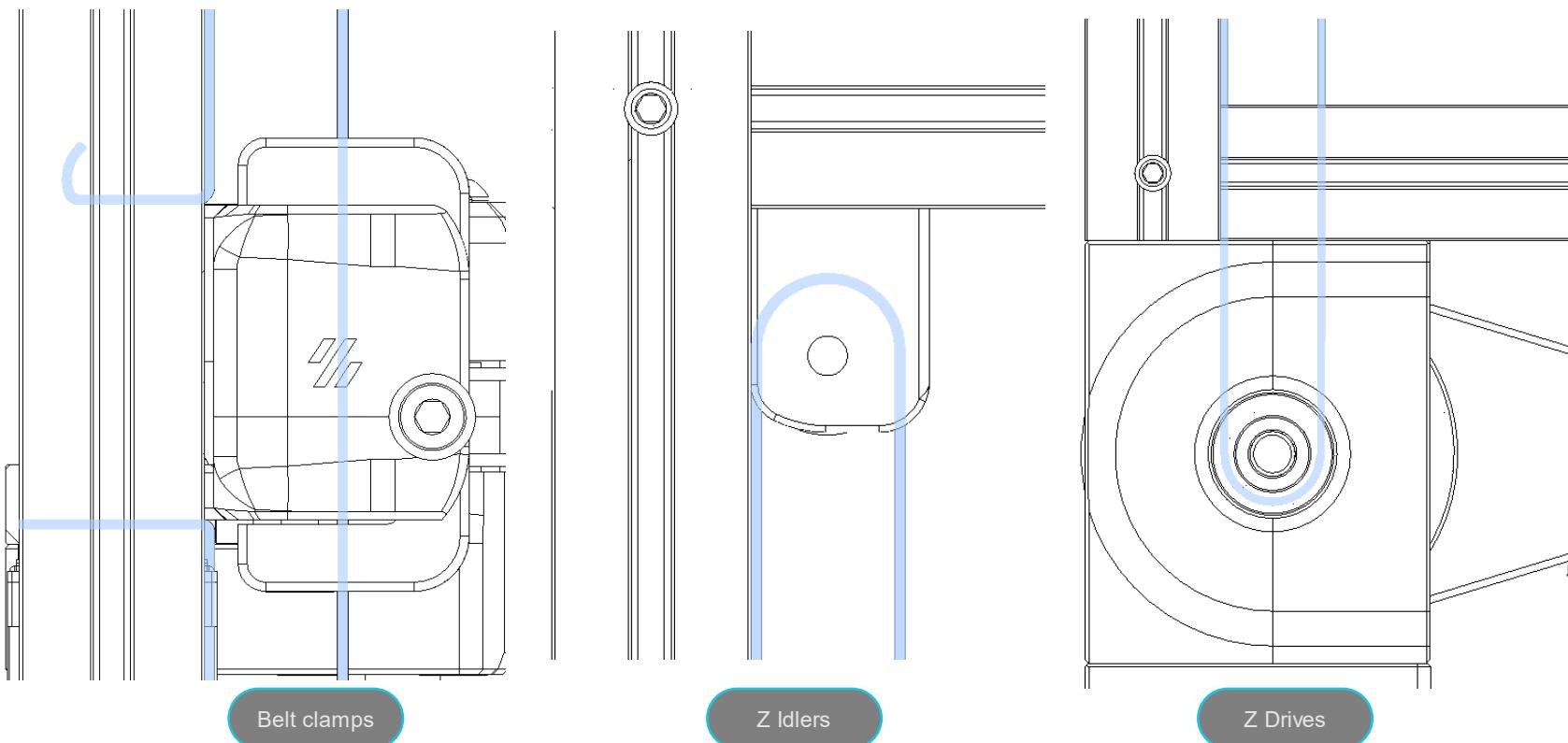


## Z BELTS

MICRON

### Installing Z belts

Since the belt is already attached to the bottom of the idler thread the belt down through the z drive , up through the holes in the gantry and then around the Z idlers. Finally slip it under the top belt clamp and tighten it down. Repeat this process for the last 3 belts.



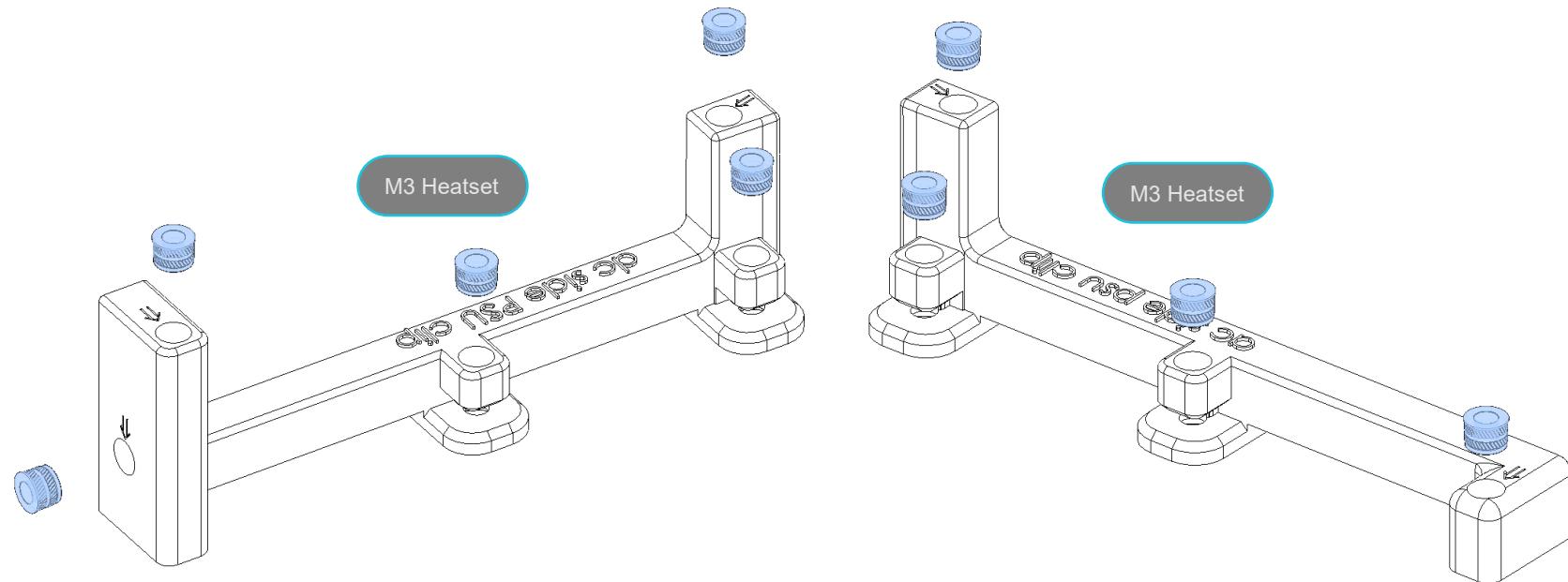
FRAME

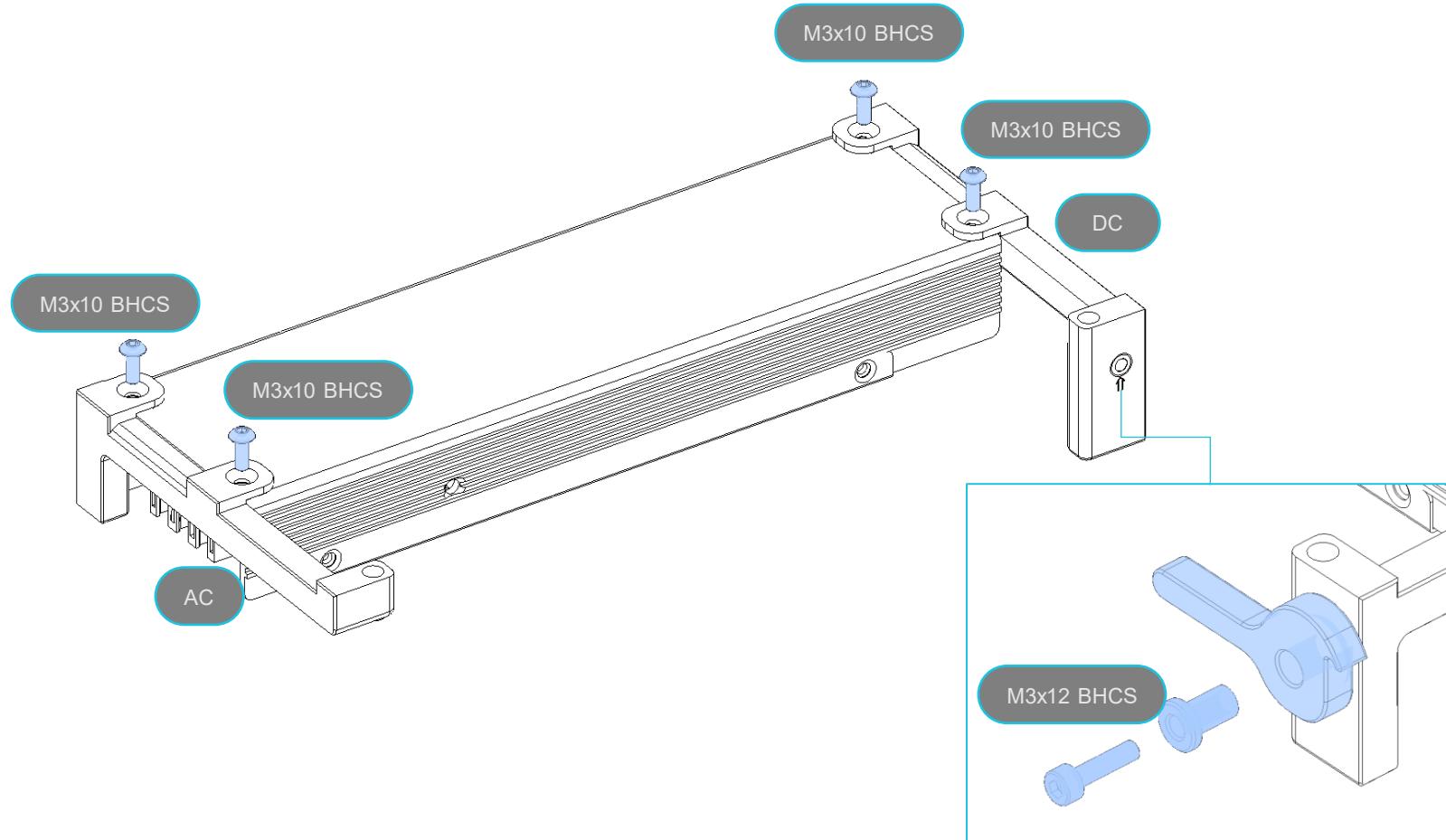
MICRON

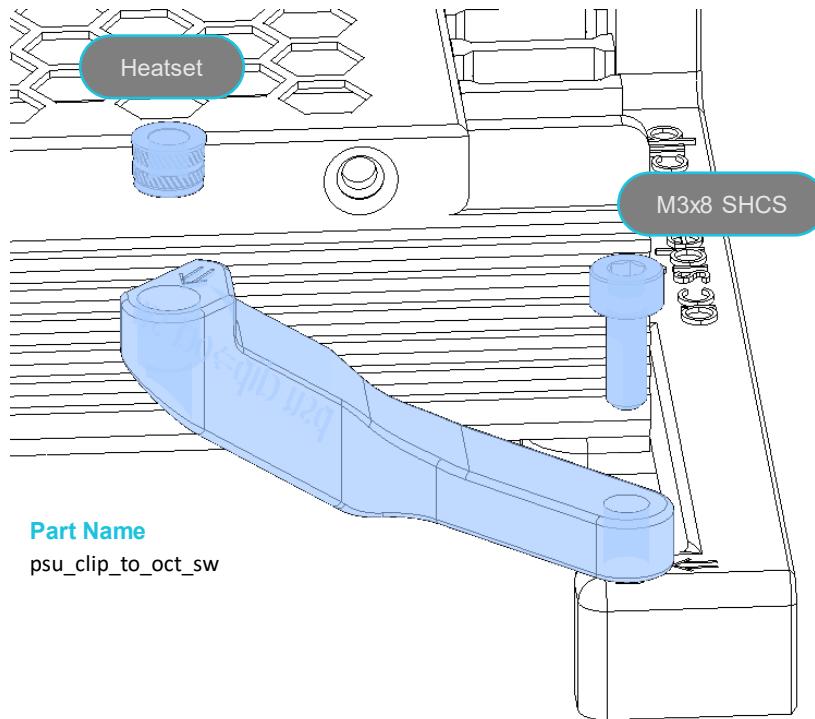


ELECTRONICS

MICRON

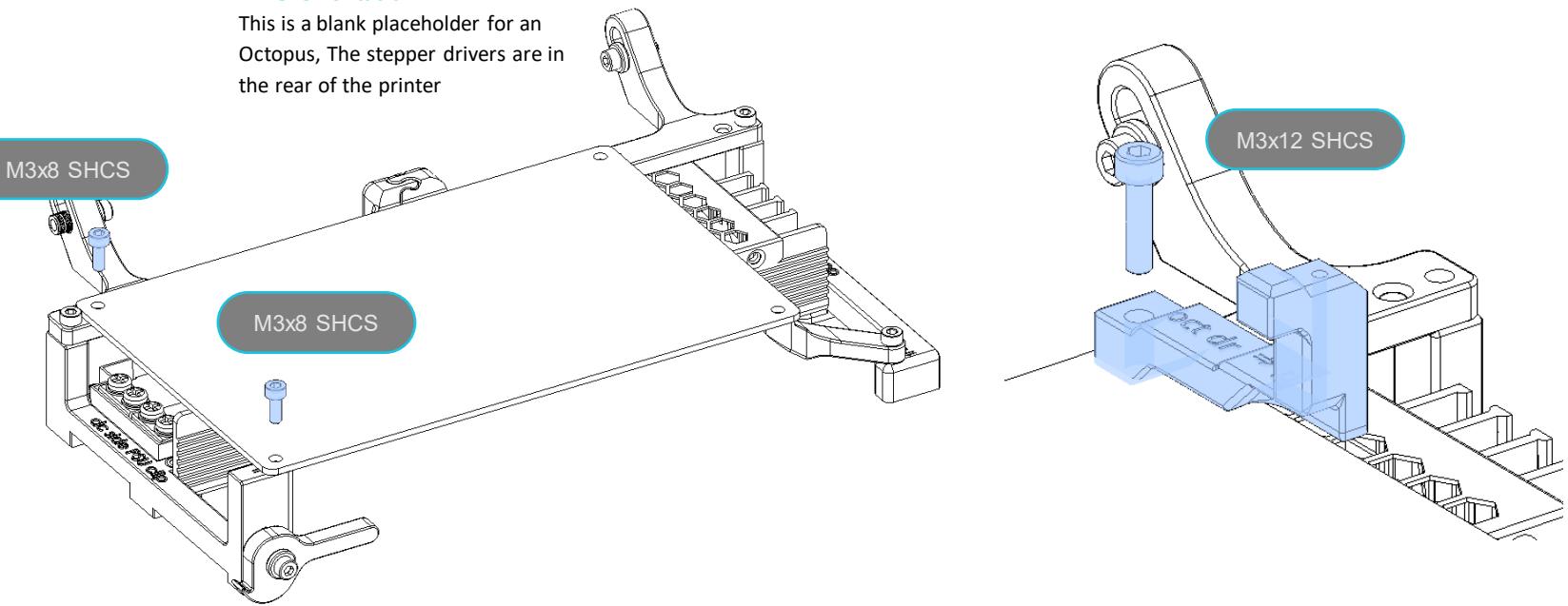






**MCU Orientation**

This is a blank placeholder for an Octopus. The stepper drivers are in the rear of the printer



TEMPLATE

MICRON

TEMPLATE

MICRON